# The Wolf Pack II

## Another Collection Of U-Boat Modelling Articles

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# Introduction

In May 2010 *The Wolf Pack: A Collection Of U-Boat Modelling Articles* (referred herein as the original Wolf Pack collection) was released as a downloadable pdf on the Accurate Model Parts (AMP) website. Included in the collection are a number of articles dealing with various issues of interest to the U-boat modeller. Each of these articles has some connection with Revell's seminal 1/72nd Type VIIC U-boat model kit (RV5015), with some penned specifically to assist AMP customers who have bought our products.

In the past decade there have been three other major 1/72nd scale injection-moulded releases: the Special Navy Type IIA, Revell Type IXC U 505, and a late war (advertised as IXC/40) version of the Revell U 505 kit. These have developed our collective interest into the other two mainstays of the German fleet - the Type II and Type IX - in much the same way that the Revell VIIC did back in 2003. This second collection of U-boat modelling articles continues in the same vein as the first but branches out to the Type IIs and IXCs currently on the market in 1/72nd scale. It also further explores the VIICs in more detail, particular the late war version depicted in Revell's VIIC/41 release.

The method employed here is the same as the first collection, namely researching the modifications made to each variant over time as well as the insignia and paint colours of individual boats. Once again the articles were all written with the modeller (especially the AMP customer) as the target reader. U 505 has been used as a case study due this boat being the subject of the Revell IXC kit. She currently survives as a museum boat in Chicago, meaning that interest in this particular boat will persist over time.

The original intention was to include individual articles on the modifications and vent patterns of the Type VIIA and the Type IX. However, this was deemed unnecessary as the modifications which would have been included can already be found in existing articles ("*Type VII Modifications*" for VIIAs and the U 505 article for IXCs). Additionally, the identification characteristics of both types can be found in the article "*List Of U-Boat Modifications & Identification Features*". This latter article is the product of over a decade and a half of research into U-boat modifications and essentially summarises the bulk of my research. Given that there are presently no published books on the market specifying all the modifications made to Kriegsmarine fleet, it is hoped that the summary tables can at least partly fill the research gap in this area.

Dougie Martindale, March 2018

## Acknowledgements

I would like to thank the following individuals and recognise their contributions to the articles herein -

- Jon Kelly (*Capt Kremin* on AMP forum) for his valued assistance in regard to the U 505 article. Thanks are also due for his Spanish Civil War suggestion and for allowing me to use his U 534 photos.
- My AMP colleague Wink Grisé for sending me the *U-505: Extend The Experience* DVD and all the photos he took when he visited U 505. Furthermore, thanks are due for the use of his U 505 and model photos.
- I would like to extend my gratitude to the late Dani Janer Åkerberg for his excellent work with his website U-Historia.com. There are many detailed articles on this website and I am most grateful to him for translating many of my articles for inclusion in his website. I am also grateful to Dani for suggesting to me that a list of modifications would be useful as this proved to be the stimulus for me to create the summary tables.
- Olaf Krabbenhöft for many informative discussions and several helpful corrections.
- Axel Urbanke of *U-Boot im Focus* for kindly allowing the use of the Type VIIA "U 26" photo.
- Jerry Mason for the wealth of information in his website (http://www.uboatarchive.net), which was of great benefit when researching the U 505 article. Additionally, thanks for advising me on the VII weather balloon hydrogen feature.
- Ernest Roth (*Grief* on AMP forum) for help on *Bold* dates and for kindly agreeing for me to include two of his photos of U 505.
- Ron Keller (*Bad Karma* on AMP forum) for sending me a number of photos of Type IIDs.
- Simon Morris (*NZSnowman* on AMP forum) for assistance with late war VIIC/41 arrangements.
- Glenn Cauley (*GlennCauley* on AMP forum) for assistance with the ammunition containers on the U 505 tower.
- Air Commodore Derek Waller for his informative online article "*U-505 In The US Navy*".
- Keith Gill for his diligent work in restoring and documenting U 505. More than a few enthusiasts were saddened when the former curator moved on to another position.
- My late father, John Martindale, for providing me with the colour video footage of U 505 that has been so useful in trying to decipher the colours during capture.
- My assistant Ellie Martindale for helping me with my typing.
- To all those who have contributed to the AMP forum.

## Spanish translation

Five articles from the original Wolf Pack collection can be found in Spanish at http://www.u-historia.com/ The following four articles from this collection, as listed below, can also be found on this website.

- U 201: Remscheid & The Snowman
  - Spanish title: El U201, Remscheid y el muñeco de nieve
  - Website section: Historia
  - Subsection: Artículos Históricos
  - Translator: Dani J.Åkerberg

- U 505: Modifications, Colours & Insignia
  - Spanish title: U505: Modificaciones, colores y emblemas
  - Website section: Historia
  - Subsection: Artículos Históricos
  - Translators: Dani J.Åkerberg and José Carlos Violat

- List Of U-Boat Modifications & Identification Features
  - Spanish title: Modificaciones aplicadas a los Uboot y caracteristicas identificativas
  - Website section: Técnica
  - Subsection: Artículos Históricos
  - Translator: Dani J.Åkerberg

- Late War Type VIIC & VIIC/41 Configurations
  - Spanish title: Configuraciones de los uboote del Tipo VIIc y VIIc/41 a finales de la Guerra
  - Website section: Historia
  - Subsection: Artículos Históricos
  - Translator: Dani J.Åkerberg

## The SubCommittee Report articles

The SubCommittee Report (SCR) is a magazine published by the SubCommittee, a non-profit organisation who share an interest in submarines, primarily the building of radio-controlled submarine models. Their website can be found at http://www.subcommittee.com/

The article "*U-Boat Waterline Draught Marks*", which is included in this collection, was published in two parts in the following issues -

- U-Boat Waterline Draft Markings Part 1
  - March 2016 (#104) SubCommittee Report

- U-Boat Waterline Draft Markings Part 2
  - June 2016 (#105) SubCommittee Report

# U 201: Remscheid & The Snowman

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## Part I - The Boat

### Introduction

A large number of Kreigsmarine U-boats had insignia painted on their conning towers. The insignia were varied in terms of their origin, meaning and quality. Some were nothing more than hastily prepared sketches (*malings*) which did not adorn the conning towers for long. Other designs (*emblemes*) lasted for numerous patrols. Another type of insignia was the *bootswappen*, which were coat of arms belonging to a German town or city.

One of the most memorable and enduring of *emblemes* is the snowman of U 201. When modellers choose which of the 700 or so Type VII boats they wish to model, the visual impact of the snowman, together with the aesthetics of U 201's wavy camouflage scheme, ensures that U 201 is one of the most popular choices. Alongside U 96 and U 552, it is arguably one of the three most popular VIIC boats. U 201 also displayed two versions of the Remscheid coat of arms (*wappen*), the latter version being present alongside the snowman.

This article discusses the various insignia of U 201 in the hope that it may assist modellers who have purchased a set of decals from Accurate Model Parts. In Part IV, a summary of U 201's insignia and modification dates has been presented in table format; patrol dates are also provided. The modification dates and patrol dates are essential guides for trying to determine when photos of U 201 were taken. Successful dating of period photos can then allow us to establish when the various insignia and features were present on U 201. More details of the modifications - netcutter, breakwater and wind deflector - can be found on pages 80 to 83 of the original Wolf Pack collection.

### U 201

U 201 was a Type VIIC built by the *Friedrich Krupp Germaniawerft A.G.* shipyards in Kiel. Launched on the 7th December 1940, the boat was commissioned into the Kriegsmarine on the 25th January 1941. The boat's first commander, Oberleutnant zur See Adalbert "Adi" Schnee, had previously commanded U 6, U 60 and U 121, all Type IIs of various variants. Schnee would command U 201 for seven patrols, during which his tally of enemy shipping steadily mounted. Some important milestones in Schnee's naval career are listed below -

- 30th August 1941 Knights Cross
- 1st March 1942 Promotion to Kapitänleutnant
- 15th July 1942 Knights Cross with Oak Leaves
- 1st December 1944 Promotion to Korvettenkapitän

In the boat's first seven patrols, Schnee sank 21 ships and damaged another two ships. His very successful seventh patrol - in which he sank 41,036 tons - saw him awarded the Knights Cross with Oak Leaves. He then left the boat to take up a shore position on the BdU staff. Near the end of the war he returned to operational duties, commanding the Type XXI U 2511. U 2511 and U 3008 were the only two Type XXIs to undertake a war patrol. Schnee's patrol started on the 3rd May 1945 and ended, due to the German capitulation, three days later on the 6th May 1945. Just after the cease fire orders were issued on the 4th May, Schnee conducted a simulated attack on the London-class heavy cruiser HMS *Norfolk* before successfully evading the escorting destroyers. One of the most popular commanders, "Adi" Schnee survived the war.

The second and final commander of U 201 was Günther Rosenberg, who sank three ships during the boat's eighth patrol. By the time U 201 sailed on her ninth war patrol in January 1943, the boat had sunk 24 ships of 109,055 tons and damaged 2 ships of 13,386 tons. There would be no further successes. On the 17th February 1943, U 201 was located by HF/DF, then depth charged to the surface by the destroyer HMS *Viscount* near ONS.165 (at 50°36N/41°07W - 480 miles east-north-east of St. Johns in Canada). All 49 crewmembers were killed when the U-boat was sunk.

# Part II - Remscheid Coat Of Arms

## The Remscheid coat of arms

One very popular practice concerning U-boat insignia was the adoption of civic heraldry. Many German towns and cities sponsored individual U-boats, contributing money towards their construction. In this scheme - known as *patenschaft* - the boat would have the city's crest painted, or mounted on a shield, on the tower. The crew would often have an association with the city, sometimes even visiting the city during a period of leave. According to a list in Georg Högel's update booklet *Embleme Wappen Malings: Deutscher U-Boote von 1939-1945*, at least 137 U-boats sported *bootswappen* via the *patenschaft* scheme.

Most of the boats in the series of twelve boats following U 201 were sponsored by towns or cities. U 201 had the crest of Remscheid on her tower, indicating that the boat was sponsored by that city. Situated to the south side of the Ruhr, Remscheid was heavily damaged in July 1943 by Allied bombing. The main industries in the town at that time were mechanical engineering and tool-making. Many U-boat men had previous engineering skills, so the adoption of a city with such an industrial background is quite fitting.

According to the Heraldry of the World website, the arms of Remscheid were officially granted on the 18th February 1854. This website further states -

*"Remscheid became a city in 1808 and the arms were based on a seal from 1556, and show in the upper part the lion of the Counts of Berg, who ruled the area in the 16th century. The sickle represents the speciality of the local forges, who were well known in a wide area. The arms were granted with a mural crown, a Prussian eagle behind the shield and a forger and his assistant as supporters. The supporters were removed before 1914, the Prussian eagle after 1918 and the crown around 1930."*

Right (HER-1939): A drawing of the former coat of arms of Remscheid - dated 1939 - from the Heraldry Of The World website (http://www.ngw.nl/int/dld/r/remschei.htm).

In this 1939 drawing (HER-1939), there is a forger and assistant, a parapet and a Prussian eagle with crown. In the top half of shield there is a red lion upon a pale blue background; in the lower half there is a sickle (light blue blade and brown handle) upon a medium blue background.

The same website also includes a drawing of the current Remscheid coat of arms (HER-PRESENT). The top half of this coat of arms includes a red lion upon a silver background; the lower half shows a sickle (silver blade and yellow handle) upon a light to medium blue background. Note that several of the features of the 1939 version - yellow brick parapet, eagle, forger and assistant - are absent from this present version.

Above (HER-PRESENT): The current coat of arms of Remscheid is a simplified version, without several features of the 1939 version.

**Remscheid early version (REM-E)**

Now that we know a little of the background of the Remscheid coat of arms we can discuss the shield insignia on U 201. There were in fact two distinct versions of the shield upon Schnee's boat. We shall use the codes REM-E for the early version and REM-L for the late version.

The early version of U 201's Remscheid shield (REM-E) is very similar to the current coat of arms, as seen in the artwork HER-PRESENT above. The most immediate difference is the presence of the parapet, which may be a throwback to the 1939 coat of arms.

Left (A1): The first version of Remscheid shield REM-E - as found on U 201 in July 1941. This design includes a *parapet*. Situated at the top of a castle, a parapet is a wall-like barrier with a sawtooth shaped top. Another name for the parapet is a *crenelation*; this consists of high areas called *merlons* and low areas called *crenels*.

Right (AMP1): The AMP drawing of REM-E. There is just enough detail in photo A1 to discern five merlons and four crenels on each of the three towers; this detail has been incorporated into the AMP design.

The following colours were used in the AMP design for REM-E –

Parapet - Although the parapet in the 1939 arms is brick yellow, this is clearly not the case on REM-E. In the black and white photo A1, the parapet looks the same shade as the red lion so red was incorporated into the AMP drawing. Some darker red was used to provide depth to the drawing.

Sickle blade and lion background - The definitive work on U-boat insignia is *U-Boat Emblems Of World War II 1939-1945* by Georg Högel. Högel asserts that the following colours were used - "red half lion on silver field, silver buckle on blue field". The "buckle" refers to a sickle - a tool with a curved handle used for harvesting crops. In photo A1, the sickle blade matches the background around the lion, which is reportedly silver. Accordingly, silver was used for both the blade and the lion background in the AMP version.

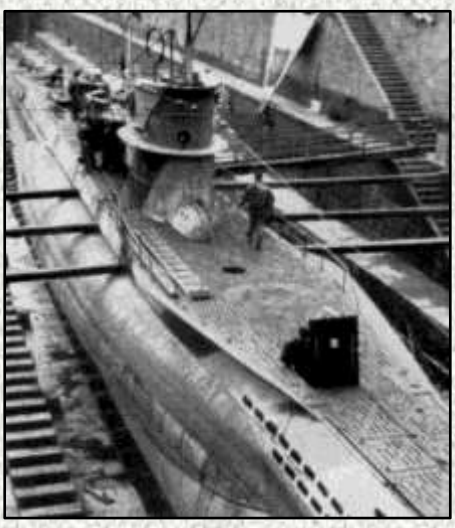
Sickle handle - The colour of the sickle handle is yellow in HER-PRESENT. However, in photo A1 the handle is much too dark for yellow. Dark brown was chosen for sickle handle in the AMP

version for two reasons. Firstly, the handle would likely have been made of wood; and secondly brown is the colour used in the 1939 version (HER-1939).

Lower half of shield - If we look closely at photo A1, we can see that the red lion is darker than the blue field below. This suggests that the blue field was a light to medium blue shade.

Right (A2): U 201 in a Lorient dry-dock after patrol 1. Note that the 88mm has been removed for maintenance. The breakwaters are still in place but would soon be removed. The netcutter had probably been removed by this stage.

Below (A3): U 201 before leaving Lorient on patrol 2 on the 8th June 1941. The breakwaters have been newly removed, replaced by a semi-circular line of 26 evenly-spaced holes of variable size.



Below left (A4): Taken moments after photo A3, this shows the freshly painted U 201 on the 8th June 1941. We are now afforded a glimpse of REM-E; an identical shield was present in the same position on the port side of the tower.

Below (A5): Adalbert Schnee returns U 201 from patrol 2 on the 19th July 1941. The exact size and position of REM-E can be determined using this photo. The wind deflector flange has not yet been fitted to U 201 at this time.

Many U-boat insignia were merely painted onto the towers. However, on some boats a real shield - either wood or metal - was fixed to the tower. The early Remscheid insignia looks to have been a thin shield mounted upon the tower side.

It is unclear when U 201 first sported the Remscheid coat of arms. There is one photo of the boat on her commissioning day on the 25th January 1941. Unfortunately the front of the tower is not shown on this photo; as such it is unclear whether version 1 was present when the boat was commissioned. As a point of interest, it appears the boat did not yet sport her distinctive wavy camouflage pattern when commissioned.

U 201 did have a camouflage pattern, and REM-E, during her first war patrol. This can established by photo A2, which shows the boat in a Lorient dry-dock between patrol 1 and patrol 2. The boat is clearly painted in a camouflage pattern at this point, heavily weathered during the rigour of the boat's first patrol. What is harder to distinguish is the presence of REM-E, but it *can* just be discerned on the tower.

## Remscheid late version (REM-L)

Towards the latter half of 1941, a new improved shield (REM-L) was introduced. The two smaller shields (REM-E) were removed in favour of one larger shield in the centre of the tower.

REM-L was a more professional rendition of the Remscheid shield, incorporating a wealth of raised 3D detail. The parapet, lion, sickle handle and sickle blade were all depicted in raised detail. New features such as defined edges and a brick pattern also featured in raised detail.

Left (A6a): Our next photo of U 201 shows the boat a little later, probably around the autumn of 1941, with REM-L mounted in a central location. A number of slogans were added to the tower, most likely during the course of a patrol.

Left (A6b): The slight curve in REM-L can be discerned. Some of the 3D elements - the parapet, lion and sickle blade - are all evident. Three mounting brackets - one on either side of the shield and another at the base - can also be seen. Four bolt heads are also visible - two around the top of the lion and one either side of the sickle handle.

Right (AMP2): The AMP drawing of REM-L. Note the three rectangular mounting brackets have been included. Some shadows were incorporated into the design (including the lion) to help produce a more realistic decal.

The following colours were used in the AMP design for REM-L -

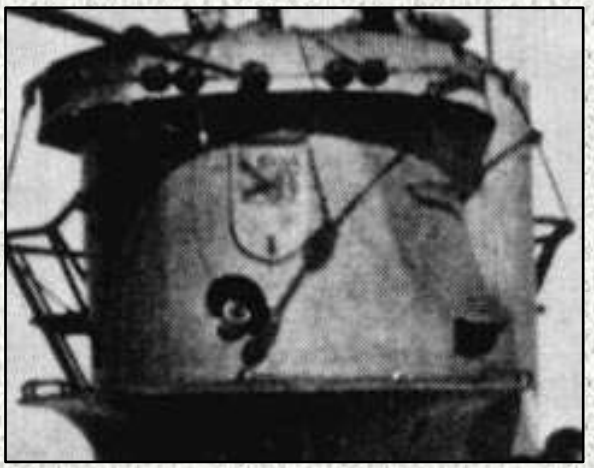
Parapet - In photo A6b, the shade of the parapet looks identical to the shade of the red lion. Once again red was chosen for the parapet.

Sickle blade and lion background - As with REM-E, silver was used as the colour of the sickle blade and the background of the lion.

Sickle handle - Dark brown once again.

Lower half of shield - The area behind the sickle is much lighter on REM-L than on REM-E. Indeed, in photo A6b it can be seen that this area is very light in shade. A very light blue was

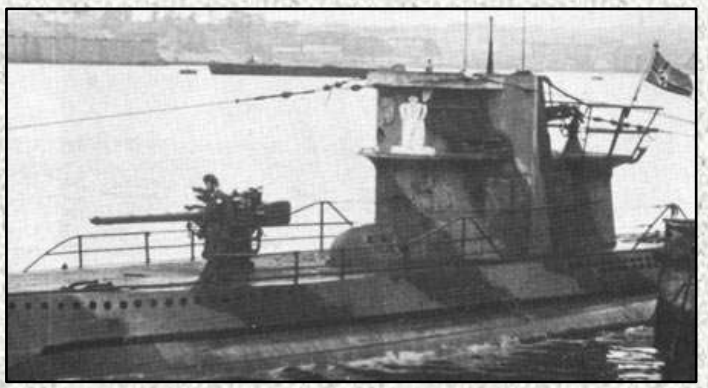
initially considered for the AMP decals. However blue was not chosen for two reasons. Firstly, it would have to be a very pale blue to have matched the shade in photo A6b. Secondly, the raised detail appears to depict brickwork, and blue tends not to be a colour used for bricks. In the 1939 coat of arms a pale yellow brick colour was used for the parapet bricks. Considering these reasons, pale yellow was used for the brickwork on the decals for REM-L.



Right (A7): Taken at some stage after photo A6, possibly in late 1941, we can see REM-L in the centre of the tower. This photo allows us to gauge the size - a much larger shield than REM-E. The wind deflector flange is now present at the top of the tower.

# Part III - Schnee & The Snowman

## Snowman version 1 (SNOW-V1)



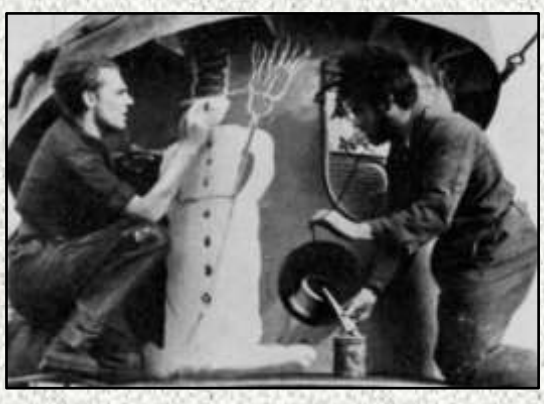
Above (A8): U 201 returns to Brest on the 21st May 1942. At this time version 1 of the snowman (SNOW-V1) was in place on both sides of the tower. The Remscheid shield (REM-L) remained in place in the centre of the tower.

On many occasions U-boat sported personal insignia in addition to *patenschaft* or flotilla insignia. The Remscheid shield was clearly a *patenschaft* insignia, belonging to the boat rather than her commander. At some point midway in her career - perhaps late in 1941 or even early in 1942 - a personal insignia belonging to the boat's commander Adalbert Schnee was introduced. This consisted of a snowman figure painted on both sides of the tower. The snowman quite obviously derived from the commander's surname Schnee, which is German for "snow". Note there were at least two distinct versions of the snowman; these will be referred to as SNOW-V1 and SNOW-V2, for versions 1 and 2 respectively.

Photo A8 shows the boat returning from patrol 6. In photo A9 overleaf, two crewmen are in the process of painting version 1 (SNOW-V1) of the snowman; they may be applying the snowman from scratch or they may be re-touching features of an existing snowman. Close examination of photos A8 and A9 reveal two differences. In photo A8, the edges of the coat are straight and the broom is fully white. However, in photo A9 the edges of the coat are wavy, and only white lines are present on the broom.

When designing the AMP decals, we had to decide whether to draw SNOW-V1 as it appears in photo A8 or as it appears in photo A9. We opted for photo A8, which shows the boat returning from patrol 6 on the 21st May 1942, since it provides definitive proof that the straight coat edges and full white broom was definitely used upon U 201 at this time. Photo A9 was not used as it may show an in-progress shot of SNOW-V1 - the two crewmen may have painted a full white broom in the hour following the moment the photo was taken.

Note that the broom is over the right hand shoulder in both photo A8 and photo A9. When we consider that photo A8 shows the port snowman, and photo A9 shows the starboard snowman, it follows that the two snowmen were *not symmetrical* - the broom must have been *over the right hand shoulder on both sides*. This is why the AMP design for SNOW-V1 has both port and starboard versions with the broom over the right shoulder.



Above (A9): Two crewmen bringing the early snowman to life. They may have painted the entire snowman or are possibly touching up some of the features of an existing design. Note the broom and hat both extend to the same height as the supports for the wind deflector flange.

Left (AMP3): The AMP drawing of the early snowman on the starboard side. There are no obvious clues as to exactly when the snowman was first introduced to U 201. The dates when each version of the Remscheid shield and snowmen was present on U 201 are covered in Part IV: Patrol & Combination Dates.

## Snowman version 2 (SNOW-V2)

Significant numbers of freshly painted U-boats leaving on patrol indicate the likelihood that U-boats were often fully repainted in dry-dock following the end of a war patrol. A full repaint was particularly likely if boats had been to sea for many weeks. When repainting occurred, the insignia would often have to be repainted from scratch or touched up. The snorting bull of U 47 provides us with valuable insight into this practice: the bull was repainted after *each* patrol, resulting in numerous versions throughout the boat's career.

With such a practice, it is not surprising that we find a different version of the snowman (SNOW-V2) present on the tower on patrol 7. Photos of the boat returning to Brest at the end of patrol 7 show two differences to the previous version: the hat was now fully black and there was now no black belt around the waist.

Below (A10): U 201 returns to Brest on the 8th August 1942. A lifebelt from one victim is hanging in celebration from the forward jumping wire. The inscription "HMS T137" reveals that the lifebelt originated from the 545-ton trawler HMS *Laertes*, sunk by U 201 on the 25th July 1942.

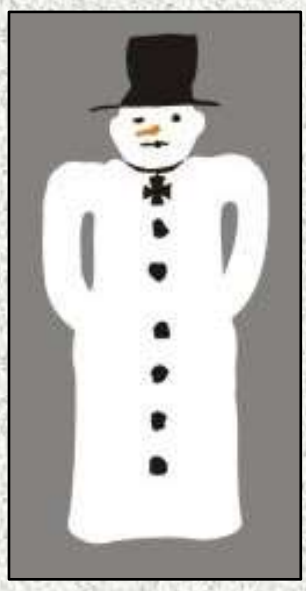
Another obvious difference occurs at the snowman's feet. In SNOW-V1 there was a large white area extending down to the spray deflector - this may be the snowman's feet or perhaps melted snow. The feet/melted snow feature is not present in SNOW-V2. Modellers should note the position of SNOW-V2 - there was a significant gap between the bottom of the snowman and the spray deflector.

The port and starboard versions, being painted by hand rather than stencil, were not identical. With this in mind, the port and starboard snowmen on the AMP decals have been purposefully drawn with some minor differences. Modellers should be aware that the starboard version has five black buttons and a carrot nose pointing to the right, whereas the port version has six coat buttons and a nose pointing to the left. One of the buttons on the starboard snowman may have disappeared due to weathering during the patrol.

During patrol 7 - Adalbert Schnee's final and most successful patrol - he was awarded the coveted Knight's Cross with Oakleaves (*Ritterkreuz des Eisernen Kreuzes mit Eichenlaub*). The award, bestowed upon him on the 15th July 1942, was a real cause of celebration for his crew. Consequently, when the boat entered Brest at the end of the patrol, real leaves were placed around the tower bulwark and at the top of the attack periscope housing.

Above (A11): Adalbert Schnee returns U 201 from a war patrol for the seventh and final time. With the leaves around the tower, the victory pennants flying, the later version of the Remscheid shield (REM-L), the later version of the snowman (SNOW-V2), and Schnee's recent prestigious award, this is an ideal time to depict U 201.

Below (AMP4): The AMP drawing of SNOW-V2 on the port side. Note that the starboard version has a carrot nose pointing to the right while the port snowman's nose points to the left.



On SNOW-V2, a cross is present around the neck of the snowman. This is clearly a reference to the Knight's Cross award, which was worn on a ribbon tied around commanders' necks. However, it appears that the cross around SNOW-V2 was not to celebrate Schnee's Knight's Cross award, which he received almost a year earlier (30th August 1941). The snowman's cross, newly introduced during patrol 7 in 1942, must have been added to celebrate his Knight's Cross with Oakleaves, which was awarded on the 15th July 1942.

Modellers who are depicting U 201 during the early stages of patrol 7 should be aware that the cross around the snowman was probably not present *before* the crew were informed that their commander was to be awarded the oakleaves. The application of white paint over the snowman's cross would ensure historical accuracy in this case.

The white flags flying from the attack periscope are victory pennant flags (*erfolgswimpeln*). A popular way for U-boatmen to celebrate their successes, they were commonly found hanging in a line from the extended attack periscope to the tower railings of returning U-boats. The victory pennants have been added in 1/72nd scale to the AMP flag range (DK-UBPEN-072).

**Günther Rosenberg**

Following the departure of the original skipper to a shore position, U 201 was next commanded by Kapitänleutnant Günther Rosenberg. Although Rosenberg had previously commanded the VIIC U 351, his first opportunity to command a war patrol came in September 1942, when he took U 201 on her penultimate patrol (patrol 8). The ninth patrol, with Rosenberg again in command, would be the final patrol of U 201.

The photos of U 201 in common circulation all show the boat under the command of Schnee. As such it is impossible to ascertain what insignia was present upon the boat during the latter stages of the boat's career, when Rosenberg was in command. It is not even clear if the camouflage scheme was retained upon the boat.

It is likely that the Remscheid shield would have been retained when Rosenberg commanded U 201. As part of the ongoing *patenschaft* scheme, the shield belonged to the boat rather than a commander. There would be no reason for Rosenberg to discard this very well designed 3D shield, especially considering the time and materials that must have been required to produce it.

The question of whether the snowman was retained has quite different considerations. Many commanders removed the personal insignia of their predecessors in order to assert their own personality upon the boat and the crew. The large imposing snowman was a uniquely *personal* reminder of the previous incumbent, who had enjoyed such great success with the boat. Many men in Rosenberg's shoes would have removed the snowman insignia. This is, of course, mere speculation, offered solely due to the absence of any real evidence. Unless photos showing the boat under Rosenberg's stewardship become available, we will not be able to determine if the snowman was retained during the last two patrols.

# Part IV - Patrol & Combination Dates

### U 201 patrol dates

| Patrol | Departure | | Arrival | |
|---|---|---|---|---|
| 1 | 22/04/41 | Kiel | 18/05/41 | Lorient |
| 2 | 08/06/41 | Lorient | 19/07/41 | Brest |
| 3 | 14/08/41 | Brest | 25/08/41 | Brest |
| 4 | 14/09/41 | Brest | 30/09/41 | Brest |
| 5 | 29/10/41 | Brest | 09/12/41 | Brest |
| 6 | 24/03/42 | Brest | 21/05/42 | Brest |
| 7 | 27/06/42 | Brest | 08/08/42 | Brest |
| 8 | 06/09/42 | Brest | 26/10/42 | Brest |
| Sortie | 27/12/42 | Brest | 29/12/42 | Brest |
| 9 | 03/01/43 | Brest | - | - |

### U 201 combination dates

| Combination | Net-cutter | Break-waters | Wind deflector | REM E | REM L | SNOW V1 | SNOW V2 |
|---|---|---|---|---|---|---|---|
| Combination A | Yes | Yes | No | ? | No | No | No |
| Combination B | No* | Yes | No | Yes | No | No | No |
| Combination C | No | No | No | Yes | No | No | No |
| Combination D | No | No | No | No | Yes | No | No |
| Combination E | No | No | Yes | No | Yes | No | No |
| Combination F | No | No | Yes | No | Yes | Yes | No |
| Combination G | No | No | Yes | No | Yes | No | Yes |

* The absence of the net cutter on the 1st patrol is likely but not certain

| Combination | Date | Patrol |
|---|---|---|
| A | 25/01/41 | Commissioning |
| B | 22/04/41-18/05/41 | 1 |
| C | 08/06/41-19/07/41 | 2 |
| C or D* | 14/08/41-25/08/41 | 3 |
| D or E* | 14/09/41-30/09/41 | 4 |
| E or F* | 29/10/41-09/12/41 | 5 |
| F | 24/03/42-21/05/42 | 6 |
| G | 27/06/42-08/08/42 | 7 |

*If patrol 3 = combination C, then patrol 4 = combination D and patrol 5 = combination E
If patrol 3 = combination D, then patrol 4 = combination E and patrol 5 = combination F

# U 505: Modifications, Colours & Insignia

# Contents



## Part I - Introduction

In late 2013, Revell released their long-awaited Type IXC U-boat kit in 1/72nd scale (kit number RV05114). At the time of writing, first impressions of the kit have been generally very positive. One reason may be that Revell chose to depict U 505, a museum boat which currently resides in the Museum of Science and Industry (MSI) in Chicago. This afforded them the opportunity to study a real life boat which is much the same (but not exactly, as we shall see) as a wartime Type IXC boat.

Although the kit is impressive, the same cannot be said for the kit decals. Both the waterline draught marks included in the kit and the tower emblem decals are entirely unsuitable. Alternative decals have been designed by Accurate Model Parts to replace these inaccurate kit decals. This article was primarily written to explain why the Revell emblem decals require replacement, and to determine the patrols in which each emblem was present.

It is important to recognise that technical features and weapons were added or removed from U 505 in line with technological advances or the need to combat the growing air threat posed by Allied aircraft. Due to the constant modifications made to the boat over time, it is not historically accurate to place the lion emblem of the boat's first commander on the Revell kit without making suitable adjustments to the kit tower. Only by a careful study of the patrol dates, refit dates and established modification timeframes can we match both the emblems and the technical features to a specific time frame. Once this is ascertained, it then becomes possible to state what features were present when the lion, axe and shell emblems were present on the boat.

Although the author has completed this type of study on other boats, the previous studies were conducted precisely because a range of photos were available to show the individual boat at every stage. Due to the dearth of wartime U 505 photos available in current circulation, this present study has been especially difficult. Readers should be aware that such lack of photographic material means that my interpretations are subject to error. It is possible that new information, or previously unseen photos, will be unearthed and these will bring the results of this article into question. Some of the results herein are, it is fully admitted, simply logical conclusions determined from the sources available at the time of writing. It is hoped that the author may be forgiven for any errors in judgement made when trying to assess the full modification history of the boat without adequate resources.

The subject audience of this article is primarily a modeller undertaking the building of Revell's U 505. Other related subjects, such as the full history of the boat, are considered peripheral to the purpose of this article, and will not be covered in detail. The exception is a very basic coverage of the boat's operational career, which is presented to give the reader some idea of the major events which occurred during the boat's history.

Additional information, such as the modifications U 505 may have received if it remained in Kriegsmarine service throughout the war, have been included to assist modellers who wish to depict other boats. Many of the features in this article are also relevant for mid-to-late war Type VIICs and VIIC/41s. Details can be found in the article "*Type VII U-Boat Modifications*" within the original Wolf Pack collection.

The fitting dates of certain features do not correspond in two important books about U 505. In addition, the fitting date of the 37mm automatic in one book does not fit in with the "conventional" dates proffered in U-boat literature. Without photographic evidence I am in no position to assert which is correct. Both dates are provided in this article, along with some supporting evidence, and the reader can make their own judgement on the matter.

### Patrol numbers

When U-boats went to sea on a war patrol, technical failures or issues which became apparent during a test dive sometimes resulted in a direct return to port. Sources can be conflicting with regard to patrol numbers because opinions vary in what may, or may not, constitute a war patrol. Usually sources will only attribute a patrol number to a full war patrol. Due to the very high number of aborted patrols in U 505's operational career, and the requirement to be very particular with every period when the boat was in port, in this study each patrol - regardless of whether it was an aborted patrol or full patrol - has been attributed an individual number. For this reason, the patrol numbers used in this article and in the summary tables at the end do *not* correspond with the patrol numbers in other sources. There are 14 patrols listed in this article, whereas *U-Boat Fact File* by Peter Sharpe lists ten patrols and the website uboat.net lists twelve patrols.

In the summary tables, the X suffix denotes a refit or time in port. 3X, for example, refers to the refit period before patrol 3.

### Special thanks

I would like to extend my sincere appreciation to Jon Kelly, who is known as Capt Kremin on the AMP forum. In the course of one forum thread, in which the fitting date of the Turm II, Turm IV and 37mm automatic was discussed, Jon alerted me to important passages in *Steel Boats, Iron Hearts: A U-Boat Crewman's Life Aboard* U-505 by Hans Göbeler, and was kind enough to send me direct quotes that were relevant to the topic. These quotes, together with our discussion of the "well wishers" photo, and many other topics relating to Type IXs, allowed a clearer picture to emerge. It was also Jon, not the author, who spotted that a camouflage pattern was applied to U 505 following the Hudson attack. I think it is fair to say that the results of this article have been much improved by his contributions.

I would also like to take this opportunity to thank Revell for their new Type IXC kit. The decal issues are minor and can be easily fixed. But thanks to Revell we finally have a very good Type IX model kit, which is very enjoyable to build and looks stunning even as an out-of-box build. Thanks Revell!

## Part II - Historical Overview

### The boat

Out of the many hundreds of U-boats serving in the Kriegsmarine in World War II, U 505 ranks as one of the best known of all U-boats. This is partly due to her dramatic capture on the high seas, and partly because she has survived as a museum boat in Chicago's Museum of Science and Industry (MSI). What might not be realised by the millions of enthusiasts who have visited the boat are the numerous dramatic incidents which took place during her wartime career. This included the sinking of eight ships, being hit by one of her own circle-running torpedoes, being the most heavily damaged U-boat ever to return to base, seven patrols being aborted due to technical issues and sabotage, the suicide on board of one of her commanders, and the remarkable capture by US naval forces. Lastly, against all the odds, the boat managed to evade the attentions of the scrap man by journeying all the way to Chicago, an inland city not known for its proximity to the Atlantic Ocean. The boat will remain throughout the ages as a lasting testimony to those who fought and perished on both sides in the Battle of The Atlantic.

U 505 was one of 193 Type IX U-boats operated by the German Kriegsmarine. The boat was built in the *Deutsche Werft AG* shipyard in Hamburg in the batch between U 501 - U 506. While the late-war tower presently on the boat provides an impression of a late-war U-boat, the boat was actually laid down early in the war, on the 12th June 1940. The boat was launched nearly a year later, on the 24th May 1941, with the commissioning ceremony taking place a few months later on the 26th August 1941.

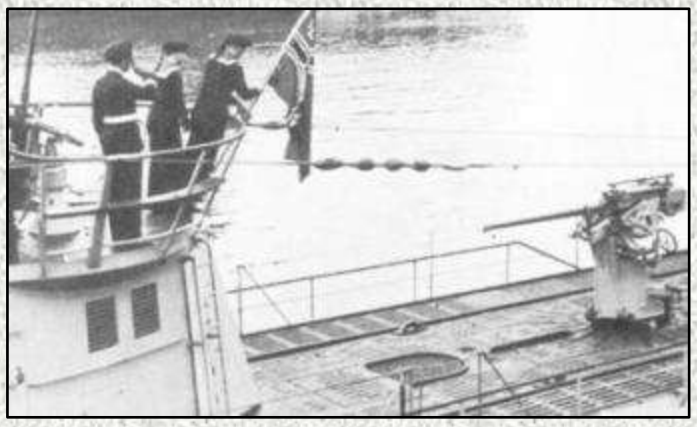
The U-boat fleet included two Type Is, eight Type XBs (mine-layers / transport), ten XIVs (supply), XXIs (large electric boats), XXIIIs (coastal electric boats) and a few research types. But the main types which played a leading role in the conflict were the Type IIs, VIIs and IXs. The Type II was a small coastal submarine which operated in the North Sea in the early war years. The medium-sized Type VII, often described as the workhorse of the fleet, was produced in vast numbers and became famous for operating with sustained success in wolf packs against Allied convoys in the North Atlantic. The final main type was the large, ocean-going Type IX U-boat. Their larger size accounted for longer diving times and reduced manoeuvrability compared with their smaller brethren. Although this made the type less suitable for convoy attacks, it did allow a much longer range which made them suitable for long range solo patrols. Their attacks off the coast of America were particularly successful in the months directly after the US entered the war.

The slight differences in the specifications between the IXA, IXB and IXC can be seen in the table below -

| Specifications of 193 Type IX U-boats | | | | | |
|---|---|---|---|---|---|
| **Variant** | **Number** | **Surface displacement (tons)** | **Length (metres)** | **Beam (metres)** | **Draught (metres)** |
| IXA * | 8 | 1,032 | 76.5 | 6.5 | 4.7 |
| IXB | 14 | 1,051 | 76.5 | 6.8 | 4.7 |
| IXC | 54 | 1,120 | 76.8 | 6.8 | 4.7 |
| IXC/40 | 87 | 1,144 | 76.8 | 6.9 | 4.7 |
| IXD1 | 2 | 1,610 | 87.6 | 7.5 | 5.4 |
| IXD2 | 28 | 1,616 | 87.6 | 7.5 | 5.4 |
| * Original IXs are now referred to as IXAs | | | | | |

Of importance to modellers is the question of external differences between the IXC and the IXC/40 sub-variant. The 10cm difference in beam on the real boats equates to only 0.14cm in 1/72nd scale. This would be hardly noticeable to the naked eye. More importantly, it does not appear that there were obvious visual differences between an IXC and an IXC/40. Therefore, unless being very particular, one might wish to use the Revell IXC kit to model an IXC/40.

## The first commander - Alex-Olaf Löwe



Above (B1): The Kriegsmarine flag being hoisted for the first time during the commissioning ceremony of U 505. We can see that the boat had an original Turm 0 tower (without a lower wintergarten platform), *Hellgrau 50* paint, and a 37mm semi-automatic on the aft deck. The two black rectangles on the sides of the tower were air intake holes for the diesel engines.

Below (B2): The Hudson attack in November 1942 severely damaged the aft deck, with the 37mm gun and much of the casing on the port side being completely blown away.

One aspect that is rarely appreciated by visitors to the Chicago museum is how early the boat was commissioned into the Kriegsmarine. It was way back in August 1941 when her first commander, Alex-Olaf Löwe, raised his commissioning pennant on the commander's flagstaff.

Löwe was a competent and calm commander, very popular with his crew and also successful in sinking Allied ships. The first war patrol was in reality a transfer passage from Kiel to the new operating base in Lorient. In the second patrol off the western coast of Africa, and the third patrol in the warm waters of the Caribbean, Löwe would sink seven ships. In subsequent patrols, after the first commander had departed, only one more ship would be sunk.

Löwe's successful spell as a U-boat commander was cut short towards the end of the third patrol in the Caribbean, when a return to base was required due to his appendicitis. Following this patrol he was transferred to shore duties.

## The second commander - Peter Zschech

Replacing the popular commander was Peter Zschech, who was in line for a command of his own after serving as First Watch Officer on U 124 for four very successful patrols. However, the successes he shared aboard U 124 were not to be repeated when he took over command of U 505. His authoritarian command style contrasted sharply to that of his predecessor. Along with an aloof and moody nature, his style did not endear him to his new crew and he would fall short of the high standards expected of him.

On the 10th November 1942, during Zschech's first patrol, U 505 was attacked and very seriously damaged by a Lockheed Hudson aircraft. Zschech actually ordered the crew to abandon ship but this was not followed by some crewmen, who were correct in assessing that the boat was not sinking. When the crew climbed out of the tower, they could see extensive damage had been wreaked to the aft deck. The 37mm on the aft deck was completely gone, having been completely blown away in the attack. Following repairs to the pressure hull, a makeshift camouflage pattern was painted in the vain hope of trying to disguise the gaping hole in the aft deck. Despite the grave technical condition, and to the horror of the crew, Zschech was still hunting for targets. Having served on U 124, a famous and very successful U-boat, the new commander was plainly over

anxious to sink tonnage. When U 505 fired a torpedo, it became a "*kreislaeufer*" - a circle-running torpedo - which turned around and struck the U-boat. Luckily for all aboard the warhead did not explode.

Although the boat managed to reach port, it was assessed as being the most heavily damaged U-boat to ever make it back to port. Field Marshal Erwin Rommel and Luftwaffe General Adolf Galland were amongst the dignitaries who visited U 505 when repairs were being made. The Desert Fox apparently shook his head in disbelief when he saw how badly damaged was U 505.

Zschech's lack of success to date would be aggravated by a prolonged period in refit, when extensive repairs and modifications were completed. When U 505 did finally leave on patrol in July 1943, the so called happy times, when successes came quickly, were over for good. The Allies had greatly increased numbers of escorts and aircraft, a higher level of expertise, and had made significant technological gains, particularly in the field of radar. The threat of Allied air attack was ever present, accounting for the loss of over 40 boats in May of 1943. In fact, it was this month in which the tide of war in the Atlantic turned firmly against the U-bootwaffe.

The grave dangers presented by air attack, and the overall decline in U-boat successes at this time, meant that the opportunities for Zschech to achieve the success he craved were now greatly reduced. Yet another aspect would prevent Zschech and U 505 from sinking Allied shipping. Following July 1943, numerous technical issues would plague the boat and her commander. Patrols were aborted on no fewer than *six* occasions under Zschech's command. Many, or indeed all, were caused by sabotage. The frustration was also keenly felt by the crew. In *Steel Boats*, former U 505 crewman Hans Göbeler relates how he beat up a French saboteur who taunted him about the boat's lack of progress after leaving Lorient.

Having to return to port time and again, each time justifying his reasons for a premature homecoming, became increasingly difficult for the sensitive commander. The commander began to feel very distressed, even shameful that he had not faced the enemy. Rumours began to circulate around Lorient concerning his competence and bravery. When allied to his mounting frustration at his lack of success, these rumours were having a serious impact upon his deteriorating mental health.

In early October 1943, Zschech took the boat to sea for the last time. On the 24th October 1943, following a harrowing depth charge attack, Zschech committed suicide by shooting himself in the head with a handgun. The First Watch Officer, Paul Mayer, assumed command and returned the boat to port.

## The third commander - Harald Lange

With a history of technical frustrations, six aborted patrols, and the suicide on board of the unpopular commander, it was a frustrated and troubled crew which returned with the boat in November 1943. An experienced officer would be required to steady the ship and her crew. This was provided by Harald Lange, who at 40 years old was much older than the average U-boat commander.

The history of aborted patrols did not conclude with the passing of Zschech - Lange's first patrol with U 505 was cut short when a leak was found during the first practice dive. This was quickly rectified in port and the boat left again on patrol a few days later. Three days later the boat was ordered to divert on a rescue operation to pick up survivors of the torpedo-boat T25. During the return more technical issues prevailed when a fire started in the starboard electrical motor. Even when the boat did return to port, more bad luck prevailed when the starboard diving plane was damaged during docking.

## Capture

In mid-March 1944 U 505 left on her final patrol. More technical issues persisted, this time in the

form of a jammed bow cap and issues with the radar set. Then came the 4th June 1944, the famous day when the boat was captured by Task Group 22.3 of the US Navy. The "hunter-killer" group, commanded by Captain Daniel Gallery, consisted of the escort carrier USS *Guadalcanal* and five escorts - USS *Pillsbury*, USS *Pope*, USS *Flaherty*, USS *Chatelain* and USS *Jenks*. The American ships and aircraft fired countless rounds of various calibres at U 505. In additional to the damage sustained during these attacks, U 505 was left circling clockwise following damage to the rudder by depth charges. Believing the boat to be sinking, Lange ordered the crew to abandon ship. However, due to injuries sustained by himself and other key officers, and the haste with which the crew abandoned ship, the scuttling charges were not set. An eight man party from the USS *Pillsbury* climbed aboard the U 505 to find the U-boat abandoned by her crew. Subsequently, the American sailors were successful in their efforts to save U 505 and managed to tow the boat back to Bermuda.

### The museum boat

At Bermuda, the US Navy stripped out many key technical parts for evaluation. Later the boat was moved to Portsmouth Naval Yard, where it would ultimately be joined by other U-boats which were surrendered after the cessation of hostilities. In 1954, following complex negotiations, the boat was towed to the Museum of Science and Industry in Chicago. Over many years exposed to the elements, various restorations tried to allay the deterioration process. In order to ensure that the boat could be preserved without any further decline, a move indoors was deemed necessary. Following a $35 million restoration project, this move was accomplished in 2004. U 505 currently resides within a temperature controlled underground enclosure which ensures the boat will last into the future years without deterioration. This will allow U 505 to remain as one of the best known U-boats, particularly when the story of her capture is told to future generations.

Only one other Type IX U-boat survives today. This is U 534, an IXC/40 boat which was sunk in 1945 and raised in 1993. The boat was transported to Birkenhead, near the English city of Liverpool, where the boat was on display for a number of years within the Warship Preservation Trust. Following the closure of this museum, the boat was transported to her current location at the Woodside Ferry terminal. Mostly infuriatingly, due to financial and technical reasons it was necessary to cut the boat into several separate sections. This was incredibly frustrating for U-boat enthusiasts as it leaves U 505 as the only complete Type IX in the world.

## Part III - Pre-capture Modifications

The important early milestones for U 505 are as follows -

- laid down on 12th June 1940.
- launched on 24th May 1941.
- commissioned on 26th August 1941.
- first patrol on 19th January 1942.

Early features - The boat was built with an original Turm 0 tower (without any lower wintergarten platform). Between June 1940, when the boat was laid down, and the launch date in May 1941, more and more features were added to the boat. From the beginning U 505 had -

- one 105mm deck gun (10.5cm SK C/32 on a U-boat LC/36 mount) on the foredeck.
- one 37mm semi-automatic (3.7cm SK C/30 gun on a LC 39 mount) on the aft deck.
- one 20mm gun (2cm Flak C/30 gun on a L30/37 mount) at the rear of the bridge.
- no radar or radar detector equipment.
- two air intakes on the tower.

## Early modifications

Vent patterns - The distinctive variations in the free-flooding vents act as footprints that can help us identify a U-boat variant or, in many cases, the batch from which the boat originated. The author wrote the article "*Type VIIC Free-Flooding Vent Patterns*", which can be found in updated form in original Wolf Pack collection. Coverage of the patterns on Type IXs can be found on page 26 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle. According to this book, the pattern on U 505 was the same on U 68, U 125-131, U 153-158 and U 503-512. Note that the vent directly in front of the diesel exhaust outlet, which is shown as one-half size in the book, was actually one-quarter size on U 505. In addition, the book shows four vents near the stern in the diagram but does not mention them in the table. The Revell kit successfully depicts the patterns for these boats so no modification should be necessary for building any of these boats. Other IXs have slight differences, as outlined in Köhl and Niestle's informative book, so some alterations would be necessary for other boats.

Breakwaters - Breakwaters were not fitted to the earliest IXAs when they were launched in the pre-war period. They were introduced in an attempt to reduce the amount of water splashing onto crewmen who were operating the 105mm deck gun. The first of the two breakwater features - the horizontal breakwaters - were fitted on either side of the deck, outboard of the 105mm deck gun. Although similar in position and purpose to the VII breakwaters, the IX version was a longer, thinner shape. The second feature was the vertical breakwaters, fitted directly in front of the deck gun. Photos do show the vertical breakwaters successfully preventing a rush of seawater from hitting the 105mm. On the downside, the vertical breakwaters may have induced some additional hydrodynamic drag and may also have been a hindrance during the loading of torpedoes into the forward torpedo hatch.

In some photos, IXs have the horizontal breakwaters at the sides of the hull but not the vertical breakwaters on the deck. Whether U 505 was originally outfitted with both sets is unclear. An order to removal this feature was issued on the 21st May 1941, three days before the launch of U 505. U 505 would almost certainly have retained the breakwaters when launched but it is also likely that they were removed by the time the boat was commissioned in late August 1941.

Above (B3): The red arrows point to the three attachment points on the port side of the forward end of the foredeck. Along with the other three attachment points on the starboard side, they are what remained when the net cutters were removed from the bow of U 505.

Net cutters - A net cutter would have been installed at the bow of U 505. On the 1st March 1941, an order was issued for the net cutters to be removed. This feature would very likely have been removed from U 505 before the launch date in late May. Evidence of the net cutters remains on the boat to this day, in the form of the six attachment points that were left on the foredeck when the net cutter was removed.

Deck railings - The deck railing pattern also varied between boats. The patterns are also covered in *Vom Original zum Modell: Uboottyp IXC*, this time on page 17. The railings on U 505 are suitable for U 505 and U 506, with slight modification necessary for other boats. As will be covered later, modifications to the railings are necessary to depict U 505 at any point during or after capture.

Tripod jumping wire supports - When Type IXs had the original Turm 0 tower, there were no tripod supports for the aft jumping wires.

Insulators - As we move backwards along the forward jumping wire we meet a splitter, at which this point the wire splits into two separate wires. These two wires meet the top of the tower at an attachment point on either side. Each of these two distinct wires contained three insulator blocks. The earliest IXs also had a third wire which was connected from the splitter to the front of the tower; this third wire was mounted centrally and also included three insulators. U 505 was possibly built too late to have the third central set. If the boat did have the third wire then it was removed at some point early in its career.

Spray deflectors - The earliest IXAs did not have a spray deflector on the tower. This feature, mounted halfway up the front face of the tower, was introduced in 1939 prior to the start of hostilities.

Wind deflectors - A similar feature was the wind deflector flange, fitted at the top of the tower. Again, the earliest IXAs did not have this feature. The wind deflector was added to IXs much earlier than it was added to Type VIIs. U 43 had the wind deflector before the start of hostilities so it appears that the implementation date of this feature upon IXs was 1939.

Given these dates it is clear that U 505 would certainly have both the spray deflector and wind deflector from the start.

Anti-vibration wires on periscopes - The earliest IXs had no anti-vibration wires around the top of the periscopes. Around 1940, these wires were added to the attack periscope to help reduce the wake left by a raised periscope. Although similar wires were added to the sky periscopes of U 38 and U 66, they may not have been added to the sky periscopes of other IXs such as U 505. Again, given the introduction dates, U 505 must have had this feature from the start.

## S-Gerät

One of the active sound features under development was the *S-Gerät* (*Sonder-Gerät für aktive Schallortung* or "Special equipment for active sound location"). A bow device was fitted on the stem in readiness for when the equipment became available. The order to install this feature was placed on the 11th October 1940. However, it was decided that VIICs and IXs would not be fitted with the *S-Gerät* internal equipment after all. An order to remove the equipment was issued on the 24th April 1942. Rather than removing the bow device altogether, the boats with an existing bow device had this feature blanked off. Subsequently, the boats would have the blanked off feature removed altogether from the stem.

The following boats (of various types) had the *S-Gerät* without the blank plate on the following dates -

- U 551 - 14th September 1940.
- U 559 - January 1941.
- U 351 - March 1941.
- U 128 - 31st July 1941.
- U 374 - 10th May 1941.
- U 458 - 4th October 1941.
- U 441 - 12th January 1942.

The following boats had the *S-Gerät* with the blank plate on the following dates -

- U 228 - Summer 1942.
- U 194 - 7th January 1943.
- U 1060 - 8th April 1943.

- U 390 - Sometime following launch on the 23rd January 1943.

An unidentified VIIC was launched in the winter of 1943 / 1944 with no *S-Gerät* bow device at all. This suggests that by 1944 the *S-Gerät* and blanking plate were completely removed from the stems of U-boats.

It is clear that U 505 would have had the *S-Gerät* bow device when launched on the 24th May 1941. From the dates above, the blanking off plate would have been added at some point after the removal order date of 24th April 1942. This might have been during refit 3X, which occurred between the 7th May 1942 and the 6th June 1942. The *S-Gerät* would have been completely removed by the winter of 1943 / 1944.

## Tower versions

When Allied air attacks became a significant threat to U-boats, the High Command tried to combat this with the introduction of new or modified towers. U 505 featured three different types of tower during the course of her wartime career. Since a discussion of the conversion dates require us to be acquainted with each tower and its associated armament, the relevant details are listed below -

Turm nomenclature - When modifications were implemented on existing and new build boats, the nomenclature Bridge Conversion I, Bridge Conversion II etc. was used to refer to the modified or replacement towers. The term "Bridge Conversion I" is better known as "Turm I" (*turm* meaning tower in German). Since Bridge Conversion I came to be known as Turm I, and Bridge Conversion II became known as Turm II, the original towers would later became known as Turm 0. It was the Turm 0, with a single 20mm C/30, that U 505 had during the first few patrols.

It has been said that the *wintergarten* refers specifically to the lower platform on a Turm II or Turm IV bridge. This would mean that the upper Flak platform was not the wintergarten - only the lower platform was. Although the rear of the tower on an early Turm 0 tower is sometimes referred to as the wintergarten, in this article the term will *only* refer to the lower platform.

The term *Turm* is not specific to a U-boat variant, rather it is the *style* of tower that was fitted to different variants. For example, a Type VIIC and a Type IXC might both be equipped with a Turm IV tower. Although the towers would be outfitted with the same armament and the same platform arrangements, the difference in size between the variants means that the actual towers themselves would be slightly different sizes.

Turm 0 - The original form of tower that could be seen on the early Type IXs, such as U 505, and the early Type VIICs. This had a single 20mm C/30 behind the bridge and no lower wintergarten platform.

Turm I - Turm I was used on only a very few U-boats (possibly only U 193 and U 553) in 1942. It was intended to mount two 20mm MG 151 guns on a widened upper platform and a twin 20mm C/30 on a lower wintergarten platform. Since the twin 20mm was not yet ready, a single 20mm C/30 was mounted on the lower platform. Due to poor performance, and the positive results of the *Vierling*, which was being developed and tested at the time, Turm I was abandoned at the end of 1942.

Mittelmeerturm - Known as *Mittelmeerturm*, this modification to Turm 0 towers was used on VIIBs and VIICs operating in the Mediterranean. Noticeably longer than the standard early VIIC Turm 0, this tower featured two twin 13.2mm Breda machine guns (side by side in pressure tight pods) and a single 20mm behind. It did not feature upon Type IXs.

Turm II - Bridge Conversion II (known as Turm II) was used on a number of Type VIICs and IXs. The Turm 0 towers began to be modified to Turm II in December 1942. Turm II featured a single 20mm C/38 on the upper platform behind the bridge, and a single 20mm C/38 on a lower wintergarten platform. Note that the C/38 was an improvement upon the earlier C/30 gun.

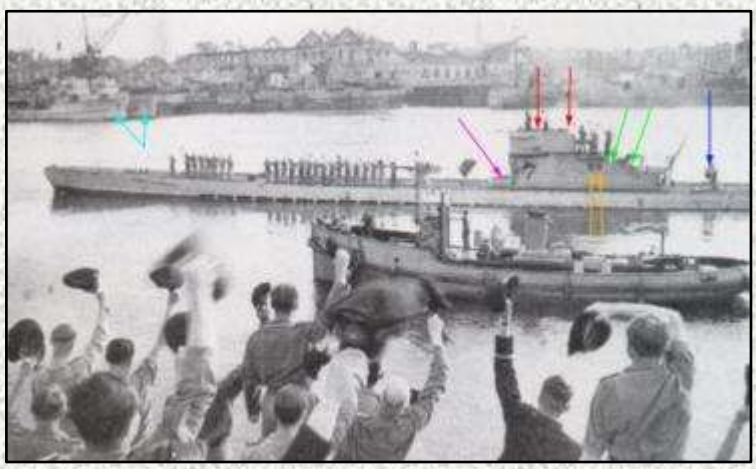
Turm III - The intention with Turm III was to have a pair of single 20mms side by side on the upper platform and no lower platform. This was necessary for VIIDs so that the mineshafts would not be covered. Only a few boats (perhaps only VIIDs?) were outfitted in this fashion in April and May 1943. However, the initial intentions may have changed because late in the war the VIID U 218 had an upper platform as well as a lower, shortened lower platform which covered some of the mineshafts. The instructions in the Revell U 505 kit, which state that U 505 had a Turm III tower, are incorrect as Turm III was clearly never fitted to U 505.

Turm IV - Turm II was only an intermediate solution until suitable armament was available. It had been decided on the 14th November 1942 that it would desirable to have a Turm IV arrangement consisting of a pair of twin 20mm C/38s (mounted side by side) on the upper platform, and either a quadruple 20mm (*Vierling*) or 37mm automatic on the lower platform. None of these weapons were available so boats had to make do in the meantime with Turm II towers.

When such armament became available in 1943, U-boat towers were modified from Turm II to IV. The process of modifying existing towers to Turm IV began around the spring of 1943 or so. The 37mm automatic was not available when the Turm IV towers were first installed, so Vierlings were fitted initially.

Turm identification - To distinguish between a Turm II and Turm IV we need to look at the upper platform. If there is only one gun then it is a Turm II. If there are two separate gun mounts then it is a Turm IV. Note also that to accommodate an extra gun, the upper platform on a Turm IV was wider than the upper platform on a Turm II.

Below (B4): The "well wishers" photo, which was the subject of continued debate on the AMP forum. It *appears* to show the boat departing or returning from patrol but appearances can be deceptive. The coloured lines were added to the photo by the author to illustrate to the reader certain points of discussion.



## The "well wishers" debate

Now that we know a little background knowledge on the Turm variants, we can apply this knowledge to our study of U 505. U 505 had the Turm 0, Turm II and Turm IV at various points but exactly when were these towers introduced on our chosen boat?

The excellent *Hunt And Kill:* U-505 *And The U-Boat War In The Atlantic* includes chapters from renowned historians. It includes a photograph which is key to determining when the towers were fitted. The caption for this photo in *Hunt And Kill* states "Cheered on by well-wishers, *U-505* leaves for a war patrol to the distant Caribbean on October 4, 1942." As can be seen by the photo (photo B4), the axe insignia - covered later in the paint colours section - ensures that this boat is definitely U 505. Note that the boat retains the 105mm deck gun on the foredeck and the 37mm on the aft deck.

We can tell that U 505 has a Turm II in this photo for the following reasons -

- The tower is noticeably longer than a Turm 0.
- There is a 20mm on the upper platform and a 20mm on the lower platform. Although we cannot see any intricate detail, we can at least see that the gun on the lower platform is not a Vierling or the later 37mm automatic.
- The two dark rectangles on the tower sides, directly below the upper platform, are intakes for the diesel engines (the orange arrows point directly to the two rectangles). These were present on Turm 0 and Turm II but they were not present on the Turm IV tower.
- We can see there are actually three levels on the tower in this photo - the upper bridge level, a short step directly behind, and the lower wintergarten level at the rear. The green arrows point to the start and end of this middle level. Turm II towers on Type IXs had these three levels, whereas the Turm IIs on VIICs had only two levels. Turm IVs on Type IXs and VIICs both had only two levels.

In the foreground men can be seen waving their caps in support of the U-boat men, who are returning the salute in similar fashion. This scene is entirely typical of a U-boat either departing or returning from patrol, and would not normally occur when a boat was leaving for a practice dive in the harbour. It therefore *appears* to show U 505 either departing or returning from a patrol.

Since U 505 Turm II photos are in short supply, establishing the date when it was taken is absolutely paramount in determining when the Turm II was fitted. So when was it taken? As previously mentioned, the caption in *Hunt And Kill* asserts that the boat is destined for the Caribbean patrol on the 4th October 1942. Although *Hunt And Kill* is a fantastic resource, written by accomplished authors and knowledgeable experts, the date is, I believe, erroneous. Photo B2 clearly shows the boat following the Hudson attack (the damage on the aft deck leaves no doubt as to the period when this photo was taken!). If we scrutinise the aft deck very carefully, we can see there is no evidence of any lower wintergarten. Another photo in both books (not reproduced here) shows crewmen dressed in swimming trunks enjoying the Caribbean sun; this shows a Turm 0 tower, again with no wintergarten. Logic dictates that there is a contradiction here - the photos showing U 505 with no wintergarten during patrol 4 ensure that the boat *cannot* have had a Turm II when it departed on this same patrol. It follows that the Turm II must have been fitted during a subsequent refit, with the obvious candidate being 5X.

Following the Caribbean patrol, U 505 spend the period between the 13th December 1942 and the 30th June 1943 in refit 5X. On page 79 of *Hunt and Kill* it is stated that the entire conning tower was replaced, and that the armament on this new tower comprised of two twin 20mms on the upper platform, and the Vierling on the lower wintergarten platform. This is the early armament fit for a Turm IV so it is clear that the authors believed that a Turm IV had been fitted in refit 5X. In *Steel Boats, Iron Hearts: A U-Boat Crewman's Life Aboard* U-505 by Hans Göbeler, the former U 505 crewman states -

"By late May of 1943, the modifications and repairs on our boat were almost complete. Gone are the large gangs of shipyard workers in their thick brown welder's suits. Only a few technicians were to be still found aboard finishing some small details. *U-505* sported a totally new silhouette. We were especially excited to stand on the spacious *Wintergarten,* with its deadly looking quad barreled flak gun. Combined with the two twin-barreled 20mm guns on either side of the conning tower, our new boat now boasted a total of eight 20mm guns for anti-aircraft defense. At least now, we thought, we would have a fighting chance against any enemy birds trying to drop an egg on us."

Both books assert that the Turm IV was fitted by the end of refit 5X, with one book even being specific enough to state a late May completion date. Given that the authors of *Hunt And Kill* had the boat's KTBs (the war patrol diaries, which may not have detailed the exact changes but would often specify the dates in the shipyard), and that *Steel Boats* was written by a former

crewman who served on every U 505 patrol, then it is extremely likely that the Turm IV was indeed fitted by the end of 5X. This also accords with the timeframe when the Turm IVs were introduced to other boats in the U-bootwaffe.

So, at this point in the argument, it would seem extremely likely that the Turm IV, with two 20mms on the upper platform, and a Vierling on the lower wintergarten platform, had been fitted by late May 1943. The "issue" which remains is with photo B4, the "well wishers" photo showing U 505 apparently departing on patrol 4 with a Turm II. We shall consider the following -

- Patrol 4 was undertaken with a Turm 0.
- Turm II was fitted after Turm 0.
- Turm II had to be fitted before Turm IV.
- By the end of refit 5X Turm IV was in place.

However, in the period between mid-December 1942 (start of refit 5X) and late May 1943 (completion of Turm IV), U 505 did not undertake any patrols. So how can photo B4 show U 505 departing on patrol with a Turm II?

The logical conclusion is that conversion of Turm 0 to Turm II, and conversion of Turm II to Turm IV, were *both* completed within refit 5X, and that the "well wishers" photo does not show the boat departing on a war patrol. In fact, given the information at our disposal (refit dates, patrols dates, photographic evidence and the information in the two books), the boat *cannot* have sailed on a war patrol with a Turm II.

Despite photo B4 looking like a classic *Das Boot* style departure, with adoring well wishers urging happy hunting, it has to show the boat on a more mundane form of short passage. Let us study photo B4 once again, this time with no preconceptions about what may or may not be occurring. It is virtually certain that photo B4 shows U 505, and it is certain that a Turm II features in this photo. Due to the crowd waving to the crew assembled on the foredeck, the photo *appears* to be a classic image of a boat returning or departing from patrol. But are we *certain* that this is the case?

Despite appearances there is nothing to *prove* this photo shows U 505 leaving on patrol. It may seem unlikely, at first, for this scene to be enacted for anything less than a full war patrol but let us explore possible scenarios. During an extended stay in the shipyard, a diesel engine, most of the aft deck and the entire tower had been replaced. At some point the boat would have sailed to test the systems. Being a submarine, it was especially necessary to undertake a practice dive to ensure that all the diving systems were functioning correctly. They may also have wished to test out the new armament fitted to the two platforms. Next we can consider the crew. Having returned from the Caribbean patrol several months previously, the well rested crew may have required refresher training. On board training for new members of the crew might also have been desirable. Next we may consider that the men doffing their caps may not have known the boat was sailing on a practice run and might have assumed the boat was destined for a war patrol. Regardless of destination, the men may have simply waved to a passing U-boat, in the same manner that people may wave to a passing ship. Lastly, could this photo have been staged for propaganda purposes?

Not only do we have cause to doubt the caption date in *Hunt & Kill*, we now have serious reason to question the assertion that it shows the boat leaving on patrol. Errors with dates and the identity of U-boats are rife in U-boat literature, with only a select few being free of error. The authors of *Hunt & Kill* are highly competent authors and scholars but every U-boat researcher has had cause to reassess their previous assumptions when new information becomes available.

Can we find a reason why *Hunt And Kill* might be incorrect with the "well wishers" caption? Firstly, the authors may have been influenced by *Steel Boats*, which also includes this controversial photo. The photos in Göbeler's book appear to be deliberately placed at a point where they are directly relevant to the topic being discussed. Although Göbeler does not provide a date for this photo, its presence at the point where Göbeler discusses the departure on patrol leaves the distinct

impression that the author, or perhaps editor, of the book thought that photo B4 was taken on the 4th October 1942.

We may wonder why the authors of both books did not query the lack of Turm II after the Hudson attack. After all, photos in both books clearly show no lower platform on patrol 4. Why did they not spot the contradiction?

One of the factors may lie in the whereabouts of Hans Göbeler when the Turm II was being fitted. Hans saw the boat in late December 1942, and was surprised to see his boat minus a conning tower. At this point the Turm II had yet to be fitted. He was given three weeks' leave in late January 1943. When he returned from Germany to Lorient, he went with the rest of the crew to the boat's sponsor city of Schliersee in Bavaria and then to a U-boat recreation place at a ski resort south of Munich. He returned along with the crew in late February 1943. Following this period, rather than sleeping on board, he would have stayed at the *Lager Lemp* U-boat facility outside the city of Lorient. In early March Hans was sent to the anti-aircraft gunnery school at Mimizan, returning in mid-March. It is just possible that the Turm II was in already in place by mid-March, and that Hans was in Mimizan when the sailing in photo B4 took place. However, it is more likely that he was present aboard the foredeck in photo B4 and would, for a short time, have seen U 505 with a Turm II. At the very least, Hans would not have seen the boat with this intermediate tower for long.

Another relevant point is that the identification of Turm II towers is so often neglected by enthusiasts. Many people have mistaken a Turm IV for a Turm II, and indeed others have no knowledge of the Turm II at all. It is very possible Göbeler had no recollection of the Turm II when he wrote his book so many years down the line. It is equally likely that Turm IIs were not foremost in his mind at this time. Either way, he may not have been best placed to notice the lower wintergarten contradiction in the patrol 4 photos.

The authors of *Hunt And Kill* (who referenced *Steel Boats*) would probably have been influenced by the position of the photo in Göbeler's book. Once again, the identification issues surrounding Turm II towers may have come into play again. And once again, the contributors to *Hunt And Kill* may have ranked other topics as more important than Turm II identification.

To conclude, the authors of *Hunt And Kill* knew that a Turm IV had been fitted in refit 5X, and the photo *appears* to show the boat departing on patrol with a Turm II. They may have not noticed the contradiction in the patrol 4 photos, and assumed, quite understandably, that the photo had to show the boat departing on the patrol directly before refit 5X (patrol 4 in the Caribbean).

## Fitting of Turm II

U 841 was expected to go on patrol in late June / early July 1943 with a Turm II. However, the boat did not sail and the tower was changed from a Turm II to Turm IV. This is one example of another boat being changed from Turm 0 to Turm II, then Turm II to Turm IV, all within one refit period.

The major repairs that were necessary after the Hudson attack, the change to Turm II, and then a further change to Turm IV, would partially explain this prolonged period in the first half of 1943 when no patrols were undertaken. Given the duration, the Turm II may have been fitted in April 1943, perhaps slightly earlier, in March. This would allow enough time for the major repairs to the aft deck and engines to be completed and the fitting of the Turm II itself.

As for other boats, the conversion of Turm 0 to Turm II did not occur overnight. This is backed up by the following information -

- U 125 went to sea in late February 1943 with a Turm 0.
- U 135 went to sea in June 1943 with a Turm 0.
- U 185 still had a Turm 0 on the 24th August 1943.

It is possible that some boats, such as U 185, did not receive the Turm II at all, and were converted from a Turm 0 directly to a Turm IV.

## Modifications during first stage of refit 5X (with Turm II)

Covers for torpedo storage tubes - Type IXs were fitted with eight pressurised storage tubes for spare torpedoes. These were housed in the channels running down either side of the deck. The covers for the tubes varied, with at least three types being used.

The first type, evidenced on pre-war photos of U 37, had a semi-circular bulge along top. This pre-war type was not widely used, and perhaps only featured on the very earliest Type IXs. The second type of cover was made of metal, with around 33 thin grooves and 5 rows of circular holes running along the length, and anti-slip bumps on the surface. The third type consisted of 7 wooden planks running along the length of the cover. Boats tended to have a mixture of metal and wooden covers, with the positions varying among boats.

When commissioned, the boat had wooden planks in the channels just aft of the tower, and metal covers on either side of the 37mm semi-automatic. This arrangement was changed, probably as a direct result of the Hudson attack, to one metal cover on either side of the deck (just outboard of the lower wintergarten platform) and wooden planks elsewhere. During the capture, the metal cover on the port side of the deck was damaged. It was jettisoned overboard along with the damaged torpedo underneath. At some point following U 505's transit to Chicago, the deck was restored or replaced. The two metal sections on either side of the wintergarten were not replaced with the correct metal type but with the wooden planking type.

Despite these differences, it should be noted that the Revell kit correctly depicts the torpedo storage tube covers at the time of U 505's capture.

Tripod jumping wire supports - The aft jumping wires on the early Type IXs (with the Turm 0) extended back from the bridge to the aft deck, without any need for any tripod supports. When the lower wintergarten platform was introduced, the rear jumping wires extended back from this lower platform to the top of the tripod supports and then into the deck farther back. The tripod supports were presumably added near the stern to raise the level of the jumping wires. Fitted in the initial phase of refit 5X, this style of supports was retained and feature on the boat at present.

FuMO 30 box - The two red arrows in photo B4 point to the top of a box added to the port side of the tower to house the FuMO 30 radar mattress antenna. This could be extended out of the box and rotated by a crewman inside the boat. More details of the radar can be found in Part IV of this article.

Hydraulically extendable mast antenna - Like many VIICs, the early Type IXCs had a fairing on the port side of the tower to house a hydraulically extendable mast antenna. On the VIICs the housing was a rounded shape, whereas on the IXCs the fairing was smaller and almost akin to a rounded triangle. This antenna was in the exact position taken by the FuMO 30 box so it is likely that the radar displaced the mast antenna in refit 5X. The hydraulically extendable shaft formerly used to raise the mast antenna may have been used to raise and lower the mattress radar antenna.

The order to remove the rod antenna and install the fairing for the FuMO 30 was issued on the 19th November 1942.

Air intake grill - Before the implementation of the FuMO box, there were two horizontal intake grills on IXCs, mounted at the top of the rear of each tower bulwark. The mast antenna had been situated directly in front of the port intake grill. When the FuMO box was installed it would have resulted in the removal of the port intake grill. It might be assumed that two intakes were required, one for each diesel engine. However, there is a precedent for one intake grill. On VIIBs, which had persistent difficulties with their intakes, the final result (for VIIBs in 1941 and 1942) was a single teardrop-shaped intake directly behind the attack periscope base. This single intake must have

sufficed for both diesel engines on VIIBs. Given that no other intake appears to be present in photos of the present day U 505, it looks likely that the boat was also reduced to one horizontal air intake in refit 5X.

Note that when the Turm II was implemented, U 505 still had intakes on the vertical walls of the tower (see orange arrows in photo B4). When the Turm IV was implemented later in refit 5X, the new tower did not have these vertical intakes and the boat was left with one horizontal intake, at the top of the rear of the starboard tower bulwark.

Armour plate - In order to provide some protection against machine gun fire from attacking aircraft, 16mm thick armoured plate was added to many U-boat towers above the spray deflector. It does **not** appear that U 505 was fitted with this plate.

Mountings for removable machine guns - Quite a number of photos show U-boats with machine guns mounted at the top of the tower bulwarks. The machine guns, which included MG15, MG34 or MG81 types, were kept inside the boat and only brought out and mounted when they were to be used. Usually, but not universally, Type VIICs would feature two mounts and Type IXs would feature four mounts. It is likely that U 505 would have received four mounts but it is unclear when they would have been fitted. U 517 had the mountings on the bridge by October 1942, so a fitting date of 4X or 5X is possible for U 505.

37mm replacement - Since the original 37mm (3.7cm SK C/30 gun on an LC 39 mount) was blown clear off the aft deck during the Hudson attack, a replacement was necessary. In photo B4 we can see that U 505 did have a 37mm semi-automatic at the time a Turm II was present. But we can see the new mount is conical shaped, much like the mount we see in many photos of 20mm guns at the rear of Type VIIC towers. The weapon fitted early during refit 5X may have been a 3.7cm SK C/30 on an L30/37 mount.

## Other modifications around the 5X refit period

Diesel exhaust outlet - There were changes made to the diesel exhaust outlets on the hulls of Type IXs. When captured, U 505 had a shroud over the diesel exhaust outlets. This outlet style can be seen on some early Type IX hulls so it is possible that U 505's outlets may not have been modified over time.

KDB removal - U 505 would probably (but not certainly) have been originally outfitted with a KDB (*Kristalldrehbasis Gerät*) device. This consisted of a rotating T-shaped piece with six acoustic listening devices (hydrophones). Housed on the foredeck, this rotating device could be extended or retracted into the deck. Used in conjunction with the *Gruppenhorchgerät* (GHG, group listening apparatus), the KDB was effective only at slow speeds. It is perhaps this limitation which led to a removal order on the 24th April 1942. The first refit after this order was 3X so it may have been removed at this time. Note that U 172 retained the KDB by commander's request.

Armoured boxes (coal scuttles) - Following an order issued on the 4th June 1943, armoured boxes (*Kohlenkasten* - coal scuttles) were fitted to *some* towers to protect lookouts from aircraft fire. Generally the port box was to house one crewman, while the starboard box was to house five men. Due to the presence of the FuMO box on the port side, the port coal scuttle was smaller and was mounted directly ahead of the FuMO box. U 868 was one Type IX which had the coal scuttle boxes. Since the excessive weight of the boxes reduced the stability of boats in high seas, an order was issued on the 30th October 1943 to remove the boxes.

No evidence has yet surfaced that U 505 was fitted with the coal scuttles.

Armoured doors - On some Type IXs, armoured doors were fitted to separate the bridge from the upper platform. Again, no evidence has yet surfaced that U 505 was fitted with this feature.

## Fitting of Turm IV

If the fitting of the Turm IV was nearly complete by late May, then it is likely that the process of conversion of Turm II to Turm IV took place throughout May. It has been said that this conversion process included removing existing towers and completely replacing them with new pre-fabricated towers. If this is correct, then refit 5X would have seen the entire removal and addition of several types of tower in the following order: Turm 0 removed; Turm II inserted; Turm II removed; Turm IV inserted.

When U 841 was changed from Turm II to Turm IV, the interrogation report states that the lower wintergarten platform was removed and a pre-fabricated, larger and stronger lower platform was fitted. This suggests that the entire Turm II was not exchanged for a Turm IV on U 841, and that only a *pre-fabricated lower platform* was introduced. This information may not be relied upon since the upper platform, which was wider on a Turm IV than a Turm II, would also need modified or replaced.

According to Hans Göbeler in *Steel Boats* -

"On July 1, U-505 was moved to a wet dock in the bunkers. With her new and much larger conning tower and fresh coat of dark grey paint, she was unrecognizable as the same boat that had limped into harbor more than six months earlier."

This suggests that the boat was out of dry-dock and into the bunker by the start of July 1943.

## Modifications during last stage of refit 5X (with Turm IV)

Removal of deck gun from foredeck - At the start of the war, the deck cannon (88mm on VIIs and 105mm on IXs) were used reasonably frequently to sink ships and to preserve valuable torpedoes for future attacks. By 1943 the opportunity to sink Allied ships using the deck gun was massively reduced. On the 27th April 1943, an order was issued to remove the 88mm from Type VIICs. Presumably this also applied to the removal of the 105mm from Type IXs. The 105mm was removed from U 505 in the last stage of refit 5X.

When the 105mm was removed from U 505, the 105mm ammunition rack was also removed from the underside of the foredeck. Despite being superfluous to requirements, the strips around the gun, which helped crewmen keep their feet when operating the gun in high seas, were retained on the deck.

Although this did not occur on U 505, some IXs were fitted with a 37mm semi-automatic (3.7cm SK C/30 gun on a LC/39 mount) on the foredeck in the positioned vacated by the 105mm. This was the case on U 515, U 860 and U 873. When U 172 returned from patrol on the 7th September 1943, the shipyard changed the 105mm for a 37mm semi-automatic. A member of the crew objected so the shipyard personnel were forced to reinstate the 105mm on the foredeck. When U 172 left on patrol on the 22nd November 1943, the boat had an unusual combination of Turm IV, Vierling and 105mm. U 841 also went on patrol with this combination on its last patrol but the 105mm was due to be removed when they returned from this patrol.

On some IXs (such as U 168) undertaking long range patrols to the Far East, where there might be an opportunity to use the deck cannon, the 105mm was retained on the foredeck.

Additions to upper platform - When the Turm IV was installed, a pair of twin 20mms (2cm Flak Zwilling C/38 II on an M 43 U mount) were added to the upper platform. These weapons did not feature an armoured shield.

Addition to lower platform - When the Turm IV was installed, a four-barrelled 20mm Vierling (2cm Flak Vierling C/38 on an M 43 U mount) was added to the lower wintergarten platform.

Removal of 37mm from aft deck - When the Turm IV was installed on U 505, the new 37mm semi-automatic (3.7cm Flak 42 gun in L30/37 mounting) was removed from the aft deck.

Ammunition containers - When the Turm IV was installed, water- and pressure-tight ammunition containers were fitted to both platforms. On the upper platform, mounted centrally at the rear of the platform, there was one circular ammunition container encased within a small D-shaped box. On the lower platform there were two containers to the starboard side; these circular containers were mounted together in a row and encased within a larger D-shaped box (the straight edge was aligned with the edge of the wintergarten, the rounded edges were inboard). Also on the lower wintergarten platform, this time on the port side, were three circular containers that were also arranged in a row and mounted together in a larger D-shaped box.

Lattice mesh grill - When the Turm IV was installed, a lattice mesh grill was fitted on both sides to the lower half of the upper platform tower railings, directly below the three wooden seats per side. Some other boats received the lattice mesh on the lower platform as well.

## Background information on Turm IV and Vierlings

*U-Boot Im Focus 9* contains a superb discussion of the changes to the anti-aircraft armament in the U-bootwaffe. For more details readers are directed to this highly informative issue of the magazine. The *U-Boot Im Focus 9* article provides us with the following information (the text in square brackets is from the author) -

- Vierlings were first ready for experimental purposes in March 1943, and fitted to boats in April and May.
- In the April and May period, the second boat was due to have been fitted with a 37mm automatic but this was not yet ready.
- Production of the Turm IV with Vierling was increased in mid-May; 50 Turm IVs were due to have been delivered in June, and 150 in July [it is unclear if these numbers were actually delivered].
- Conversion to Turm IV and Vierling began in early June, with operational boats getting first opportunity.
- On the 14th June 1943 an order was issued stating that no U-boats should leave from Atlantic ports without twin 20mms. Since Vierlings were mandatory for Atlantic boats at this point, this effectively meant that a Turm IV was mandatory as of mid-June 1943. [This is earlier than August 1943, the period when others books state that boat were not allowed to go on operations without a Turm IV tower]
- As a direct result of the June 1943 order, U-boats were delayed from sailing on war patrols in the late June / early July period.
- Boats operating on a war patrol without a Vierling were actually recalled to Norwegian ports.
- The effectiveness of the Vierling was betrayed by its lack of range. It was to be replaced by the 37mm automatic when the longer range, larger calibre weapon became available.

The decision to recall boats from patrols if they did not have the Vierling seems, at first, quite drastic. However, this decision becomes comprehensible when we recognise that it was made in the period directly following Black May. During the infamous month of May 1943, at least 40 U-boats

were sunk. The events of that infamous month resulted in BdU withdrawing almost all boats to port. Tactical and technological changes were implemented to try to wrench the upper hand back from the Allies, though this ultimately proved to be impossible.

The information above makes it clear why conversion from Turm II to Turm IV was considered necessary before U 505 left on patrol in the summer of 1943.

## Change from Vierling to 37mm automatic

When the Vierling did not rise to expectations, this four-barrelled weapon was changed to a single 37mm fully automatic weapon (3.7cm M 42U gun on LM 42U mount). This automatic weapon, fitted on the lower wintergarten platform, should not be confused with the 37mm semi-automatic which had previously been present on the aft deck.

The new fully automatic weapon had a greater range than the Vierling and proved to be much more effective. The 37mm on the lower platform, and the twin 20mms on the upper platform, became the standard fit for IXs, VIICs and VIIC/41s until the end of the war.

In *Steel Boats*, Hans Göbeler refers to the period after patrol 6 by stating -

"For the next two weeks, our boat underwent repairs. They also replaced our huge four-barreled anti-aircraft gun with a newly designed single barreled *Oerlikon* 37mm automatic cannon."

If Göbeler is correct, then the 37mm automatic was fitted during refit 7X (14/07/43 to 31/07/43).

However, other sources suggest that the 37mm was introduced later in the year. According to Eberhard Rössler in *The U-Boat: The Evolution And Technical History Of German Submarines*, the 37mm automatic was ordered on the 15th October 1943. In Robert C. Stern's *Type VII U-Boats*, the author asserts that that the 37mm automatic "finally began" to be fitted in November 1943, with 18 boats being fitted by the start of December.

When U-boats were sunk, the Allies would interrogate any survivors. Many of the interrogation reports are available to us (at www.uboatarchive.net) and provide excellent information on technical and operational details. The following information about 37mm automatic fitting dates can be gleamed from these interrogation reports -

- U 68 - 37mm fitted after end of penultimate patrol (after 23rd December 1943).
- U 172 - still retained the *Vierling* when it departed on its final patrol on 22nd November 1943. Had the boat returned, it would have received the 37mm in the next refit.
- U 177 - 37mm fitted just after the middle of December 1943, prior to sailing on final patrol on the 2nd January 1944.
- U 257 - 37mm fitted between end of penultimate patrol (14th September 1943) and start of final patrol (2nd January 1944).
- U 515 - 37mm fitted after end of penultimate patrol (after 14th January 1944).
- U 744 - 37mm fitted between end of penultimate patrol (15th January 1944) and start of final patrol (24th February 1944). Note: Turm IV had been fitted at the end of September 1944.
- U 801 - 37mm fitted between end of penultimate patrol (8th January 1944) and start of final patrol (26th February 1944).
- U 841 - departed on first patrol on 4th October 1943 with a *Vierling*. Boat was sunk during this patrol so there was no opportunity to fit a 37mm.
- U 845 - 37mm fitted at the end of 1943.
- U 1229 - 37mm fitted in mid-July 1944.

The interrogation report of U 177 states that the "37 mm full-automatic gun was introduced to the U-boat arm about November 1943". U 177 had returned from its penultimate patrol on the 1st

October 1943. At that time, a pair of twin 20mms were added to the upper platform, but it was necessary to add a *Vierling* to the lower platform of U 177 because a 37mm was not available. The reports states: "The 37 mm. gun could not be procured until the last days before sailing and a quadruple 20 mm. gun was mounted for use in gunnery exercises." The 37mm was fitted in a three day period in La Pallice, just after the middle of December 1943, and the boat sailed on its final patrol on the second day of 1944.

This information suggests that the 37mm automatic was not normally fitted in July 1943. For Göbeler's information to be correct, U 505 would have to have been fitted with a 37mm automatic a full three months before the order was placed to fit them to boats. There is one precedent of a boat sailing before the order date - the VIIC U 707 had the 37mm when it sailed on patrol on the 12th October 1943, three days before the order was issued. However, a full three months before the order, as suggested by Göbeler, would require U 505 to have been evaluating the 37mm under combat conditions. So far no information has come to light to confirm that U 505 was used in an experimental capacity, but the possibility cannot be ruled out.

According to the conventional dates, the most likely date for U 505 to have been fitted would be refit 12X (8th November 1943 to 20th December 1943).

37mm ready container - When the 37mm automatic was introduced, a ready container was also fitted to the starboard side of the tower. Consisting of a long thin tube, it housed a replacement barrel for the 37mm weapon. This ready container feature could be found on other boats, such as U 977 when it sailed to Argentina.

37mm training - When the 37mm automatic was fitted, crewmen were required to attend a suitable training course. This was conducted during a Flak specialists' gunnery course, either in the Baltic port of Swinemünde or at Mimizan in the south-west of France. Hans Göbeler had attended a two-week course at Mimizan in early March to learn the rudiments of the 20mm Vierling. The training for the 37mm was reputed to have been conducted during a four-week course.

### Late modifications

*Balcongerät* - This system consisted of 48 hydrophones in a round dome at the bottom of the stem. It was standard on XXIs and was fitted to some VIICs, VIIC/41s, and IXs in 1944 and 1945. The IXC/40 U 194 was the test boat for this device, and it was in place on this boat by January 1943. U 505 received the *Balcongerät* in refit 14X (2nd January 1944 to 16th March 1944). All Lorient boats were expected to receive this in due course.

Rudder support - As with other boats of the period, U 505 was launched with an A-shaped support bracket. This was connected to the bottom of both rudders and ran forward to the thick support bar near the stern. This was removed on late war boats and was not present on U 505 on her final patrol.

## Part IV - Radar & Radar Warning

The implementation of radar aboard U-boats first began in summer 1939, when the IXAs U 39 and U 41 were fitted with a radar set from the GEMA manufacturer. But it was not until 1942, when air attacks were beginning to be suffered by the U-bootwaffe in earnest, before this field of technology was given the full attention it deserved. Radar and radar warning became increasingly important in the Battle of the Atlantic and it was not long before it became essential for survival.

In the following sections, our discussion will be limited to a brief coverage of the types, the time period when they were fitted, and the types of antennae used on the towers. We will cover the types in service when the boat operated during war patrols (pre-capture) and the types in use after the boat was captured (post-capture). These have been broken down into different sections to ensure

there is clarity between what systems the boat did have and what systems the boat might have had after capture. Different text colours have been used to illustrate the differences. These are -

- Black text — General information (not specific to U 505)
- Blue text — Equipment used aboard U 505
- Dark red text — Equipment that would possibly have been installed on U 505 had the boat remained in Kriegsmarine service until the end of the war.

- Green headings — Radar or radar warning sets (internal equipment)
- Purple headings — Antennae (external equipment)

The Kriegsmarine used the following codes -

- FuMO (*Funkmessortungsgerät* meaning bearing taking apparatus) - radar equipment.
- FuMB (*Funkmessbeobachtergerät* meaning radar warning apparatus) - radar warning receiver equipment.
- FuMB Ant - the antenna associated with the FuMB radar warning receiver equipment.

**Radar (pre-capture)**

FuMO 29 *Seetakt* - Also known as GEMA, from the firm which originally manufactured the set, this consisted of two rows of six diploes fixed to the front of tower, above the spray deflector. The upper row of dipoles were for transmitting, the lower row for receiving. These dipoles are clearly visible in some photos, while in other photos the dipoles are hidden by a cover or shield. First tested in late 1941, installation upon operational boats began in 1942. Photos show a number of Type IXs were fitted with this radar equipment.

At present there are no photos in common circulation showing U 505 with this radar. Given that FuMO 29 was not present during patrol 4, and FuMO 30 was fitted early in refit 5X, there does not appear to be a time window when U 505 could have had this set.

FuMO 30 *Seetakt* - Introduced in late 1942 and early 1943, the internal equipment within the FuMO 30 was much the same as the FuMO 29. However, a completely different antenna made the system far more effective than its predecessor. The aerial consisted of a large rectangular mattress-style antenna, with two four-dipole rows, housed in a box on the port side of the tower. This rotatable antenna could be extended or retracted into the box.

This was augmented by the introduction of dipoles belonging to the FuMB Ant 5 *Samoa* antenna (the *Samoa* dipoles were added to the back side of the FuMO 30 mattress, and are characterised by four near oval shaped pieces, arranged in rows of two at a 45 degree angle).

U 505 refit 5X (13/12/42 to 30/06/43) - FuMO 30 radar installed. It is unclear when the *Samoa* dipoles were added.

**Radar (post-capture)**

FuMO 61 *Hohentwiel U* - The existing FuMO 30 radar would have been replaced with FuMO 61 *Hohentwiel U*. Identical in size to its predecessor, the rectangular *Hohentwiel* mattress antenna housed two six-dipole rows and would have been housed in the same location vacated by the FuMO 30. Evaluation of the *Hohentwiel U* began in August 1943, while production began in late 1943. The new radar was first introduced in March 1944 and 64 U-boats were fitted with this improved radar by the 17th September 1944. This *Hohentwiel U* was augmented by dipoles belonging to the FuMB Ant 4 *Sumatra* antenna on the back side of the mattress.

U 505 - It is likely that U 505 would have been fitted with this set in the refit that would have followed patrol 14.

## Radar warning receivers (pre-capture)

Note 1: Radar warning receiver sets are in green headings, antennae are in purple headings.

Note 2: There are discrepancies between the fitting dates of radar warning receivers. The conventional dates are provided in the blue text and the tables. Göbeler's fitting dates are provided at the end of this section.

FuMB 1 *Metox* - Although radar had been fitted to British aircraft since November 1940, it only began to appear in large numbers by 1942. By the summer of 1942 it was a serious threat to U-boats and countermeasures were necessary. On the 26th August 1942, an order was issued to fit radar warning receivers to all U-boats. The first radar warning receiver on U-boats was the FuMB 1 *Metox* (*Metox* being the French company which first manufactured the set). This was trialled in July 1942, and fitted on operational boats beginning in August 1942. By December 1942 the whole fleet had not yet been fitted. By mid-May 1943, BdU began to appreciate that Allied aircraft were homing in on emissions radiated by the *Metox* equipment itself, and banned use of the *Metox* in August 1943.

U 505 refit 4X (25/08/42 to 03/10/42) - *Metox* installed along with the FuMB Ant 2 *Biskayakreuz* antenna.

Note: The original FuMB 1 *Metox* (600A) may have been upgraded or replaced with FuMB 2 *Metox* (R.87) at some point.

FuMB Ant 2 *Biskayakreuz* antenna - The Biscay Cross (*Biskayakreuz*) antenna (also known as *Honduras*, referred to as "Southern Cross" in interrogation reports) for the FuMB 1 *Metox* radar warning receiver was an improvised structure made of wood and wire. It was mounted on a bracket on the attack periscope base, and brought into the boat every time the boat dived. This antenna proved effective but due to its rudimentary nature, and the requirement to be moved in and out of the boat, it was prone to breakage.

U 505 refit 4X (25/08/42 to 03/10/42) - *Metox* installed along with the FuMB Ant 2 *Biskayakreuz* antenna.

FuMB 8 *Wanze* G1 - Due to an urgent requirement to replace the *Metox*, a new radar warning receiver - the FuMB 9 *Zypern* (also known as *Wanze*, or sometimes as *Hagenuk*) - was rushed into use in August 1943. Due the immediacy with which *Wanze* G1 was introduced, inevitably corners were cut during the design and evaluation process. In due course it became realised that this set also radiated emissions. The *Wanze* G1 was banned on the 5th November 1943 and replaced with the *Wanze* G2.

*Wanze* would normally use the FuMB Ant 3 *Bali 1* antenna but the *Wanze* could be connected to the Biscay Cross if required. Even after the introduction of *Wanze* G1, and the *Bali* antenna, the Biscay Cross was often carried inside the boat as a reserve.

The *Wanze* G1 was prone to overheating. In such circumstances, it would be temporarily disconnected until it cooled down, and the *Borkum* would be connected to the *Bali* antenna. It was also possible to connect the *Wanze* to the FuMO 30 mattress antenna.

U 505 refit 10X (23/08/43 to 17/09/43) - *Wanze* installed along with the FuMB Ant 3 *Bali* antenna. The *Metox* and Biscay Cross were removed during this refit, though the Biscay Cross antenna was probably carried inside the boat as a reserve.

FuMB Ant 3 *Bali 1* antenna - The antenna for the FuMB 9 *Wanze* G1 was the FuMB Ant 3 *Bali runddipol* (round dipole). This consisted of a cylinder enclosed in a wire mesh frame, with two dipoles pointing vertically out of the top. Known as the "wire basket" in interrogation reports, the cable went through the stand and entered the pressure hull. The *Bali runddipol* was pressure-tight and overcame the shortcomings of the previous antennae which had to be taken into the boat when diving. The *runddipol* antenna did not allow any direction finding capability.

When boats were fitted with the *schnorchel*, the FuMB Ant 3 *Bali runddipol* antenna was normally fitted on the tower and the top of the *schnorchel*.

U 505 refit 10X (23/08/43 to 17/09/43) - *Wanze* installed along with the FuMB Ant 3 *Bali 1* antenna. The FuMB Ant 3 *Bali 1* antenna remains on U 505 on the port side of the tower, directly ahead of the FuMO 30 box.

FuMB 9 *Wanze* G2 - Following the order on the 5th November 1943 to cease using *Wanze* G1, a newer version (*Wanze* G2) which did not radiate was ordered. This was introduced in late November 1943.

There is no information to confirm that U 505 was upgraded from *Wanze* G1 to *Wanze* G2. But due to the banning of G1 it is almost certain that this did occur. The most likely time period for the changeover would be refit 12X (08/11/43 to 20/12/43).

FuMB 10 *Borkum* - The FuMB 10 *Borkum* was a primitive stop gap measure that was introduced just after *Wanze* G1 was discontinued. The original intention was that *Borkum* was only to be used until the advent of *Wanze* G2. However, the frequency coverage of *Borkum* resulted in it being used in conjunction with *Wanze* G2 and the *Naxos* system. *Wanze* covered the 1.3 to 1.9 metre range, *Borkum* covered the 0.75 to 3.0 metre range, and *Naxos* covered the 8 to 12 metre range (including the all important 9.7cm wavelength of the ASV Mark III radar). Although only intended as a temporary measure, the fact that the *Wanze* / *Naxos* / *Borkum* combination allowed a near complete coverage of the radar spectrum meant that all three were used together on many boats until the end of the war. *Borkum* used the FuMB Ant 3 *Bali 1* antenna or the existing Radione receiver and was introduced in November 1943.

U 505 refit 12X (08/11/43 to 20/12/43) - the war diary (KTB) of U 505 for her final patrol makes frequent mention of *Naxos* and *Wanze* but does not mention *Borkum*. However, many other boats, such as U 515 and U 845, used *Naxos*, *Wanze* and *Borkum* as they were found to be an effective combination. It is very likely that U 505 did have the *Borkum*, with refit 12X being a plausible fitting period.

FuMB 7 *Naxos* - An RAF Stirling bomber, fitted with the latest new ASV Mark III radar, was shot down near Rotterdam in February 1943. This radar set was analysed first by the Luftwaffe and later by the Kriegsmarine. This capture of this cutting edge technology was significant as it allowed the German scientists to analyse and copy the magnetron. These evaluations made it possible to design a radar warning receiver - the *Naxos* - which detected the ASV Mark III radar and did not radiate emissions. The *Naxos* prototype was available in June 1943 and was introduced to the fleet in early October 1943. *Naxos* used the FuMB Ant 3 *Bali* antenna.

U 505 refit 11X (01/10/43 to 08/10/43) - *Naxos* installed. This was operated with the FuMB Ant 3 *Bali* antenna and possibly also used with the FuMB Ant 11 *Finger* antenna.

U 505 refit 14X (02/01/44 to 16/03/44) - an improved *Naxos* version with longer range installed.

FuMB Ant 11 *Finger* - Since direction-finding could not be achieved with the *Bali* antenna, *Naxos* also frequently used the FuMB Ant 11 *Finger* antenna. This consisted of a narrow vertical wooden mast with a circular disc at the top, and a 9cm metal rod extending out of the top of the circular disc. Since this antenna was liable to breakage, especially when moved quickly inside the tower

when the boat dived, spare aerials were often carried. The *Finger* antenna was usually mounted temporarily between the periscopes. Among the boats which used this antenna were U 515 and U 845.

U 505 refit 11X (01/10/43 to 08/10/43) - The FuMB Antenna 11 *Finger* antenna was probably issued to the boat at this time. Since it was removable, it was not a permanent feature on the tower.

The conventional dates are provided in the blue text above. In *Steel Boats*, Hans Göbeler states that FuMB 7 *Naxos* was fitted in refit 8X (early August) and that FuMB 9 *Wanze* (version not specified) was fitted in refit 10X. This is at odds with the conventional view, which holds that *Naxos* was introduced in October 1943, a few months after *Wanze* was implemented.

For Göbeler's information to be correct, U 505 would have to have been carrying *Naxos* two months early, in an experimental capacity. If *Naxos* had been carried at this point, it would seem prudent to have fitted *Wanze* (which was available in August 1943) at the same time. This is because *Naxos* only covered part of the high end of the spectrum (8 to 12 metres), while *Wanze* G1 covered the 1.3 to 1.9 metre range.

**Radar warning receivers (post-capture)**

Additional note: readers are reminded that the modifications in the dark red text were **NOT** made to the boat (they are what *may* have been fitted if the boat had continued in Kriegsmarine service).

FuMB Ant 24 *Cuba 1 (Fliege)* - In March 1944 an improved antenna was built for the *Naxos*. This was the FuMB Ant 24 *Cuba 1* (also known as *Fliege*, meaning fly). Depending on the predilection of the boat's commander, this could be fitted either inside the direction finding loop or on its own mast between the periscopes. First installed in April 1944, the *Fliege* was another antenna that had to be taken inside the boat when the boat dived.

U 505 - It is possible that U 505 would have been fitted with this set in the refit that would have followed patrol 14.

FuMB 26 *Tunis* - Following the introduction of shorter wavelength radar systems by the Allies in May 1944, the Germans countered with the FuMB 26 *Tunis*. This was a combination of FuMB 24 *Fliege*, FuMB Ant 24 *Cuba 1*, and FuMB Ant 25 *Müecke*. The *Fliege* was for 8-23 cm wavelength, and had a parabolic-shaped antenna (FuMB Ant 24 *Cuba 1*) which faced aft. *Müecke* was for 2-4 cm wavelength, and had a horn-shaped antenna which faced forward.

Although *Tunis* replaced *Naxos*, both *Wanze* and *Borkum* were retained to provide coverage of low frequencies. This meant that some boats had, at one point in time, *Wanze*, *Borkum*, *Fliege* and *Müecke* internal equipment, plus FuMB Ant 3 *Bali 1*, FuMB Ant 24 *Cuba 1* and FuMB Ant 25 *Müecke* antennae on the tower - quite a combination!

Depending on the preference of the boat's commander, the *Tunis* system was mounted either inside the direction finding loop or on its own mast between the periscopes. Once again, the *Fliege* / *Müecke* combination had to be removed from the tower each time the boat dived.

U 505 - It is very likely that U 505 would have been fitted with *Tunis* (with accompanying *Fliege* and *Müecke* antennae) at some point in 1944.

FuMB 35 *Athos* - The final refinement came in September 1944 when the FuMB 35 *Athos* was introduced. The antenna for the *Athos* was very distinctive - two capstan-shaped circular arrays mounted on top of a telescopic mast.

U 505 - The *Athos* was very rare (possibly only fitted to U 249) so it would probably not have featured on U 505.

FuMB 37 *Leros* - The FuMB 35 *Athos* was coupled with a FuMB Ant 3 *Bali* antenna to form the FuMB 37 *Leros* system.

U 505 - This was probably only fitted to Type XXIs so it would not feature on U 505.

Note: For summary table please see Part XII.

# Part V - Countermeasures

## Anti-sonar decoys

*Bold* - Code named *Bold* (short for *Kobold*, meaning "deceiving spirit" or "goblin"), this anti-sonar decoy consisted of a large mass of air bubbles which were created beneath the surface. This produced an echo which was intended to fool Asdic operators into thinking that this was a U-boat contact. The mass of air bubbles was created using calcium hydride capsules, which were ejected from a 10cm or 15cm diameter container known as the *Pillenwerfer* ("pill thrower"). This was considered a successful system and was introduced to all operational U-boats in 1942 or early 1943. Upgraded versions, *Bold 4* (introduced in 1944) and *Bold 5*, operated at greater depths.

U 505 - Fitted to U 505 in February 1943 during refit 5X.

### Anti-radar decoys

Note: the code FuMT means *Funkmess-Täuschung* (active deception).

*FuMT 1 Aphrodite* - Code-named *Aphrodite*, this anti-radar decoy consisted of a 36-inch diameter hydrogen-filled balloon which was tethered by a line to a sheet anchor. Once suspended, three aluminium foils of four metre length were attached to the line by a cross-bar. This would act as a radar reflector and create false radar echoes. Initially, the decoys were meant to be inflated on the deck using one of the two hydrogen cylinders on the tower bulwark. Later, pressure-tight containers were introduced under the tower floor to safely house the hydrogen bottles.

First fitted in June of 1943, and deployed operationally in September of 1943, *Aphrodite* was commonly used by U-boats until the introduction of the *schnorchel* made surface transit less frequent.

U 505 - Early in refit 5X, two hydrogen bottles were added (each one was directly behind a tower bulwark) to the upper platform of the Turm II. It is possible these bottles were also used to inflate weather balloons. At a later stage (probably with the introduction of the Turm IV later in refit 5X), these two bottles were removed. Six bottles were introduced under the floor of the lower wintergarten platform. These can be seen in photograph 507 of the Task Group 22.3 Report (Enclosure G) at http://www.uboatarchive.net/U-505EnclG507.htm. This webpage includes the caption "Flask as in rack aft of conning tower on U-505". To ensure there is no confusion as to their location, the bottles were under the floor of the lower wintergarten platform, directly behind the upper platform.

*FuMT 2 Thesis II C* - *Thesis* included a variety of floating decoys that were intended to confuse Allied radar operators. It consisted of thin metal dipoles added to the top of a five metre long wooden pole. At the top of the decoy buoy was a thin wire filled with foil bands. This equipment took up a lot of space under the deck casing and proved awkward to assemble on a rolling deck.

First introduced in January 1944, *Thesis* continued to at least April 1944. It was discontinued around this time when it was recognised that Allied radar sets were not picking up the decoys. Boats which carried *Thesis* in early 1944 included U 66, U 91 and U 744. A later version, FuMT 4 *Thesis US*, was launched underwater through the *Bold* ejector but it was not used operationally.

U 505 - If U 505 did carry this decoy system, it was probably fitted in refit 14X.

**Anti-radar coatings**

*Tarnmatte* - A sound absorbing coating was also added to a number of *schnorchel* heads. Known as *Tarnmatte*, it can be distinguished by a criss-cross shape on the top surface.

U 505 - Not fitted to U 505.

**Anti-sonar coatings**

*Radar absorption* - A radar wave absorbing mat (*Bachen-Netz*) was fitted to the conning tower of U 968 in the autumn of 1943. A few months later, in late 1943, a different type of absorbing material (*Schornsteinfeger*) was used on U 390. Soon afterwards the tower of U 708 was coated with black paint which included radar absorbing properties. Later, U 1277 had parabolic metal screens added.

U 505 - Not fitted to U 505.

*Alberich* - To counter Asdic, a few boats were fitted with sound absorbing anechoic tiles. Known as *Alberich*, this reduced the sonar reflection of the boat.

U 505 - Not fitted to U 505.

## Part VI - Damage During Capture

Several warships and aircraft fired countless rounds, of various calibres, at U 505 during the capture. The following are some of the more obvious signs of damage sustained at this time -

Bow plane - The port bow plane of U 505 was ripped off during the second of two collisions with the USS *Pillsbury*.

As a point of interest, the two collisions resulted in considerable damage to the hull of the escort. The first collision made two holes, both of 2 1/2" x 4". The second collision made another two holes, of 5-6" x 19" and 21" x 4-5". Following the second collision, a large section of U 505's bow plane was wedged inside the escort's hull and three compartments were flooded below the waterline.

Rudder - The rudder was jammed to the starboard side.

Ballast tank - A 20mm shell punctured number 7 ballast tank.

Holes in deck - Although there is no available photographic evidence, it is likely that some rounds would have hit the wooden deck.

Torpedo storage tube - The torpedo storage tube on the port side, just to the side of the lower wintergarten platform, was damaged, as was the warhead of the torpedo itself. The torpedo, storage tube and metal cover, were all rolled overboard by American personnel.

Deck railings - Some of the deck railings on the starboard side were bent. On the port side, the top rail was bent slightly in one position, and one of the vertical stanchions (beside the torpedo tube cover) was severed. On both sides, three vertical stanchions at the front of the group appear to have been missing after the capture. To depict U 505 during or after capture, the railings on a model would have to be altered accordingly.

Holes in tower - The tower of U 505 was punctured by cannon and machine gun fire in several places. Thankfully successive curators have chosen not to repair these holes so that visitors to MSI are presented with first hand evidence of the damage sustained by the boat. On the starboard side, there appears to be ten jagged holes of various sizes on the tower, four holes on the wintergarten platform, and three holes on the magnetic compass fairing. On the port side, there are a few small holes near the emblem, and two holes on the port side of the wintergarten platform.

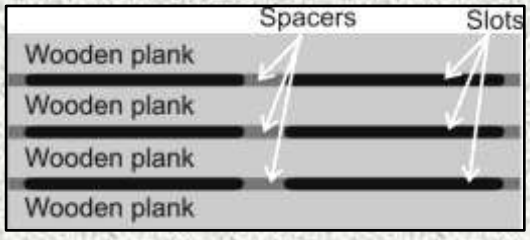
Wind deflector flange - The most obvious sign of damage concerns the wind deflector flange at the top of the tower. As can be seen in the available images, a section of the flange is clearly missing and damage to the forward jumping wire is also evident. The wire would normally be attached to both sides of the tower but it can be seen that the wire had detached from the attachment point on the starboard side. The insulators for the starboard side can be seen hanging downwards at the right hand side. The forward jumping wire itself was not taut and hanged limply on the foredeck.

There are photos showing other Type IXs with sections of the wind deflector flange missing; these include U 106, U 126, U 506, U 530, U 550, U 870, U 889 and U 1227. The thin steel deflector may have been susceptible to being ripped off the tower as the result of depth charge attack.

37mm automatic - The 37mm automatic on the lower wintergarten platform (3.7cm M 42U gun on LM 42 U mounting) was knocked out of place following the depth charge attacks.

## Part VII - Future Kriegsmarine Modifications

In this section we will examine the modifications which may have been made if U 505 had not been captured. Although not directly relevant to the modeller of U 505, it is hoped this information may assist modellers who intend to build a different late-war IXC boat.




Above (B5): As can be seen in the drawing above, the *slotted* style of decking was achieved by adding wooden spacers and slots in between the wooden planks. The various dimensions, such as plank width, spacer length and slot width, were the same on Type Is, IIs, VIIs, IXs and XIVs. With the exception of Type XXIs and XXIIIs, which did not feature wooden decking, the slotted decks produced a style that was distinctive to all Kriegsmarine U-boats.

Note: To be clear, the following modifications were **NOT** made to U 505 (they are simply what *may* have been fitted to U 505 if the boat had continued in Kriegsmarine service until the end of hostilities).

Deck - There were two types of wooden deck used upon U-boats - the earlier *slotted* style and the later, more simplified *planked* style. The first U-boats to be built with the planked deck were launched as early as the autumn of 1942. However, as there were variations between shipyards, in some yards the introduction of the planked decks may have taken place a little after the autumn of 1942. Boats launched in 1943, such as U 534, had the planked style.

While other modifications would be retrofitted to existing boats, the installation of the planked deck only took place on newly-built boats. Changing existing decks to the planked arrangement was nowhere near worthwhile for the financial and manpower expenditure. Therefore, boats which were launched with the slotted deck would keep their slotted deck until their demise.

U 505, which was built with the slotted style, would therefore **not** have received the planked deck.

Cut out foredeck - The large size of the Type IXs had implications upon their ability to dive quickly. When the need to evade approaching aircraft became more desperate, an attempt was made to reduce the diving time of Type IXs by cutting out a large section on either side of the foredeck. This alteration produced a very identifiable visual change but did not gain an appreciable improvement in diving time.

On pages 33 and 34 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle, the authors list the IXCs and IXC/40s which received the cut out foredeck and the dates when the alteration was completed. Note that this feature was not universal by the end of the war - U 532, U 534 and U 889 are some examples of IXs which did not receive this modification. Therefore, U 505 may or may not have had the cut out foredeck if the boat had remained in active service until the end of the war.

Some enthusiasts believe in two fallacies - firstly, that the cut out foredeck was an exclusive feature of the IXC/40; and secondly, that this feature was added to all IXC/40s. Although quite understandable, both these assumptions are erroneous. Many Type IXC/40s were built before the introduction of this cut out foredeck and were therefore launched with the normal deck. It is also true that the cut out foredeck was added to IXs regardless of variant or sub-variant.

As a side note, U 805 was fitted with a curving walkway on the foredeck. This started off on the port side of the tower, then turned at a 45-degree angle, and then turned again to run centrally along the foredeck up to the point where the cut out foredeck began.

Late-war tripod jumping wire supports - Following the introduction of lower wintergarten platforms, Type IXs were fitted with tripod supports on the aft deck to raise the level of the jumping wires. Normally IXs would have these supports in the positions we see on the Revell kit.

On some later boats, such as U 532 and U 805, a late-war tripod style was introduced; these faced outboard and were located farther forward along the aft deck, directly inboard of the planked sections at the edge of the deck. In this arrangement, the insulators were positioned directly in front of the tripod supports. A number of late-war VIICs and VIIC/41s also had the late-war tripod style. Due to time frame considerations we may ask if the late-war tripod style was exclusive to planked decks. This theory is disproved by photos of U 377 and U 415, which featured slotted decks and the late-war tripod style.

*Schnorchel* - The *schnorchel* system included a hinged mast on the deck, a clamp on the tower to hold the mast upright, and air trunking on the starboard side of the tower. On Type IXs the *schnorchel* was fitted to the starboard side, whereas on Type VIICs the device featured on the port side. On page 30 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle, the authors list the IXCs and IXC/40s which received the *schnorchel*, the type of device, and the dates in which the device was fitted. Although implementation began on operation boats in November 1943, very few boats had this feature by April 1944.

U 505 would almost certainly have been fitted with this feature, perhaps directly following patrol 14. The air trunking for the *schnorchel* would normally have been fitted to the starboard side of the tower, where it would have displaced the ready container tube for the replacement 37mm barrel.

Torpedo storage tubes - Type IXs were fitted with eight pressurised storage tubes for spare torpedoes. The process of transferring the spare torpedoes from the storage tubes into the boat was time consuming. Late in the war, when the threat of air attack made this lengthy procedure much too hazardous, the storage tubes were removed. They were removed from U 68 in early 1944, whereas removal from U 805 took place in late 1944 or early 1945. Although U 505 retained them at the time of capture, it is likely that they would have been removed in the months which followed.

*Askania* magnetic compass fairing - The magnetic compass on U 505 was located inside a fairing at the front end of the tower. On page 9 of *U-Boot Im Focus 2*, it is stated that a new type of compass - the "*Askania*" type - was ordered for new boats on the 15th October 1942. Shaped like an inverted cone, the new housing was entirely separate from the tower and was located just ahead of the old location. Although U 534 appears to have had the *Askania* magnetic compass in 1943 (possibly in an experimental capacity), implementation on most boats occurred around the latter half of 1944. When boats were retrofitted, a metal plate was positioned underneath the area vacated by the previous magnetic compass fairing. Most Type IXs were fitted with the *Askania* magnetic compass by the end of the war so it is likely that U 505 would also have been converted at some point. However, a photo of U 190 showing the normal fairing at the end of the war means that the fitting of the *Askania* type would not have been guaranteed

Radar and radar warning receivers - This is covered in Part IV (see dark red text). Additionally, the pole with the *Bali* antenna would have been moved from the port side to a central location between the two periscopes.

UZO - *Uberwasserzieloptik* (torpedo aimer) - Late in the war, the existing UZO column was replaced with a new type. Note that the UZO column was offset to port on Type IXs.

Twin 37mm - By the end of the war, U 534 and U 190 both featured a twin 37mm automatic on the lower wintergarten platform. According to Jon Kelly, U 534 had a 3.7cm Zwilling M 42 U gun on a DLM 42 U mount, which was upgraded to a 3.7cm Zwilling M 43 U gun on a DLM 42 U mount. Although rare, it might have been possible for U 505 to have been fitted with this very powerful armament.

*Zwiebel* - The *Zwiebel* system at the bow included hydrophones enclosed within a rounded housing at the forward end of the upper deck. U 889 is reputed to be the only U-boat fitted with this system so it is unlikely that U 505 would have received it.

# Part VIII - Post-capture Modifications

The fascinating story of how U 505 migrated all the way from the Atlantic Ocean to Chicago can be found in the chapter *Project 356:* U-505 *And The Journey To Chicago* within *Hunt And Kill*. This authoritative chapter was penned by Keith Gill, the former curator of the U 505 at MSI who was (and is) highly regarded by enthusiasts for his contributions to the boat and to U-boat research in general. Many of the brief details which are included in the following timeline were derived from Keith's excellent chapter.

A few of the dates in the immediate post-war period were derived from naval historian Derek Waller's excellent online article "*U-505 In The US Navy*" (http://candotg.org/USNavy.htm). This is highly recommended reading for those interested in the story of the boat's move to Chicago.

Due to the constant process of deterioration and restoration, some of the boat's current features differ from the original wartime features. The chronological breakdown which follows shows the general order in which these modifications were made. In order for readers to extract information more easily, each feature is also covered individually at the end of this section.

## Bermuda modifications

Following the boat's arrival at Port Royal Bay in Bermuda on the 19th June 1944, it was evaluated by the US Navy's Office Of Naval Intelligence. In the quest to assess the quality of the many individual components which made up a Type IXC U-boat, technical equipment was either tested

on site or removed for further study. This resulted in an array of systems being removed from the boat. The radio and sound rooms, for example, were stripped bare.

In dry-dock in Bermuda, the following modifications and repairs were completed -

- Forward dive plane on the port side replaced.
- Rudders freed.
- Hole to number 7 ballast tank repaired.
- At some point (perhaps in Bermuda) rectangular plates were added over the *Unterwasser Telegraphie* (UT, underwater telegraph) membranes, which were located above the forward dive planes. These membranes were probably removed for evaluation by the US Navy.
- Torpedo storage tube cover on port side replaced with wooden planking (the original metal cover had been jettisoned along with the damaged torpedo and the torpedo storage tube).
- Deck railings repaired (though not to original design).
- Forward jumping wire repaired, but without any insulator blocks directly in front of the tower. The original jumping wires aft of the tower may also have been replaced.
- Tall pole added to the foredeck, near to the bow. The forward jumping wire was attached to the top of this pole.
- Tall T-bar added to the aft deck, just ahead of the rearward facing navigation light.
- Wind deflector flange repaired.
- Running light added to front of tower, near the top of the bulwark.
- Some form of vertical tubular attachment added to the outside of a vertical stanchion on the upper platform railings (on both port and starboard sides).
- Anti-aircraft guns probably removed for evaluation.

The holes in the conning tower were not repaired. U 505 was then returned to sea with a US crew and used to train destroyer crews. In an effort to keep the capture a secret, the boat was named USS *Nemo*.

## Post-capture timeline

- 16th May 1945 - US Navy Press Release made a public announcement about capture and salvage of U 505.
- 18th May 1945 - US Treasury Department announced that U 505 would undertake two war bond tours to raise funds for the war against Japan. It was intended that U 505 would visit more than 20 ports and cities in these two tours.
- 18th May 1945 - U 505 departed from Bermuda.
- 23rd May 1945 - Arrived in Philadelphia for the start of the first tour with US Navy crew on board. Spectators could climb on board if they purchased a war bond.
- 7th July 1945 - First tour ended.
- 1st August 1945 - Second tour began.
- 8th January 1946 - Memo stated that second war bond had finished, and that spare parts could be taken from U 505 for other remaining U-boats.
- 12th January 1946 - Arrived at Boston naval base after the end of the second tour.
- 1946 - The US Navy had decommissioned the boat, had extracted all technical information, was using U 505 for spares for other U-boats, and was intent on using the boat for gunnery and torpedo practice until it sank.
- 3rd May 1946 - Transferred from Boston to Portsmouth, New Hampshire.
- 13th January 1947 - Captain Daniel Gallery started efforts to save the boat and bring it to Chicago.
- September 25th 1947 - Lunch between Father John Gallery (brother of Captain Daniel Gallery) and Lenox Lohr of MSI. This started a series of complex negotiations (particularly over

who should foot the transportation costs) over several years which would eventually see the boat moved to the museum.

- October 6th 1947 - With U 505 due for disposal in November 1947, museum representatives sent a telegram to the Secretary of the Navy and Chief of Naval Operations Admiral Chester Nimitz. The boat would subsequently be saved from destruction.
- Late 1949 - U 505 was again on list of boats to be used for gunnery practice or scrapped.
- 22nd April 1953 - U 505 was the only remaining U-boat at Portsmouth. A *Chicago American* article discussed the advanced state of decay, mentioning parts being stripped and cannibalised, heavy rust, and periscopes missing. With eight years spent exposed to sea air, the outer hull was deeply pitted with rust. Questions were raised as to whether the boat was in a suitable condition to withstand a several thousand mile voyage to Chicago.
- 12th August 1953 - Moved into dry-dock at Portsmouth. Barnacles and sealife removed from lower hull. Diving planes removed. Every exterior opening sealed. At rear of torpedo doors, locks added over the doors. Deep exterior scars present, including a large hole at the stern on the port side. Running lights added on either side of the tower. Original anchor removed and auxiliary anchor fitted.
- Early September 1953 - Repairs completed.
- 9th March 1954 - Boat transferred from US Navy to the Museum of Science and Industry.
- May 1954 - In addition to the small welded Kriegsmarine examples, large welded waterline draught marks were added to the boat in preparation for the towed journey to Chicago.
- 15th May 1954 - U 505 left Portsmouth, New Hampshire. It would travel through 28 locks on the St. Lawrence, and through four of the five Great Lakes, on its way to MSI.
- 3rd June 1954 - Arrived in Cleveland. Upper hull and tower repainted.
- 7th June 1954 - Departed Cleveland.
- 26th June 1954 - Arrived in Chicago.
- 28th June 1954 - Towed to *American Shipbuilding* dry-dock. Preparations for move.
- 2nd July 1954 - Towed to another *American Shipbuilding* dry-dock in Calumet river. Structural work undertaken.
- Early July 1954 - Moved onto the *Great Lakes Dredge And Dock Company* floating dry-dock. Photos at this time can be seen at http://www.neiu.edu/~reseller/esu505albm.htm.
- 13th August 1954 - Made transit to 57th Street Beach aboard floating dry-dock. After moving off floating dry-dock, the boat spent two and a half weeks on the beach with the bow jutting out over the water.
- 2nd September 1954 - Lake Shore Drive closed. The move across this main road (on a rail and roller system) began.
- Early September 1954 - Arrived at MSI.
- 19th September 1954 - Repairs and repainting in preparation for dedication ceremony.
- 25th September 1954 - Dedication ceremony at MSI.

## September 1954 restorations

Between the 19th and the 25th September 1954, the following repairs were hastily conducted to make the boat presentable for the dedication ceremony -

- Diving planes replaced.
- Locks over torpedo doors removed.
- Holes on hull patched up.
- Exterior sandblasted and new light grey / black paint scheme applied.
- Deck railings repaired (not to original design).
- Jumping wires added.

- Running lights on either side of the tower removed (the central running light at the front of the tower retained).

At this time neither of the original periscopes were available. A British navigational periscope was fitted, as was a mock-up of the sky periscope. The original anchor was not replaced on the boat.

## Subsequent restorations

Restoration projects were conducted in 1954, 1968, 1978 and 1988 / 1989. The following changes occurred -

- On each restoration (1954, 1968, 1978 and 1988 / 1989), sandblasting of the hull progressively reduced the thickness of the outer skin.
- During the course of restorations, some of the free-flooding vent holes were not replaced according to the boat's original wartime patterns. This included the four vents at the stern (above the rear dive planes) which were filled in at some point. More details can be found in Part IX.
- At some point the rear section of the propeller shaft housing (on both port and starboard sides) was removed and not replaced.
- A protective bar was fitted from the forward dive planes to the hull.
- At some point in the 1950s, the rotted areas of the deck were replaced. The anti-slip strips around the 105mm deck gun position were removed. Note that the slotted deck style remained on the boat for decades.
- Originally the boat had a metal cover for torpedo spare tubes on either side of the tower. The boat now had only wooden planking in these areas on either side of the tower.
- In the 1970s, only one insulator block was present in front of the splitter on the forward jumping wire. The forward jumping wire did not meet with the foredeck, rather it met with a tall vertical stanchion in place on the bow.
- In the 1970s, the capstan had several poles jutting out at different angles.
- At some point a square-shaped area was added directly on top of the magnetic compass fairing.
- The original sky periscope was returned in 2002.
- Some original sound and radio equipment was returned.

## Final restoration project

In 2005, following a $23.5 million restoration project, U 505 opened to the public in a new climate controlled underground enclosure. The restoration project completed the following -

- Large welded waterline draught marks removed.
- Protective bar between the forward dive planes and hull removed (this was actually completed after the move).
- Deck replaced with planked deck.
- Tall vertical stanchion on the foredeck, near to the bow, removed.
- Tall T-bar on the aft deck removed.
- Insulators added in correct positions to both the forward jumping wire and both aft jumping wires. The forward jumping wire now met with the foredeck in the correct position.
- Wind deflector flange section removed to correctly show the boat during capture.
- Square-shaped area on top of the magnetic compass fairing removed, leaving a square hole on the top surface of the fairing.
- Running light on front of tower removed.
- Vertical tubular attachments on either side of the upper platform railings removed.

The inaccuracies in the deck railings were not corrected so the boat retained a railing pattern which differed from the original design.

## Individual features

The information above has been presented in chronological order. In order to make it easier to extract information, the information has been broken down into individual features.

Hull plating - In 1954, deep exterior scars, including a large hole at the stern on the port side, were present. A section midway along the hull, just below the main drainage holes, was particularly badly deteriorated. Sandblasting took place during restorations in 1954, 1968, 1978 and 1988 / 1989; this reduced the thickness of the outer skin on each occasion.

Free-flooding vent patterns - As a consequence of the replacement of hull plating, some of the free-flooding vent holes were not replaced according to the original wartime pattern. This included the four vents at the stern (above the rear dive planes) which were filled in on U 505 at some point. More details can be found in the Part IX.

Kriegsmarine welded waterline draught numbers - As discussed in Part IX, some of the welded waterline draught numbers are missing from the boat. By 1954 the section midway along the hull, just below the main drainage holes, was particularly badly deteriorated. When hull plating was added to restore this central area, new welded draught numbers were not added.

Prior to the move to Chicago, locks were added to the rear of the torpedo doors directly over some of the welded waterline draught numbers on the bow. This accounts for why the lower figures are missing from this area of the boat.

Large US-style welded waterline draught numbers - In addition to the small welded Kriegsmarine examples, large welded waterline draught marks were added to the boat in preparation for the transit to Chicago. On the port side there were six numbers - 0, 1, 2, 3, 4, 5 - running vertically from bottom to top. The starboard side had the same six numerals, but due to the position of the anchor, the numerals 4 and 5 were positioned forward of the anchor recess. These numbers were all removed in 2003 / 2004.

Anchor - In August 1953, the original anchor was removed and an auxiliary anchor fitted. The original anchor was not relocated on the boat and resides in MSI as a separate display feature.

Propeller shaft housing - At some point in Chicago, the rear section of the propeller shaft housing was removed and not replaced.

*Unterwasser Telegraphie* - At some point, perhaps in Bermuda, rectangular plates were added over the *Unterwasser Telegraphie* (UT, underwater telegraph) membranes, which were positioned on the hull just above the forward dive planes. These membranes may have been removed for evaluation by the US Navy.

Deck - At some point in the 1950s, the rotted areas of the deck were replaced. The anti-slip strips around the 105mm deck gun position were removed at this time.

In 2003 / 2004, the opportunity was taken to replace the slotted wooden deck. Unfortunately the replacement deck was of the planked variety, which had never featured on the boat.

Deck railings - The deck railings were repaired in Bermuda but probably not to wartime specifications. In July 1954, the deck railings were again in poor condition, with bent and missing stanchions. In September 1954, prior to the dedication ceremony, the deck railings were repaired. In 2003 / 2004, the inaccuracies in the deck railings were not corrected, leaving U 505 with a railing pattern which differs from the original design.

Cover on deck for torpedo storage tube - In Bermuda, the torpedo storage tube cover on the port side was replaced with wooden planking (the cover had been jettisoned along with the damaged torpedo and the torpedo storage tube).

Jumping wires and insulators - In Bermuda, the forward jumping wire was repaired but there were no longer any insulator blocks in front of the tower. The forward wire met with the top of a tall pole fitted to the foredeck. The original jumping wires aft of the tower may also have been replaced. The jumping wires were removed for the journey to Chicago and replaced by the time the boat went on public display. In the 1970s, only one insulator block was present in front of the splitter on the forward jumping wire. In 2003 / 2004, the insulators were added in the correct positions to both the forward jumping wire and both aft jumping wires.

Wind deflector flange - The wind deflector flange was repaired in Bermuda. In the final restoration in 2003 and 2004, the section of the wind deflector flange section which had been added in Bermuda was now removed. This was quite an important modification because it allowed the boat to regain the appearance it had during capture.

Magnetic compass fairing - At some point in Chicago a square-shaped area was added directly on top of the magnetic compass fairing. By 2005 this area had been removed, with only a square hole being present on the top surface of the fairing.

Running lights - In Bermuda, a central running light was added to front of tower, near the top of the bulwark. Prior to the journey to Chicago, a running light was added to either side of the tower (the port light was fitted to the outside surface of the FuMO 30 box). In September 1954, the running lights on either side of the tower were removed but the central running light was retained. In 2003 / 2004, this central light was removed.

Attachments on upper platform railings - In Bermuda, some form of vertical tubular attachment was added to the outside of a vertical stanchion on the upper platform railings (one on each side). In the 2003 / 2004 restoration, these were removed.

Damage to tower - The holes in the conning tower were not repaired.

Periscopes - By the time the boat went on public display in 1954, neither of the original periscopes were present. A British navigational periscope and a mock-up of the sky periscope featured on the boat. The original sky periscope was returned in 2002. The low ceiling currently prohibits this from being displayed in an extended position on the tower so it is now mounted horizontally beside the boat.

Anti-aircraft guns - The 37mm automatic was knocked slightly off position and this damage would have been repaired in Bermuda. Some photos in 1945 show the boat without anti-aircraft guns, while others in this year show the guns in place. They may have been removed for evaluation and then refitted to the boat. It is stated that the original guns (with the exception of one 20mm barrel, which came from U 858) were returned to the boat at some point.

# Part IX - Current Features Versus Revell Kit

In the last section we studied how the external features of U 505 changed in the 60 years spent outside exposed to the elements, and how the boat was repaired and restored with varying degrees of accuracy when compared with the wartime prototype. These modifications should give us some understanding as to why certain current features differ from the original design.

If modellers wish to depict U 505 following the capture, they will of course have to modify their model to account for the damage sustained by various attacks from US aircraft and surface vessels. Such modifications are within the capabilities of most modellers (at least I hope so, since I plan to try adding battle damage to my own model). What is much more challenging is attempting to depict U 505 with her current features. As we shall see, a number of alterations would be necessary. The most challenging task, of replacing the slotted kit deck with an entirely new scratchbuilt planked-style deck, may deter all but the dedicated of us from depicting the boat in its present guise.

## Hull plating

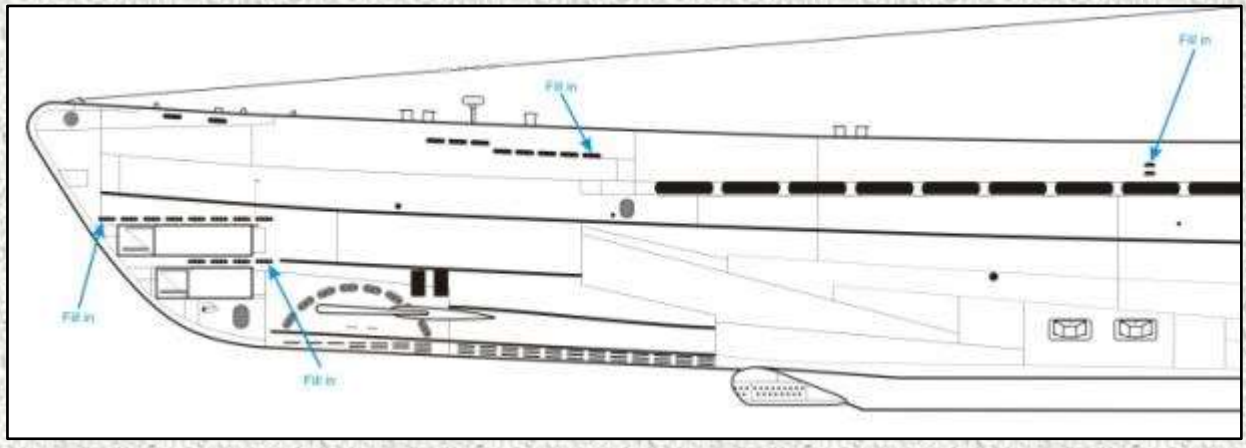
When we view photos of U 505, housed within a climate controlled underground enclosure which protects the boat from the elements, there are, at least on first inspection, no obvious visual clues to betray the fact that U 505 was once a derelict hulk, lying with gaping wounds in her hull and stripped of all her precious technological features. The extensive corrosion damage was the inevitable result of ten full years lying exposed to the salty waters of the Caribbean and Atlantic coast. While the move to MSI saved the boat and ensured her survival from destruction, the seasonal variations that Chicago offers became a threat to the boat. The freezing cold and snow of winter, the rains in spring, the heat and humidity of summer, and the thunderstorms of the autumn, were all endured 50 times over by the wartime relic. In each of the four major restoration projects, when the entire hull was sandblasted, some areas of steel plating were cut away and other plates added. Following the progressive deterioration of the hull, which had “thinned dramatically” since her first days as an exhibit, it was decided that housing the exhibit indoors was essential for its survivability.

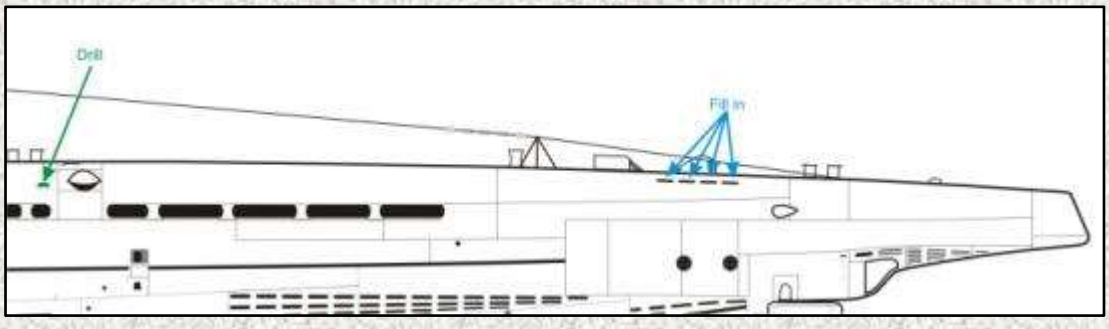
## Free-flooding vent patterns

Although visitors cannot see the thin hull plating, evidence of the deterioration can be discerned in the boat’s free-flooding vent patterns. In the process of restoration work, care was not always taken to maintain her original wartime patterns.

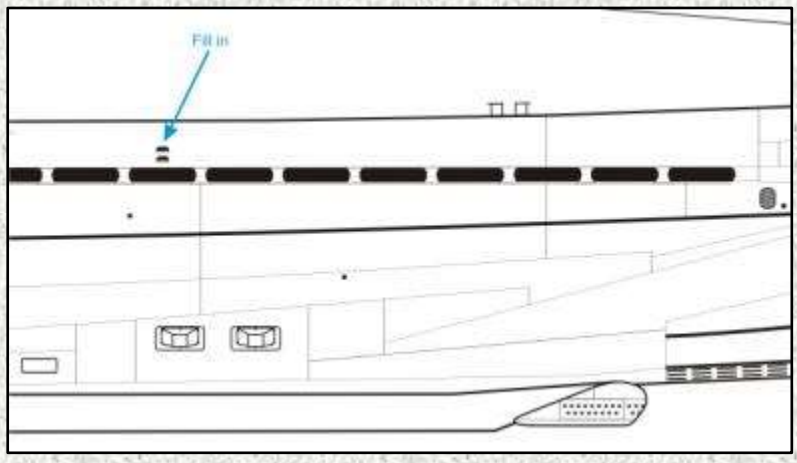
The following drawings illustrate the holes that need to be filled or drilled on the Revell kit in order to depict a modern-day U 505. These changes should **NOT** be completed for any other boat, or indeed for depicting U 505 in her wartime guise. In the drawings, blue indicates holes to be filled in, and green indicates holes to be drilled.

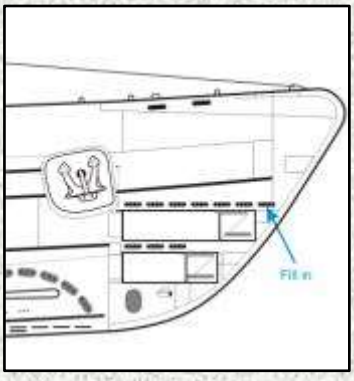
Port side - On the right hand side of the drawing below, a blue arrow points to two steps arranged vertically. Although there is only one arrow, both steps should be filled in.

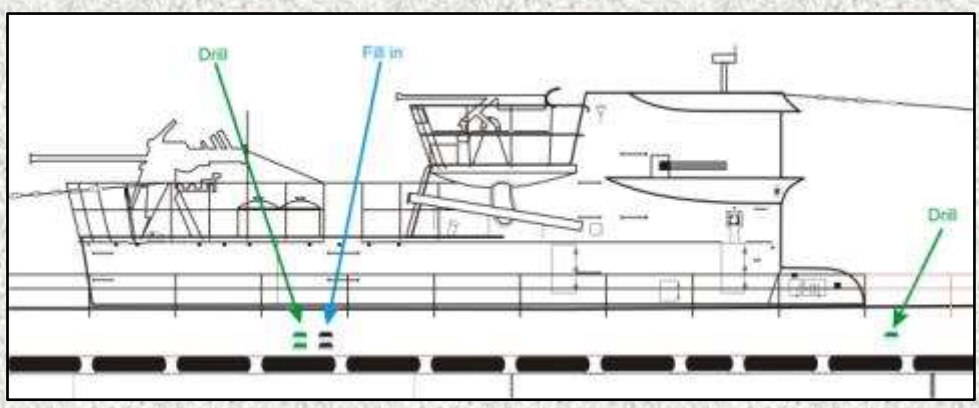


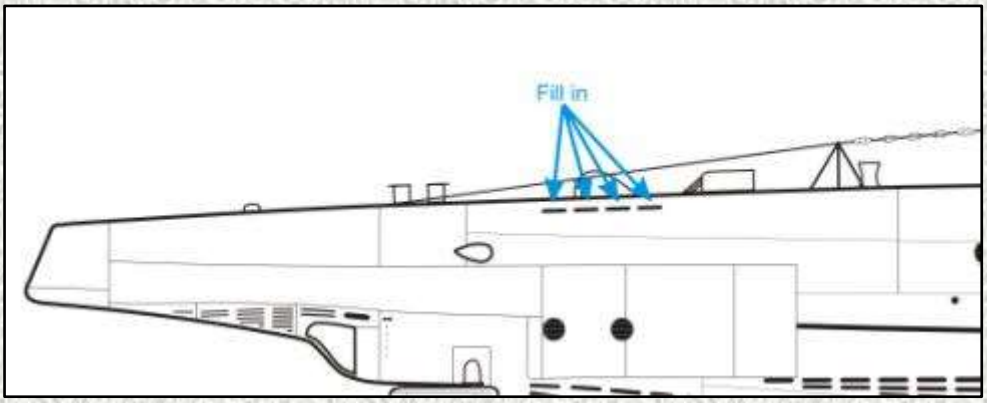




Starboard side - The two steps on the drawing below (pointed to by the single blue arrow) should both be filled in.



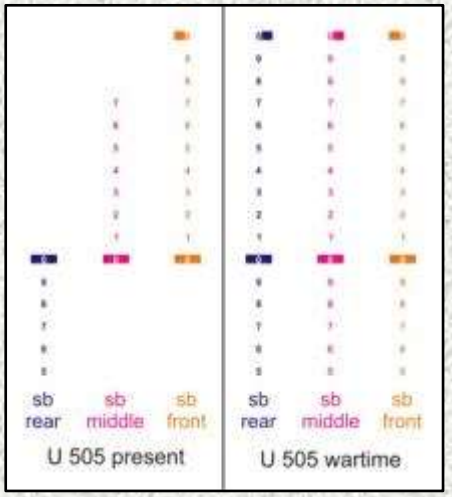






Revell pattern - Since current photos do not immediately betray the depths of restoration works required over the years, it is far from obvious that the vent patterns are presently different from wartime patterns. With this in mind, and the convenience and expediency that the museum boat offers researchers, it would have been easy for Revell to have copied the patterns of the current boat without checking them against wartime photos. Perhaps the known inconsistencies which marred their VIIC kit made Revell extra careful when researching the IX patterns. However, it is rather impressive that Revell chose the correct wartime patterns when they could so easily have been led astray by the modern day U 505.

The Revell kit depicts the vent patterns found on U 505 during wartime so no alterations are required for this boat or others with the same pattern (U 68, U 125-131, U 153-158 and U 503-512). Some alterations are necessary for other Type IXs.

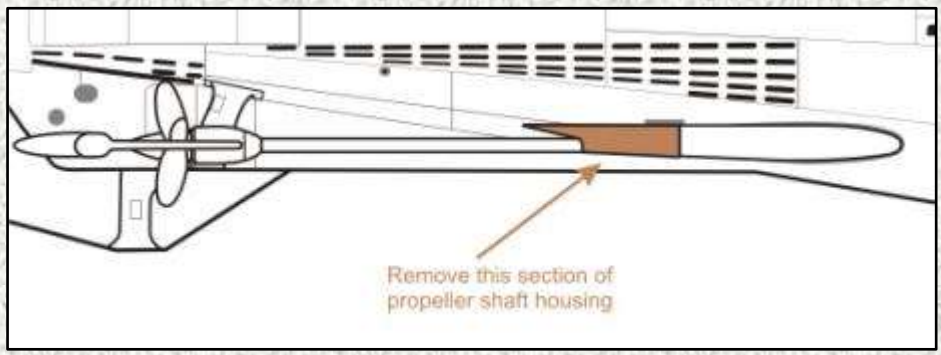
## Welded waterline draught numbers




As can be seen from the drawing to the left (which shows the welded waterline numbers on the starboard side) certain numbers were not replaced when repairs were made to the hull. The port side currently has the following numerals –

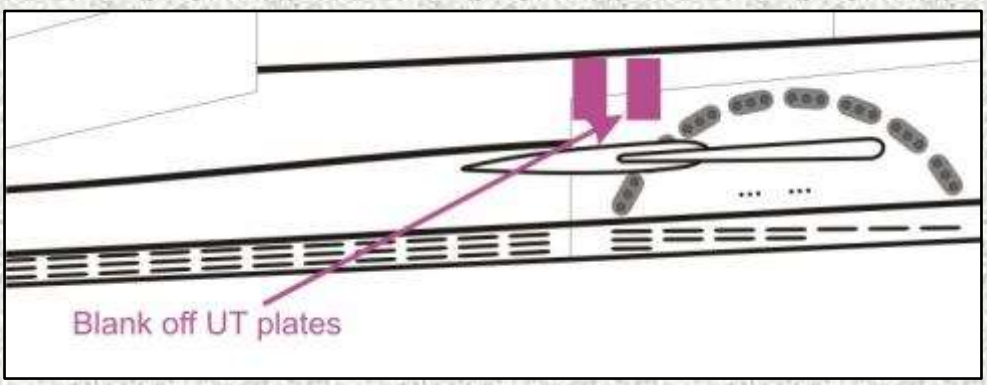
- Rear - Same as starboard side, with middle 0 down to 5.
- Middle - Same as starboard side, except the top 7 is difficult to discern.
- Front - Same as starboard side, except the lower rectangle and 0 are both missing.

## Propeller shaft housing



This housing should be removed from both sides.

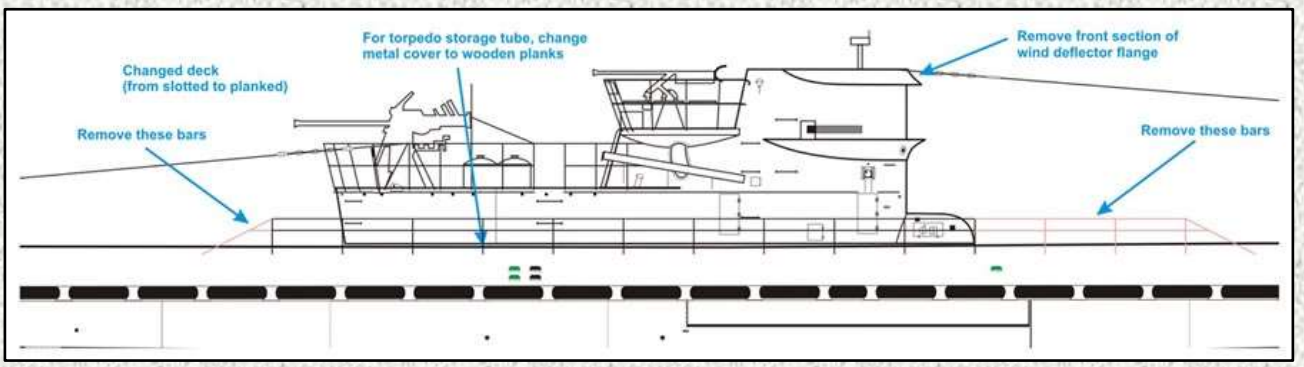
## UT plates




The rectangular plates should be added over the UT plates on both sides.

## Deck railings

During the final restoration project, the deck railings were not returned to the original design. At the front, the boat currently has three vertical stanchions and one diagonal stanchion missing. At the rear, the diagonal stanchion is missing. The pink lines below show what needs to be removed from the Revell railings.




## Other features

Deck - At some point in the 1950s, the rotted areas of the wooden deck were replaced and the anti-slip strips around the 105mm deck gun position removed. The slotted style was retained at this time and this deck remained on the boat for decades.

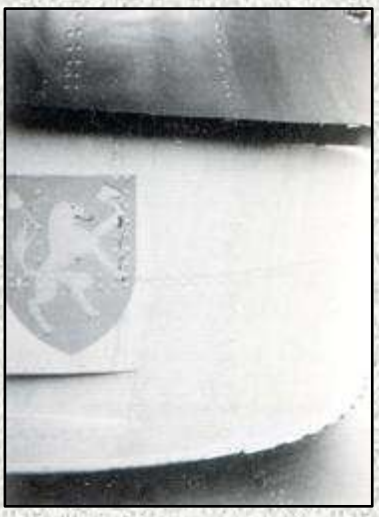
In 2003/ 2004, the wooden deck was replaced with a planked deck. It is this change from slotted to planked deck which makes the current U 505 a challenging proposition for the modeller.

Cover on deck for torpedo storage tube - On either side of the deck, just beside the lower wintergarten platform, the Revell kit has a metal cover for the torpedo storage tubes. Since U 505 currently has wooden planking in this area, modellers should fit wooden planks.

Wind deflector flange - In order to backdate the boat to the time of capture, the repair to the wind deflector flange was removed during the final restoration in 2003 and 2004. Modellers should also conduct this simple alteration.

Damage to tower - The holes in the conning tower were not patched up so modellers should add this battle damage.

As a direct result of all these differences between the present boat and wartime boats, researchers and modellers should be **VERY** careful when using U 505 (or indeed another museum boat, U 995) as a research tool.



## Part X - Insignia & Paint Colours

In this section covering paint colours, it is assumed that readers will already be familiar with Kriesgmarine paint colours. A discussion of this topic may be found in the original Wolf Pack collection. As always, the information presented herein merely represents the knowledge of the author at the time of writing. It is hoped that new information will be unearthed to clarify this debatable topic.

### Alex-Olaf Löwe - lion

Light grey - If we look back at photo B1, which shows U 505 being commissioned, and photo B6 on this page, we can see that the boat originally had light grey paint on the tower and upper hull. The shade in these photos displays the washed out characteristics that is typical in many photos showing *Hellgrau 50*, the lighter of the greys that were often used in the early war years. The lower hull would, according to normal practice, have been painted in the standard dark grey anti-fouling paint *Schiffsbodenfarbe III Grau* prescribed in the painting regulations.

As per the painting regulations directive that horizontal surfaces were to be painted black, the top surface of the spray deflector (see photo B6) was painted black. We can also see that the wind deflector was painted black at this time. Since the sloping surfaces of this flange were mostly vertical, it was more usual for the wind deflector to be considered as a vertical surface and be painted grey. However, as we can see from this photo, in some circumstances the flange was painted black. Later the flange would be painted in the same grey paint as was used on the tower.

Above (B6): Löwe's emblem on the starboard side of the tower shows a lion wielding an axe. The channel directly below the emblem is the channel to allow light to shine forward from the starboard navigation light. This photo should make for accurate positioning of a decal on an early U 505 model. A similar emblem (the mirror image) would be found in the same position on the port side.

Below (B7): Taken by Wink Grisé at MSI, this plaque commemorates a 1980 reunion. The lion is yellow or gold on this plaque, with a blue background. The scallop shell which later adorned the boat has a green background. The axe has been cleverly positioned inside the rune belonging to the flotilla emblem.


Lion emblem - In photo B6 we can also see the emblem of the boat's first commander, Alex-Olaf Löwe, directly above the channel for the starboard navigation light. The emblem combines two elements. Firstly, the lion quite obviously relates to Löwe's surname, which means lion in German. Secondly, the axe relates to the emblem of Crew 28, the officer class of 1928 which Löwe graduated from.

The definitive study of U-boat emblems - *U-Boat Emblems Of World War II 1939-1945* by Georg Högel - suggests a white / silver lion and a red background. On a

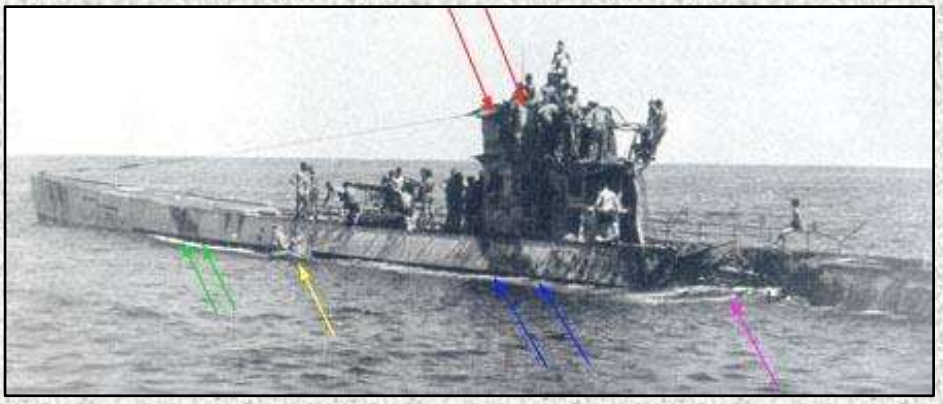
commemorative plaque currently on display in MSI, the lion is yellow or gold and the background is blue. Also of note is that the lion faces to the left on the plaque and faces to the right in photo B6. From this information, it is presumed that the lions both faced forwards on the boat (faced to the right on the starboard side and faced to the left on the port side). The lion was present on U 505 during the first three patrols, when Löwe was in command.

## Peter Zschech - axe and rings

Axe emblem - When Peter Zschech assumed command, a very large axe was added to both sides of the tower. There was insufficient space to paint such a massive motif on the top half of the tower so it was added under the spray deflector. In photo B4, which shows its position and large size, it is clear that the emblem was highly visible from a distance. The axe itself was symmetrical, with the axe blade facing forward on both sides. The design of the axe was slightly different to the drawing in Högel's book and to designs which can be found on the internet.

The huge size of the axe is consistent with a new commander who wished to make his mark. The change of emblem away from the lion asserted his authority, making it clear that a new commander was now in charge. However, the use of the axe from his very popular predecessor was a smart move by Zschech. Whether this was his idea, or he was persuaded to do so, is not clear but it allowed him to impose his authority while maintaining a link with the previous incumbent. It is also reputed that the crew wore brass or aluminium axe badges on their caps at this time.

Olympic rings - During Zschech's command, it is reputed that U 505 also featured the Olympic rings emblem, derived from the Berlin Olympic Games of 1936. A number of commanders, including Peter Zschech, celebrated their inclusion in the officers' class of 1936 (Crew 36) by applying this symbol to the towers of the boats they commanded. Many boats, of different variants, all possessed this symbol: U 3, U 20, U 23, U 37, U 59, U 183, U 203, U 227, U 314, U 344, U 387, U 394, U 407, U 426, U 440, U 467, U 505, U 534, U 546, U 555, U 643, U 710, U 760, U 869, U 1230 and U 3504. Some boats had one set of rings, either above or below the spray deflector. Other boats had two sets of the symbols, one on either side of the tower. Although no photos have shown the rings on U 505, the presence of the large axe on either side would suggest a singular set of rings at the front of the tower. It is unclear whether they would be located above or below the spray deflector.



Left (B8): The camouflage pattern was spotted by Jon Kelly (thanks Jon!). The position of the dark bands and the consistency of the angles suggests that the dark areas are indeed part of a camouflage scheme. The arrows point to the start and end position of the respective bands. The purple arrow points to the gaping wound which resulted from the Hudson attack while the yellow arrow shows men in a dinghy.

Camouflage pattern - Following the destruction wrought by the Hudson attack in November 1942, a massive gaping hole was left on the aft deck and upper hull of U 505. At this time dark diagonal bands were present on the upper hull and tower. The first band (see the red arrows in photo B8) was present on the tower. Most importantly, the second band, pointed to by the blue arrows, is on the

hull casing in the ideal location for it to follow on from the first diagonal band. There is a third band (see green arrows) farther forward on the hull casing. In another photo (not shown in this article) another band can be seen behind the damaged casing. The angle and positions of the bands make it likely that a camouflage scheme was employed on the boat at this time. These bands were probably painted on the boat prior to departure but another possibility is that the bands were added following the Hudson attack in the vain hope of trying to disguise the black hole. It happens that the men in the dinghy in photo B8 are roughly halfway between the second and third band, where one might expect an additional band to be painted. This photo might show the men in the dinghy in the process of applying a makeshift camouflage scheme to U 505 or, perhaps more likely, in the process of transferring supplies from U 462.

Photo B8 is almost certain to have been taken by a photographer aboard U 462, the Type XIV milch-cow (milk cow) which provided U 505 with supplies on the 22nd November 1942.

Colours with Turm II - Photo B4 (which appears earlier in this article) shows the boat in 1943 with a light grey that is likely to be the *Hellgrau 50* previously used on the boat. Another image (not shown here) of the boat with the Turm II also displays the pale, washed-out features that are reminiscent of *Hellgrau 50*.

The use of *Hellgrau 50* on the Turm II cannot be taken for granted due to the two small vessels at the top left hand corner of photo B4 (see the light blue arrows). If they are Kriegsmarine vessels then their superstructure would probably be painted in *Hellgrau 50* and their hull painted in *Dunklegrau 51*. The upper colour of U 505 appears to be the same as the hull of the two vessels. However, the quality of the image and the questionable identity of the two vessels mean that it is impossible to make any judgements from this photo.

As previously mentioned, there was a directive in the painting regulations to paint horizontal surfaces black. In practice, there was variance as to how strictly this was followed and discrepancies in what constituted a horizontal surface. In photo B4 we can see that the top half of the magnetic compass housing (see the purple arrow) was black, as were the deck railings and the top half of the 105mm gun barrel. Following a long period in refit, and no requirement to urgently return the boat to sea, the shipyard may have been especially prudent in following the paint regulations. Later in the boat's career, grey rather than black was used on these features.

Change to darker colours - Earlier in the article we discussed a quote by Hans Göbeler in *Steel Boats*: "On July 1, U-505...[had a] fresh coat of dark grey paint". This accords with the well-known order of the 7th May 1943, which stated that only the petrol-proof camouflage colours *Schlickgrau 58, Blaugrau 58/1* and *Blauschwarz 58/2* were to be used as upper colours on operational U-boats. This was the only order specifically pertaining to U-boat colours. The reason given is that the High Command was worried at this time that the Allies were using infra-red sensors to detect U-boats. Presumably these paints did not reduce the infra-red signature of a U-boat. Instead, the High Command, alarmed at the number of U-boats being sunk by aircraft, must have deemed that these darker colours would render a U-boat less visible to enemy aircraft. This order seems to have been partially adhered to, since the prominence of darker colours appears to have increased following this order. However, implementation was not universal since light and medium greys were sometimes used until the war's end.

## Harald Lange - patrols 12 and 13

Paint colours for patrols 12 and 13 - At the end of patrol 13, which was cut short due to an operation to rescue survivors of the torpedo-boat T25, a photo shows U 505 in a darker grey paint that may have been *Schlickgrau 58* or *Blaugrau 58/1*. It is almost certain that the upper hull would be the same paint colour at this time. There was a small element of paint peeling from the tower.

Scallop shell version 1 (patrols 12 and 13) - When Lange took over from Zschech, the axe and Olympic rings were removed in favour of two new items - the scallop shell emblem and the 2nd U-Flottille emblem. According to a forum post by Keith Gill, "A long standing rumor was that Lange was a merchant seaman pre war for the shell oil company and so took the shell logo from this experience and painted it on the tower. However other crewmembers say they simply painted it on the tower prior to Lange arriving at the boat and that it was purely a maritime related symbol, nothing else." This post can be seen at - (http://uboat.net/forums/read.php?3,43159,43188#msg-43188).

The scallop shell has often been used as a symbol of heraldry, where it can sometimes be found on a shield background. The nautical connection is derived from the shell's usual habitat in the oceans around the world.

In this first version of the shell, there was *no shield background*.

Above (B9): U 505 enters Brest at the end of patrol 13 on the 2nd January 1944. Evident are the darkish grey paint, the first version of the scallop shell, and the 2nd U-Flottille emblem below the spray deflector. To the right, lined up on the foredeck, can be seen some of the survivors of the torpedo-boat T25.

2nd U-Flottille emblem (patrols 12 and 13) - Also evident in photo B9 is the 2nd U-Flottille emblem, positioned centrally on the tower below the spray deflector. In this design, a U-boat passes (from right to left) through a victory rune. Viktor Schütze, who had previously utilised the symbol aboard U 103, used it as the emblem of the 2nd U-Flottille when he became the flotilla chief. It was installed on U 505 when Lange assumed command and remained on the boat until after the capture.

## Harald Lange - patrol 14 (during capture)

Upper hull during patrol 14 - Many modellers wish to depict the boat on the fateful day when it was captured. The paint colours on this date have been a subject of conjecture and debate for many years. The very

Below left (B10): According to sources, in June 1944 the carrier *USS Guadalcanal* was painted in measure MS32/4a. Although there appear to be some differences between MS32/4a and the paint scheme employed on the carrier at this time, this does not interfere with the likelihood that the stern of the carrier was painted in US Navy paint 5L (FS35526), a light grey which allows a good comparison with the upper hull of U 505.

Below right (B11): This is a very rare colour image of U 505 directly after capture, when attempts were being made to save the boat and tow her to Bermuda. The rust and rust residue patterns are evident on the upper hull.

rare colour video footage which shows the boat in the period directly following the capture do help us enormously, but it still remains difficult to be precise about exact colours.


Above (B12): The Kriegsmarine paint colours that were specified in the order of the 7th May 1943.

Right (B13): Paint peeling, salt staining, rust and a general patchy appearance are all evident in this photo. We can also see that some of the waterline draught marks appear to be white. All U-boats were meant to have the marks but in some cases boats might have been rushed to sea without them. Although we cannot be certain, it appears the white marks *may* have been there on U 505. Due to very heavy weathering, some numerals look to have been covered over by plantlife or been chipped off entirely. In another photo the marks are difficult to distinguish. If modellers do choose to apply AMP waterline mark decals (which replace the inaccurate Revell examples), then care should be taken to weather the decals appropriately.

Photos B10 and B11 show video captures from the colour footage. Photo B10 shows the upper hull was markedly darker than the 5L light grey employed on the stern of the carrier. The quality of photo B11 leaves a lot to be desired yet certain key elements can be established. Firstly, on the upper hull, patches of rust residue can clearly be seen directly below the rust itself. Although the paint is peeling a little in places, it is distinctly less than on the tower. Given the dubious quality of the image, it is difficult to determine if the upper hull paint has a slight blue tinge. If so then this might suggest *Blaugrau 58/1* rather than *Schlickgrau 58* on the upper hull. Another Kriegsmarine paint, *Dunkelgrau 51* (actually a medium blue-grey) is probably too light to be a candidate.

Tower during patrol 14 - The most contentious issue is the paint colour on U 505's tower. I would like to make it clear, from the outset, that I have an *opinion* on this matter but *no definitive proof*.

All black and white photographs show a dark tower. However, since U 505 is photographed with much of her deck partially awash, with only her bow sticking out of the water, it is not easy to compare the upper hull with the tower. It is the colour video footage which is much more useful in this regard, and this footage shows, *in my opinion*, that the tower was darker than the upper hull. One particularly useful shot (see http://flickriver.com/photos/deckarudo/6039207629/#large) allows a good comparison to be made between the hull and tower. Just below the eight vents on the hull casing, there is a darker area of the hull. This is not a camouflage scheme but simply a wet area of the hull. Even the wet area of the upper hull is lighter than the dry area of the tower. As for the dry area of the hull, it is markedly lighter than the tower.

This photo points towards a darker tower, but in one or two other photos the tower looks a similar shade to the upper hull. Due to their low quality, they are not in themselves of sufficient quality to provide any proof but they should not be discounted or ignored. This is an example of the complexities of assessing paint colours, where photos appear to contradict each other.

In black and white photos next to the USS *Guadalcanal*, the tower of U 505 looks about the same shade as the carrier's 5-N navy blue paint, which was slightly lighter than *Blauschwarz 58/2*. It is quite difficult to tell anything from these photos due to the very poor quality and the fact that so much paint has peeled away.

In tandem with photographic evidence, we should also evaluate this theory by asking if painting the towers darker than the hulls was an accepted practice within the U-bootwaffe. If this practice was commonplace then we can be more confident that this was in place on U 505. Although it might not be prudent to state that this practice was commonplace, one might argue that it was *not uncommon* for U-boats to have different coloured towers. Examples of U-boats with towers painted differently to the upper hulls include U 156, U 302, U 313, U 441, U 805 and U 858.

Above (B14): U 858 following the surrender in 1945. This is a very important artefact in researching U 505's paint colours during capture. The blue tinge on the hull of U 858 may suggest *Blaugrau 58/1* and the tower appears to be the dark blue grey *Blauschwarz 58/2*. The paint colours of U 505, U 805 and U 858 in the late war period all exhibit the same characteristics and may constitute the same informal paint scheme. Note that some areas of the tower are covered in rust, with others exposing the bare metal beneath.

Below (B15): This photo is a leading contender in favour of the case for a darker tower. But the poor quality categorises it as supporting evidence rather than definitive proof.

Another very influential factor is derived from period photos of U 805 and U 858. The most influential image is a superb colour image of U 858 (see image B14). The similarities to U 505 (and U 805) in the paint colours and condition are immediately obvious in this photo and the other black and white images. These photos provide irrefutable evidence that the towers of U 805 and U 858 were darker than their upper hulls when they were surrendered at the end of the war. As with U 505, the paint on the dark towers was peeling much more than on the upper hulls. If we look again at photo B14, we may be inclined towards *Blaugrau 58/1* on the upper hull and *Blauschwarz 58/2* on the tower. The similarities between the paint schemes of U 505, U 805 and U 858, and indeed the similar condition of the paint on these three boats, lead us towards the possibility that U 505 may have been painted very similarly to the paint colours we see in photo B14.

Author's note: In *Kriegsmarine U-Boat Colours & Markings*, I offered a suggestion that the hull of U 505 may have been *Dunkelgrau 51* and the tower *Blauschwarz 58/2*. The question mark after this suggestion shows my great uncertainty on this issue. In an earlier draft of the colours and markings article I had offered *Blaugrau 58/1* as the upper hull colour. I cannot recall why I substituted *Dunkelgrau 51* for *Blaugrau 58/1* (I probably did not have access to the colour footage of U 505 at the time) but I suspect I may have made an error. My present suggestion would be a *Blaugrau 58/1* (or perhaps a *Schlickgrau 58*) upper hull and a *Blauschwarz 58/2* tower but, given

the uncertainty on this subject, I would certainly not wish to argue with anybody who holds a different opinion.

Condition of the tower during patrol 14 - What can be established, beyond any doubt, is the very high amount of peeling on the tower of U 505. Although rust, salt staining and all the usual signs of wear of a boat at sea would also have been present, a large proportion of the paint had peeled from the tower. A number of photos of the boat (see http://www.uboatarchive.net/U-505Photographs.htm) show the extent to which the paint had peeled away from all of the outer surfaces of the tower. Any model of the boat at this time must exhibit significant paint peeling to be even remotely accurate.

The marked contrast between the amount of paint peeling from the tower and the upper hull requires scrutiny. Firstly, it should be noted that other late-war boats (particularly late-war Type IXs) also exhibited this pattern. The towers of U 805, U 858, U 870 and U 889 all exhibited paint peeling, whereas their upper hull had a near uniform paint coating with no signs of similar deterioration. This may be the result of a different type of metal plating present on the towers of U-boats. It appears that paint did not adhere to the tower plating in the same manner as was possible with the steel used on the upper hull.

Photo B14 gives readers some idea of the colours that were present when the paint peeled from the tower. Some rust patches are evident, while other areas appear to show a whitish silver colour of the metal beneath. The exposure of a light grey colour underneath is possible but it is more likely that when the paint peeled from the tower it revealed the bare metal below.

The poor quality of the paint used by U-boats in the late war period is evidenced in the interrogation report of U 66. Sunk in May 1944, survivors told their captors that the poor quality of the paint resulted in camouflage schemes only being able to last three to four weeks. A significant reduction in quality in the late war period might be expected when we consider the great difficulties encountered due to the bombing of industrial targets by the RAF and USAAF.

Scallop shell version 2 (patrol 14) - Both the 2nd U-Flottille emblem and shell were retained for the boat's final patrol. However, this patrol saw a different version of the scallop shell - this time *with* a shield background B utilised on either flank of the tower. Although a specific colour for the shield cannot be discerned from the colour video footage, it can be said that the colour was certainly not the red colour used in the Revell decal sheet. The museum boat currently has a green colour, which can also be seen on a plaque commemorating a 1980 reunion (see photo B7). The green colour used in the plaque may have been as a direct result of information provided by former crewmen of U 505. It is quite possible therefore, that the shield colour was dark green.

Another aspect is the white border around the shield. Given the dark grey paint on the tower, a white border would have been necessary to delineate the dark green shield from the dark grey tower.

2nd U-Flottille emblem (patrol 14) - This was present in the central position below the spray deflector. The condition matched the rest of the tower, with areas of the emblem peeling away from the tower.

**Post-capture colours**

Can do Junior (just after capture) - In reference to the "can do" motto of the *USS Guadalcanal*, American personnel painted "CAN DO JUNIOR" on the front face of the tower of U 505, just below the damaged wind deflector supports.

War bonds black scheme (1945 - 1954) - By the time the boat embarked upon a war bonds drive in 1945, the tower and upper hull were painted black. The shell emblem and 2nd U-Flottille emblem

were both painted over by the black paint. "U-505" was painted in large white block capitals on both sides of the tower so there could be no questions about the boat's identity. As each year passed, a progressively more weathered, rusty and barnacle-encrusted *Schiffsbodenfarbe III Grau* remained on the lower hull.

On the 12th August 1953, U 505 was moved into dry-dock for the first time since 1944. Having spent nine years in the water, it would have taken some time to scrape off all the barnacles, weeds and plantlife which had accumulated on the hull. A colour photo which appears in the *U-505: Extend The Experience* DVD shows the boat when it arrived in Chicago in 1954. The photo shows that the lower hull was entirely covered with rust and very little, if any, of the *Schiffsbodenfarbe III Grau* remained on the hull. What was left of this Kriegsmarine dark grey paint may have been removed in August 1953, when all the barnacles and plantlife were scraped off the hull.

Another aspect of the colour photo is the very low division between upper and lower colours. From 1944 until 1954, the lower hull was not painted. The upper hull and tower were painted black during this period, but when the black was applied it was done so when the boat was in the water. The painters simply applied the black paint down to the waterline level. The final application of black must have been completed when the boat was lying quite high in the water because the black paint extended much farther down than the normal Kriegsmarine waterline level. This produced an incorrect division line which was employed upon the boat for decades and would not be rectified until the 21st Century.

Second black scheme (1954) - To assist in the transit to Chicago, large white draught marks were added to the bow and stern in May 1954.

When the boat stopped at Cleveland on the 3rd and 4th of June 1954, an effort was made to disguise the poor technical condition and make the boat more presentable for its arrival at MSI. This was done by painting the boat in the standard black favoured by the US Navy at the time for their submarines. Since the boat was in the water at the time, only the upper hull and tower could have been painted black. "U-505" was again painted in block white capitals on the tower at this time, with additional white text below.

When Chicagoans glimpsed U 505 when it first entered their city, the boat had reasonably fresh black paint all the way down to a very low waterline level. Below this was a hull clean from barnacles but entirely covered with rust.

Light grey / black scheme (September 1954 - 1968) - Between the 19th and the 25th September 1954, the boat was repaired and repainted to make it presentable for the dedication ceremony. Since the exterior of the boat was sandblasted, all evidence of Kriegsmarine paint colours on the exterior was removed. Due to time pressures, no attempt was made to record paint colours at this time. By the 25th September 1954, the boat was in a smart new light grey scheme for her dedication ceremony. The boat had a light grey upper hull and tower, with "U-505" being painted in large black block capitals on both sides of the tower. The lower hull was painted black, with the division line between the upper and lower colours once again being markedly below the normal Kriegsmarine level.

Light grey / black scheme (1968 - 1978) - The same scheme - light grey upper hull and tower, black lower hull, and incorrect division line - was used during this period. The large US style welded waterline marks were white at this time. U-505 in black block capitals was used at this time. The metal covers on the deck were all light grey.

Light grey / black scheme (1968 – 1978) - The same scheme - light grey upper hull and tower, black lower hull, and incorrect division line - was used during this period. The large US style welded

waterline marks were either yellow or gold at this time. U-505 in black block capitals may have been used at this time. The metal covers on the deck were all light grey.

Light grey / black scheme (1978 - 1988) - The same scheme - light grey upper hull and tower, black lower hull, and incorrect division line - was used during this period. It is unclear what colour the large US style welded waterline marks were at this time. U-505 in black block capitals was probably not used at this time. The metal covers on the deck were all light grey.

Light grey / black scheme (1988 - 2004) - The same scheme - light grey upper hull and tower, black lower hull, and incorrect division line - was used during this period. Since the division line was too low, it cut directly through the anchor recess, with the anchor itself being painted black. The large US style welded waterline marks were painted black at this time. U-505 in black block capitals was **not** used at this time.

Scallop shell version 3 (1988 - 2004) - For several decades, the shell emblem was missing from U 505. At some point, probably following the 1988 and 1989 restoration, the scallop shell was reinstated upon the boat. This version did not have the additional two areas on either side of the fan, but did have the white border. The shield was mounted on a dark rectangle which never featured in wartime.

2nd U-Flottille emblem (1988 - 2004) - At some point, again probably following the 1988 and 1989 restoration, the 2nd U-Flottille emblem was reinstated. The design of the U-boat in this version is reasonably consistent with the original. However, the rune is completely white on this version whereas the original rune was black and white.

**Present colour scheme (2004 - present)**

Research by MSI - During the major multi-million dollar restoration project conducted in the early years of this century, the exterior of the boat was completely repainted *to depict the boat at the time of capture*. The division line was correctly placed this time, and the lower hull painted in a colour that is an extremely good approximation of *Schiffsbodenfarbe III Grau*.

The paint colours were researched in detail by the boat's then curator Keith Gill. Following publication of *Kriegsmarine U-Boat Colours & Markings* in three issues of the SubCommittee magazine, I was contacted by Keith and had the good fortune to exchange information about U-boat colours with him. It was a pleasure to discuss these matters with a genuine enthusiast who has carried out the role of curator with distinction. Although many enthusiasts were not well versed on U-boat colours at the time, Keith obviously had a good deal of knowledge on the subject. In November 2004, an online article reveals the impressive lengths which the curator went to in restoring the boat's colours. The article - *U-boat's True Identity Surfaces: Microscopic Analysis and Old Manuals Help Conservators To Restore A German Sub's Original Appearance* by Matthew V. Veazey - can still be found online today (see http://events.nace.org/library/articles/features/uboat.asp). In the article we learn that Keith travelled to Germany specifically to research U-boat paint colours, whereupon he found a fandeck from the 1920s (presumably a RAL fandeck) and a Kriegsmarine U-boat painting manual. He also travelled to England, where he compared the colour chips he copied in Germany to the U 534. Back in Chicago, with the benefit of a real U-boat to play with, he undertook painstaking research on interior colours and wooden deck colours. To provide some idea of the lengths the curator went to during a two-year research process, he told me that he removed "flakes of paint from each valve and electrical box, basically every surface," and then analysed each flake under a microscope. In some areas he found five or six German layers, with another five or six US Navy or museum layers over

the top. Having analysed some 500 flakes in microscopic detail, it is fair to say he conducted this research with commendable tenacity.

Above (B16): This clear image shows the colour of the paint used upon the upper hull and tower of U 505 at MSI. The green shield background of the shell emblem can also be seen. Several holes punched in the side of the tower were caused by aircraft and vessels belonging to the task force which captured U 505. The tube at the left hand side contains a spare barrel for the 37mm automatic. Lastly, note how the deck railing stops abruptly just ahead of the magnetic compass housing. Originally this railing had an additional three vertical stanchions.
*(Ernest Roth)*

Upper hull - The interior colours, lower hull colour and deck colours are not, to my knowledge, the subject of any debate. The interior colours and deck colours were particularly well researched and documented. But what has been suggested, by other modellers as well as myself, is that the upper hull and tower paint colours on the boat may not reflect the true colours when captured. First of all, let us be clear what paint colour is actually on the upper hull and tower of the real boat in MSI at present. The *U-boat's True Identity Surfaces* article states that "painters applied the original mud gray to the top and granite gray to the bottom. Gill likens mud gray to the shade of gray one would see on a river bottom." We should note that the German term "*Schlickgrau*" translates as "sludge-grey" or "mud-grey". This use of "mud-grey" to the upper hull and tower also accords with the information sent to the author by Keith. Although he did not specifically mention *Schlickgrau 58*, the term mud grey is surely a reference to the *Schlickgrau 58* paint colour used on U-boats. The choice of *Schlickgrau 58* is entirely valid, with both *Schlickgrau 58* and *Blaugrau 58/1* being sensible choices.

While at the military archives in Freiburg, Keith was able to copy the chips from an original manual which cross-referenced the paints to RAL standards. Since there is reputed to be no direct RAL equivalent for *Schlickgrau* 58, it is unclear if this paint colour was amongst the paint chips he was able to copy.

At present, the boat is illuminated by spotlights which shine from the roof of the temperature-controlled enclosure. The photos showing the boat inside the enclosure show a light grey upper hull and tower. However, it is much more helpful to look at photos of the boat in its present paint colours before it was moved indoors. (One such photo can be found at - http://web.mst.edu/~rogersda/american&military_history/Shot%203%20U-505%20in%20Chicago-2004.jpg) Without artificial lighting affecting the appearance, this photo is able to show the actual paint colours better than any indoor photo. In this outdoor photo, the upper hull and tower are **not** as light as in the indoor photos. In 2004, when Keith sent me one such outdoor photo, my first impression (before I was told by that "mud-grey" was used) was that a lighter version of *Schlickgrau 58* had been used. When comparing the outdoor shots with Kriegsmarine colour cards, the upper paint colours on the boat are not consistent with the light grey *Hellgrau 50* or the medium grey *Dunkelgrau 51* but do exhibit a shade that is reminiscent of *Schlickgrau 58*. However, the upper paint colour does look noticeably lighter than the *Schlickgrau 58* colour in the Snyder & Short Enterprises paint chip cards. Jointly researched and produced by John Snyder of White Ensign Models, these cards are regarded worldwide as the definitive guide to naval paint colours. The popular Colourcoats range of naval paints, produced and sold by White Ensign Models, naturally correspond directly to the Snyder & Short paint chips. My impression that U 505 has been painted in a shade that is somewhat lighter than *Schlickgrau 58* is, I must stress, based upon an assumption that the Kriegsmarine colours in the Snyder & Short Enterprises paint chip cards are accurate.

Every modeller has had to mix paints at some point or another. For many of us, mixing paints from several tinlets has proved to be a matter of trial and error. More than a few times I have successfully mixed paints in the evening only to find, the next day when the paint has dried, that my efforts to match a particular Federal Standard colour were not quite as successful as I had previously envisaged. Attempting to obtain a paint finish which matches *Schlickgrau 58* - a paint which has never been associated with a RAL equivalent - for an entire full size U-boat is a somewhat more challenging proposition requiring professional expertise. This was provided by Sherwin-Williams, who according to the aforementioned article *U-boat's True Identity Surfaces* "soon discovered that matching them [the original paint chips] to today's coating formulations would be laborious...they worked tirelessly with me [Gill] trying to match colors to sometimes conflicting information in several different paint systems". It should be noted that the boat was also given a matt finish, as was customarily applied to U-boats.

Tower colour - It is worthwhile mentioning the lack of information that was available on U-boat colours at the turn of the century. My article "*Kriegsmarine U-Boat Colours & Markings*" was borne out of frustration with the conflicting and often erroneous sources which did not address the subject in anything other than a cursory manner. More than a few modellers were still painting U-boat lower hulls a lovely shade of red at that time. Worse still, some were even adding a smart looking but historically inaccurate bootline. Despite many photos clearly showing dark greys, the majority of modellers painted their models light grey, with medium grey being the darkest they would venture. The use of red hulls was thankfully coming to an end but the reticence to use dark greys on models would take longer to purge. It was this mindset, where lighter greys were the established norm, which was prevalent when U 505 was painted in her current scheme. As for knowledge of U-boat towers being painted in different colours to the tower, perhaps only a smaller band of enthusiasts with particular interest in U-boat colours seemed aware of this.

The theory of a darker tower on U 505 was covered previously (within "Tower during patrol 14"). Given the great deal of ambiguity on this issue, and the lack of iron-clad photographic evidence, it would have been most problematic in 2004 to paint the real boat with a darker tower. A different coloured tower is the sort of thing visitors would notice and query. More importantly, of course, is that the theory of the darker tower may itself be incorrect. The museum staff may not have considered this theory, or they may have considered it and rejected it altogether. Although I mentioned to Keith about this theory, I thought it imprudent to solicit his opinion on this matter when the boat had already been painted.

While we may devote a lot of time and effort debating the paint colours, these considerations seem rather futile when we recall the condition of the paint on the 4th June 1944. The museum boat cannot possibly look like she was on the day of capture without rusting the upper hull and peeling much of the paint away from the tower. In a forum post (http://www.uboat.net/forums/read.php?3,36886,36931)

Above (B17): As a final point, although the boat itself does not have a dark tower, there are two MSI museum exhibits which do show a dark tower. The first is a wall mural, and the second is a tower mock-up sitting on the floor beside the starboard side of U 505. This image is ideal in allowing us a comparison between the real tower and the tower mock-up. The mock-up is a very dark charcoal grey, not far perhaps from *Blauschwarz 58/2*, and is complete with shell emblem and 2nd U-Flottille emblem. If the real boat is painted to depict U 505 during the final patrol, why is the mock-up painted a dark grey colour?
*(Ernest Roth)*

the curator stated "we all know it is hard to get all the resources to agree and so I gave it my best shot considering the time and constraints I was under. It will look better and I feel good about it being like she was on the day it was captured and my guess is that if she were in port in 1944 nobody would point and say, 'Hey look at how wrong that boat is painted'." Given the impossibility of making a museum boat emulate the highly weathered and peeling state on the day of capture, I would concur with Keith's sentiments and agree that the colours on the boat at present would not be amiss if the boat sailed from Brest or Lorient on a war patrol in 1944.

Scallop shell version 4 (2004 - present) - The main features of the current emblem are highly consistent with the original version seen in post-capture photos. For example, the present design depicts the fan and the scalloped ridges very well. However, the dark green shield on the current version has a thin black border surrounded by a thicker white border. Surrounding the white is an additional thin black border around the white border. The white border is prominent in period photos but neither of the black borders can be identified in the available photos. These two black borders also feature in the Revell decal sheet but are not present on the AMP replacement decal design.

The present version also has an additional two areas on either side of the fan. These two areas do not seem to be present in the post-capture photos and are not on the AMP decal design.

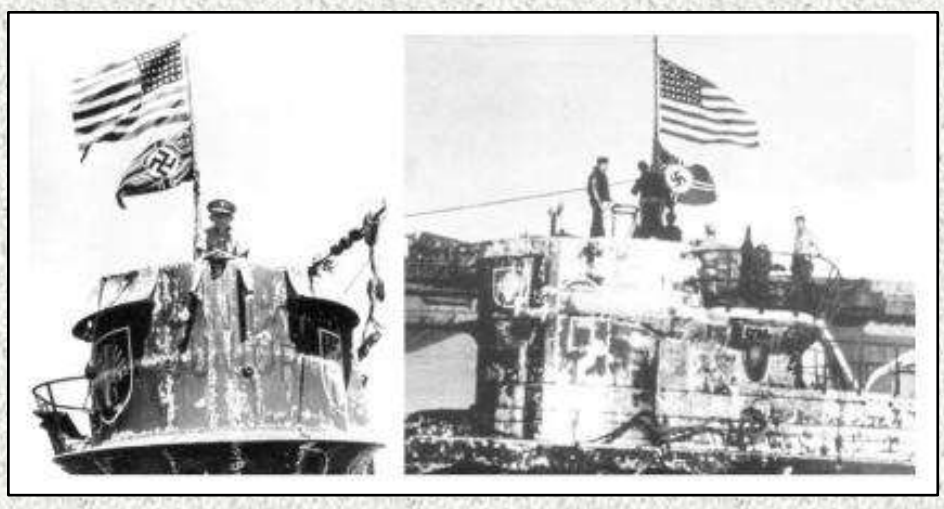
2nd U-Flottille emblem (2004 - present) - This current version looks accurate when compared to the wartime original. The Revell example also looks accurate, which is why we considered that a replacement was unnecessary.

Note: For paints and emblems summary table please see Part XII.

# Part XI - AMP Decals & Flags

## Flags

Below (B18a and B18b): The two flags flying from the periscope of the newly captured boat, with the American example positioned more prominently than the German naval flag.



Following the capture, there are memorable photos showing Captain Gallery posing on the front of the conning tower of U 505. Above his head, suspended on the attack periscope are two flags showing the previous and new owners of the boat. Naturally the US flag dominates the German Kriegsmarine flag, both in position and size.

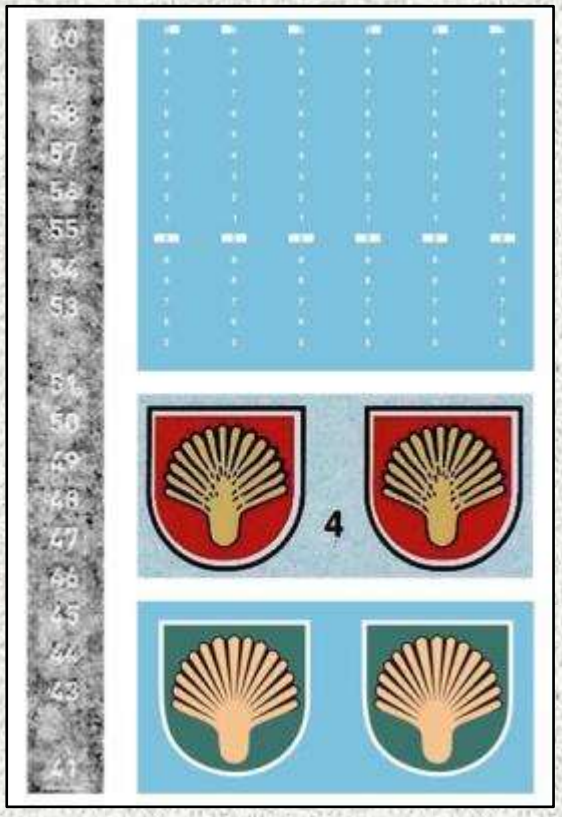
The Kriegsmarine flag was a smaller example that was flown only when the boat was at sea; a larger example was flown in port. The actual flag that we see in the photos was presented by Captain Gallery to Admiral Jonas Ingram in 1944 and currently resides in the Memorial Hall at Annapolis. A similar German flag, which was stored in the boat during the capture, can presently be seen in a glass display case at MSI in Chicago.

Top left (B19): Taken by Wink Grisé of Accurate Model Parts during his visit to the boat in 2010, this Kriegsmarine flag was stored aboard U 505 and is an identical size to the smaller type Kriegsmarine flag that we see in the photos. There were four or five flags stored aboard U 505 at the time of the capture.

Bottom left (B20): Also taken by Wink, this shows the remains of a US flag which was flown from one of the US escort vessels.

Top right and bottom right (B21a and B21b): Both flag designs within the AMP range.

## Replacement AMP decals



While many features of Revell's kit are commendable, some of the kit decals are entirely unusable. The waterline draught marks in the Revell decal sheet consist of the two-digit numeral system that was a feature of the Type IIs. However, all IXs (and VIIs) had the one-digit system. The AMP replacement, K-72W, was designed using information gleamed from numerous Type IX photos. It is unclear why Revell chose the two-digit system when a perfunctory check of widely-available photos clearly shows the one-digit system. In addition, only four sets of waterline marks were included in the Revell decal sheet, when nautical practice is to apply six sets to the hulls.

An incredulous decision by Revell was to choose red as the background colour of Lange's scallop shell emblem. Colour footage taken at the time shows a complete absence of red in this area. It might be noted that a very old and basic U 505 kit, in the ever popular 1/209th scale, was produced by a model company called Aurora. The moulds for this kit were taken over by Monogram, the model company which joined with Revell in 1986 to become the US-based Revell Monogram. The box art, which is the same for both the Aurora and Monogram kits, shows the boat with a red shield and U-505 in block white capitals. Whether this influenced the German based Revell when they designed the new 1/72nd U 505 is unclear, but at least the new Revell kit does not feature the U-505 in white block capitals that was a

Left (B22): The two-digit numerals on the Revell decal sheet are completely unsuitable for a Type IX model. The two-digit system was a feature of Type IIs - not Type IXs!

Top right (B23): The waterline draught mark decals available from AMP (code K-72W).

Middle right (B24): The red background is highly visible on the Revell decal sheet.

Bottom right (B25): The AMP scallop shell emblem decals (code T9-SHELL-72). Since the shell on the penultimate patrol did not include a shield, the AMP decals are only suitable for U 505's final patrol.

feature of the Aurora and Monogram kits.

The AMP replacement includes the green colour currently favoured on the boat. It should be noted that the plaque commemorating a 1980 reunion (see photo B6) shows a green background. This commemorative plaque, together with the green colour on the boat at present, influenced our colour choice when designing the decals. Another aspect that has been corrected is the black border around the edge of the emblem on the Revell sheet. Photos show that no black border existed.

The 2nd U-Flottille emblem and the "CAN DO JUNIOR" writing on the Revell decal sheet were not deemed to require replacement as they appear to correspond with period photographs.

### Additional AMP decals

The following AMP decal sets are also available for Revell's IXC kit -

U 505 axe emblem - For U 505 under Zschech (code T9-AXE-72). Note: this decal set includes one set of Olympic rings.

U 505 early shell - For the scallop shell emblem used on U 505 during patrols 12 and 13. This will have no shield background (code T9-SHELL-EARLY-72).

Olympic rings - For U 505 under Zschech and the following boats (code T9-RINGS-72) -

- U 37, U 534, U 546, U 869 and U 1230 (Type IXs).
- U 3, U 20, U 23, U 59, U 203, U 227, U 314, U 344, U 387, U 394, U 407, U 426, U 440, U 467, U 505, U 555, U 643, U 710, U 760 (other types).

10th U-Flottille emblem - For the following Type IX boats with a Turm IV and 37mm automatic (code T9-10UF-72) -

- U 170, U 510, U 516, U 539 and U 543.

For more details pelase refer to the article "*A Guide To AMP U-Boat Decals*".

## Part XII - Summary Tables

The patrol numbers in the following table have been devised by the author. They include all of the aborted patrols, which are not normally included as proper patrols. The X suffix denotes a refit or time in port. For example, 3X refers to the refit period before patrol 3.

Much of the information included in this timeline is derived from *Hunt And Kill:* U-505 *And The U-Boat War In The Atlantic*. It is highly recommended for any enthusiast interested in any aspect of U 505. Edited by Theodore P. Savas, it includes chapters from accomplished U-boat historians with a wealth of knowledge on the subject. Some of the information below is from *Appendix B: U-505 Combat Chronology*, complied by Timothy Mulligan. Other information was found in the Lawrence Paterson's chapter on the combat patrols of U 505.

Additional information was sourced from other important book, *Steel Boat, Iron Hearts: A U-Boat Crewman's Life Aboard U-505*, by Hans Göbeler and John Vanzo. Göbeler served aboard U 505 and provides excellent detail in the Turm IV fitting debate.

Other details have been determined through analysis of period photographs of the boat and the conventional fitting dates attributed within U-boat literature. The tables do **NOT** serve as a definitive record of the modifications of U 505, rather it is a list of the *likely* modifications and the dates they were *likely* to have been fitted given current knowledge. The paint colours are even less certain, with merely suggestions on paint colour being offered here.

| U 505 Timeline | | | | | |
|---|---|---|---|---|---|
| **Patrol** | **Start date** | **End date** | **Location** | **Comm-ander** | **Details and changes** |
| 1X | - | Prior to 19/01/42 | Kiel | Löwe | Turm 0 (original tower) with 20mm.<br>105mm on foredeck, 37mm on aft deck.<br>Paint - light grey *Hellgrau 50*.<br>Insignia - lion with small axe, on both sides directly above the front of the navigational light channels.<br>(Löwe is lion in German, the axe for class of 1928). |
| 1 | 19/01/42 Kiel | 03/02/42 Lorient | Transfer passage | Löwe | - |
| 2X | - | - | Lorient | Löwe | - |
| 2 | 11/02/42 Lorient | 07/05/42 Lorient | West Africa | Löwe | - |
| 3X | 07/05/42 | 06/06/42 | Lorient | Löwe | Repairs and refitting. Diesel engines overhauled.<br>Blanking off of *S-Gerät* bow device possibly in this refit. |
| 3 | 07/06/42 Lorient | 25/08/42 Lorient | Caribbean | Löwe | Broke off patrol on 31/07/42 due to Löwe's appendicitis. |
| 4X | 25/08/42 | 03/10/42 | Lorient | Löwe / Zschech change on 15/09/42 | Diesel fuel capacity increased.<br>FuMB 1 *Metox* radar detector fitted.<br>Biscay Cross used as an antenna.<br>Insignia - lion removed. Large axe added on both sides of the tower, below the spray deflector.<br>Olympic rings supposedly added in one location at the front of the tower. |
| 4 | 04/10/42 Lorient | 12/12/42 Lorient | Caribbean | Zschech | Problems with *Metox* on 09 and 10/11/42.<br>Attacked by Hudson on 10/11/42.<br>Aft deck very badly damaged.<br>37mm on aft deck destroyed.<br>Replacement parts for *Metox* transferred from U 462 on 22/11/42.<br>Paint - diagonal camouflage bands. |
| 5X | 13/12/42 | 30/06/43 | Lorient | Zschech | Major repairs required to aft deck.<br>Port engine replaced.<br>Turm II fitted (with single 20mm on upper platform and single 20mm on lower platform).<br>105mm on foredeck retained.<br>New 37mm on aft deck (with different mount).<br>Extendable rod antenna removed.<br>Covers for torpedo storage tubes changed.<br>Two hydrogen bottles (for FuMT 2 *Aphrodite* or weather balloons) on upper platform.<br>*Bold* anti-sonar decoy system fitted.<br>FuMO 30 radar fitted on housing on port side. |
| | | | | | Photo during practice run shows Turm II.<br>Paint - probably *Hellgrau 50*. |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | By late May, Turm II changed to Turm IV (with two twin 20mms on upper platform and Vierling on lower platform). 105mm deck gun removed from foredeck. 37mm deck gun removed from aft deck. Two FuMT 2 *Aphrodite* bottles removed from the tower, possibly at this stage. Six bottles added under floor of lower platform. Paint - by 01/07/43 changed to a darker grey. |
| 5 | 01/07/43 Lorient | 02/07/43 Lorient | Bay of Biscay | Zschech | Aborted patrol due to leak on first test dive. |
| 6 | 03/07/43 Lorient | 13/07/43 Lorient | Bay of Biscay / N Atlantic | Zschech | Problems with *Metox*, hydrophones and radio. Large oil leak after being damaged by depth charges on 08/07/43. Patrol aborted. |
| 7X | 14/07/43 | 31/07/43 | Lorient | Zschech | Corrosion of gaskets and batteries rectified. Suspicions this had been caused by battery acid being poured over them (sabotage). According to *Steel Hearts*, the 37mm automatic replaces the *Vierling* in this refit. |
| 7 | 01/08/43 Lorient | 02/08/43 Lorient | Bay of Biscay | Zschech | Cracking noises in hull identified during test dive. Patrol aborted. |
| 8X | 03/08/43 | 13/08/43 | Lorient | Zschech | Problems with cracking noise identified, with sabotage suspected again. |
| 8 | 14/08/43 Lorient | 15/08/43 Lorient | Bay of Biscay | Zschech | Banging noises in hull identified during test dive. Air intake duct damaged. Patrol aborted. |
| 9X | 16/08/43 | 20/08/43 | Lorient | Zschech | Repairs to air intake duct. Casing on torpedo storage tube fixed. |
| 9 | 21/08/43 Lorient | 22/08/43 Lorient | Bay of Biscay | Zschech | Oil leak and noises in hull identified again during test dive. Patrol aborted. |
| 10X | 23/08/43 | 17/09/43 | Lorient | Zschech | A hole was found to have been drilled in a fuel bunker (sabotage once more). *Metox* removed. FuMB 8 *Zypern* (also known as *Wanze* G1) radar detector fitted.* |
| 10 | 19/09/43 Lorient | 30/09/43 Lorient | Bay of Biscay / North Atlantic | Zschech | Starboard exhaust valve not watertight - repaired on 19/09/43. On 23/09/43, following a crash dive, motor and ballast pump not functioning. Pump could not be fixed. Patrol aborted. |
| 11X | 01/10/43 | 08/10/43 | Lorient | Zschech | Main ballast pump and other problems fixed. FuMB 7 *Naxos* radar detector fitted (in addition to *Wanze*).* |
| 11 | 09/10/43 Lorient | 07/11/43 Lorient | Bay of Biscay / N Atlantic | Zschech / Meyer | Zschech commits suicide on 24/10/43. First Watch Officer Paul Meyer assumes command and returns the boat to port. |
| 12X | 08/11/43 | 20/12/43 | Lorient | Lange assumes command on 18/11/43 | Refit and repairs. Conventional time period for a change from *Vierling* to 37mm automatic.* Ready container with a spare 37mm barrel fitted.* Highly likely that FuMB 10 *Borkum* was also fitted, either in this or the preceding refit. FuMB 9 *Wanze* G2 probably replaced FuMB 8 *Wanze* G1. Paint - tower remains a darker colour, perhaps |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | *Schlickgrau 58* or *Blaugrau 58/1*. Upper hull presumably the same paint colour. Insignia - axe and rings removed. First version of the scallop shell added (with no shield background or white border) to both sides. 2nd U-Flotilla insignia added in one location (at the front of tower, below spray deflector). |
| 12 | 20/12/43 Lorient | 21/12/44 Lorient | Bay of Biscay | Lange | Leak during practice dive. Patrol aborted. |
| 13X | 21/12/43 | 24/12/43 | Lorient | Lange | Leak found in flange thought to be due to deliberately faulty welding (sabotage). |
| 13 | 25/12/43 Lorient | 02/01/44 Brest | Bay of Biscay / N Atlantic | Lange | On 28/12/43, diverted on rescue operation. Returned to port with 34 survivors. On 02/01/44, fire in motor. When returning to port, starboard forward diving plane and shaft damaged in mooring accident. |
| 14X | 02/01/44 | 16/03/44 | Brest | Lange | Refit and repairs. Diving plane and shaft repaired. New T-5 torpedoes loaded. *Balcongerät* fitted. Improved version of FuMB 7 *Naxos* fitted. FuMT 1 *Thesis* decoy probably added. Tower painted in a dark grey, perhaps *Blauschwarz 58/2*. Upper hull an unidentifiable medium to darkish grey colour, possibly *Blaugrau 58/1*(?). Second version of the scallop shell added (with a dark shield and a white border around shield) to both sides. 2nd U-Flottille insignia retained. |
| 14 | 16/03/44 Brest | 04/06/44 | West Africa | Lange | Problems with radar. Bow cap on torpedo tube II jammed on 30/05/44, then cleared. Boat damaged during capture on 04/06/44. Upper hull paint weathered and rusting but not peeling. Tower paint very badly chipped and peeling. After capture, "CAN DO JUNIOR" painted, possibly in red, in capitals letters on the front of the tower (above spray deflector). |
| * Fitting of 37mm automatic, *Wanze* and *Naxos* differs according to sources. | | | | | |

| U 505 features per individual patrol | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hull** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| *S-Gerät* bow - not blanked | Y | Y | Y | Y | | | | | | | | | | | | | |
| *S-Gerät* bow - blanked | | | | | Y | Y | ? | ? | ? | ? | ? | ? | ? | | | | |
| *S-Gerät* bow - removed | | | | | | | ? | ? | ? | ? | ? | ? | ? | P | P | P | Y |
| *Balcongerät* | | | | | | | | | | | | | | | | | Y |
| A-shaped rudder support | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | |
| **Deck** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Breakwaters | Y | | | | | | | | | | | | | | | | |
| Aft jumping wire supports | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Torpedo storage tube covers | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (early arrangement) | | | | | | | | | | | | | | | | | |
| Torpedo storage tube covers (late arrangement) | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Tower** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Turm 0 | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |
| Extendable mast antenna | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |
| Air intakes on both sides | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |
| Air intake on one side | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Turm II | | | | | | | Y | | | | | | | | | | |
| Turm IV | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Watertight ammo containers | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| Lattice mesh grill | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| **Armament** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| 20mm on tower (Turm 0) | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |
| 105mm on foredeck | Y | Y | Y | Y | Y | Y | Y | | | | | | | | | | |
| 37mm semi-auto aft (V1) | Y | Y | Y | Y | Y | Y | | | | | | | | | | | |
| 37mm semi-auto aft (V2) | | | | | | | Y | | | | | | | | | | |
| 1 X 20mm on both Turm II platforms | | | | | | | Y | | | | | | | | | | |
| 2 X twin 20mm (Turm IV) | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| 1 X Vierling (Turm IV)* | | | | | | | | Y | Y | Y | Y | Y | Y | Y | | | |
| 1 X 37mm auto (Turm IV)* | | | | | | | | | | | | | | | Y | Y | Y |
| * Conventional timeframe for change of Vierling to 37mm shown here | | | | | | | | | | | | | | | | | |
| **Radar** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| FuMO 30 | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| FuMB Ant 5 *Samoa* | | | | | | | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | Y |
| **Radar receivers** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| FuMB 1 *Metox* | | | | | | Y | Y | Y | Y | Y | Y | Y | | | | | |
| FuMB Ant 2 *Biskayakreuz* | | | | | | Y | Y | Y | Y | Y | Y | Y | | | | | |
| FuMB 8 *Wanze* G1 | | | | | | | | | | | | | Y | Y | | | |
| FuMB Ant 3 *Bali 1* | | | | | | | | | | | | | Y | Y | Y | Y | Y |
| FuMB 7 *Naxos* | | | | | | | | | | | | | | Y | Y | Y | Y |
| FuMB Ant 11 *Finger* | | | | | | | | | | | | | | P | P | P | P |
| FuMB 10 *Borkum* | | | | | | | | | | | | | | P | P | P | P |
| FuMB 9 *Wanze* G2 | | | | | | | | | | | | | | | Y | Y | Y |
| * Conventional timeframe for *Wanze* and *Naxos* shown here | | | | | | | | | | | | | | | | | |
| **Decoys** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| *Bold* | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y | Y |
| *Aphrodite* bottles on tower | | | | | | | Y | | | | | | | | | | |
| *Aphrodite* under tower deck | | | | | | | | P | P | P | P | P | P | P | P | P | Y |
| *Thesis* | | | | | | | | | | | | | | | | | ? |
| L = Launch, C = commissioning, X = sailing during refit 5X (with a Turm II)<br>Y = yes, P = probable, ? = uncertain | | | | | | | | | | | | | | | | | |

Other features not mentioned in summary tables -

- Exhaust outlet possibly altered at some stage.
- KDB removal probably removed in 1942 or 1943.

| Armament designations | | | | |
|---|---|---|---|---|
| **Weapon** | **Gun designation** | **Mount designation** | Turm | **Position** |
| 105 mm deck gun | 10.5cm SK C/32 | U-boat LC/36 | 0 / II | Foredeck |
| 37mm semi-automatic | 3.7cm SK C/30 | LC/39 | 0 | Aft deck |
| Single 20mm | 2cm Flak C/30 | L30/37 | 0 | Rear of Turm 0 |
| 37mm semi-automatic | 3.7cm SK C/30 | L30/37 (?) | II | Aft deck |
| Single 2cm on both platforms * | 2cm Flak C/38 | L30/37 | II | One on upper platform, one on lower platform |
| 2 X twin 20mm | 2cm Flak Zwilling C/38 II | M 43 U | IV | Both on upper platform, side by side |
| Vierling | 2cm Flak Vierling C/38 | M 43 U | IV | Lower platform |
| 37mm automatic | 3.7cm M 42U | LM 42 U | IV | Lower platform |
| * May have been the earlier Flak C/30 version | | | | |

| U 505 radar and radar warning | | | | | | |
|---|---|---|---|---|---|---|
| **Type** | **On U 505?** | **Refit** | **Refit start** | **Refit end** | **Associated antenna** | **F / R** |
| FuMO 29 | N? | - | - | - | 12 dipoles at front of tower | F |
| FuMO 30 | Y | 5X | 13/12/42 | 30/06/43 | Mattress in box on port side | F |
| FuMO 30 | ? | 5X or later? | ? | ? | FuMB Ant 5 *Samoa* added to mattress? | F |
| FuMB 1 *Metox* | Y | 4X | 25/08/42 | 03/10/42 | FuMB Ant 2 *Biskayakreuz* | R |
| FuMB 9 *Wanze* G1* | Y | 10X | 23/08/43 | 17/09/43 | FuMB Ant 3 *Bali 1* | F |
| FuMB 7 *Naxos** | Y | 11X | 01/10/43 | 08/10/43 | FuMB Ant 3 *Bali 1* | F |
| | | | | | FuMB Ant 11 *Finger* (?) | R |
| FuMB 10 *Borkum* | P | 12X | 08/11/43 | 20/12/43 | FuMB Ant 3 *Bali 1* | F |
| FuMB 9 *Wanze* G2 | P | 12X | 08/11/43 | 20/12/43 | FuMB Ant 3 *Bali 1* | F |
| Improved FuMB 7 *Naxos* | Y | 14X | 02/01/44 | 16/03/44 | FuMB Ant 3 *Bali 1* | F |
| | | | | | FuMB Ant 11 *Finger* (?) | R |
| F / R refers to whether the antenna was fixed (F) or removable (R). When the boat dived, the removable antennae had to be disconnected from the tower and taken inside the boat. | | | | | | |
| * Sources vary on fitting date. Conventional dates given here. In *Steel Boats*, Hans Göbeler states that FuMB 7 *Naxos* was fitted in refit 8X (early August) and that FuMB 9 *Wanze* (version not specified) was fitted in refit 10X. | | | | | | |

| U 505 colours and emblems per individual patrol | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Upper hull paint colours** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Light grey hull and tower (probably *Hellgrau 50*) | Y | Y | Y | Y | Y | Y | Y | | | | | | | | | | |
| Camouflage bands | | | | | | Y | | | | | | | | | | | |
| Darkish grey hull and tower | | | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | |
| Darkish grey hull with a darker grey tower | | | | | | | | | | | | | | | | | Y |
| **Insignia** | | | | | | | | | | | | | | | | | |
| **Feature** | **L** | **C** | **1** | **2** | **3** | **4** | **X** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| Lion (Löwe) | | Y | Y | Y | Y | | | | | | | | | | | | |
| Large axe (Zschech) | | | | | | Y | Y | Y | Y | Y | Y | Y | Y | Y | | | |
| Olympic rings (Zschech) | | | | | | P | P | P | P | P | P | P | P | P | | | |
| 2nd U-Flottille (Lange) | | | | | | | | | | | | | | | Y | Y | Y |
| Scallop V1 (Lange) | | | | | | | | | | | | | | | Y | Y | |
| Scallop V2 (Lange) | | | | | | | | | | | | | | | | | Y |
| L = Launch, C = commissioning, X = sailing during refit 5X (with a Turm II)<br>Y = yes, P = probable, ? = uncertain | | | | | | | | | | | | | | | | | |

| U 505 post-capture colours and emblems | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Paint colours** | | | | | | | | | | |
| **Feature** | **12** | **13** | **14** | **1945 - 1954** | **June 1954** | **Sep 1954 - 1988** | **1988 - 2004** | **2004 - 2014** | **Rev-ell decal** | **AMP decal** |
| Tower | BG | BG | BS | B | B | LG | LG | S58*2 | | |
| Upper hull | BG | BG | BG | B | B | LG | LG | S58*2 | | |
| Lower hull | SB | SB | SB | SB | SB*1 | B | B | SB | | |
| Waterline level (L = too low) | | | | Y | Y | Y | Y | | | |
| U-505 in white capitals (tower) | | | | Y | Y | | | | | |
| U-505 in black capitals (tower) | | | | | | Y | | | | |
| Large white US waterline marks | | | | | Y*3 | Y*4 | | | | |
| BG = *Blaugrau 58/1*, BS = *Blauschwarz 58/2*, SB = *Schiffsbodenfarbe III Grau*,<br>LG = light grey, B = black, Y = yes<br>SB*1 - Very little, if any, *Schiffsbodenfarbe III Grau* remained on very rusty lower hull by 1954<br>S58*2 –*Schlickgrau 58* (lighter museum version)<br>*3 - Waterline draught marks added May 1954<br>*4 - Waterline draught marks were yellow or gold in 1977 | | | | | | | | | | |
| **Scallop shell** | | | | | | | | | | |
| **Feature** | **12** | **13** | **14** | **1945 - 1954** | **June 1954** | **Sep 1954 - 1988** | **1988 - 2004** | **2004 - 2014** | **Rev-ell decal** | **AMP decal** |
| On boat | Y | Y | Y | | | | Y | Y | | |
| Version | V1 | V1 | V2 | | | | V3 | V4 | | |
| Peeling | | | Y | | | | | | | |
| Shield | | | Y | | | | Y | Y | Y | Y |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shield colour | | | G | | | | G | G | R | G |
| Extra areas* | | | | | | | | Y | | |
| Background rectangle | | | | | | | Y | | | |
| Thin black border around shield | | | | | | | | Y | Y | |
| White border | | | Y | | | | | Y | Y | Y |
| Second thin black border (around white border) | | | | | | | | Y | Y | |
| Extra parts* = two extra areas on either side of the fan<br>G = presumed to be green, R = red | | | | | | | | | | |
| **2nd U-Flottille emblem** | | | | | | | | | | |
| **Feature** | **12** | **13** | **14** | **1945 - 1954** | **June 1954** | **Sep 1954 - 1988** | **1988 - 2004** | **2004 - 2014** | **Rev-ell decal** | **AMP decal** |
| On boat | Y | Y | Y | | | | Y | Y | Y | |
| Peeling | | | Y | | | | | | | |
| Rune all white | | | | | | | Y | | | |

# U-Boat Waterline Draught Marks

# Contents



## Part I - Draught Marks

### Introduction

This article will address the white waterline draught (*draft* in US spelling) marks which were located in six positions on Kriegsmarine U-boat hulls. This topic has, until relatively recently, been omitted from the list of items to be added by the U-boat modeller. Now that a greater number of images are available to enthusiasts, more of us are becoming aware of the marks on the boats and wish to apply them to our models. A small range of draught mark decals has been produced by Accurate Model Parts to make this possible. For customers who have bought AMP waterline decals, placement diagrams can be downloaded from our decals page (http://amp.rokket.biz/decals.shtml).

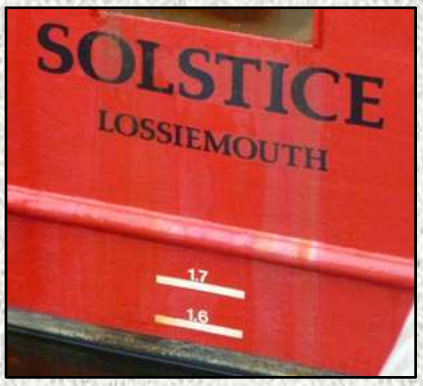
### Ship draught marks

The accurate determination of a ship's *draught* - the vertical distance between the keel and the normal waterline level - is particularly important to prevent a vessel running aground when navigating shallow waters. Therefore all ships have marks on the hull to indicate their draught.

Ships also have a Plimsoll Line (also known as the load line) painted where the hull meets the water surface. Consisting of a circle with a horizontal line running through it, this indicates the safe level to which they can be loaded. However, since submarines are designed to sink, a Plimsoll Line is not necessary on these vessels.

Ships (and submarines) are customarily provided with draught marks at the forward end, aft end and amidships. The draught marks are painted in a suitable colour (often white) to contrast with the background paint colour. The numerals can be in either Roman numerals or normal numbers. The English system uses Roman numerals six inches high, spaced one foot apart vertically. Another system uses metric figures spaced one decimetre (10cm) apart vertically.

In some cases the numbers are welded onto the hulls, often with white numbers being painted on top of the welded numbers.




Above (C1): An example of draught markings on a modern vessel, with 1.7 indicating 1.7 metres above the keel. No prizes for guessing the vessel's name and home port.

### U-boat draught marks

One vital area in the operation of submarines is trim. The state of trim of a submarine in port can be ascertained by comparing the forward and rear draught marks. Due to the importance of trim we should expect there to

be some form of draught marks on U-boats. As we shall see, it was standard practice for Kriegsmarine U-boats to have six sets of white waterline draught marks on the hull. As per the customary nautical fashion, these are painted on the forward end, aft end and amidships. Although the design of the marks varied slightly between U-boat type, they all followed the metric system and had the numbers spaced vertically at one decimetre (10cm) intervals. Some types (such as the Type IIs) had two digits in each number, whereas other types (such as the Type VIIC and the Type IX) had one numeral per number.

### World War 1 U-boats

The origin of waterline draught marks on Kriegsmarine U-boats can be traced back to the U-boats of the *Kaiserliche Marine* (Imperial German Navy) in World War 1. As we should expect, these early U-boats had the six sets (three per side) of draught marks spaced vertically at one decimetre (10cm) intervals. The waterline numbers all consisted of two numerals.

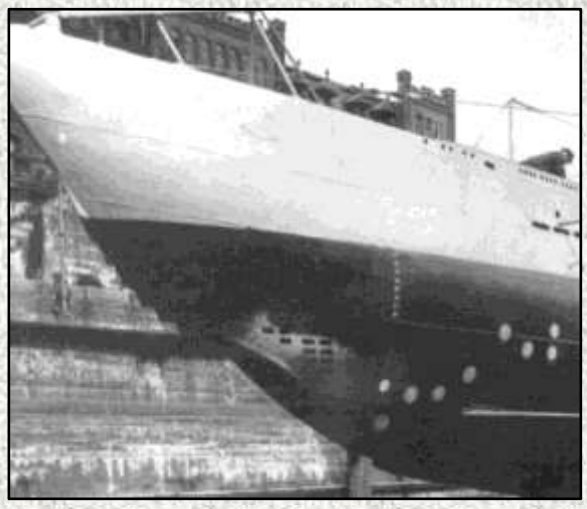
On the few photos of Kaiser's U-boats that I have seen, above the waterline the draught marks were painted black to provide suitable contrast to the light grey paint underneath. On the dark grey paint below the waterline, the draught marks were painted white and this again allowed the numerals to be easily observed. It is unclear whether the draught marks were welded on U-boats of WW1 vintage as I do not have access to close up photos of this area.

## Part II - Two-digit System

### CV 707 / *Vesikko*

Below (C2): A pristine pre-war shot of the Type IIA U 2 in dry-dock. The double-digit numbers can be seen running down the hull at 10cm intervals just behind the torpedo doors. The white marks above the waterline cannot be easily observed since there was little contrast between the white numbers and the light grey *Hellgrau 50* paint employed above the waterline.

Waterline draught marks were employed in 1933 upon the CV 707, a coastal submarine which was later named *Vesikko* when it served in the Finnish navy. This small submarine, which was the forerunner of the German Type II, was built in secret by a German company in Holland. On CV 707, the forward set appears to run up to 40 or 41 (not 45, which was used on the Type IIs). The middle set ran from midway up the saddle tanks, all the way up the hull casing to a position over halfway up the conning tower. These numbers would likely have changed when the boat became the *Vesikko* in the Finnish navy. There were no welded marks on the hull.



### Type IIs

When the first Type II (U 1) was built in 1935, the early two-digit system of waterline draught marks was employed. This two-digit system was characterised by the following -

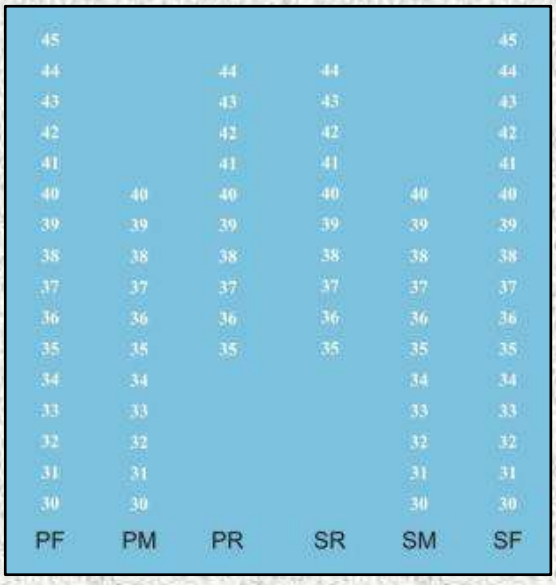
- Six sets of waterline marks (forward end, aft end and amidships on either side).
- Marks spaced vertically at one decimetre (10cm) intervals.
- Each number had **two** numerals.
- The number indicated the height in decimetres above the keel (for example, 39 indicated 390cm above the keel)
- All marks painted white.
- **No** white rectangle used.

- Used upon early U-boat types such as the CV 707, Type IAs, Type IIs and VIIAs.

Although the two-digit system was similar to the type employed on WW1 U-boats, there was one notable difference. Above the waterline on WW1 U-boats, the marks were painted black. On Reichsmarine and Kriegsmarine U-boats, in the two-digit system (and indeed on the one-digit system which followed) the marks were painted white above the waterline. This was a major disadvantage when one considers that the light grey *Hellgrau 50* paint was frequently used as an upper hull paint on Kriegsmarine U-boats. Since this naval paint was a very light shade, the waterline marks above the division line could be difficult to distinguish due to inadequate contrast between the white numbers and the light grey behind. This was not an issue when darker upper greys such as *Dunkelgrau 51* and *Schlickgrau 58* were employed since these shades allowed for adequate contrast.

On the Type II waterline draught mark design, the port and starboard sides were identical. However, due to various obstacles on the hull, each position included a different set of numbers -

| Code | Position on hull |
|---|---|
| PF | Port forward |
| PM | Port middle |
| PR | Port rear |
| SR | Starboard rear |
| SM | Starboard middle |
| SF | Starboard forward |

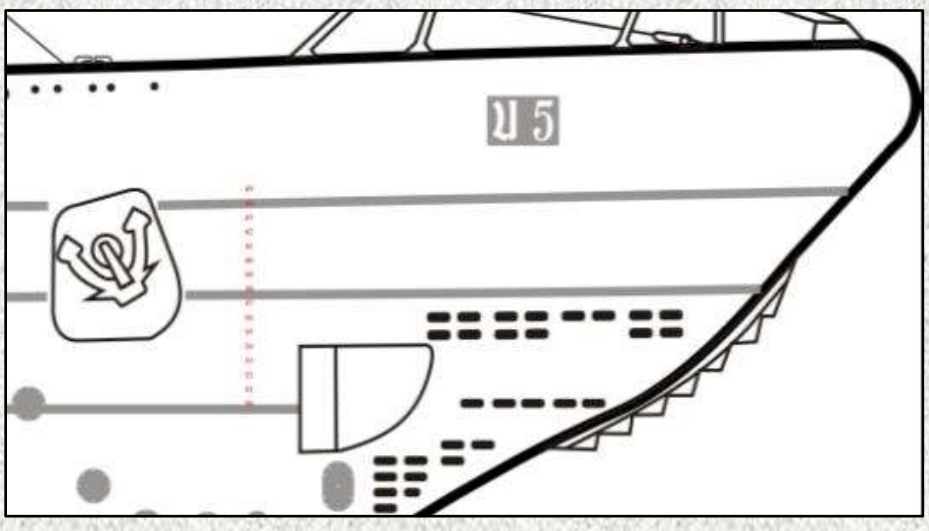


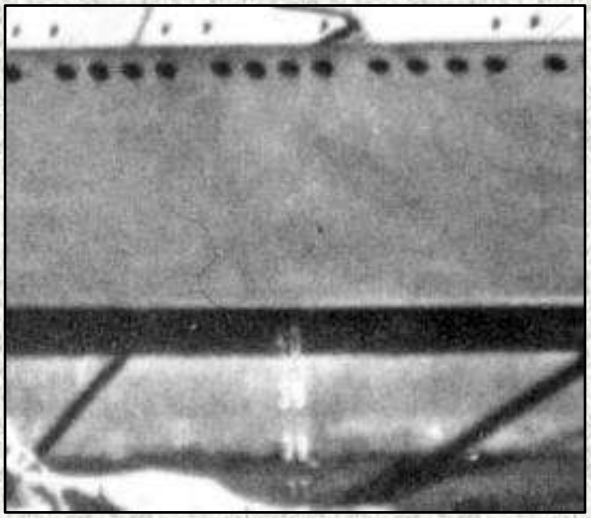

Left: The drawing shows the design of the AMP Type II waterline decals. Each number would be aligned at the same distance above the keel. The number 38, for example, would be aligned 380cm above the keel. Note that the black codes are NOT part of the decals; these are included here to indicate the position on the boat.

Above: The black codes used in the drawing to the left are explained in the table above.

- The forward markings, near the bow, ran from 45 at the top down to 30 at the bottom.
- The middle set ran from 40 (at the top of the saddle tank) down to 30.
- The rear set, near the stern, ran from 44 (just below a free flooding vent) down to 35.

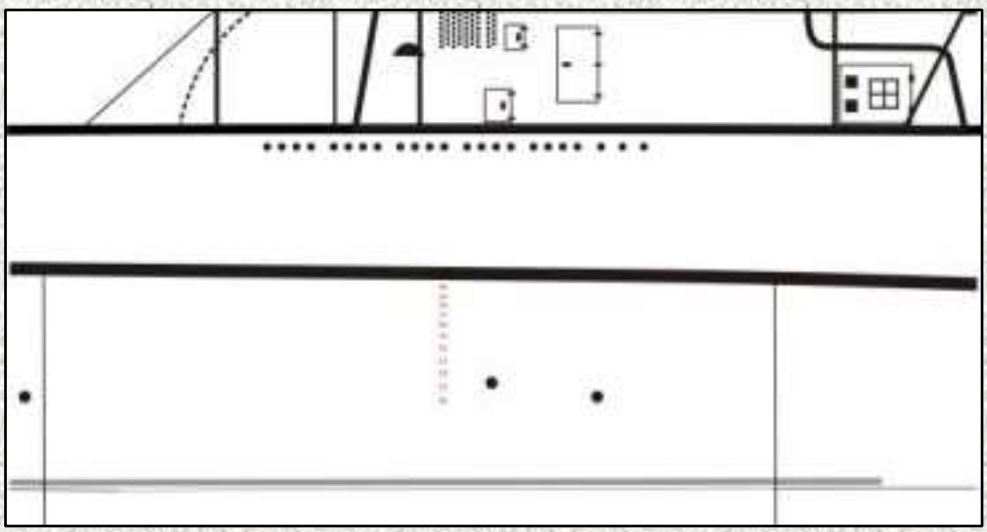
Right: The drawing shows the positions of the forward set on the hull of a Type II U-boat. Although drawn in red for visibility purposes, the real numbers were painted white.





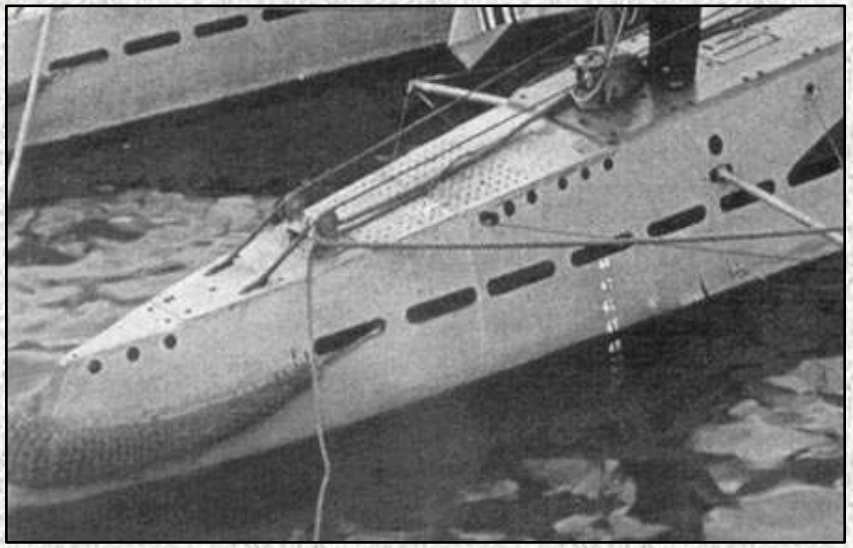
Left (C3): In the middle set, the number 40 was positioned at the top of the saddle tank. The numbers did not continue onto the hull casing up to 45.

Below: The drawing shows the positions of the middle sets on the hull of a Type II U-boat. The position of top numeral, 40, in photo C2 should allow the modeller to apply decals to the saddle tanks without difficulty.



In the pre-war period U 7 and U 8 had a middle set which ran from the saddle tanks up onto the hull casing and then halfway up the tower. As they were the first IIBs built at *Germaniawerft* in Kiel, the draught mark format may not have been agreed upon at that time. Or, since U 7 and U 8 were the first Type IIBs, the shipyard may have added these additional marks for diving trials.

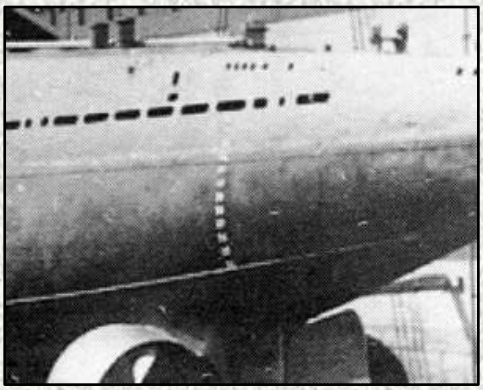
When the Type IIB U 11 was covered with *Alberich* (sound absorbing anechoic tiles), the white waterline numbers were painted on top of the tiles. In one difference to the norm, the rear set on U 11 had only seven numbers rather than ten.

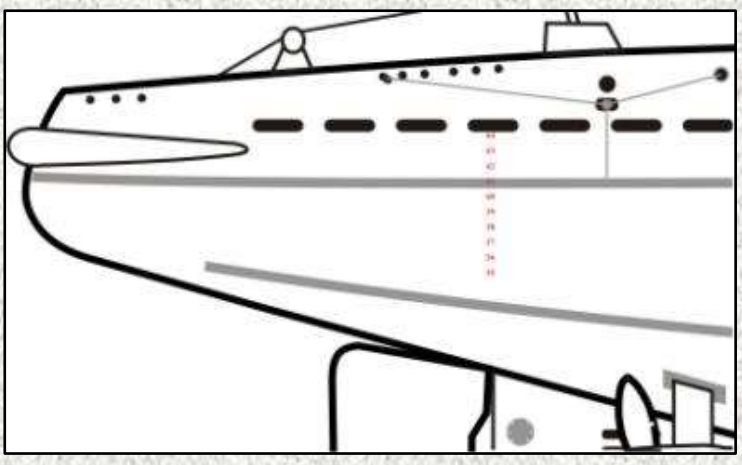


Left (C4): The rear set ran up to 44, just below a free-flooding vent. The vent excluded the possibility of the number 45 being represented in the rear set.

Right (C5): This image shows the rear set extending down the hull casing of U 18 until the number 35 was reached.

Below: The drawing shows the positions of the rear set on the stern of a Type II U-boat.

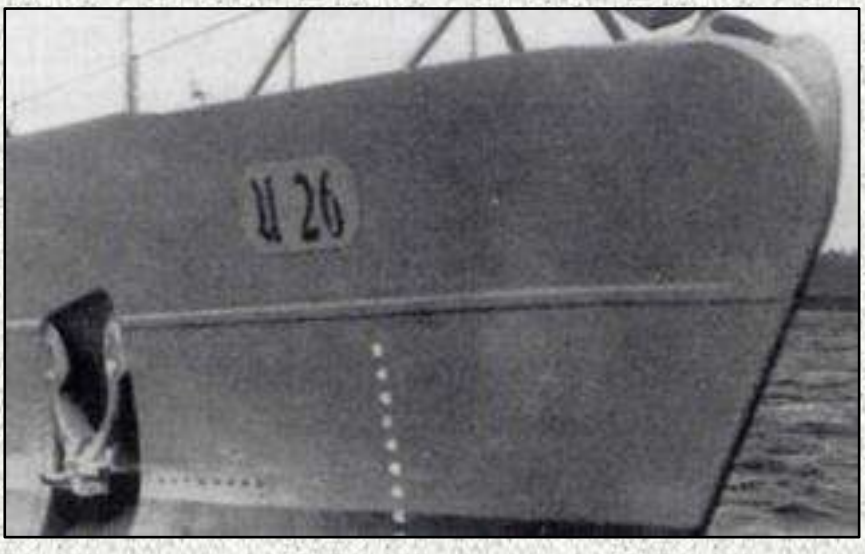




## Type IAs and original Type VIIs (VIIAs)

In the pre-war period, the Kriegsmarine operated two Type IAs, U 25 and U 26. These were larger ocean-going submarines which were used in the development of the Type IX ocean-going submarine. The other type operated in the pre-war and early war period was the original Type VII. When the B variant was constructed (with two rudders and greater fuel capacity), the ten original VIIs (U 27 to U 36) would later be referred to as VIIAs.

Both types of U-boat (IAs and VIIAs) used the two-digit system of waterline draught marks. The rectangle used in the one-digit system to denote the metre point above the keel was unnecessary in the two-digit system because the numbers themselves (e.g. 30 and 40) made it obvious where the one metre points lay.

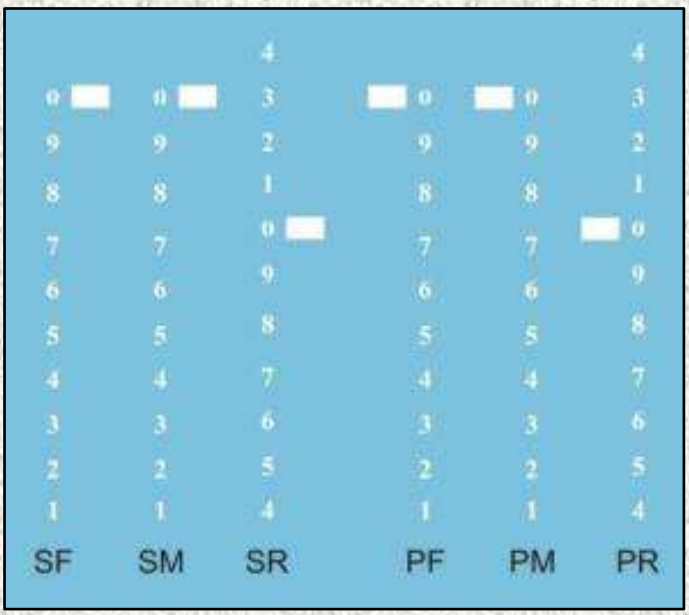



Left (C6): The two-digit draught marks on the bow of the Type IA U 26. On the IIs, VIIs and IXs the numbers were positioned just ahead of the anchor recess but on the IAs (U 25 and U 26) the numbers were much farther forward. The medium grey upper hull paint allowed sufficient contrast to allow the white numbers to be clearly identified.

Above (C7): Another image taken in the pre-war period, this time of the original VII (VIIA) U 35. The white numbers are clearly shown against the medium grey upper hull paint. Some of the numbers are not so clear against the dark grey lower hull paint. The numbers would have been present but may be obscured beneath a scumline or any slime that tended to accumulate just below the waterline of boats sitting in harbour. On VIIAs, the numbers on the bow ran down to the top of the lower torpedo door.

Below right: The drawing shows the design of the AMP Type VIIB/C/D waterline decals. The black codes are once again NOT part of the decals, and are included to indicate the position on the boat. Due to space requirements, on the AMP decal sets the rear sets were not aligned with the forward and middle sets (the 500cm point on the rear sets is aligned just above the 470cm point on the front and middle sets). Alignment was not necessary since modellers are required to separate each set before applying them to their model.

## Part III - One-digit System

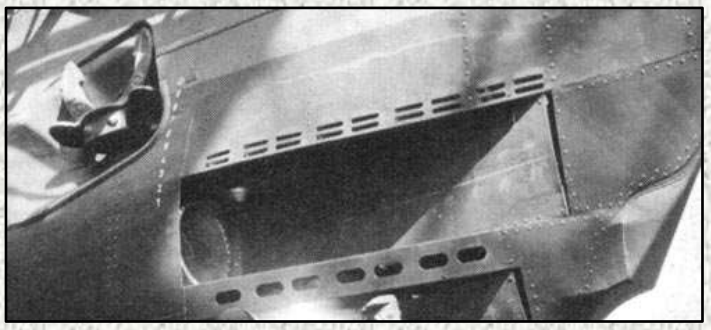


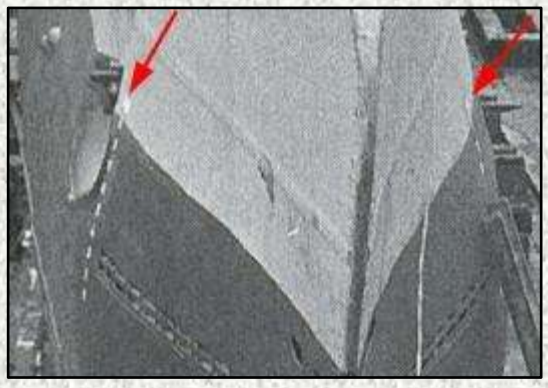

When the first Type VIIBs were launched in 1938 a new one-digit system was implemented. It was this format which would become the norm for any other U-boat type subsequently built for the Kriegsmarine. This one-digit system was characterised by the following -

- Six sets of waterline marks (forward end, aft end and amidships on either side).
- Marks spaced vertically at one decimetre (10cm) intervals above the keel.
- Each number had **one** numeral.
- All marks painted white.
- At the 500cm point above the keel there was a white rectangle (just next to the number 0).
- The format varied between types.
- Used upon VIIBs, VIICs, VIIDs, IXs, XIVs, XVIIBs, XXIs and XXIIIs.
- Note that some types (not VIIs) had a white rectangle at the 400cm point above the keel; this rectangle was centre aligned, with the number 0 superimposed upon it.

## Type VIIBs, VIICs and VIIDs

The main advantage of the two-digit system was that it allowed the number of decimetres above the keel to be seen very easily. The number 39, for example, meant 39 decimetres (390cm) above the keel. Now that only one digit was available, the number of decimetres was not obvious - the number 9 on the hull may refer to the 390cm or 490cm level. However, the addition of a white rectangle at the 500cm level made the metre point above the keel obvious. This rectangle was added ahead of the numbers on both sides.



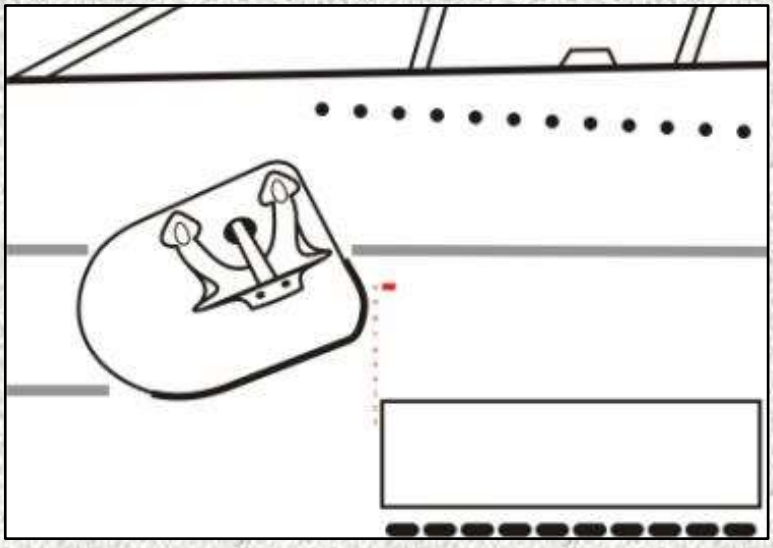


Above left (C8): The forward set just ahead of the anchor recess on the bow of the VIIC U 228. A welded rectangle, just to right of the 0, has been added here and, unlike common practice, the rectangle has not been painted white.

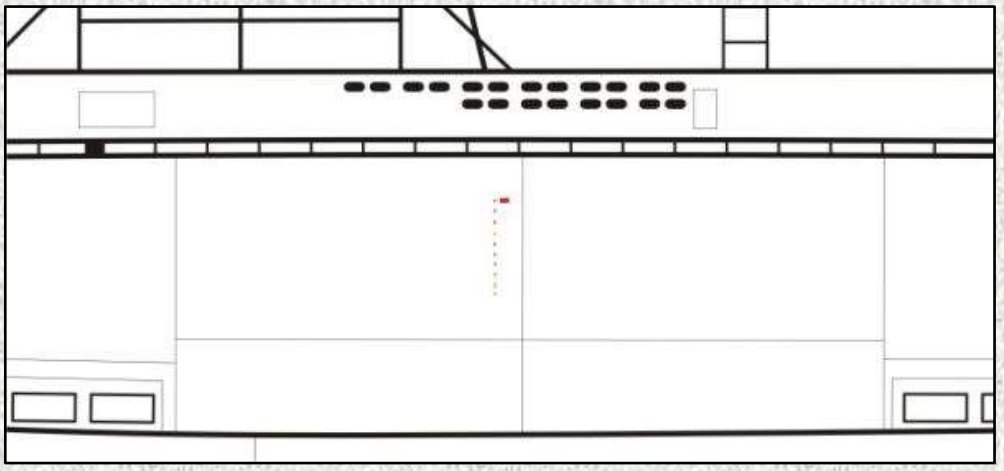
Above right (C9): The forward draught marks can be seen on both sides of the VIIC U 94. A red arrow has been added to show the position of the white rectangles, which denote the 500cm level above the keel. Note that the rectangle is just above the division between the upper and lower greys.

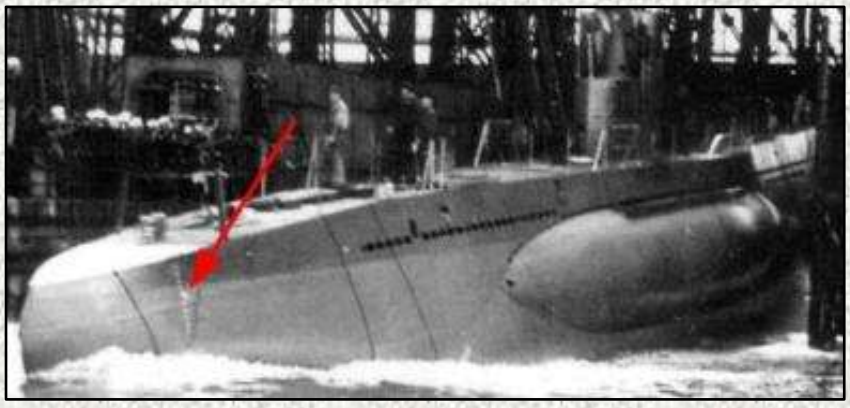
Right: A drawing showing the position of the forward marks on the starboard side of a VIIB hull. On the port side the rectangle was also positioned ahead of the numbers.

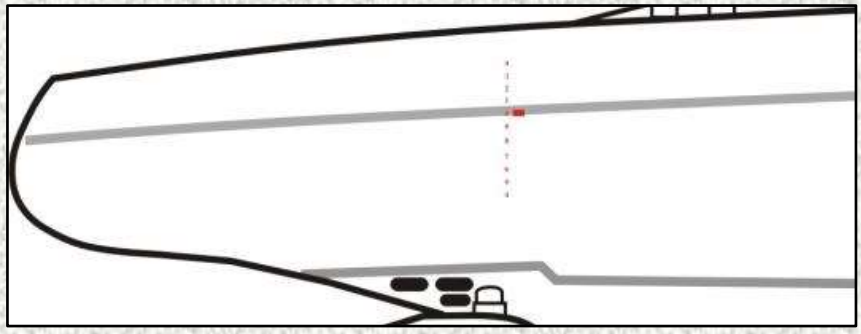
Bottom right: (C10): The port side of a light grey *Hellgrau 50* painted U 751 in January 1941. Since the rectangle was painted ahead of the numbers, on the port side this meant the rectangle was to the left of the numbers. The top 0, next to the rectangle, is a circle on this boat. On some boats the number zero was used, whereas on other boats a circle was used.



Below: A drawing showing the position of the middle marks on the starboard saddle tank of a VIIB hull. Again, the rectangle denotes the 500cm mark. The positioning of this set is more difficult as there is no ideal reference point to judge how far up the saddle tank the numbers should go. Modellers could place the rectangle 6.94cm from the keel, which is 1/72nd of the real 500cm distance from the keel.





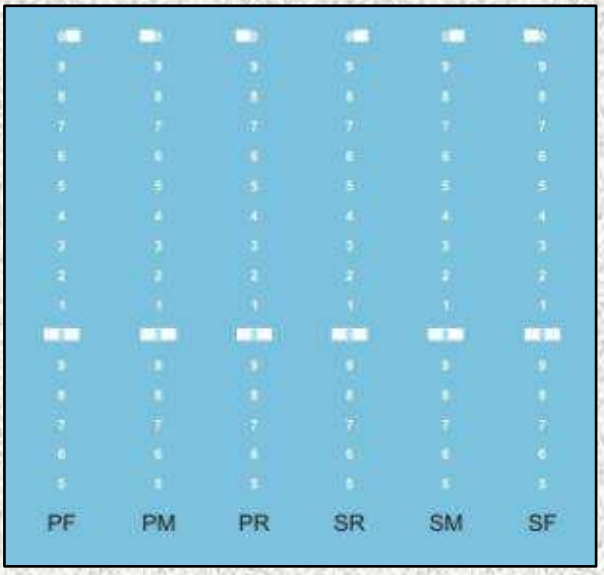


Left top: (C11): The VIIB U 54 being launched on the 15th August 1939. As normal, the division between the greys was just above the white rectangle.

Left middle (C12): The red arrow points to the white draught marks on this colour shot of a VIIC in construction. Unfortunately our view is obstructed.

Left bottom: A drawing showing the position of the rear marks on the starboard side of a VIIB hull. It can be seen that the format was different on the rear set in that they ran from the 440cm (number 4 at the bottom) level up to 540cm level (the 4 at the top).

There were sometimes variances from the usual standard. For example -




- As we have seen on U 228 (see photo C7), on a few boats the welded rectangle at the top was left unpainted.
- The rear set on U 752 had no numbers above the white rectangle.
- The rear set on U 226 had no numbers above the rectangle and the rectangle was left unpainted.

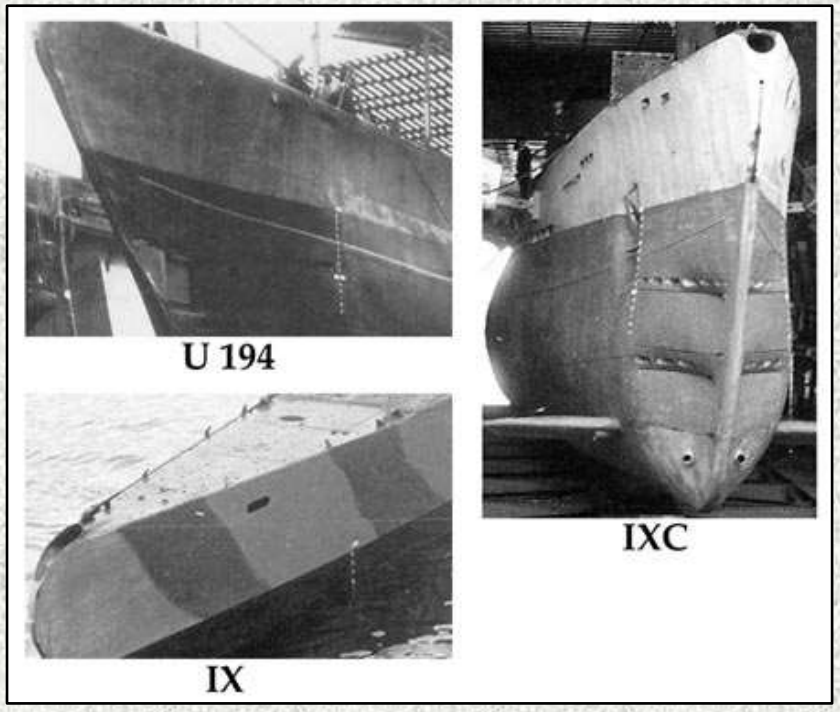
## Type IXs

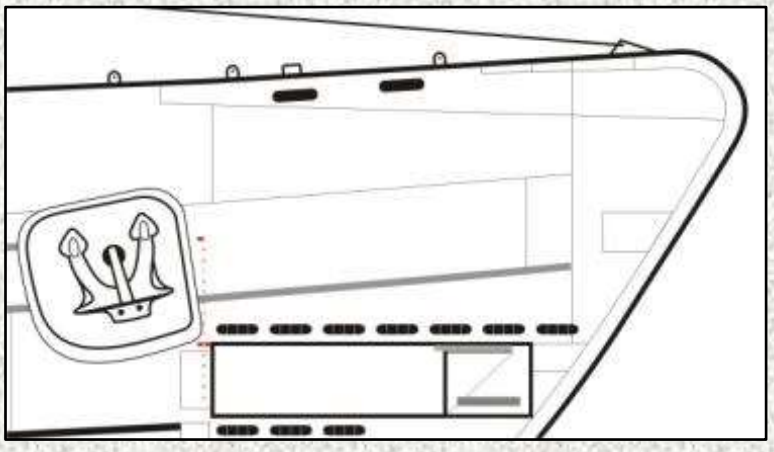
Another major type to utilise the one-digit system was the Type IX class of ocean-going submarine.

Top right: The drawing above shows the design of the AMP decals (K-72W) for the 1/72nd Revell IXC U-boat. Please consult the earlier table for the black codes. Note the presence of the wide white rectangle at the 400cm. The number 0 was superimposed over this wide white rectangle.

Right (C13-C15, numbered clockwise from top left): Three views of waterline draught marks on the bows of Type IXs. The 500cm level above the keel has a white rectangle that is offset slightly behind the numbers.

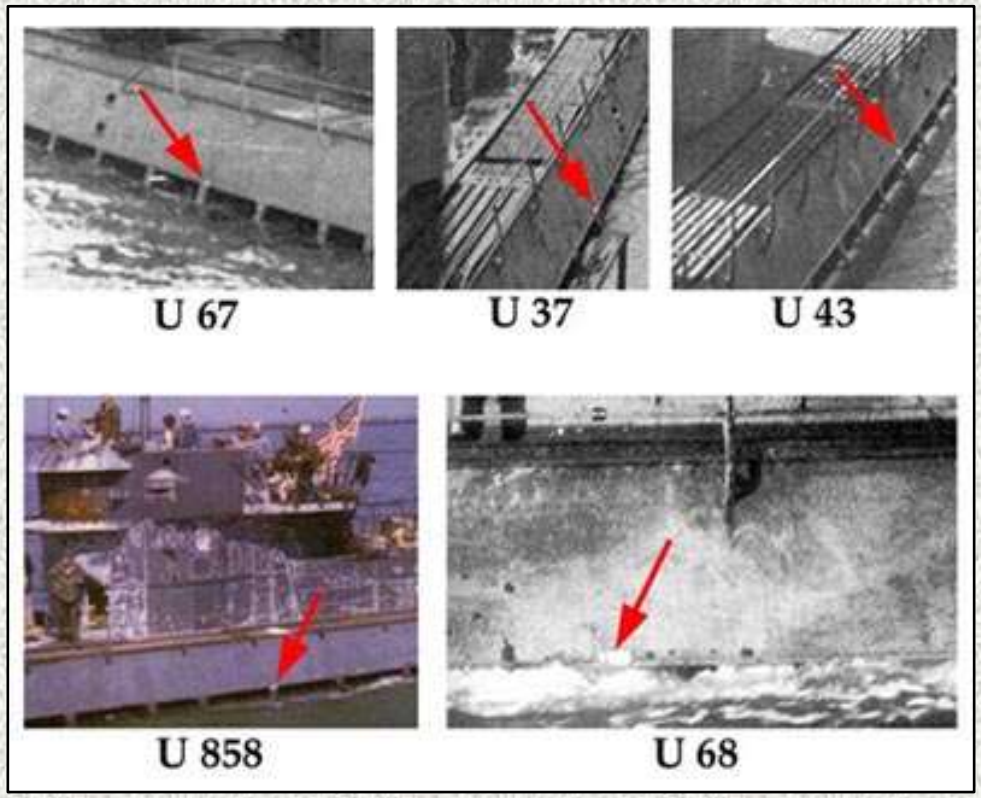
Bottom right: The positioning of the numbers can be seen on the bow of the IXC side profile below.



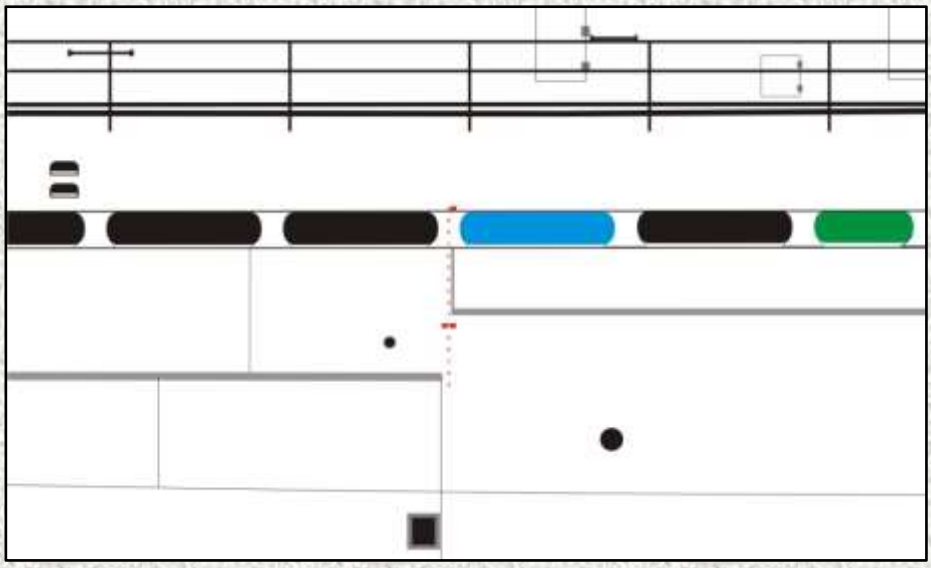
For this type of boat, each individual set was similar in that it ran from the 350cm level at the bottom up to the 500cm level at the top. At the 400cm level, the 0 was added on top of a white rectangle; this rectangle was centre-aligned with the numbers and therefore not offset to one side. At the 500cm level, there was a white rectangle which was offset to one side.

Revell's new Type IX model kit provides only four sets of waterline draught marks on their decal sheet (only the sets at the bow and stern are provided). The omission of the middle set may be a result of the difficulty in identifying the sets amidships. This is primarily because most photos show boats in the water and only a few middle numbers are visible above the waterline.

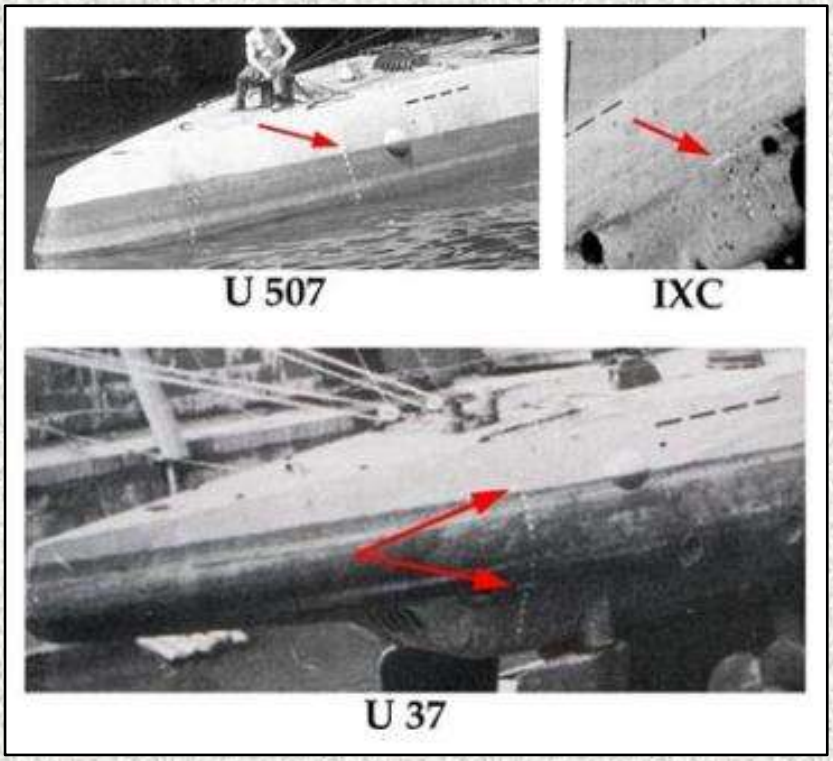


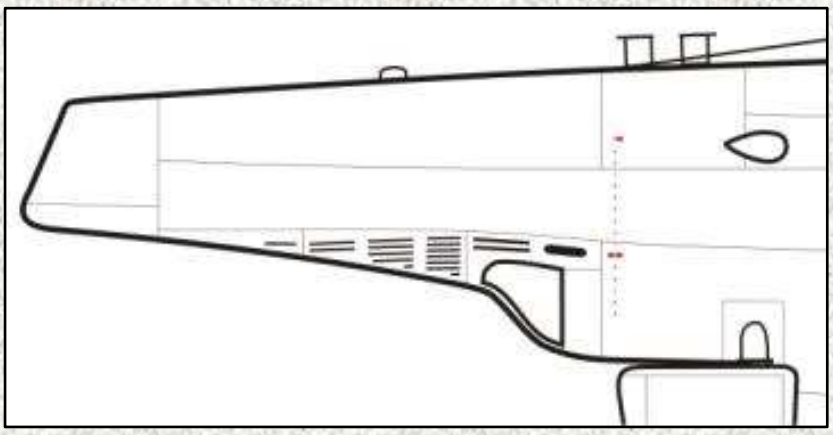

Above (C16-C20, numbered clockwise from top left): The white rectangle at the top of the middle set has been identified in each of the five Type IXs shown here. The rectangle just ahead of the 0 in the U 68 image is the best example.

Below: The positioning of the numbers amidships can be seen on the starboard side of the U 505 side profile below. When trying to determine the position on the Revell IXC model, the first thing to do is find the horizontal position. This can be done by finding the drainage slot which is narrower than the rest (coloured green below) and then counting two slots back to the slot coloured blue below. The waterline marks start just behind this blue slot. For the vertical position, the rectangle at the top (500cm level) lies directly above the top level of the main slots.



Given the standard nautical custom of providing draught marks at the bow, stern and amidships, it is clear that the marks should be there on Type IX hulls. To spot them it was necessary to determine their exact position on the hull and then look at every IX photo at our disposal, sometimes with the assistance of a magnifying glass. A full assessment yielded the identification of the white rectangle at the top of the set on five IXs. It now becomes clear that any IX with draught marks at the bow and stern would also have a set amidships.



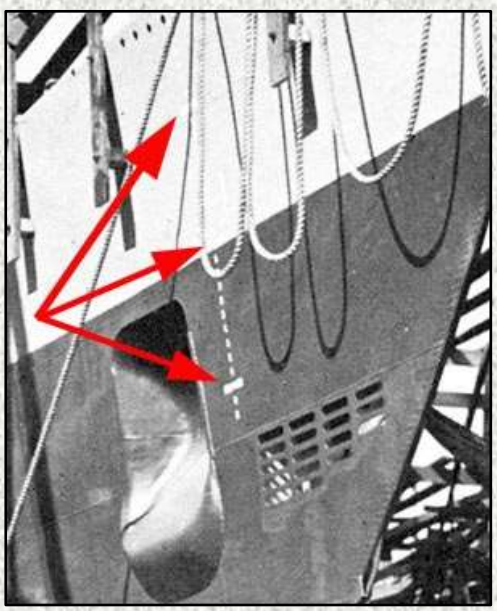



Left C21-C23, numbered clockwise from top left): Once again, many photos were consulted to identify the draught marks on the stern of IXs. There is a discrepancy in the top rectangle position in the U 37 and U 507 photos. On U 37 the rectangle is *behind* the numbers whereas on U 507 the rectangle is *ahead* of the numbers. Unusually, the rectangle on U 507 appears to have been left unpainted.

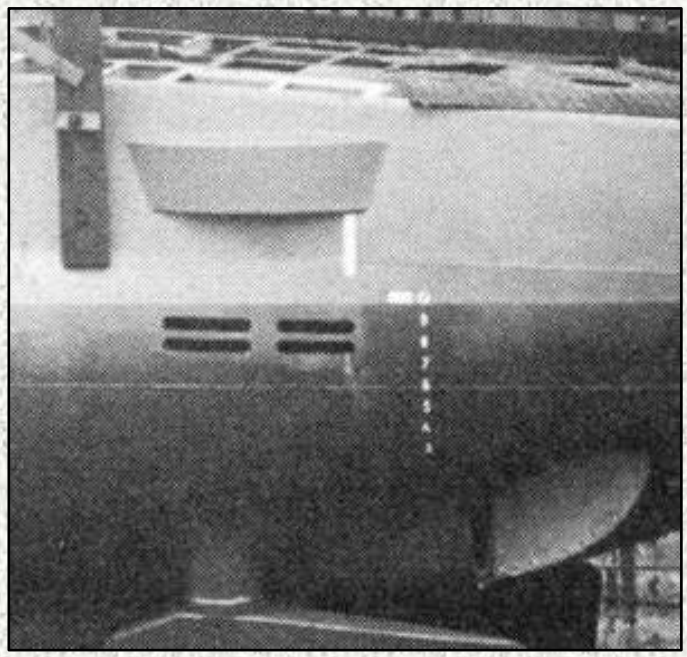
Below left: The positioning of the numbers can be seen on the stern of the IXC side profile.

## Other types

All other types of Kriegsmarine U-boat, from types intended to be mass produced to experimental boats, had white waterline draught marks which used the one-digit system.



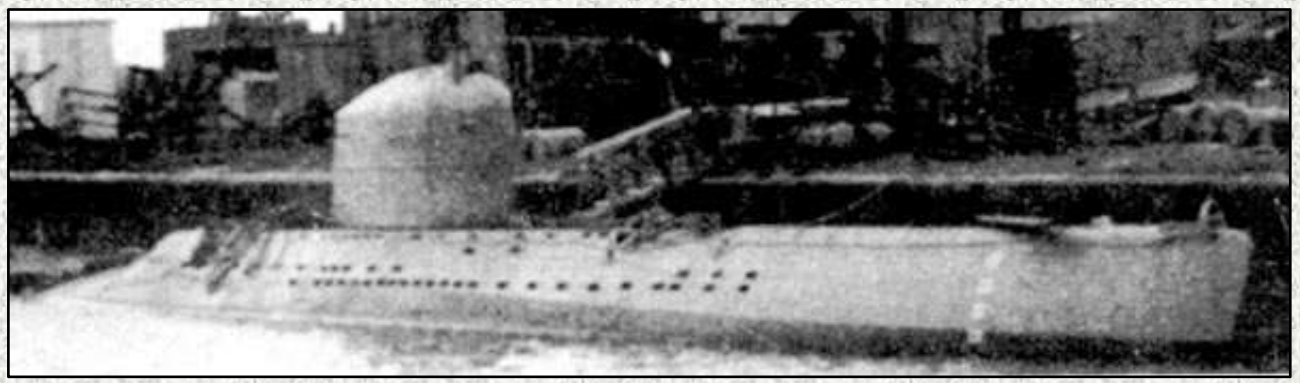
Right (C24): The Type XB U 116 on the day of her launch from the *Germaniawerft* shipyards on the 3rd May 1941. The photo is a prime example of the white draught numbers not standing out well against the light grey employed above the waterline. Unlike the Type IXs, which had a wide central rectangle at the 400cm level and an offset rectangle at the 500cm level, on this boat there were three rectangles - all three were the wide centre-aligned rectangles.

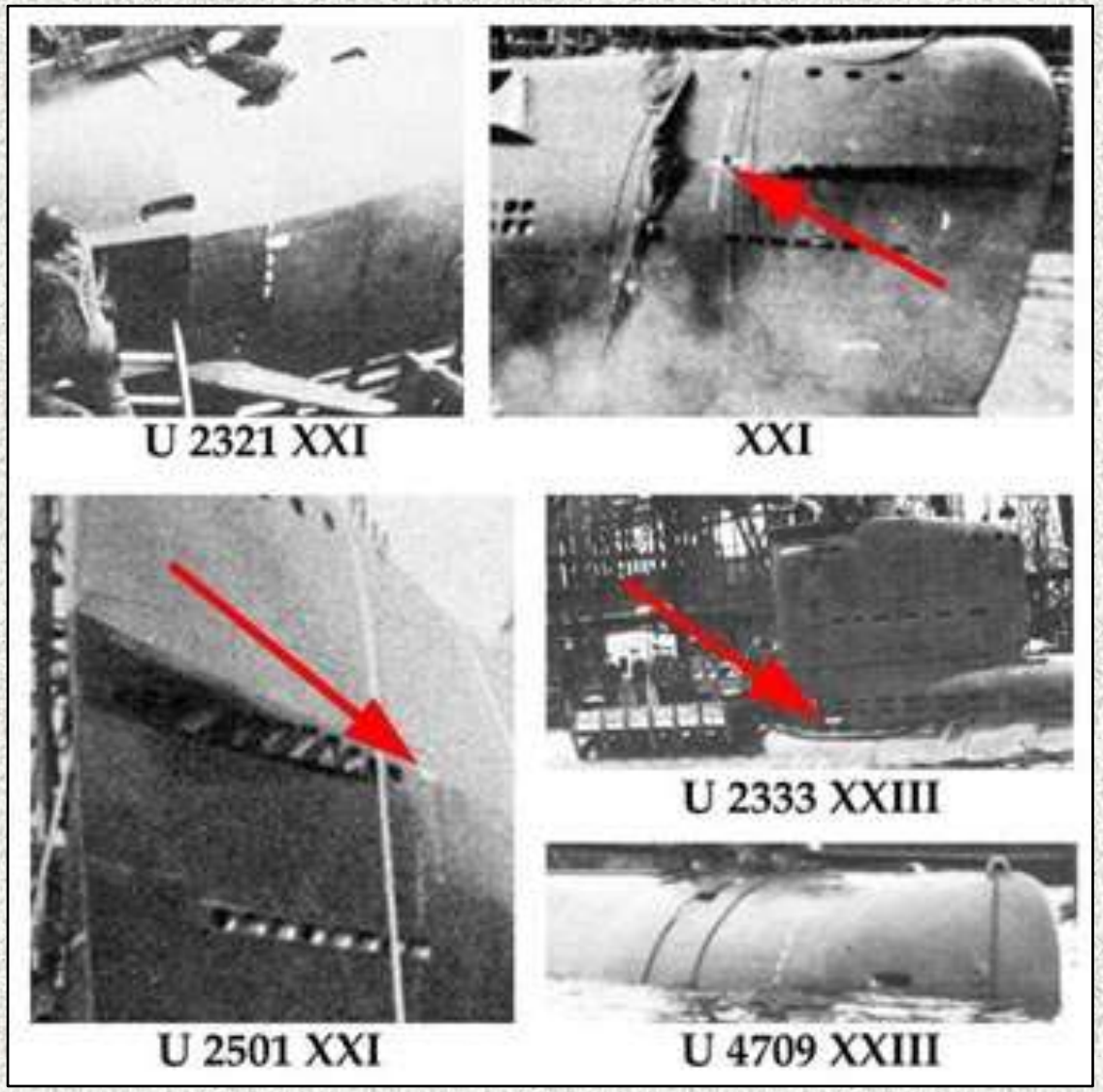


Left (C25): Another XB, U 118, on the 6th September 1941, a few weeks before her launch from *Germaniwerft*. Construction photos of very helpful in distinguishing draught marks because such photos show the whole hull and the marks are fresh on the boat. The rear markings ran from 0 at the top to 3 at the bottom, with a white offset rectangle at the top. As with normal Kriegsmarine practice - indeed nautical custom - there would also be a set amidships.

Right (C26): The Type XIV U 463 was one of ten "Milch cows" which resupplied U-boats operating in the Atlantic. The marks on the bow look almost identical to the IX marks, with the exception of an additional 4 at the bottom of the set. Note how the division between the greys was just above the top rectangle.

Below (C27): The Type XVIIB U 1407 was a small experimental U-boat which tested the Walter propulsion system. In total there were eight Walter boats - the V80 prototype, four XXIIAs and three XXIIBs. The four large white draught markings are completely unlike the normal small U-boat marks. The boat may have been given larger marks for diving trials and other tests.






Above (C28-C32, numbered clockwise from top left): The exact format of the marks on these photos of Type XXIs and XXIIIs are difficult to determine but the general arrangement can be seen. One of the images shows the conning tower of the XXIII U 2333. What is interesting about this photo is that it shows the middle draught marks extending onto the tower. The wide centre-aligned rectangle, pointed to by the red arrow, was also in this position on U 2321, U 2332 and U 2333 so it appears to be a standard feature. On U 4704, a Type XXIII with the *Alberich* sound absorbing anechoic tiles, the waterline numbers were added in the normal positions over the coating.

## Part IV - Welded Waterline Numbers

On certain U-boat types, the waterline numbers were also welded onto the sides of the hull. The types which have been identified with welded numbers include the original Type VIIs (also known as VIIAs) and IXs. Given the dearth of close up images required to identify whether the welded numbers were present or not, it is not possible to state whether welded number were applied consistently to all VIIAs or IXs. Similarly, although welded numbers have been identified upon a few VIICs, the lack of available close up images make it impossible to make a judgement of how many boats of this type had the welded numbers.

## Type VIIAs

Above (C33): In mid-August 1939, a crewman removes a pre-war identification bow plate from the VIIA U 35 in readiness for the commencement of hostilities. At the bottom left can be seen the two-digit welded numbers, directly in front of the anchor recess, without white paint. Welded numbers have also been seen on U 30 and U 31 so it is likely that all ten VIIAs had this feature.

An obvious point to be considered is the question of whether the welded numbers were painted white or left unpainted. One might argue that painting the welded numbers white would be unnecessary since the level could be read directly from the welded numbers. However, this was not always the case, as we shall see.

Let us take U 35 as a case study. In photo C33, taken in mid August 1939, we can clearly see that the welded numbers on the bow of U 35 were unpainted. Yet if we look back at an earlier photo of U 35 (photo C7), we can see white numbers present on the bows of this same boat. The welded numbers would have been added when the boat was being constructed (U 30 had the welded numbers before launch) so we can assume that U 35 had the welded numbers **and** the white numbers in photo C7. Other photos show U 35 with the white marks present so we may judge that the welded numbers were *usually* painted white on this boat.

Other photos of VIIAs show the white numbers were often, but not always, in place. The presence of the welded marks may have, on occasion, led shipyard personnel to think that painting them white was unnecessary.

## Other types

*Vesikko* - This boat featured no welded numbers.

Type II - It is extremely difficult, perhaps unfeasible, to identify if welded numbers were present if the white numbers are painted over the top. There does *appear* to be welded numbers in place upon the hulls of U 120, U 147 and an unidentified Type II but it is impossible to state this with any degree of certainty. It would be unwise to speculate that all Type IIs had the welded numbers merely on the basis of their use up these three boats. However, since they were probably used upon the three boats, the possibility of the widespread use of welded numbers upon Type IIs cannot be excluded.

Type VIIB/C/D - Again, given the unfeasibility of identifying welded numbers lying underneath white paint, it is not viable to state whether all Type VIIB/C/Ds has welded numbers or not. However, it can be stated that welded numbers may be identified on the bow of U 73, U 431, U 596 and an unidentified VIIC. It is possible, due to the numerous shipyards which produced VIIs, that some boats had welded numbers and others did not.

What can be stated with full certainty is that U 73, U 83, U 94, U 96, U 228, U 374 and U 431 all had a rectangle welded to the bow at the 500cm level. This rectangle can be seen earlier in this

article in photo C8. If the rectangle was added to the bow, it is likely that a similar rectangle was welded to the stern and saddle tanks. One benefit of this welded rectangle would be to allow shipyard personnel to find the 500cm level without having to measure the distance from the keel. This would greatly speed up the application of white draught marks at the end of a refit.

Type IX - On U 505 and U 534, the two Type IX boats which survive today, both boats have welded waterline numbers. Welded numbers can also be distinguished upon the bows of U 41, U 67, U 107, U 128 and the stern of U 873 and U 889. It is quite likely that welded numbers were a feature of many (perhaps all) of the Type IXs.

Type XB - Welded numbers cannot be distinguished in the XB photos (C23 and C24) but this does not mean they were not present.

Type XIV - Welded numbers cannot be distinguished upon the Type XIV in photo C26.

All other types - It is unclear if other types had welded numbers since I have no suitably close range photos in which to make a judgement.

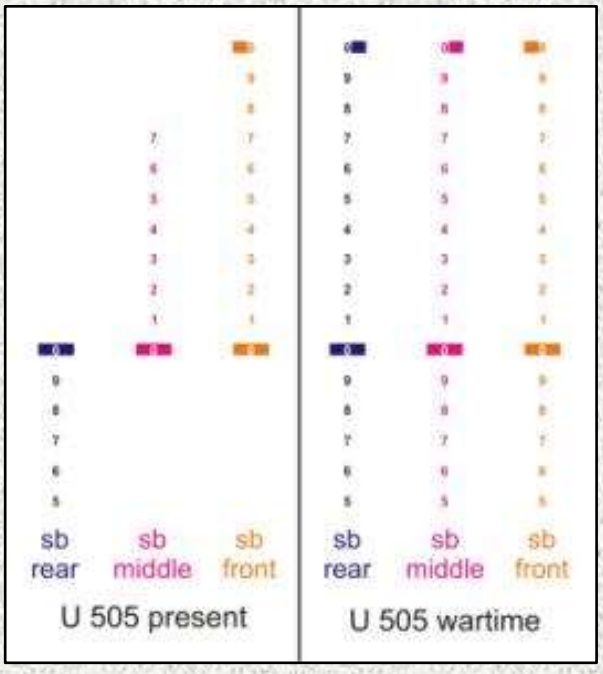
## U 505

Missing Kriegsmarine welded numbers - The museum boat U 505 is currently missing some welded waterline draught numbers. Details are as follows -

- Rear - The only marks present are 350cm to 400cm inclusive.
- Middle - The only marks present are 400cm to 470cm inclusive.
- Front - The only marks present are 400cm to 500cm inclusive.

The reason why many of the middle marks are missing is due to the deterioration in the period between 1944 and 1954. By 1954, the section midway along the hull of U 505, just below the main drainage holes, was particularly badly deteriorated. When hull plating was added to restore this central area, new welded draught numbers were not added.

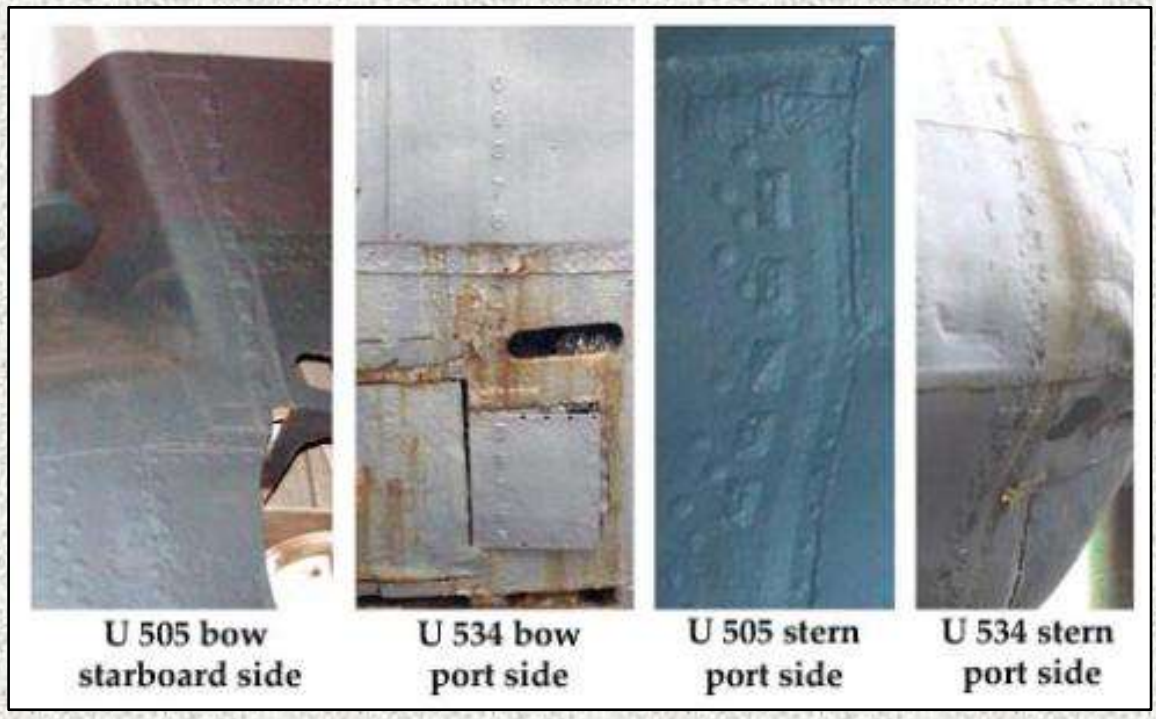
A similar reason exists for the marks on the bow. Prior to the move of U 505 to the Museum of Science & Industry in Chicago, locks were added to the rear of the torpedo doors directly over some of the welded waterline draught numbers on the bow. Again, the welded numbers were not replaced.




Above: The drawing indicates the numbers that are currently missing from the museum boat U 505.

Large US-style welded waterline draught numbers - In addition to the small welded Kriegsmarine examples, large welded waterline draught marks were added to the boat in preparation for the long distance transit to Chicago. On the port side there were six numbers - 0, 1, 2, 3, 4, 5 - running vertically from bottom to top. The starboard side had the same six numerals, but due to the position

of the anchor, the numerals 4 and 5 were positioned forward of the anchor recess. These numbers were all removed in 2003 / 2004.




Far left (C34): Taken by Wink Grisé on a visit to U 505 at the Museum of Science & Industry in Chicago, this photo shows that the numbers no longer exist below the 400cm rectangle on U 505

Middle left (C35): Taken by Jon Kelly during a visit to U 534 in Birkenhead in England, the welded numbers can clearly be seen on the port side of the bow. We can see there is no rectangle positioned behind each number on this boat.

Middle right (C36): These are the only waterline numbers (350cm to 400cm) which exist on the stern of U 505. The rectangles positioned behind each number can be seen.

Far right (C37): When we compare this photo of the stern of U 534, which shows a full set of numbers, to the stern of U 505, we can see that the boat in Chicago is missing many of the numbers in this area.

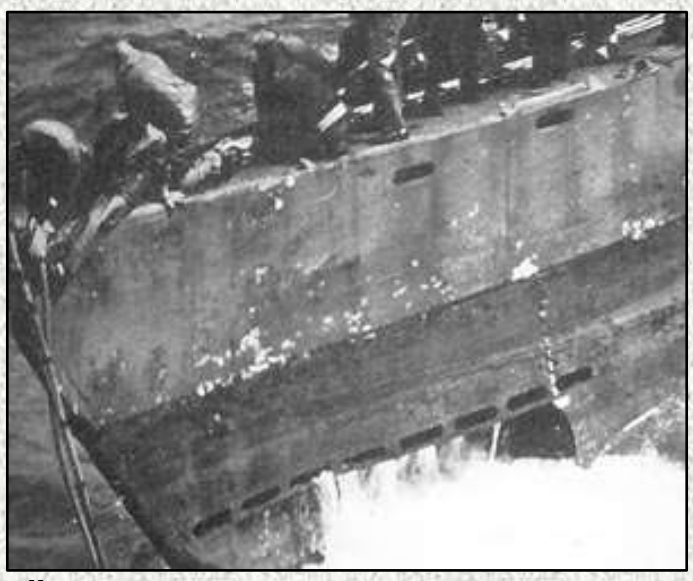
## Part V - Difficulties Observing Numbers

To identify the draught marks on Type VIIB/Cs, a number of close up photos of very good quality were required to identify the actual numbers themselves and their exact positions on the hull. The high number of photos of VIIB and VIIC U-boats available made this exercise possible. With knowledge of the location and format of marks on the VIIB/Cs, it then became easier to determine the marks on Type IIs and IXs. With other types of boats there are not enough photos to permit a full understanding of the format of each set.

There are several difficulties in observing waterline draught marks. Many photos show boats in the water, with the majority of the numbers hidden beneath the water. In most photos we are fortunate if we can spot one set of numbers on the hull. When we are permitted to observe a full set of marks, the small size of the numbers often precludes identification of the numbers themselves.

The numbers are naturally easier to discern on newly painted boats, where the numerals and the paint beneath are fresh. However, when boats returned from patrol the numbers are much less visible. The white numerals lost their fresh white appearance very quickly, while the grey paint

underneath (in particular the anti-fouling dark grey on the lower hull) also faded and weathered quickly. The Type IIs, VIIs and IXs were submersibles rather than true submarines, and new enthusiasts are often shocked to find that the "under sea boats" could often spend over 90% of their patrol on the surface. Since they operated mostly on the surface, and the numerals were present near the waterline, the constant movement of water over the surface of the white waterline numbers had a detrimental effect on their appearance. On heavily weathered boats which had been operating at sea for a prolonged period, the numerals may have been partially or completely chipped away. The numerals just below the waterline may also have been obscured by any plantlife that had attached to the hull. A boat which had been lying in the oily waters in port may exhibit a scumline or slime over the numerals. All these considerations make it harder for us to discern the white waterline numbers in photos.



Above: (C38): U 505 on the day of capture, 4th June 1944. It is difficult to determine how much of her white waterline numbers were visible on the hull due to the degree of weathering. All sorts of weathering may have obscured some of the numbers or the numbers might simply have worn off from the raised surface of the welded numbers. This photo suggests that some of the white numbers and the rectangle at the 400 cm level were there. In other photos taken on the same day the white numbers cannot be discerned.

On occasion some boats may not have had the numbers for a short period. A boat had to be in dry-dock to allow the marks to be added and dry-dock facilities were usually available. However, with dry-dock time at a premium, and an urgency to return a boat to sea to fight the enemy, some boats may have been moved out of dry-dock before the white numbers were applied. Another consideration, mentioned previously, regards the boats with welded numbers. Shipyard personnel who saw welded numbers may have thought the addition of white to these numbers was not required.

Although it may be the case that a small number of boats went to sea without the draught marks, it is likely that this was a very rare occurrence. The application of the white numbers should therefore be considered as being standard practice upon Kriegsmarine U-boats.

**And finally...**

U 995 - In 1979, the museum VIIC/41 U 995 had a set of white marks on the stern and bow. The boat may also have had a set on the saddle tanks in 1979 but there was no set amidships in September 1978. In 1998 the boat had the marks on the saddle tanks so, again, it is presumed the boat had all the other sets at this time also. In the early years of this century the boat had no marks on the hull.

Modern U-boats - As an interesting footnote, the U-boats within the modern German navy (*Deutsche Marine*) have white waterline draught numbers on the hulls. The modern system utilises two white digits in a method reminiscent of the two digit system used upon early Kriegsmarine boats. Some of the modern class 206 boats have two digit numbers running up the bow of the boat. Other 206s, and the class 212A, have white horizontal lines, with two digit numerals at each metre point. On the middle set of the 212A, the horizontal lines run all the way up to the top of the tower.

# Part VI - AMP Waterline Decals

To help modellers, Accurate Model Parts has produced the range of waterline markings in the table below. These waterslide decals can be ordered online from the decal section of the AMP website (http://amp.rokket.biz/decals.shtml). Placement diagrams can also be found on this webpage.

| Waterline Draught Mark Decals by Accurate Model Parts | | | |
|---|---|---|---|
| **AMP code** | **Scale** | **U-boat type** | **Suitable for the following kits** |
| A-72W | 72 | VIIB, VIIC, VIID | Revell VIIC (RV5015), Revell VIIC/41 (RV5045) |
| B-144W | 144 | VIIB, VIIC, VIID | Revell VIIC (RV5038), Revell VIIC/41 (RV5100), Revell VIID (RV5009) |
| I-32W | 32 | VIIB, VIIC, VIID | OTW VIIC, Andrea VIIC, Engel VIIC, Accurate Armour VIIC (35th scale) |
| J-144W | 144 | II | Revell IIB (RV5115), ICM IIB 1939 (ICMS009), ICM IIB 1943 (ICMS010) |
| K-72W | 72 | IX | Revell IXC (RV5114) |
| L-72W | 72 | II | Special Navy IIA (SN72002)* |
| * AMP 72-01 includes waterline decals for 1/72nd Type II. | | | |

## Issues with kit decals

Replacement decals were designed by AMP due to the following issues -

- 1/72nd Revell VIIC kits (RV5015 & RV5045)
  - No waterline decals are provided in these kits.

- 1/72nd Special Navy IIA kit (SN72002)
  - No waterline decals are provided in this kit.

- 1/72nd Revell IXC kit (RV5114)
  - Waterline decals are provided in this kit but for only four positions on the hull (the middle sets are not provided). Another problem is that Revell used the two-digit system rather than the correct one-digit system used upon Type IXs.

- 1/144th Revell VIIC kits (RV5038, RV5100 & RV5009)
  - No waterline decals are provided in these kits.

- 1/144th Revell IIB kit (RV5115)
  - No waterline decals are provided in this kit.

- 1/144th ICM IIB kits (ICMS009 & ICMS010)
  - Waterline decals are in the model kit but these broke up when tested by the author.

- 1/32nd & 1/35th VIIC kits (OTW, Andrea, Engel and Accurate Armour)
  - No waterline decals are provided in these kits.

Left (C39): Wink Grisé of Accurate Model Parts used AMP A-72W decals on his U 557 Type VIIC kit. The set that can be seen here is the forward set on the port side.

Right (C40): The middle set of A-72W waterline decals on the saddle tanks of Wink's model. A placement diagram is available on our decal page to help customers apply these decals.

Right (C41): The two-digit system used on Revell's 1/72nd Type IXC kit (RV5114) result in the decals being entirely unsuitable.

# Type II U-Boat Modifications & Vent Patterns

# Contents



## Part I - Introduction

### Type IIs

| Type IIs | |
|---|---|
| **Variant** | **Number of boats** |
| IIA | 6 |
| IIB | 20 |
| IIC | 8 |
| IID | 16 |

The Type II U-boat was a small German coastal submarine. The first sub-variant - the IIA - was modelled after the design export CV 707, which served in the Finnish Navy under the name *Vesikko*. The next variant was the Type IIB, which was longer and heavier than the IIA. Two further variants - the IIC and IID - followed. In total 50 Type IIs served in the German Kriegsmarine prior to and during World War II.

Space was very cramped inside these diminutive boats. Due to their small size and tendency to roll, the Type IIs were known as *Einbaum* - "dug-out canoes" - by their crews. Indeed they only carried six torpedoes, which could only be fired from the bow through three forward torpedo tubes. Range was also limited, meaning that they operated mainly in the North Sea from ports in Germany. Nevertheless a number of Type IIs, with a crew of between 22 and 24, performed well during war patrols. Several very successful commanders - Otto Kretschmer in U 23, Erich Topp in U 57 and Adalbert Schnee in U 6 and U 60 - learned their trade on Type IIs before moving to the larger ocean-going Type VII boats.

The Type IIAs, IIBs and IICs were all used during the invasion of Norway, after which the IIAs and IIBs were relegated to training flotillas. The IICs remained in operational service, departing on war patrols from various locations such as Wilhelmshaven, Bergen and Lorient before transfer to a training flotilla in late 1940. Some of the IIDs achieved success in the Atlantic in 1940 and 1941 before they too were relegated to training duties in September 1941. The majority of the Type IIs remained in the training role for a number of years, where they helped train crews who would move on to the larger Type VII and IX boats.

An exception occurred with the six Type IIBs which were shipped by barge to the Black Sea in 1942. They were re-commissioned for operational service and succeeded in sinking a number of Soviet ships.

### Model kits

There are currently several very good model kits for the Type II, as listed in the following table overleaf -

| Type II model kits | | | | |
|---|---|---|---|---|
| **Company** | **Code** | **Scale** | **Variant** | **Comments** |
| Special Navy | SN 72002 | 72 | IIA | Served by Accurate Model Part multi-media update set 72-01 |
| ICM | S.009 | 144 | IIB (1939) | Choice of two towers without wintergarten; U 9 May 1940 or U 19 March 1940 |
| ICM | S.010 | 144 | IIB (1943) | Tower with wintergarten; U 18, U 19, U 20, U 23 or U 24 |
| Revell | 05115 | 144 | IIB | As ICM S.009, with choice of tower without wintergarten; U 9 or U 20 |

When building these kits one should bear in mind that the boats were modified over time. Given the modifications and the differences between individual boats, it is prudent to choose one particular boat at a specific time frame. In order to do this we need, at the very least, a basic understanding of the different tower styles, the major modifications and the implementation dates so that we may model a boat accurately. The purpose of this article is to provide the most pertinent information that modellers require when modelling the above kits, or indeed any Type II kits which might be released in the future.

There are a few points to bear in mind. Firstly, although there are many vent patterns shown herein, these are not comprehensive. Secondly, the numbers referred here are inclusive; for example "U 21 to U 23" refers to U 21, U 22 and U 23. Lastly, **the numbers of the various types of tower and the style numbers given for various features have been attributed by the author and are entirely unofficial.**

### Type II details

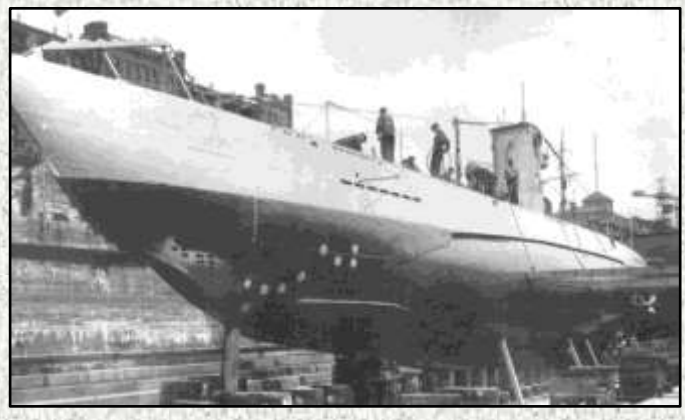
| Type II specifications | | | | | |
|---|---|---|---|---|---|
| **Measurement** | **Measured in** | **IIA** | **IIB** | **IIC** | **IID** |
| Displacement (surface) | Tons | 254 | 279 | 291 | 314 |
| Displacement (submerged) | Tons | 303 | 328 | 341 | 364 |
| Length (total) | Metres | 40.90 | 42.70 | 43.90 | 43.97 |
| Beam | Metres | 4.08 | 4.08 | 4.08 | 4.92 |
| Speed (surface) | Knots | 13.0 | 13.0 | 12.0 | 12.7 |
| Speed (submerged) | Knots | 6.9 | 7.0 | 7.0 | 7.4 |
| Range (surface) | Miles / Knots | 1,600 / 8 | 3,100 / 8 | 3,800 / 8 | 5,650 / 8 |
| Range (submerged) | Miles / Knots | 35 / 4 | 43 / 4 | 42 / 4 | 56 / 4 |

## Part II - Type IIA

The Type IIA U-boat followed on from the Finnish *Vesikko* submarine, with a hull form which is, at first glance, quite similar. The main external difference between the first German U-boats and the Finnish submarine is the tower, which is very different in shape.

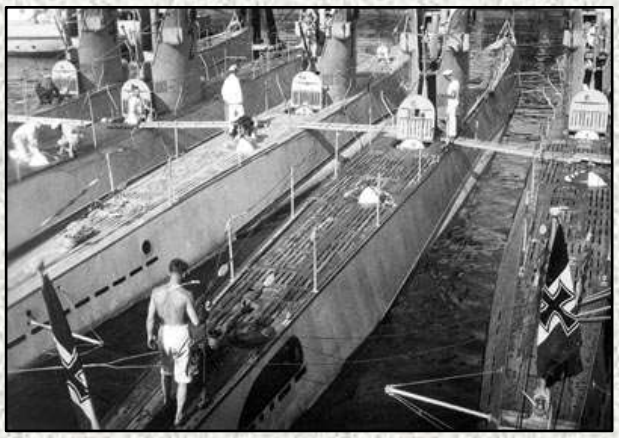
The shape of the Type IIA is rather pleasing to the eye, making a very nice subject for a model. The Type II and Type VII share many similar features: netcutter, bollards, wooden deck design, jumping wires, insulators, and the style of free-flooding holes are all similar or even identical to the VII boats. For those of us who have built a Type VIIC model, the coastal IIA is akin to a "little brother" of the ocean-going VIIC.

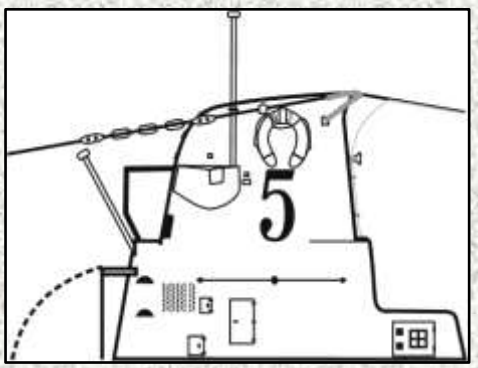
Right (D1): The very first Kriegsmarine U-boat, the Type IIA U 1. The protective bar just above the free-flooding vents on the hull was exclusive to the Type IIs but was removed from this variant in wartime.



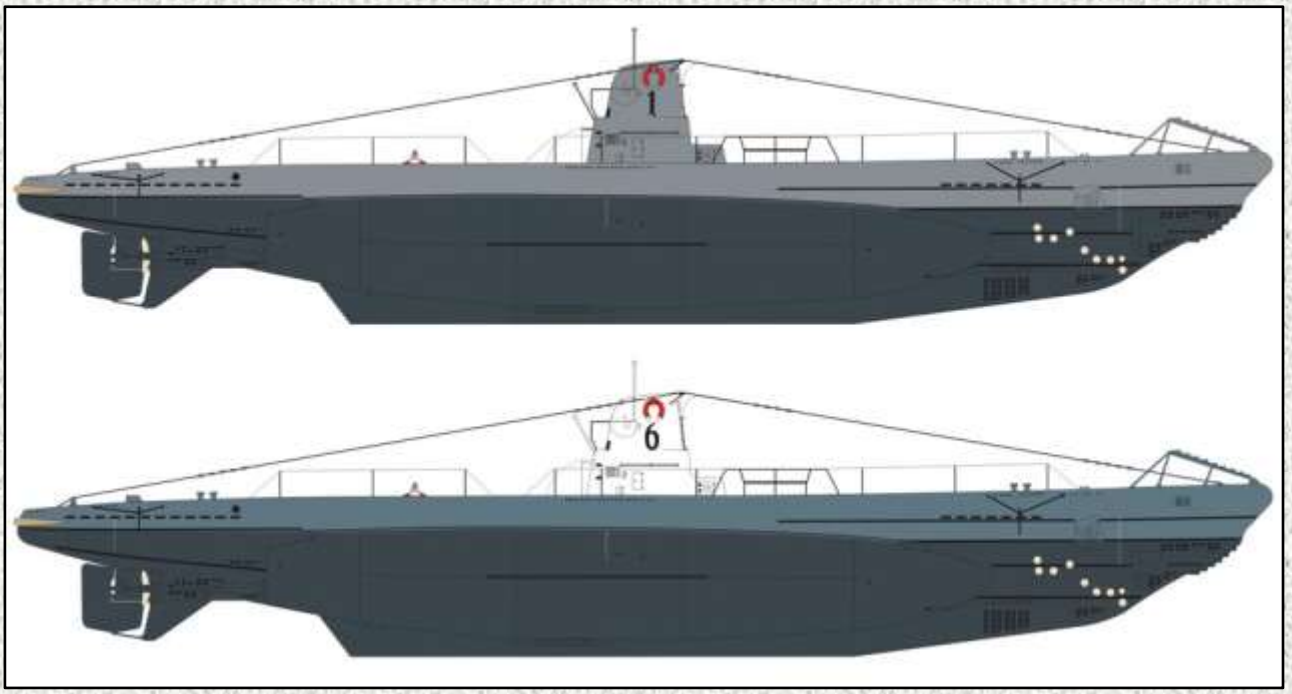
Left (D2): The second boat, U 2, in dry-dock. Here we can see some of the free-flooding vent holes cut into the hull. The circles above the forward dive planes belong to the GHG (*Gruppenhorchgerät* - group listening apparatus) hydrophones.

Right (D3): The rear deck of several Type IIAs. This photo was used, along with other similar shots, to design the AMP Type IIA photo-etch deck. The style of slots and hatches is the same as on the other early U-boats such as the Type VII and Type IX. Note the Reichsmarine flags flown from the aft decks, which are available in the AMP flag range.






Left (D4): A close-up view of U 5's tower, which we shall refer to as style 1 in this article. The removable lifebelt is above the pre-war number 5. The identification numbers were a pre-war feature and were removed from all boats in August 1939.



Above (D5): The top profile shows U 1 with the upper colour as the light grey *Hellgrau 50*. The other profile shows U 6 in a very appealing colour scheme used on the early Type IIs in the pre-war period. This consisted of the medium blue-grey *Dunkelgrau 51* as the upper colour and the tower in white.

### Type IIA details

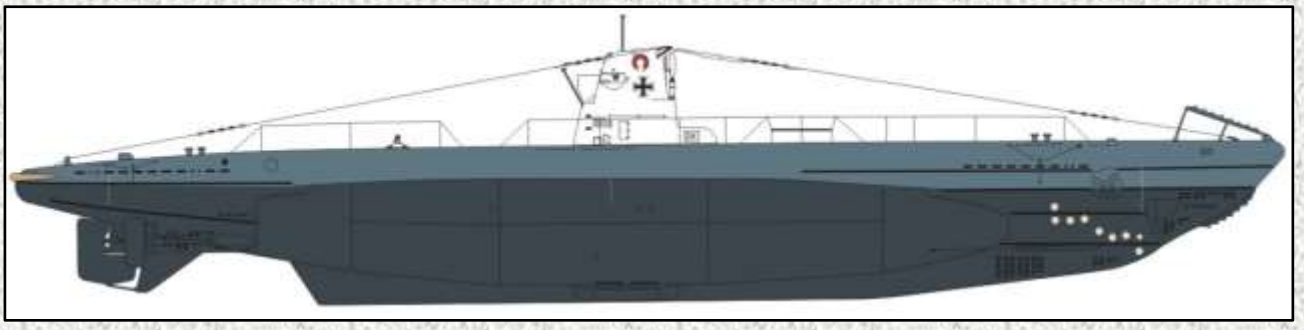
| Type IIAs | | | | | |
|---|---|---|---|---|---|
| **Boat** | **Shipyard** | **Launched** | **Training** | **Decommissioned** | **Lost** |
| U 1 | Deutsche Werke | 15/06/35 | N/A | N/A | 06/04/40 |
| U 2 | Deutsche Werke | 01/07/35 | May 1940 | N/A | 08/04/44 |
| U 3 | Deutsche Werke | 19/07/35 | May 1940 | 01/08/44 | Scrapped 1945 |
| U 4 | Deutsche Werke | 31/07/35 | July 1940 | 01/08/44 | Scrapped 1945 |
| U 5 | Deutsche Werke | 14/08/35 | May 1940 | N/A | 19/03/43 |
| U 6 | Deutsche Werke | 21/08/35 | May 1940 | 07/08/44 | Stricken 1945 |

## Part III - Type IIB

| Type IIB batches | | |
|---|---|---|
| **Batch** | **Shipyard** | **Boats** |
| 1110B | Germaniawerft, Kiel | U 7 - U 12 |
| 1110D | Deutsche Werke, Kiel | U 13 - U 16 |
| 1110C | Germaniawerft, Kiel | U 17 - U 24 |
| Fl.W. | Flenderwerft, Lübeck | U 120 - U 121 |

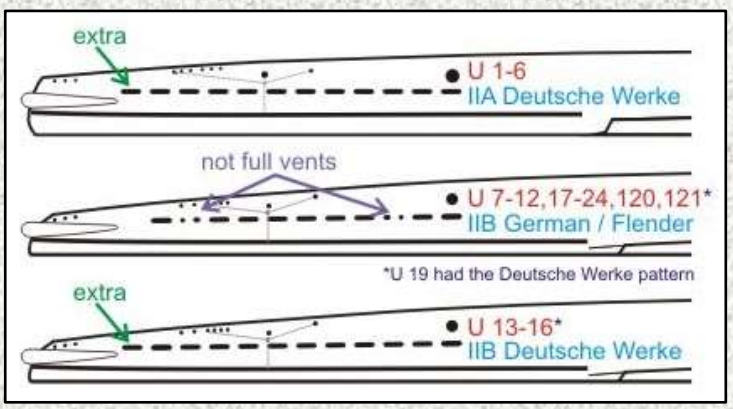
The 20 Type IIBs were built in four batches in three different shipyards. All of the boats were launched between June 1935 and September 1936. The exception was U 120 and U 121, which were launched three and a half years later. Both of these boats had the features present on the IIDs rather than their IIB brethren.

The hull of the IIB, which was 1.8 metres longer than the IIA, looks very similar to previous variant.



Above (D6): The starboard side of the Type IIB U 9, which sported an Iron Cross on the tower. One difference between the IIA and IIB can be found at the keel; the two doors are the same length on the IIB, whereas one was longer than the other on the IIA.

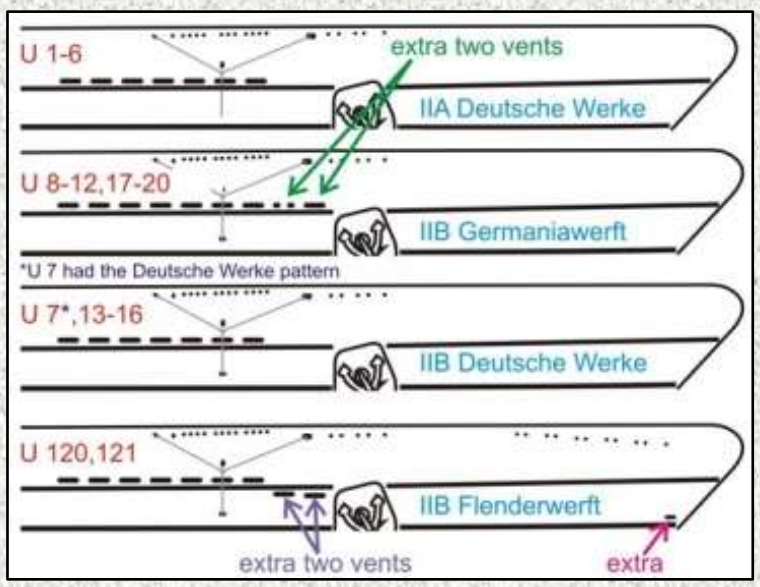
## Rear vents




Left (D7): The *Germaniawerft* and *Flenderwerft* boats had two exclusive features. The first is having one fewer vent at the rear (11 rather than 12). The second is that two of the vents were each split into two small holes (one circular and one oval). U 19 was a *Germaniawerft* boat but for some reason had the *Deutsche Werke* pattern.

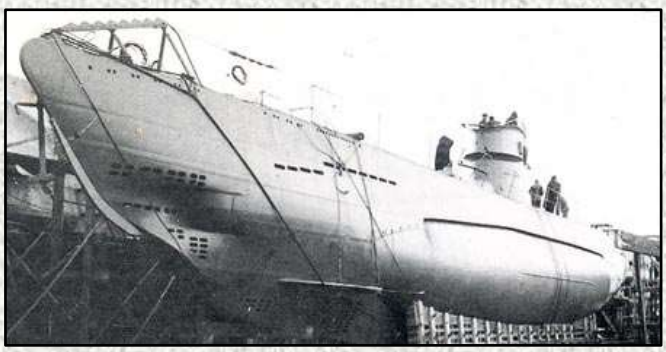
## Front vents

Starboard side - On the group of vents along the forward hull, there was one fewer vent on the starboard side compared to the port side. The reason for the missing vent was the presence of the anchor well on the starboard side. There were fewer vents on the starboard side on all IIBs, IICs and IIDs, irrespective of the batch or shipyard built. The exception was the IIAs, which all had seven vents on the starboard side and seven vents on the port side.



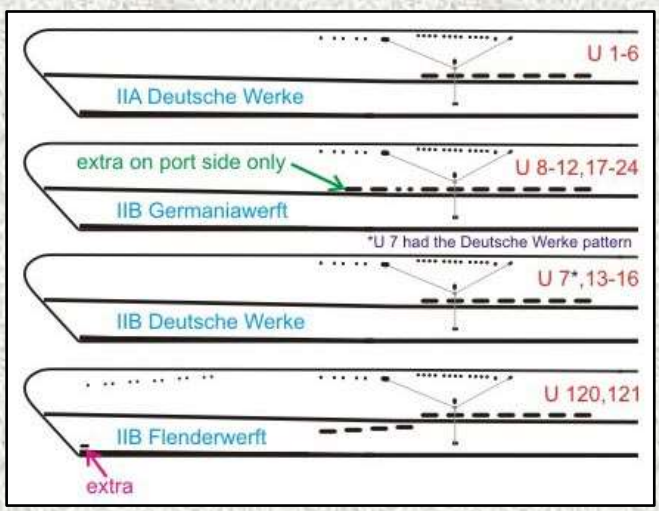

Right (D8): As with the rear vents, the *Germaniawerft* boats had one vent replaced by two much narrower ovals (almost circular in shape). Additionally, the *Germaniawerft* boats had an extra hole at the front. The exception to the shipyard-specific pattern was U 7, a *Germaniawerft* boat which had the *Deutsche Werke* pattern.

Port side - On the port side there was always an extra hole at the front of the forward holes; this is because there was no anchor recess on the port side.



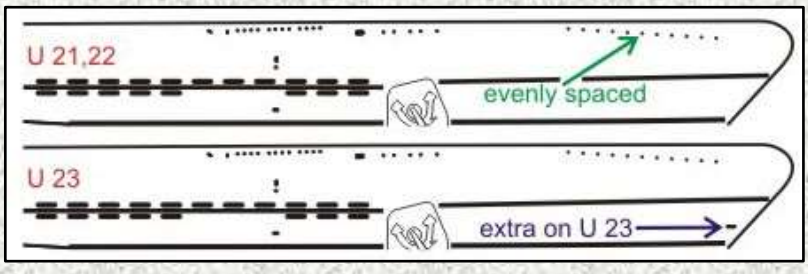
Left (D9): Here can be seen the vents on the bow of U 120 on the 16th March 1940. Note how there were four vents in a sloping line at the front of the main pattern. On the starboard side the presence of the anchor recess resulted in there being only two vents in this area.

Right (D10): The *Germaniawerft* boats (with the exception of U 7) had extra holes at the front. The two *Flenderwerft* boats, U 120 and U 121, had an additional two vents at the front of the port side. The extra two vents (as opposed to one on the early IIBs) reflected the practice employed at a later period upon the IICs and IIDs.



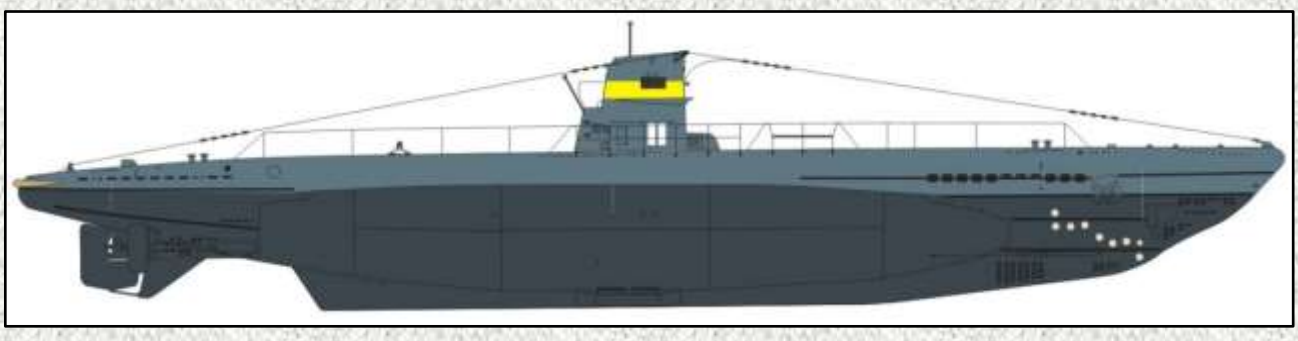

## Additional vents

U 21 to U 23 - These three boats can be discerned by the extra eight vents on a bottom row. On the starboard side this consisted of three at the front and five at the rear. These boats also had 11 evenly-spaced circular holes below the bow in an arrangement very reminiscent of the Type VIIs.



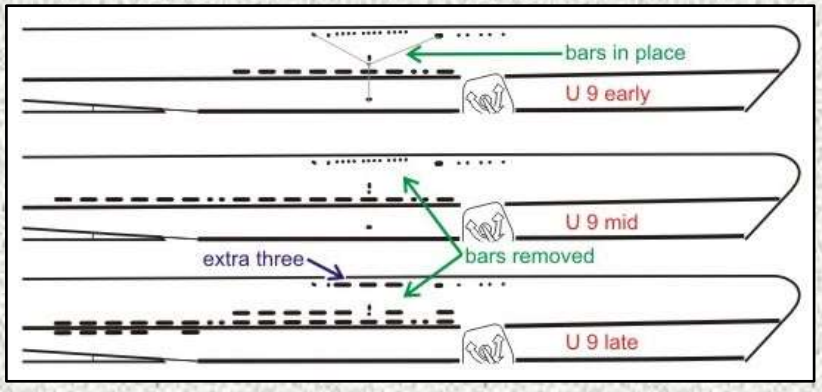

Left (D12): The pattern used upon U 21, U 22 and U 23 when launched. Additional vents would later be added to U 23 but not U 21 or U 22.

Below (D13): U 21 when serving in the 21st U-Flottille in Pillau in 1943. The yellow band indicates a training role while the two white bars are school boat symbols.

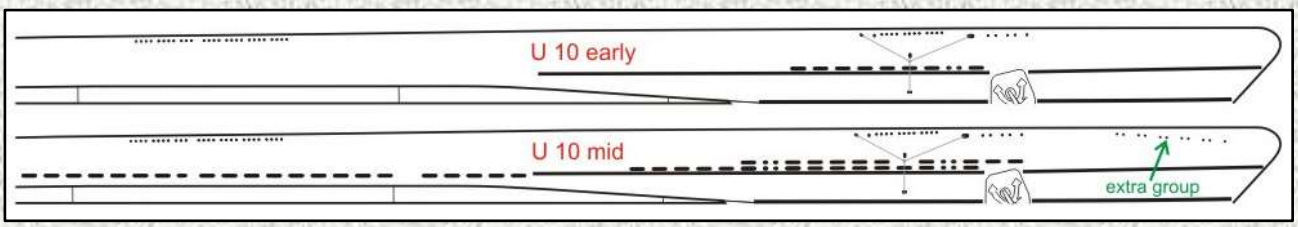


U 9 - Over time more vents were added to some boats in the hope that this would allow for marginally increased diving times. U 9 is a prime example of one boat in which holes were progressively added over time. In the mid-version, vents were added to the rear of the old group. Later, when the boat served in the Black Sea, more vents were added in what amounted to three separate rows. This consisted of seven extra holes on the top row and five on a bottom row.

Right (D14): As can be seen here, vents were progressively added to U 9 in different refits. Note also that the triangular bars (which were in place to prevent damage when the boat was in port) were removed from the bow and stern. These were also removed from the other Type IIs.

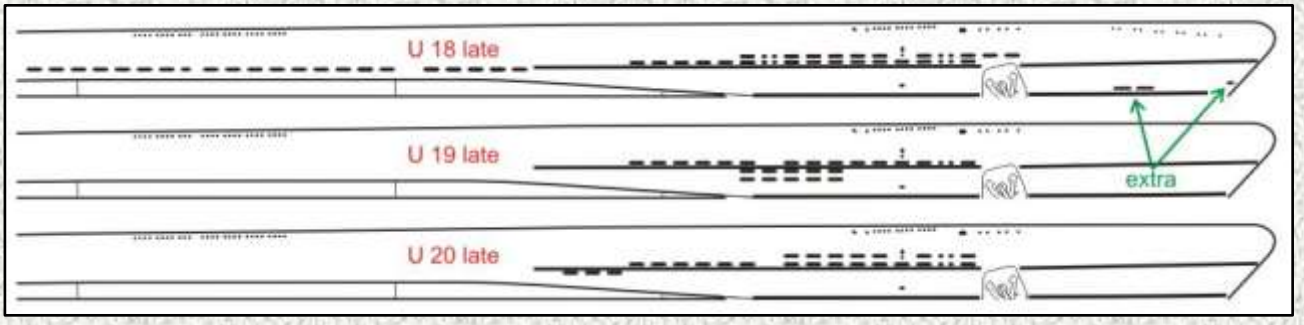


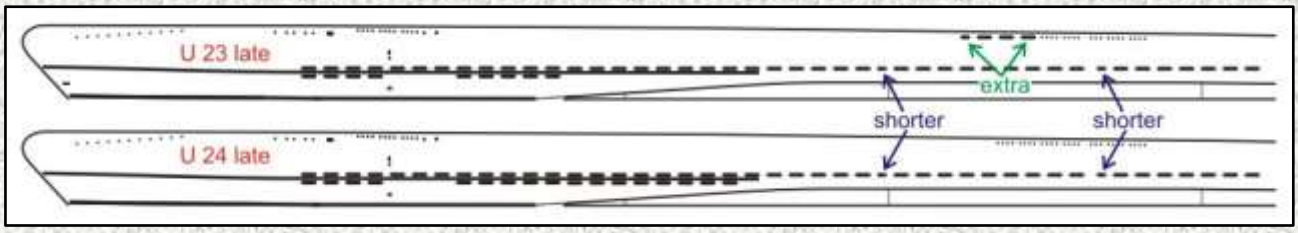

U 10 - U 10 had a significant number of vents added quite early in the pre-war period. These extra holes extended all the way back over the mid-hull section of the boat. The boat also featured 11 small circular holes near the bow in a paired arrangement. It could be that the vents on this boat were added to assess how much the additional vents helped diving times. The feature must have been deemed successful because the IICs were built with vents broadly similar to U 10.




Above (D15): On the U 10 mid drawing, the pattern above the mid-hull includes one gap and, farther back, a vent being narrower in length. The extra group of 11 small circular holes near the bow is another aspect which may be considered surprising given that they were added in the pre-war period. This change was not made to other IIBs such as U 9 and U 11 at that time. It would appear that U 10 was the very first boat to feature these vent features, almost certainly in a test capacity.

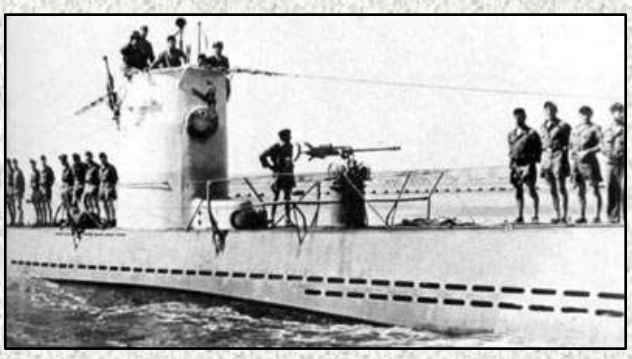
Below (D16): The late version of U 18 adopted the same vent pattern employed earlier upon U 10. The difference is that a small hole was added next to the stem plus two elongated gaps added above the torpedo doors. This change was made to U 18 in the pre-war period. The different patterns upon U 19 and U 20 were exclusive to these boats and act as very handy identifying features.






Above (D17): In the late version of U 23, an extra four vents were added below the tower on the port side. U 24 can be distinguished from U 23 by the extra eight vents on the bottom row.

Right (D18): U 24 in the Black Sea, with a long line of vents extending back over the mid-hull area. Note the 20mm gun mounted upon the waterproof barrel canister.

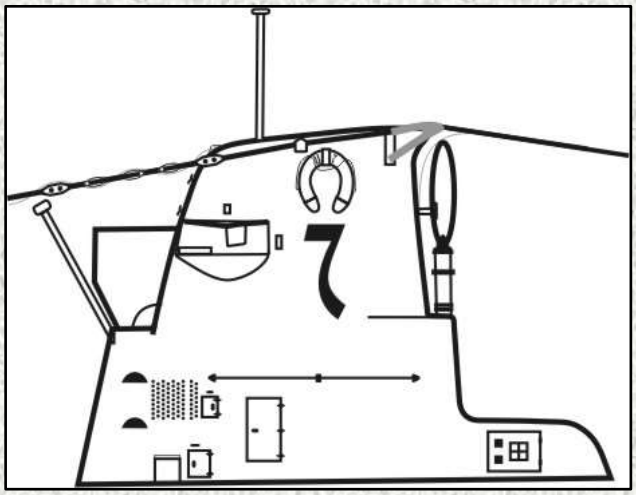


## Type IIB tower

U 7 - U 12 (style 2) - The one identifying characteristic of the style 2 tower (U 7 to U 12) is that *Germaniawerft* elected to place the direction-finding (D/F) loop directly in *front* of the front face of the tower. The readily discernable loop was placed on a step that was roughly halfway up the front of the tower. By 1943 U 9 still had the D/F loop in this position so it would appear that the loop was retained in front of the tower on U 7 to U 12 throughout their careers.

Above right (D19): The D/F loop at the front of the tower immediately identifies this boat as belonging to the batch U 7 to U 12. The Iron Cross on the tower identifies the boat as U 9. The boat has a white tower and a *Dunkelgrau 51* upper hull. Note that the D/F loop is mounted on the starboard side of the tower and not in a central position.

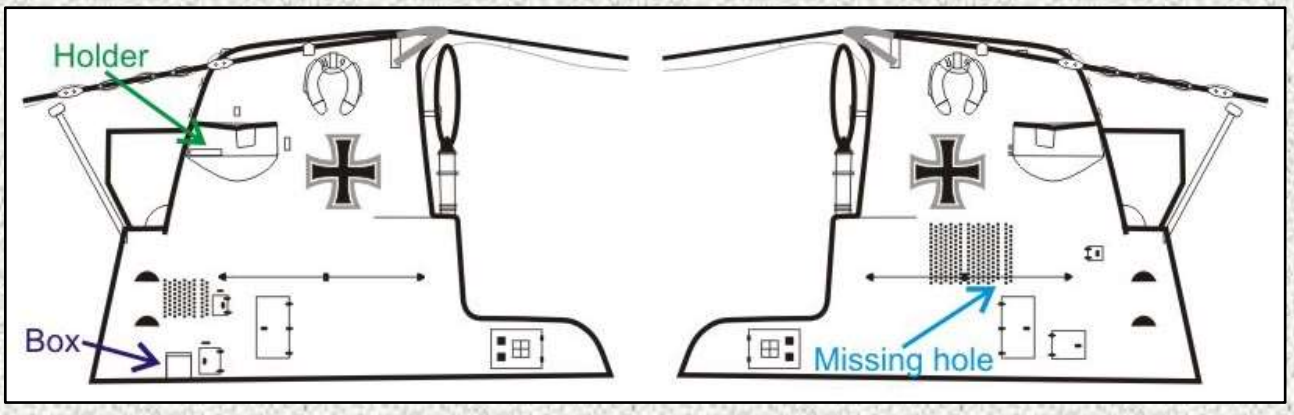
Below right (D20): On this drawing of U 7, note the large housing for the navigation lights (aft of the pre-war number 7). This bulky housing projected significantly out from the tower to allow the light to shine forwards without impediment.



Port and starboard tower differences - The following differences are evident between either side of the IIB tower -

- The commander's flagstaff was usually placed on the outside of the port side of the tower.
- The group of small circular holes on the tower was different on port and starboard sides.
- On the port side, the free-flooding hole at the bottom of the third row from the right was typically missing (see blue arrow below).
- The hatches were different on port and starboard sides.
- The circular holding bracket at the rear of the starboard light was not present on the port side.
- No box was present on port side floor.

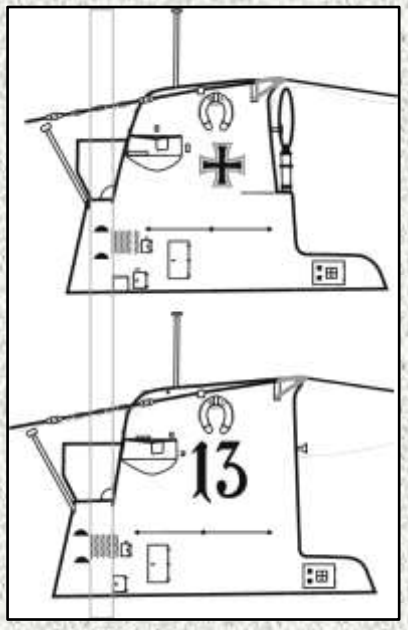
Below (D21): The port and starboard sides of U 9. The main difference is in respect to the pattern of small circular holes, there being a much larger group on the port side.




Differences between early boats - The following differences existed in respect to the IIAs and early IIBs -

- The small plates around the navigational light differed between boats.
- The IIBs (and indeed the IICs) had round bow number plates whereas the plates on the IIAs were more rectangular in shape.

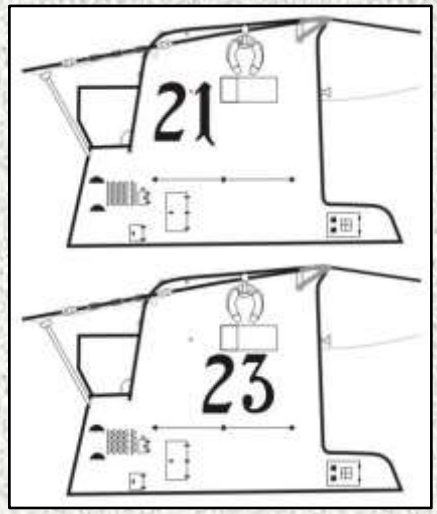
U 13 - U 20 (style 3A) - When style 3A was implemented upon U 13 to U 24, the D/F loop was housed within the tower bulwark. The step at the front of the tower was also dispensed with, meaning that the front face of the tower on these boats was straight all the way from the magnetic compass fairing upwards. This introduced clean lines which had previously been absent on earlier tower styles.




Right (D22): This graphic illustrates that there was more space behind the tower bulwark on the style 3A tower compared to the style 2 tower. Despite this additional room, the tower was very far from spacious. The distinct lack of space on the Type IIs left little opportunity for free movement by the bridge personnel and was to be addressed in later tower style arrangements.

U 21 - U 24 (style 3B) - One of the most identifiable features of the U 13 to U 20 series (style 3A) is the large navigation light housing at the side of the tower. This light was omitted from U 21 to U 24 (tower style 3B) and did not feature on any future boats. The four boats with tower 3B had the lights built farther forward on the tower, with a channel built ahead of the lights to allow light to project forwards as well as to the side. This style of channel was the type which can be commonly found on Type VIIs.

The position of the navigation light channel on U 21 to U 24 was below the horseshoe-shaped lifebelt. This is the same location where the pre-war numbers used to feature on Type IIs. The numbers therefore had to be moved to an alternate location yet it appears that no definitive location was found. Some photographs show the pre-war numbers directly behind the navigation light, with others below the channel. The numbers may have been repainted in different positions over time.

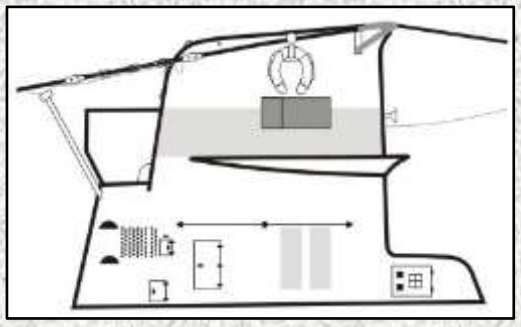



Above (D23): The different locations of the pre-war numbers on U 21 and U 23.

Below (D24): U 21 when relegated to training. This particular IIB had a spray deflector added midway up the tower. The two vertical bars near the foot of the tower are school boat markings.

## Black Sea boats

Six Type IIBs (U 9, U 18, U 19, U 20, U 23 and U 24) were partially dismantled and shipped by barge to the Black Sea, where they succeeded in sinking a number of Soviet ships during operational patrols. The first three boats - U 9, U 19 and U 24 - were transported over land in April and May 1942; U 18 and U 20 followed in August 1942, with the last boat, U 23, following in October 1942. The first Black Sea patrol was conducted by U 24, which departed from the U-boat base in Constanta in late October 1942.



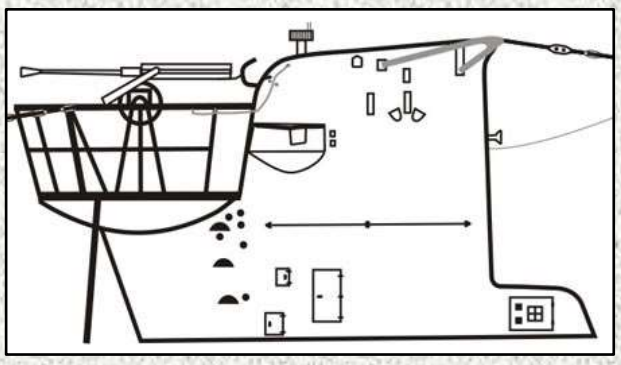
In 1944 it was not possible to transport them back to Germany so these boats were offered to Turkey. When the offer was refused, the Germans scuttled the remaining boats (U 19, U 20 and U 23) to avoid them being captured by the advancing Russian forces.

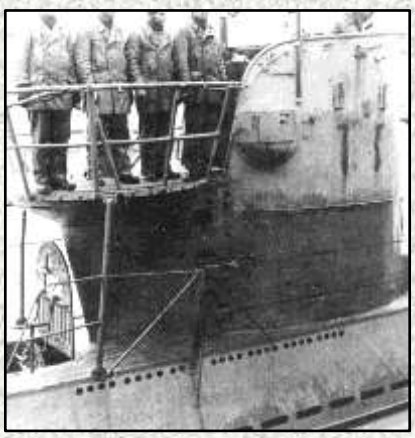
Wintergarten - In the summer of 1943, the Black Sea boats were all fitted with an additional 20mm Flak gun on an enlarged “wintergarten” platform at the rear of the tower. On the newly-installed wintergarten, some stanchions were thicker than others (one vertical bar and the top horizontal bar were thicker). The boats still retained the 20mm on the forward deck.

Twin 20mm - At a later stage some boats such as U 19 adopted a twin 20mm on the wintergarten rather than a single 20mm.

Additional armament - As with a limited number of VIIs, some Black Sea boats had small machine guns added to the top of the bulwark on either side of the tower. This may be a 7.92mm single MG34 machine gun or a similar type.

*Runddipol* - In the mid-war period, radar warning receivers were fitted to operational U-boats. The Type IIBs serving in the Black Sea were fitted with the *runddipol* antenna; this consisted of a cylinder enclosed in a wire mesh frame, with two diploes pointing vertically out of the top.





Above (D25): This drawing shows U 18 after the summer of 1943. The semi-circular holes below the wintergarten allowed crewmen to climb up the sides of the tower. Note that the rear jumping wires meet with the wintergarten railing and do not - as was formerly the case - meet with the support at the front of the tower. The mesh frame of the *runddipol* antenna can be seen jutting out the top of the tower.

Left (D26): U 18 on the 29th February 1944. What is evident here is the additional thick stanchion which extended from the underside of the edge of the wintergarten to the edge of the deck below. The thick bar was incorporated into the modified railing arrangement.

## U 120 - U 121 tower (style 4B)

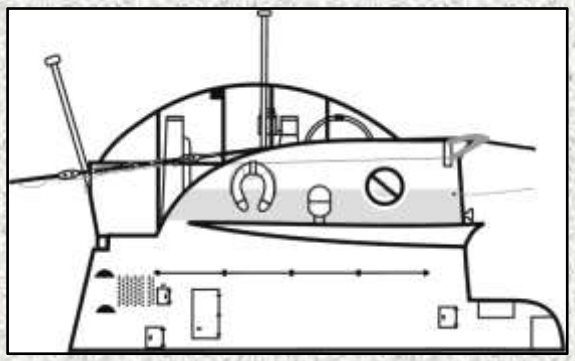
The final two IIBs, U 120 and U 121, were launched in March and April 1940, several years after the other IIBs. Indeed all of the IICs had been launched when these two boats went down the slipways. The reason that they were built much later is that they were originally intended for the Yugoslav Navy (some sources say China). They were not delivered to Yugoslavia, instead being commissioned into the Kriegsmarine.

Both boats were a mixture of the old and new. Their hull was similar to the early IIBs, with only minor differences in vent patterns. Yet the tower was very different indeed to the early boats, in a style that would become typical of the IIDs. In this much longer tower style a long curved bar with vertical supports was added on both sides. This curved support bar was placed well above the top of the tower bulwark in an arrangement that is quite unlike any other type of German U-boat design. Several of the features, such as the top of the D/F loop and the periscope housing, were also present above the tower bulwark. There was a spray deflector midway up the tower, just like on VIIs. The foghorn was present just above this deflector; as normal this was slightly offset to the port side.

One feature which was exclusive to U 120 and U 121 was the magnetic compass housing at the foot of the tower. This included a hatch on the top and another at the front (with the square and cross marker present on the front hatch).

These two boats also had a unique type of side light housing.

Below (D27): U 120 and U 121 did not undertake any war patrols and only served in a training capacity. The magnetic compass housing at the foot of the tower is the feature which makes this a style 4B tower.



### Type IIB details

| Type IIBs | | | | | |
|---|---|---|---|---|---|
| **Boat** | **Shipyard** | **Launched** | **Training** | **Decommissioned** | **Lost** |
| U 7 | Germaniawerft | 29/06/35 | June 1940 | N/A | 18/02/44 |
| U 8 | Germaniawerft | 16/07/35 | June 1940 | March 1945 | Scuttled 1945 |
| U 9 | Germaniawerft | 30/07/35 | June 1940 | N/A | 20/08/44 |
| U 10 | Germaniawerft | 13/08/35 | May 1940 | 01/08/44 | Stricken 1945 |
| U 11 | Germaniawerft | 27/08/35 | Throughout | 14/12/44 | Scuttled 1945 |
| U 12 | Germaniawerft | 11/09/35 | N/A | N/A | 08/10/39 |
| U 13 | Deutsche Werke | 09/11/35 | N/A | N/A | 31/05/40 |
| U 14 | Deutsche Werke | 18/12/35 | June 1940 | March 1945 | Scuttled 1945 |
| U 15 | Deutsche Werke | 15/02/36 | N/A | N/A | 31/01/40 |
| U 16 | Deutsche Werke | 28/04/36 | N/A | N/A | 15/10/39 |
| U 17 | Germaniawerft | 14/11/35 | June 1940 | N/A | Scuttled 1945 |
| U 18 | Germaniawerft | 07/12/35 | N/A | N/A | 24/08/44 |
| U 19 | Germaniawerft | 21/12/35 | May 1940 | N/A | Scuttled 1944 |
| U 20 | Germaniawerft | 14/01/36 | April 1940 | N/A | Scuttled 1944 |
| U 21 | Germaniawerft | 13/07/36 | - | 05/08/44 | Scrapped 1945 |
| U 22 | Germaniawerft | 13/07/36 | N/A | N/A | March 1940 |
| U 23 | Germaniawerft | 28/08/36 | June 1940 | N/A | Scuttled 1944 |
| U 24 | Germaniawerft | 24/09/36 | June 1940 | N/A | August 1944 |
| U 120 | Germaniawerft | 16/03/40 | Throughout | N/A | Scuttled 1945 |
| U 121 | Germaniawerft | 20/04/40 | Throughout | N/A | Scuttled 1945 |

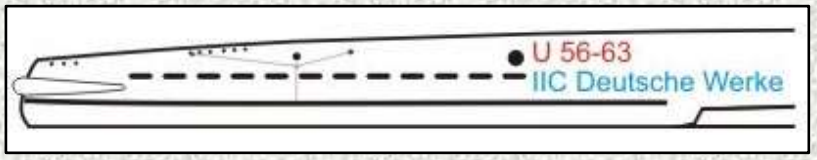
## Part IV - Type IIC

| Type IIC batches | |
|---|---|
| **Shipyard** | **Boats** |
| Deutsche Werke, Kiel | U 56 - U 59 |
| Deutsche Werke, Kiel | U 60 - U 63 |

Each successive variant of the Type II was longer and had increased bunkerage than their predecessors. The eight IICs were 1.2 metres longer than the IIB but did look quite similar to its immediate predecessor. The free-flooding vent holes reflected the pattern used at the time of construction, with a line of holes extending over the mid-hull area.

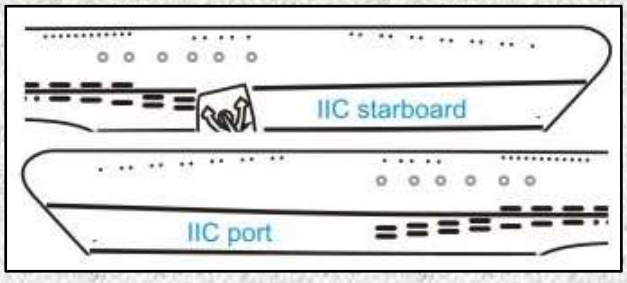
### Rear vents

The 12 rear vents on the eight Type IICs was the same pattern used upon all the IIAs (U 1 to U 6), the IIBs U 13 to U 16, and all the IIDs (U 137 to U 152).




Above (D28): The pattern of 12 holes was used on all the IIAs, IICs and IIDs (and some IIBs as well). The large circular hole is the diesel exhaust outlet, which was in place on all Type IIs on the starboard side only. Some boats had a dark grey or black patch painted around the outlet to disguise the dirt stains which accumulated around the hole.

## Front / mid-hull vents




Above (D29): As with earlier sub-variants, due to the absence of anchor recess there were extra vents at the front of the port side. Note the 13 small holes (rather than 11 on U 18) near the top of the bow in a paired arrangement. There is also a tiny hole near the stem. The double row of vents on the front group is quite interesting because they become progressively lower as they move forward. This is quite unusual for Kriegsmarine U-boats, which tended to have the vents along the same line.

The eight Type IICs which were launched between September 1938 and December 1939 and reflected the vent patterns being used at that time. The 48 full-sized vents on the front and mid-section of each side of the hull were greatly in excess of the seven vents utilised on the very first Type II. Although there were slight differences in the vents employed upon previous boats, all eight boats were similar in that they had two rows of vents at the front (one above the doubler and one below), a gap in the middle and then 24 full-sized vents in the mid-hull area. This pattern was different to the IIBs, which tended to have both rows at the front *above* the doubler.

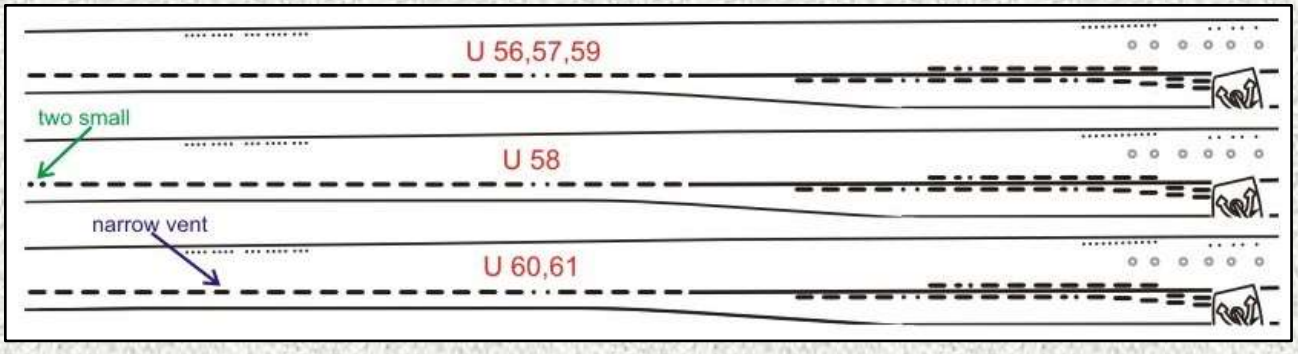
The pattern used on the IICs is very similar to that used upon the IIDs U 137, U 138 and U 139. The point of differentiation between the IIC pattern and the three IIDs is that the latter boats had one fewer vent at the rear.

One aspect which was introduced at this stage is the six circular plates added above and abaft the anchor recess on the starboard side (and another six on the same location on the port side). These plates were also present on the IIDs which followed. A boat with this feature must therefore be a IIC or IID and not a IIA or IIB.

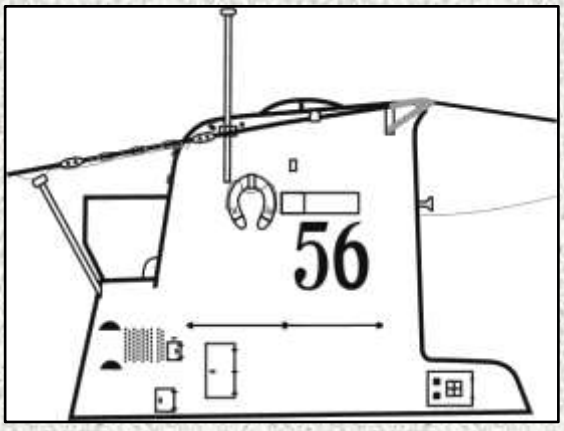
Right (D30): In this photo of U 60 on the 1st June 1939, we can see the arrangement of GHG plates above the forward dive plane. The very large vent holes below and forward of the dive plane can also be seen.

Left: (D31): U 59 during the pre-war period with the net cutter on the bow.

Below (D32): The main vent pattern on U 62 and U 63 are unknown and are presumed to be like U 60 and U 61. Note that one vent is narrower on U 60 and U 61.



## Type IIC tower




Above (D33): A drawing of a pre-war U 56 with tower style 3C, which was found on all but one of the Type IICs. The wooden pole, upon which a white commissioning pennant or victory tonnage pennants could be flown, can be seen here attached to the outside of the starboard bulwark.

Tower style 3C - All but one of the Type IICs (U 61) had tower style 3C. Overall this type of tower was very similar to style 3B used upon the earlier sub-variant. One difference was that the navigation light channel was narrower in height, with the horseshoe-shaped lifebelt situated directly behind the light housing rather than above the channel. Another was that a curved grip bar (with one vertical support in the middle) was added to the top of the bulwark on each side. This was intended to help crewmen manoeuvre around the tight confines of the small tower.

On the Type VIICs the commissioning flagpole was inserted within the tower bulwark. Perhaps due to the thinness of the tower bulwark and lack of space on the inside, on the IICs this wooden pole was suspended on the outside of the starboard tower bulwark, just behind and above the lifebelt.

At some stage prior to hostilities, the square and cross marker on the outsides of the magnetic compass housing were removed. One marker was added to the top surface of the housing, with two square holes being present on the hatch.

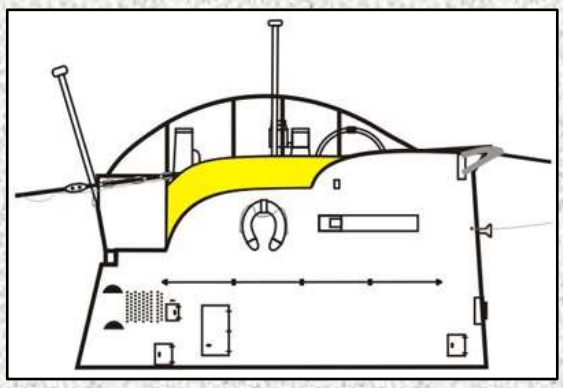
Tower style 4A - The notable exception was U 61, which had a completely different style of tower referred to in this article as style 4A. This is similar to the tower added to U 120 and U 121, the two Type IIBs launched in March and April 1940, which had style 4B. U 61 was launched much earlier - in June 1939 - so it is clear that the version on U 61 (style 4A) is the first incarnation of this very different tower type. As with U 120 and U 121, the U 61 tower had the long curved bar with vertical supports added above both tower bulwarks. What is different on U 61 - indeed what is exclusive to this boat - is that there are two separate curves on each tower bulwark rather than one. This makes U 61 unique and easy to identify. This boat was also the first to dispense with the magnetic compass fairing at the foot of the front of the tower; the front tower face now extended down neatly all the way from the top to the bottom.


Left (D34): Here can be seen the tower of U 61, with the curved railings extending high above the tower bulwarks. Note the absence of the magnetic compass fairing compared with the unidentified IIC on the right. On U 61 the hatch at the front can be seen, as can the square and cross marker on the outer surface.

Since U 62 and U 63 were not fitted with style 4A, it would appear that U 61 was used to trial this new type of tower, the idea being that any disadvantages of the new type of tower could be modified and incorporated into later Type IIs. Indeed this appears to have taken place in respect to the tower bulwark shape. One photo in late 1939 or early 1940 shows U 61 with some form of

vertical plate in place on either side of the periscope housings (or attached to the tower bulwark). This is not in place in pre-war photos of U 61 (see photo C7). It would appear that these protective guards were added because the second curve in the bulwark left the tower too exposed to wave or wind action. Whether these guards were left in place permanently, or U 61's style was modified to style 4C is unknown. But what might be determined is that the shortcomings of the double curve in style 4A was addressed, leading to one sweeping curve which can be found on styles 4B and 4C.

Right (D35): U 61 in the early-war period when serving from Kiel and Wilhelmshaven. The protective guard plate has been coloured yellow to show its position. This may be thought of an experimental tower, the inadequacies of which were addressed in styles 4B and 4C. Unlike styles 4B and 4C, there is no spray deflector halfway up the tower. This was not retrofitted at a later stage.



### Type IIC details

| Type IICs | | | | | |
|---|---|---|---|---|---|
| **Boat** | **Shipyard** | **Launched** | **Training** | **Decommissioned** | **Lost** |
| U 56 | Deutsche Werke | 03/09/38 | October 1940 | N/A | 28/04/45 |
| U 57 | Deutsche Werke | 03/09/38 | January 1941 | April 1945 | Scuttled 1945 |
| U 58 | Deutsche Werke | 14/10/38 | December 1940 | N/A | Scuttled 1945 |
| U 59 | Deutsche Werke | 12/10/38 | December 1940 | April 1945 | Scuttled 1945 |
| U 60 | Deutsche Werke | 01/06/39 | November 1940 | N/A | Scuttled 1945 |
| U 61 | Deutsche Werke | 15/06/39 | November 1940 | March 1945 | Scuttled 1945 |
| U 62 | Deutsche Werke | 16/11/39 | October 1940 | N/A | Scuttled 1945 |
| U 63 | Deutsche Werke | 06/12/39 | N/A | N/A | 25/02/40 |

## Part V - Type IID

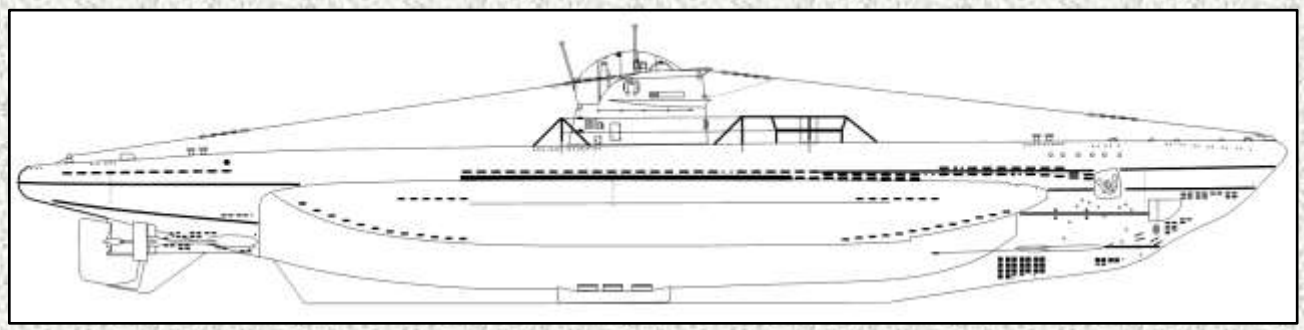
| Type IID batches | |
|---|---|
| **Shipyard** | **Boats** |
| Deutsche Werke, Kiel | U 137 - U 152 |

The final sub-variant is the Type IID, of which 16 boats were built. These boats had saddle tanks added on either side of the hull for additional fuel storage. This increased the range to 5,650 miles, some 1,850 miles greater than the IICs. The improvement had a very great difference to their operational effectiveness, allowing the IIDs to patrol north of Ireland from Lorient, or north of the Shetlands from bases in Germany or Norway.

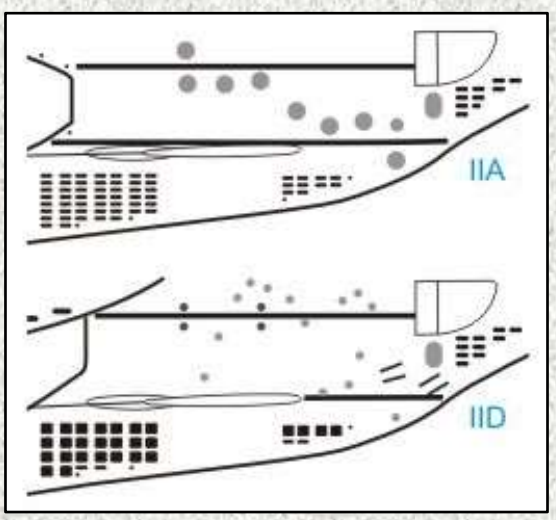
The type also saw the introduction of the Kort nozzles. Designed to improve propulsive efficiency, these were round shrouds built around the propellers. The feature was present on the IIB U 16, albeit in a test capacity.

### Front / mid-hull vents

The saddle tanks greatly changed the look of the IID in the mid-hull area. On the tanks were a large number of extra holes which were not present in previous sub-variants. At the bottom side of each saddle tank there was a curved line of 13 vents at the front and 12 at the rear. Additionally there were more vents higher up, with seven at the front (or nine on some boats) and six and the rear.



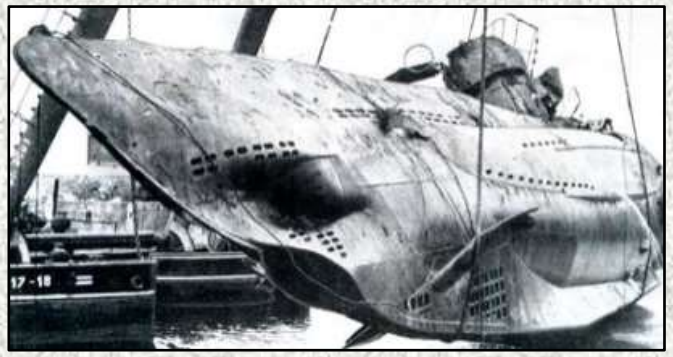
Above (D36): A side profile drawing of the Type IID U 142. There are several points of differentiation from earlier sub-variants. The main one is the presence of the multiple vents on the saddle tanks which are exclusive to the IID. Note that earlier boats such as U 137 had nine vents in the forward pattern rather than the seven vents above. The Kort nozzle shroud around the starboard propeller can also be seen.

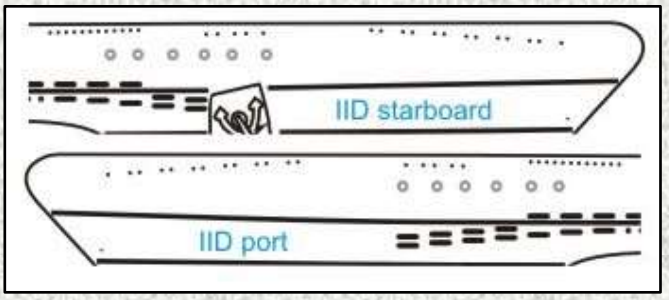



Left (D37): Here can be seen a comparison between the lower bow of the IIA and the IID. One main difference is that vents were combined to make 27 very large vents. These large vents were also in place on the IICs but not the IIBs. Another difference which is evident here is that the GHG plates were much smaller than the older versions.

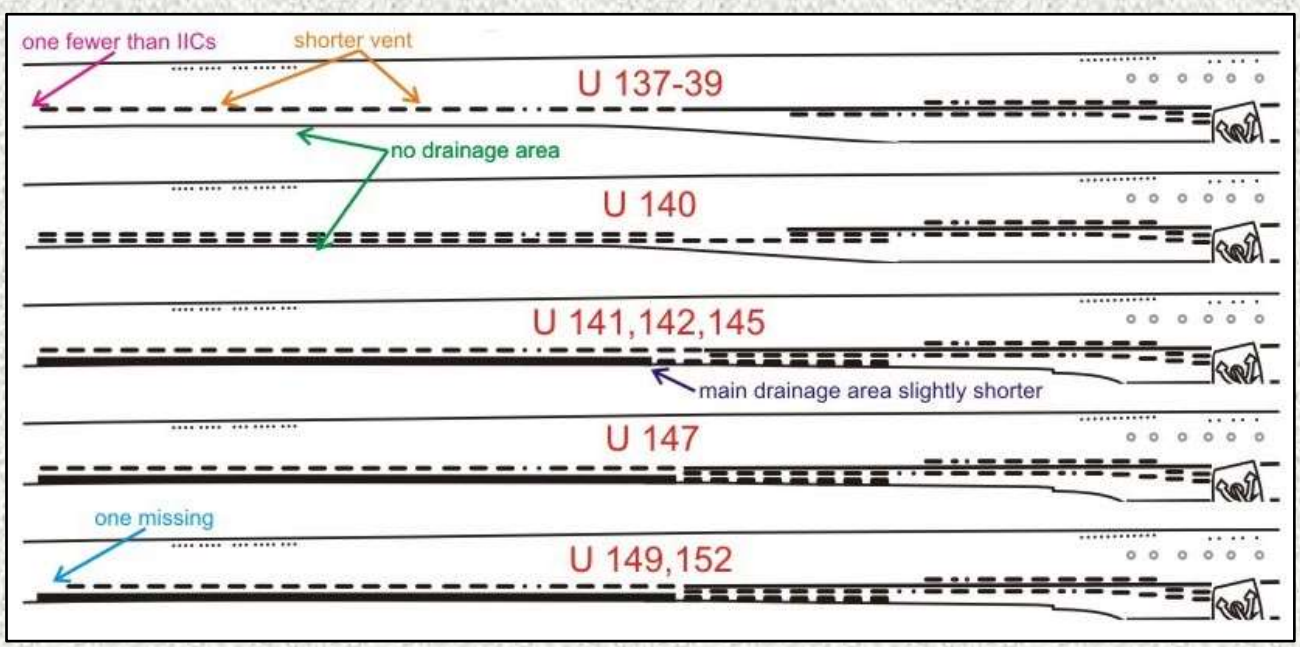
Above right (D38): This late war shot of U 146 allows a fine study of the bow area. The large hole at the lower end of the stem is the opening for the third torpedo tube. The 27 large vents are visible at the bottom of the bow while the curved line of holes in the saddle tanks can also be seen.

Below right (D39): The bow of the IID was essentially the same as the IICs. Again there are four extra vents on the port side due to the absence of the anchor recess. The six extra plates per side were also present on this sub-variant.





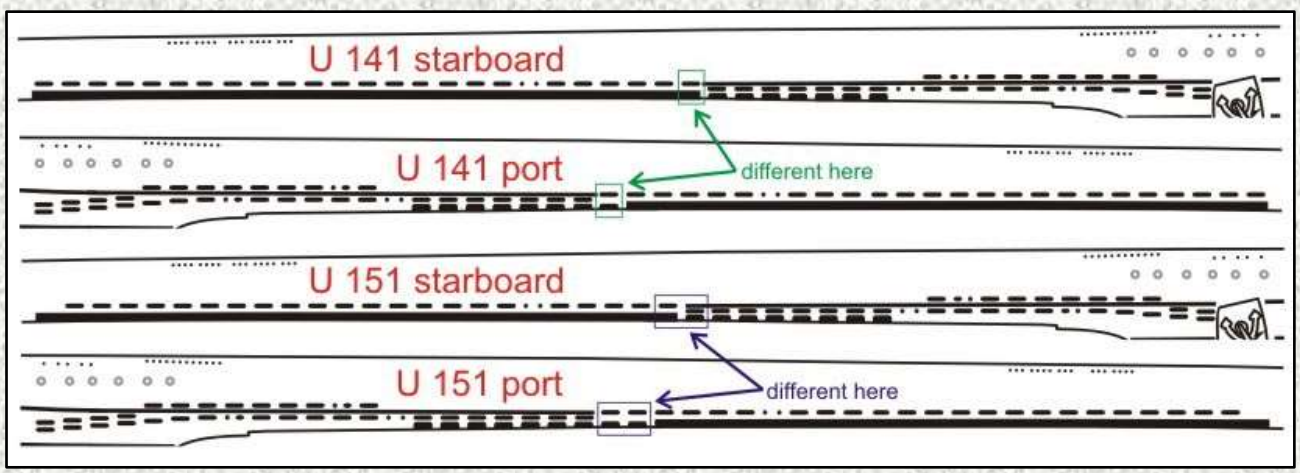
In regard to the main vents, the first four IIDs looked much like the IICs except that they had one fewer vent at the rear than the immediate predecessors. The next boat, U 140, was completely unique in having a full double row of vents in the mid-hull area. The remainder of the class (U 141 to U 152) all had a large drainage area (of slightly variable length) added above the saddle tanks in a style reminiscent of the Type VIIBs and VIICs.

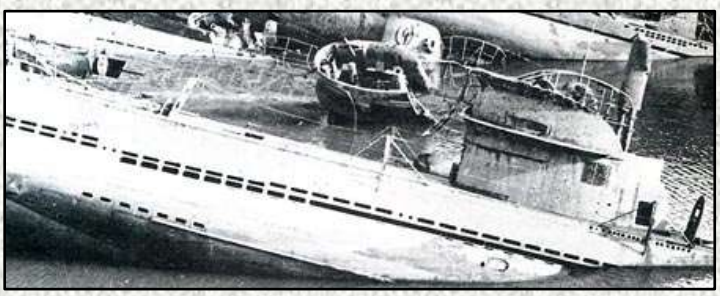



Above (D40): On the IICs there were 19 vents to the rear of the two dots. On a number of IIDs there were 18 vents, which is a useful point of differentiation. On U 149 and U 152 there were 17 to the rear of the two dots.

Left (D41): U 137 under the command of Herbert Wohlfarth. Note the 20mm on top of the conical mount.

Below (D42): There were slight differences between the port and starboard sides which should always be borne in mind when identifying IIDs in photos.

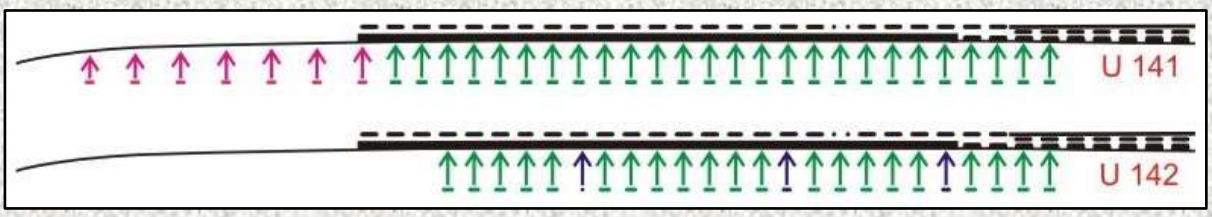




Above (D43): Here can be seen U 151 looking rather worse for wear at the end of the war. The nine holes just ahead of the main drainage area were not the standard height of the rest of the main vents. Instead they became progressively greater in height as one moves forward. The most interesting aspect of this photo is the electro-pneumatic *schnorchel* at the rear of the tower.

Above left (D44): Another exclusive feature of the IIDs is the line of vents at the very top of the saddle tanks. In this photo we can see the position of the vents just outboard of the main drainage area.

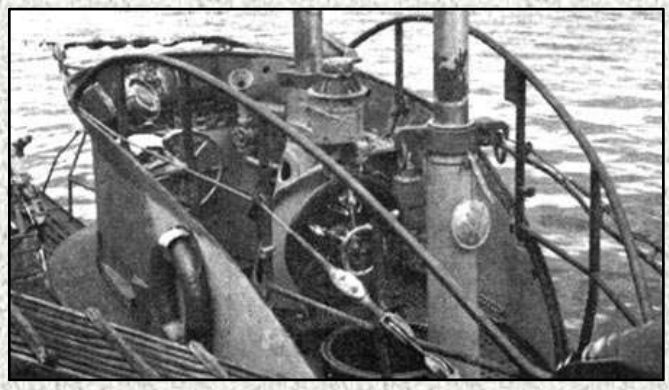
Below (D45): The arrows show the position of the various vents on top of the saddle tanks. U 141 had an additional seven vents towards the rear end of the tank. These extra vents were a little smaller than the other 26 vents.




## Type IID tower

Below (D46): The curved bars on each side of the tower of the camouflaged U 141 can be seen to good effect here.

All 16 Type IIDs had the final version of the tower, which is referred to here as style 4C. As with style 4B on U 120 and U 121, this version had the spray deflector halfway up the tower. One difference is that the unique type of side light which featured on U 120 and U 121 was not utilised on the IIDs. Rather the more usual type with channel ahead of the light was used.

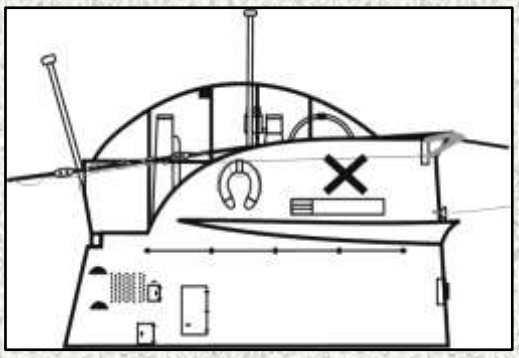


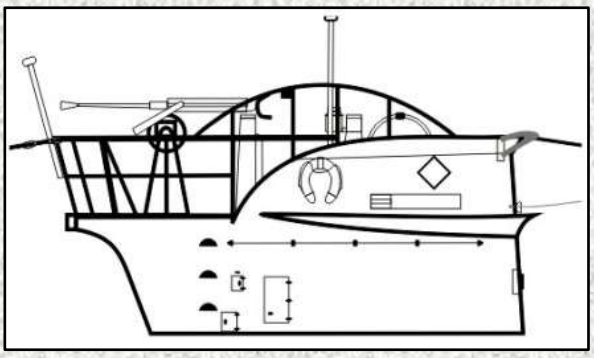
Late in the war some Type IID towers were modified with the addition of a wintergarten structure at the rear of the tower. This created a rather awkward looking tower structure in which the rear of the tower undercut in a similar manner to the Type VIIB towers. The wintergarten structure was added to incorporate the addition of a 20mm weapon at the rear of the tower. Even though all boats were assigned to training, it was still deemed necessary to house an anti-aircraft weapon in this area of the boat.

Left (D47): The very low height of the tower can be seen in this photo in which the top of the bulwark only comes up to chest height. It is easy to appreciate why the curved railing bars needed to be added above the tower.

Below left (D48): U 139 with a style 4C tower. As per normal custom with the rest of the Type IIs, there were more small ventilation holes on the starboard side than on the port side. The set was also farther back on the starboard side, as can be seen when comparing with the port side in photo D12.

Below right (D49): U 142 in 1944 with the wintergarten added to the rear tower area. Some details are not known so the real boats may have varied somewhat to the crude drawing shown here.





## Type IID details

| Type IIDs | | | | | |
|---|---|---|---|---|---|
| **Boat** | **Shipyard** | **Launched** | **Training** | **Decommissioned** | **Lost** |
| U 137 | Deutsche Werke | 18/05/40 | January 1941 | N/A | Scuttled 1945 |
| U 138 | Deutsche Werke | 18/05/40 | N/A | N/A | 18/06/41 |
| U 139 | Deutsche Werke | 28/06/40 | September 1940 | N/A | Scuttled 1945 |
| U 140 | Deutsche Werke | 28/06/40 | December 1940 | N/A | Scuttled 1945 |
| U 141 | Deutsche Werke | 27/07/40 | September 1940 | N/A | Scuttled 1945 |
| U 142 | Deutsche Werke | 27/07/40 | September 1940 | N/A | Scuttled 1945 |
| U 143 | Deutsche Werke | 10/08/40 | October 1940 | N/A | L Ryan 1945 |
| U 144 | Deutsche Werke | 24/08/40 | N/A | N/A | 28/07/41 |
| U 145 | Deutsche Werke | 21/09/40 | September 1940 | N/A | L Ryan 1945 |
| U 146 | Deutsche Werke | 21/09/40 | Late 1940 | N/A | Scuttled 1945 |
| U 147 | Deutsche Werke | 16/11/40 | N/A | N/A | 02/06/41 |
| U 148 | Deutsche Werke | 16/11/40 | Throughout | N/A | Scuttled 1945 |
| U 149 | Deutsche Werke | 19/10/40 | Late 1940 | N/A | L Ryan 1945 |
| U 150 | Deutsche Werke | 19/10/40 | Throughout | N/A | L Ryan 1945 |
| U 151 | Deutsche Werke | 14/12/40 | Throughout | N/A | Scuttled 1945 |
| U 152 | Deutsche Werke | 14/12/40 | Throughout | N/A | Scuttled 1945 |

# Part VI - Inside Tower

As we have seen in previous sections, the tower of the Type II was greatly modified over time. The small basic structure on U 1 in 1935 was very different in size and profile of the tower of U 142 in 1945. The same can also be said of the area between the tower walls, where a number of additional features were added over time. There was never any surfeit of space in the tower, with crewmen wearing bulky wet weather clothing squeezing past each other with considerable difficulty. There was slightly more room at the rear of the IIBs and IIDs which were fitted with the wintergarten but nowhere near as much space as on their illustrious big brothers - the VIIs and IXs.

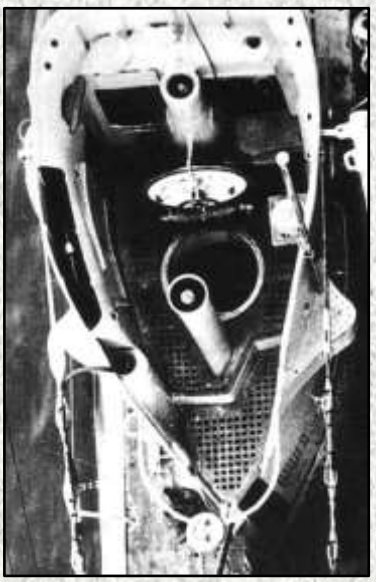
One notable difference which is relevant to all Type IIs is that the attack periscope - which had a smaller head - was present at the front whereas the larger sky periscope was at the rear. This is the reverse of the arrangement on the Type VIIs and IXs, which had the smaller attack periscope to the rear.

Type IIAs (style 1) - The very first towers were uncluttered by the various equipment which would later be added. In the middle of the Type IIA tower sat the hatch, which opened at the front (rather than the rear as on the VIIs). To suspend the open hatch in place there was a catch on the hatch lid which could be secured to the rear of the cylindrical attack periscope column. Behind the hatch sat the sky periscope column, which was an uncomplicated feature consisting of a vertical tube which tapered to an edge at the rear. The majority of the tower floor was wooden and consisted of numerous small squares in an arrangement used on other U-boat types.

Moving astern we see a step leading down to a lower level at the rear of the tower floor. Although not large, it was sizeable enough for watch personnel to trip over if they were focussing on scanning their sector of the horizon rather than concentrating on their footing. The step itself was not uniform and consisted of two angles.

Within the port bulwark lay the D/F (direction-finding) loop which could be extended via a shaft above the top of the tower, thus allowing it to rotate. On the shelf at the front of the tower was a voicetube (starboard side) and a housing to secure a magnetic compass repeater (port side). There were also three shelves which could be placed in a vertical position when required. Two of these shelves (one on either side) were wooden and lay horizontally on the inside walls, with a hinge at the top which allowed them to sit vertically. Both of these can be distinguished by their rounded edges on the outside. There was another shelf, this time a metal version with square edges, which could be held in place on the inside of the starboard bulwark. The inside of the tower walls on the starboard side had four oval holes, arranged in two rows. The metal shelf required two of these holes when securing in place and could be positioned either at roughly mid-level or nearer the top of the tower. This feature may have been stored below when not in use.

Additionally, there was also a metal step in place a few inches above the tower floor; this was present on the starboard side between the attack periscope column and the starboard bulwark.



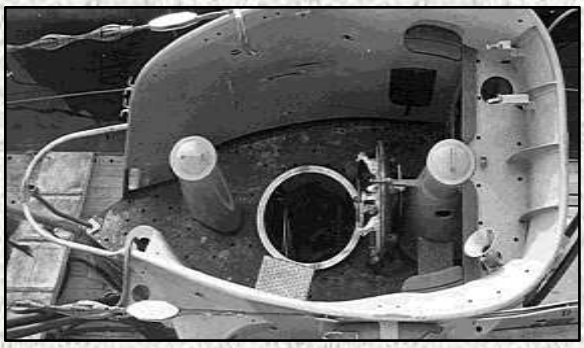
Right (D50): When we compare the size of the two periscope heads we can see that the sky periscope at the rear was larger than the attack periscope at the front. The two shelves on the starboard side are extended horizontally but the one on the port side is not. Another feature seen here is that the commissioning flagpole is attached to the navigation light housing on the outside of the starbard side.

The most notable omission is the lack of UZO column, which was used on the VIIs and IXs to aim torpedoes during surface attacks. There is no obvious bracket on the Type IIA towers to allow a portable UZO to be housed. Whether this was retrofitted to boats at a later stage is unclear. There was also only one magnetic compass repeater on the very early IIs, with no bracket to house a second repeater behind the sky periscope housing.

Note: All the tower details, including the three wooden seats, metal step and tower latch, are included in AMP's 72-01 update set.

Style 2 - The inside of the tower on the early IIBs with tower style 2 were essentially the same as the IIAs. The periscope housings, wooden and metal shelves, step, voicetube and only one magnetic compass housing were all the same as the previous sub-variant. The major difference is, of course, in respect to the D/F loop, which is the characteristic feature of the style 2 tower. Now that it was moved to the outside of the tower, the port bulwark now became a thin wall devoid of major features on the inside surface.

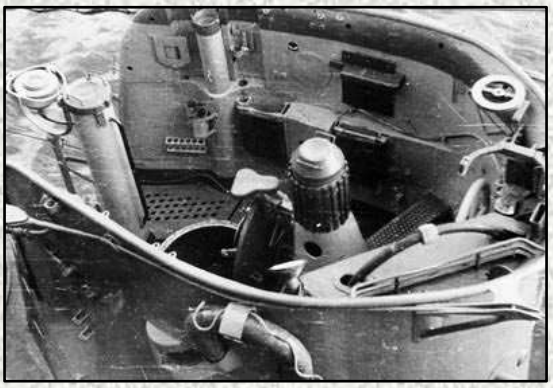
An additional change occurred in respect to the wire from the jumping wires. This now ran into the top of a small fairing mounted at the rear of the starboard side (as opposed to the port side on the IIAs).



Left (D51): The inside of U 7's tower looks very similar to the photo of U 3 except for the D/F loop now being housed externally. The magnetic compass is not present in this photo but the holders which would suspend it in place are visible on the port side of the front shelf.

Below (D52): A photo of U 24 with many additional features not present in the photo of U 7. We can see there is no dashboard area which had been in place in styles 1 and 2. Additionally, the D/F loop can be seen on the starboard side.

Note: In photo D51 above, we can see that the tower floor on U 7 did not have the usual squares through which water could drain. Instead there is a mostly uniform surface with a limited number of very small circular holes. One possibility to explain this is that the photo shows U 7 before final completion, with the wooden sections with the squares not having been fitted to the boat. The magnetic compass repeater has not yet been fitted to the boat, which lends credence to this theory. The other possibility is that U 7 was launched without the square openings on the tower floor but discontinued when found to be unsatisfactory. What is clear is that a later pre-war photo of U 7 shows the normal square tower floor being present.



Style 3 - Many differences were incorporated into the style 3 towers of the later IIBs and IICs. The main difference is in respect to the "dashboard" area which had been in place on styles 1 and 2 (a similar dashboard arrangement was present on the VIIs). This dashboard area was dispensed with on style 3, partly due to lack of space and partly to accommodate the D/F loop housing added to the starboard side of the front of the tower. The housing on the VIIs included a large opening which permitted the recessing of the entire loop. However, on the Type II the circular bars entered and

exited through two circular openings and did not fully recess.

Another new feature was the large wheel added in a central position where the dashboard had previously been. The bracket for the forward magnetic compass repeater was still present in the same location (on the port side) but was no longer on top of a dashboard shelf area.

Although the attack periscope housing was in the same position, the deletion of the dashboard area meant there was more space ahead of the housing. As for the housing, it was no longer a simple cylinder but a bulkier feature with a large hole on either side. Vertical wooden slats were added to the top of the housing and also to the inside of the tower walls. As with other U-boat types, the idea was that the clothing of crewmen would be less likely to stick to wood than a metal surface in freezing conditions.

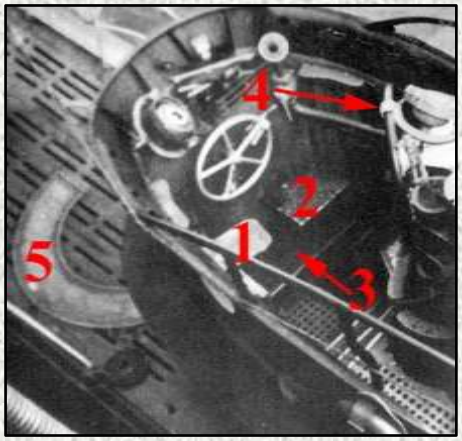
The inside of the port bulwark was no longer the simple unadorned surface. Several features were added, including a vertical tube, various holders and cables leading inside the boat. There was now a metal step on both sides of the attack periscope housing rather than just the starboard side. The voicepipe was retained on the starboard side, just behind the D/F loop housing. To assist with crewmen climbing in and out of the tower, a horizontal grip bar was added on the inside of the starboard tower wall and a vertical grip bar was added to the front of the sky periscope housing.

Another noticeable addition came directly behind the sky periscope housing, where a second magnetic compass repeater was added. The repeater was attached to the periscope housing via a curved bracket which lay on top of a thin vertical supporting pole. It should be noted that the repeater was present behind the sky periscope housing rather than ahead, as per the system on the VIIs.

Note: The second compass repeater was retrofitted to Style 2 towers (and perhaps Style 1 towers as well) at some point.

Style 4 - Space was tight enough on the towers of Type VIIs and IXs but completely unsatisfactory on the little Type IIs. There can be no doubt that the lack of space within the tower was seriously hampering operational effectiveness. Fewer lookouts could scan the horizon while watch officers might have to remain below rather than assist the commander in his duties. As for the boats serving in a training capacity, the lack of space on the tower made for a less than ideal training platform for watch officers, commanders and lookouts who would progress onto the larger boats. With war in Europe seeming almost certain, the wise decision was made to design a completely different type of tower for the Type IIDs. As we have seen in a previous section, this resulted in the style 4 tower which was much larger and roomier than the earlier models. Although the style 4 towers were far from spacious, the extended length did allow for additional space ahead of the attack periscope housing.

On the style 3 towers there had been a metal step on either side of the attack periscope housing. Now that additional space was available, the metal step now lay ahead of the housing and extended from one side of the tower to the other. Around six inches above, on the starboard side, there was also a metal step which may have been secured permanently in place.




Right (D53): This photo of a Type IID with a style 4 tower shows the following features:
1 - foldable wooden shelf
2 - metal step
3 - full-length metal step
4 - D/F loop
5 - semi-circular air identification metal plate

The extendable wooden shelves - as seen on earlier variants - were still available on both sides. The most obvious omission from the front of the tower is the D/F loop. This was moved back to a position just ahead and to the starboard side of the attack periscope housing. Rather than having its own housing to retract into, the loop sat in a rather exposed manner within the tower. This prevented a crewman from walking around the starboard side of the attack periscope housing.

The attack periscope housing had a few improvements, one being the narrow curved metal steps around the sides of the base at a height of around six to eight inches above the floor. The rearmost magnetic compass repeater, which had been present behind the sky periscope on the IICs, was moved to a position directly ahead of the top of the attack periscope housing. This time the support bracket consisted of much thicker curved metal bars, just like the typical style found on the Type VIIs. To the rear of this same housing was added a UZO head to assist in the firing of torpedoes by the First Watch Officer during surface attacks.

Right (D54): The UZO head can be seen mounted permanently in position behind the top of the attack periscope housing in this photo of U 142. Now that the rearmost magnetic compass repeater has been moved farther forward, the sky periscope housing has returned to the uncluttered arrangement of much earlier sub-variants. Just behind this housing we can see part of the step down to the slightly lower level at the very rear of the tower.

# Part VII - Other Details

## 20mm gun

One of the main features of the Type IIs is the 20mm gun on the foredeck. There were a few options in this area -

- No gun or mount on the foredeck at all (referred to as “no feature”).
- Barrel-shaped watertight canister; contained a 20mm weapon which extended out the top of the canister when open (referred to as “the barrel”).
- 20mm weapon on top of a conical-shaped mount (referred to as “the conical mount”).

Note: Until a waterproof version became available in 1940, the 20mm barrel was normally stored in a waterproof hatch. The mount would normally be absent of the 20mm barrel unless the weapon was being used. The mount usually contained a triangular-shaped cartridge tray on one side, which allowed cartridges to be quickly and easily brought to bear.

At first we might think that the application of these three options was haphazard and entirely without a consistent policy. When we closely study this feature we find this is only partially true. Some policies appear to have been implemented at various times but there were also variances and exceptions to the rule.

Pre-war - The very first IIAs and IIBs (except U 120 and U 121, which were later boats) sailed with no feature on the foredeck. Although U 6 initially had no barrel, it was added to this boat at an early stage when no other boats had this feature. Almost certainly we might assume that U 6 was the first boat outfitted with the barrel and was used to test this arrangement. U 4 had no feature at the start

but was then the first boat to be fitted with the conical mount. A little later U 5, U 7, U 9 and U 11 (which all had no feature at the start) were fitted with the conical mount, normally mounted minus the barrel. At this time the other boats still had no feature on the foredeck.

It would appear that U 14 was fitted with the conical mount while serving during the Spanish Civil War in the summer of 1937. This may have been fitted for the purpose of the Spanish patrols; if so then U 19 and U 23, which also served in that capacity, are likely to have been similarly outfitted at that time.

Most pre-war photos show the majority of boats with no feature. At some point prior to hostilities (perhaps 1938 or 1939) a major change was introduced when all of the other IIAs and IIBs had the barrel fitted to the foredeck. It might be noted that U 9 had no feature, then the conical mount and then the barrel in the pre-war period.

In regards to the IICs (and the very late IIBs U 120 and U 121), they had the conical mount in the pre-war period. As with the VIIAs and VIIBs in the immediate pre-war period, usually the non-waterproof barrel would be kept stored in a watertight hatch and only mounted on the conical mount when required.

Early wartime - When war broke out at the start of September 1939, it would appear that the IIAs and IIBs had the barrel whereas the IICs (and U 120 and U 121) had the conical mount. There would have been exceptions but this general arrangement seems to have been in place.

Black Sea boats - The photographs typically show the Black Sea boats with the barrel before the introduction of the wintergarten. Then, when the wintergarten was added, the photos show the boats with the conical mount. There are always exceptions with U-boats and this is the case in this respect; in the summer of 1943 U 23 had the conical mount before she was outfitted with the wintergarten. This may be evidence that the fitting of the conical mount preceded the wintergarten, at least on some boats.

Mid-to-late wartime (IIDs) - Towards the end of 1940, the IIDs U 138, U 139, U 140 and U 141 all had the conical mount. The difference here is that the barrel was permanently in place due to the introduction of a waterproof barrel to the fleet in 1940. Previously the barrel had to be stored below for submerged transit, which was entirely unsatisfactory due to the time taken to add the barrel to the mount or to remove it prior to diving.

In May 1941 U 141 retained the conical mount but in July 1941 it had been removed in favour of the barrel. There were differences in regard to the other IIDs. Some changed from the conical mount to the barrel in 1941 while others such as U 151 retained the conical mount. U 142, U 149 and U 151 (and perhaps the majority of IIDs) had their existing mounts removed to leave no feature on the foredeck at the end of hostilities.

Wartime school boats - In 1941, when all the IIAs and IIBs were school boats, the majority of boats had the barrel. There were exceptions, such as U 8 and U 10, which had the conical mount. On U 10 the conical mount was removed to leave no feature on the foredeck. U 21, U 56, U 61, U 62 and U 121 are other example of boats with no feature when based at Pillau. By 1943 there was no consistency, with some boats having the barrel, others the conical mount and others no feature at all.

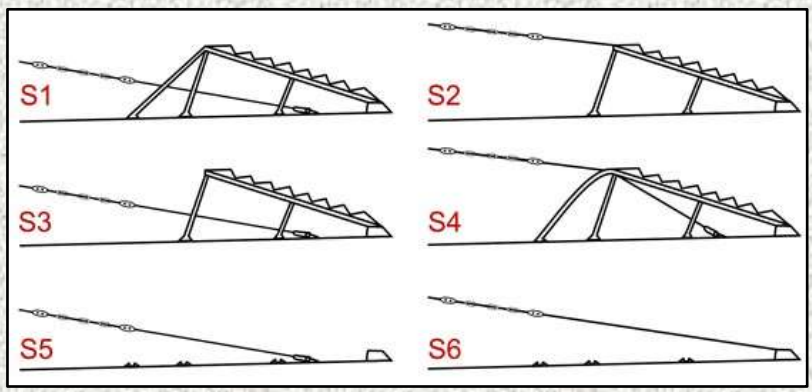
In the Battle Of The Atlantic, quadruple 20mms and, a little later, a single or even double 37mm, were deemed essential to the survival of the VIICs and IXs. By comparison the armament on board the Type IIs assigned to a secondary training role was insignificant. The presence of a single 20mm weapon on the foredeck would be completely inadequate to defend the boat against heavily-armed Beaufighters, which were attacking the Atlantic boats with great success. Given that the Type IIs were all engaged in a training role, where they would not regularly be attacked by aircraft and there was no longer a requirement to train crews in attacking shipping with armament, it

can be seen that the presence or not of a 20mm gun was no longer important. This is perhaps why we see a complete lack of synchrony in mid-to-late war training boats.

## Net cutter

There were various measures in regards to the net cutter, with boats featuring different arrangements at various times. Two types (S2 and S3) had four supports while others (S1 and S4) had a fifth support at the rear. Another difference we should be wary of is that the jumping wire connected to the deck at different places: some boats connected at the top of the net cutter (S2 and S4) whereas others connected directly with the deck or the bow.

On S1 the jumping wire met with the deck at a location offset to port. This was necessary because the rear bar was in a central location. The reason for the lack of rear bar on S2 and S3 is most likely to avoid having the jumping wire meeting the deck at an offset position. It would seem that all Type IIs had a net cutter at some stage or another. When the feature was removed, the brackets which had secured the cutter to the deck were left in place so that it could be reinstated at a future point if necessary.




Above (D55): The six styles of net cutter arrangement on Type IIs. Note the curve at the top of S4. The upper net cutter on the IIs had eight teeth as opposed to the ten teeth on VIIs and IXs.

Pre-war colour schemes - As a prelude to our discussion on the net cutter, it is necessary to cover the paint schemes employed on the very earliest Type IIs in the pre-war period as they help us discover which net cutter styles came first. The schemes are as follows -

- The first colour scheme was the light grey *Hellgrau 50* upper colour (or perhaps medium grey *Dunkelgrau 51* upper colour) with a black tower number (**black number scheme**).
- The next colour scheme consisted of *Dunkelgrau 51* on the upper hull and a fully white tower; the number on the tower varied, being either a medium grey, dark grey or black (**white tower scheme**). This was adopted on all IIAs and the majority of IIBs.
- The next colour scheme which was used for the remainder of the pre-war period consisted of *Dunkelgrau 51* on the upper hull and tower, with the pre-war number in white (**white number scheme**). Some boats such as U 9 may have worn this scheme before the white tower scheme.

There was a crossover period when some boats had the white tower scheme and others the white number scheme. The pre-war numbers were painted out in August 1939 when preparations for war began.

Pre-war net cutter styles - The very first IIAs were painted in the black number scheme and had net cutter style 1 (S1). S1 was retained when the boats were repainted in the white tower scheme and then in the white number scheme. It would appear that S2 replaced S1 on the early boats in the pre-war period, with several photos showing IIAs and early IIBs with the white number scheme and S2. There is even one photo of U 4 with S2 and the white tower, meaning that S2 was introduced on some boats at a reasonable early stage.

A full-size mock-up of U 9 had S3 when displayed during an exhibit in Berlin in 1937. Although this looks very similar to the real boat, the mock-up did not have the D/F loop on the

outside of the tower and the vents are very slightly different. It would seem that no real boats had S3 and it was only used upon this Berlin mock-up.

Around the end of 1938 or very early 1939, the Kriegsmarine dispensed with the net cutter for a short time. This left all boats in the first half of 1939 with S6. One exception was U 21, which in 1939 had S5. The net cutter was re-introduced on VIIBs in the summer of 1939 but it is unclear whether it was re-introduced on IIAs and IIBs at the same time.

The IICs initially had no net cutter (S6). U 60 was then fitted with a net cutter, with the feature present as early as June 1939. On the IICs (and indeed the IIDs which followed and the very late IIBs U 120 and U 121) the style which was adopted was S4; this arrangement included a curved bar at the rear and the jumping wire meeting with the deck via the underside of the top of the cutter. Although there may have been exceptions, it would appear that S4 was exclusive to the IICs and IIDs and not fitted to IIAs and IIBs.

Spanish Civil War - U 14 had no net cutter (S6) when serving during the Spanish Civil War in the summer of 1937. It would appear that the feature was removed for the duration of the boat's involvement in Spain and quite likely re-introduced upon her return to German waters. The removal and re-introduction may also have been applicable to U 19 and U 23 which also served in Spanish waters.

Wartime net cutter styles - The IICs and IIDs (and U 120 and U 121) continued with S4 in the early war period. On the 1st March 1941 the order to remove the net cutters from all U-boats was issued. As a result, **most** of the net cutters from Kriegsmarine U-boats were removed in March and April 1941. However, photos show no net cutter (S6) upon U 147 as early as December 1940, meaning that the removal occurred earlier on at least one boat. The no net cutter style which became standard throughout the Type II fleet was S6. There is consistency in the photos of training boats lined up at Pillau in the mid-war period in that all boats have S6. The net cutter was not re-introduced, which is not surprising given the lack of reason to do so upon school boats.

S1 - The first style used upon the IIAs and early IIBs; replaced by S2.

S2 - Replaced S1 on the early boats; was itself replaced by S6 at end of 1938 or very early 1939.

S3 - Used on mock-up of U 9 on display in Berlin in 1937.

S4 - Used on IICs, IIDs and the very late IIBs U 120 and U 121 from the early summer 1939 onwards; replaced by S6 in spring of 1941.

S5 - Used on U 21 in 1939.

S6 - Used on all sub-variants in the first half of 1939; may have continued on IIAs and IIBs in the early war period; was used on all boats after the spring of 1941.

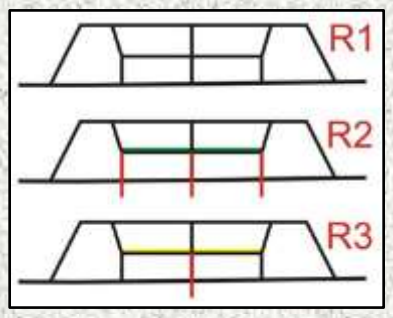
## Railings

Temporary deck railings - Photos of boats in port often show a number of vertical stanchions which were added to help prevent crewmen falling overboard. These temporary removable deck railings were placed within the small circular holes on the edges of the deck, with wires added between the tops of these stanchions. These temporary railings would often be seen when the boat was in port but can also be seen on boats at sea.

R1 and R2 - Initially the permanent deck railings were present only on either side of the 20mm

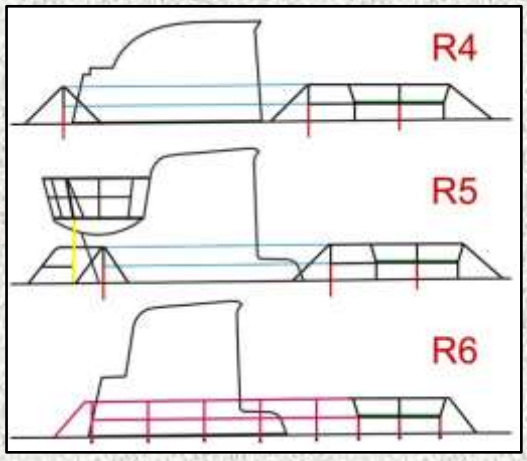
position, there being none at all around the tower or the aft deck (see railing style R1 in the drawings). After a few years (but still prior to hostilities) a curved one-piece wooden seat was added to the existing railings on the IIAs and IIBs. When the wooden seats were added, three vertical support bars were added below the seat and reached down to meet with the hull casing slightly below the level of the deck (R2).

Right (D56): Railing style R2 replaced R1 on the IIAs and IIBs in the pre-war period. R3 (which had two separate wooden seats per side and only one vertical support) was applicable to the IICs. The bars coloured red extended from the outside of the existing railings down to the hull casing.




R3 - The IICs had two separate wooden seats on each side, with each seat being rectangular rather than curved. These boats only had one additional support bar leading onto the hull casing.

R4 - The IIDs were launched with railing style R4. This was like R3 in that it had the two separate rectangular seats per side and one vertical support. The difference was that R4 had additional bars at the rear of the existing group plus three bars (two diagonal and one vertical) added outboard of the rear of the tower. Two wires were added between the front and rear railing groups to help prevent sailors walking around the tower from falling overboard. Boats such as U 18 were changed to R4 by 1942.




Left (D57): These drawings show typical wartime railing styles. The blue lines show wires whereas all other lines indicate steel bars. R4 was used from the start on the IIDs and was also applied to many existing boats. The yellow line is the thick vertical support bar between the underside of the wintergarten and the edge of the deck.

R5 - When the wintergarten was added to some boats such as U 18 and U 24, additional bars were added at the rear. Incorporated into the railing arrangement was the thick near vertical support bar between the edge of the deck and the bottom edge of the wintergarten.

R6 - A completely different arrangement (R6) can be found on the early boats such as U 3, U 6, U 7, U 8, U 9, U 10 and U 14 in 1941. This consisted of five additional vertical stanchions being added on either side of the deck around the tower position. Rather than being purely vertical, these stanchions curved outboard. They also did not fit into the edge of the deck but just below the top of the hull casing. There was one horizontal bar at half height and another at top height to connect up the railings.

A similar arrangement was applied to U 121. The difference is that on each side eight extra vertical bars were added between the hull casing and each vertical railing; these met the railings just below half height.

Railing style R6 appears to have been adopted on U 58 as early as August 1940, although with six extra vertical stanchions rather than five.

When the wintergarten was added to U 9, the thick vertical bar between the underside of the wintergarten and the edge of the deck was incorporated into the rear of the railings.

## Other features

U 6 deck - The standard practice on German U-boat until 1942 was to have a slotted deck, whereby water drained off the deck through a pattern of slots. Two boats which were exceptions to the rule were the Type Is U 25 and U 26, which had small round circles on the deck rather than the slots (except for 32 slots on the foredeck behind the capstan). By the start of hostilities the entire wooden deck of U 25 and U 26 was replaced with the more usual slotted pattern, which drained much better than the small hole arrangement. The other boat which featured the small circular holes and no slots was the Type IIA U 6, which set this boat aside from the other boats in her class. It is unclear whether U 6 retained the small circle deck as a wartime training boat or whether it was retrofitted with a slotted deck. There would have been a desire to fit the slotted deck but this had to be weighed up against the significant expenditure of doing so.

U 24 jumping wires - It would appear from a photo on page 24 of *U-Boot Im Focus 13* that U 24 had two jumping wires in front of the tower in the summer of 1939. This would have been in place for only a short time, with the normal single jumping wire arrangement being in place in the pre-war years and during the majority, if not all, of her wartime service.

Spray deflector - The spray deflector which was added as standard from the beginning to all 4B and 4C towers was not retrofitted to existing towers. One exception was U 21, which was fitted with the deflector at some stage during the war.

Bronze eagle - A bronze eagle plaque was fitted to the front face of the tower, near to the top of the bulwark, as standard to all pre-war boats. During August 1939, as Germany prepared for war, the eagle was removed. When the boats were relegated to training duties, the eagle was often re-introduced on the same location as in the pre-war period.

Lifebuoy - During the pre-war period the lifebuoy on the aft deck was painted red and white. Just prior to the war, in August 1939, the lifebuoy was removed from all boats. An exception was U 18, which had the pre-war number but no lifebuoy. When the lifebuoy was removed from the aft deck, a plate with bars was added in its place. On some boats a circular plate with small circular holes was added, as per the VIIBs. U 142 appeared to retain the lifebuoy but it was painted black. As with the eagle, the red and white lifebuoy was re-introduced when the boats assumed training duties.

Air identification plate - A large semi-circular air identification metal plate could be secured to the foredeck in the position ahead of the 20mm gun position. On the IIDs (and U 120 and U 121) the plate was added behind the gun position. The unusual aspect was that the plate on the late boats was positioned on the port side of the deck and orientated sideways.

Porcelain insulators - On the IIAs and early IIBs, three porcelain insulators and a tensioner were initially ahead of the splitter. In the pre-war period this was changed to have three insulators on each wire behind the splitter.

Anti-vibration wires - The top of the attack periscope and sky periscope originally had no wires around the top. At some stage (perhaps early in 1940) anti-vibration wires were added to the top of periscopes to help reduce the wake left by a raised periscope.

Wooden slats - For several years the Type IIs served without any wooden slats on the inside tower walls. Over time some vertical wooden slats were added to the inside of the conning tower bulwark to help prevent crewmembers from sticking to the bulwark metal in freezing temperatures. Smaller wooden slats were also added vertically to the attack periscope housing on some late war Type IIs. Some IIDs even had wooden slats added horizontally near the top of the bulwark.

Experimental tower - In the spring of 1938, the test boat U 11 had an experimental tower which extended all the way forward to cover over the magnetic compass fairing. The front face of the tower, which was devoid of features, may have been intended to improve hydrodynamic performance. There were two jumping wires at the rear but no wire at all in front of the tower. This experimental tower was removed in favour of the normal style.

*Alberich* - In 1940, the conning tower of U 11 (having reverted to the original type of tower) and the hull was covered in sound-absorbing anechoic tiles. U 11 was the first U-boat in which this system was tested. Known as *Alberich*, it was later tried upon Type VIIC and IX boats. The main technical problem was the adhesive used to stick the tiles onto the boats, which often proved unsatisfactory, but this was improved by late 1944. Nowadays much of the surface of modern submarines is covered with anechoic tiles. Adhesion can still prove to be a problem, with British nuclear submarines shedding some anechoic tiles over time.

Experimental rockets - These were fitted to U 9 and U 24 in July 1944 and U 19 in August 1944.

*Schnorchel* - The *schnorchel* was a device which allowed the boat to operate while submerged. Consisting of a pipe which could be raised or retracted, the device allowed air to be taken into the boat from just above the surface of the waves. Such a device became essential in the late-war period when Allied aircraft supremacy forced the U-boats below the waves.

The first U-boat to be fitted with a *schnorchel* was U 58, which conducted experiments with the device in August 1943. U 57 is also reported to have been used as a *schnorchel* test boat. The type employed on these IICs was the ring-floating valve *schnorchel*. A *runddipol* radar warning receiver would have been present at the top of the mast.

U 143, U 145, U 149, U 150 and U 151 were fitted with an electro-pneumatic *schnorchel*. Due to inadequate space in the narrow foredeck to house the *schnorchel*, it was positioned at the rear of the tower and extended vertically.

## Paint colours and markings

Early scheme - The standard was for the lower grey to cover the hull up to the drainage area in the mid-hull area. It should be noted that in the mid-hull area of the very first Type IIs (up to and including U 7), the division between the greys was slightly lower down, with the darker grey anti-fouling paint not reaching up to the drainage area.

Exhaust patch - It is quite normal to see a dark grey RAL7016 (or perhaps black on some boats) patch painted around and abaft of the diesel exhaust outlet on the starboard side. This was to help disguise the dirt which would form around the outlet due to exhaust gases. The application of this feature was not universal as it was absent from some boats at certain times.

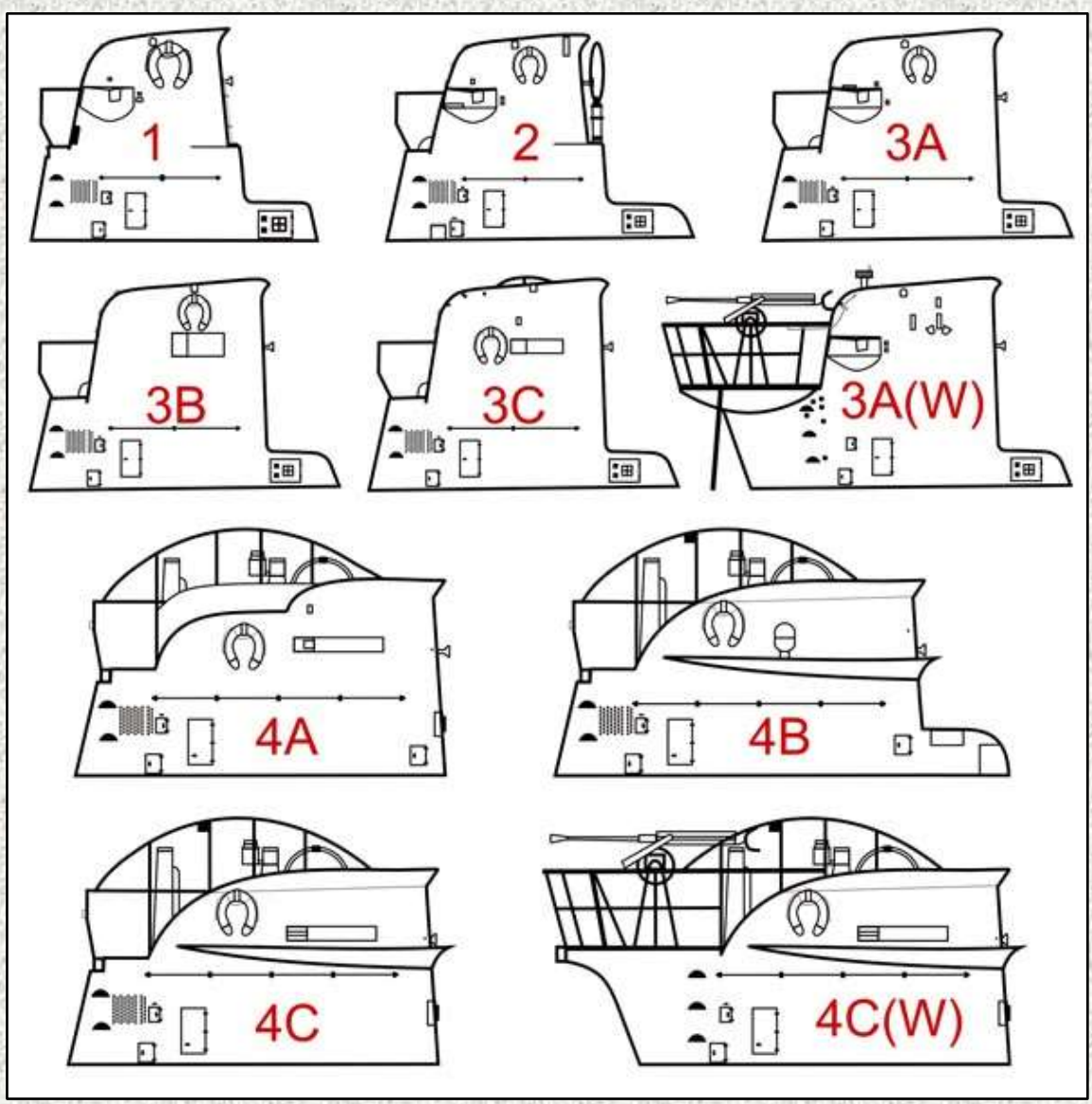
Training - Training boats had a yellow stripe around the towers and a yellow band on the foredeck near the bow. The heads of both periscopes were also painted yellow. Each boat was ascribed its own white school symbol which was painted on the tower.

Spanish Civil War stripes - This feature consisted of black, red and white stripes added horizontally

on the Type Is and IIs (and vertically on the VIIAs). All boats which served in this conflict also had black, red and white stripes across the foredeck and aft deck.

## Part VIII - Tower Styles List

| Type II tower types | | |
|---|---|---|
| **Tower type** | **U-boat number** | **Sub-variant** |
| Style 1 | 1-6 | IIA |
| Style 2 | 7-12 | IIB |
| Style 3A | 13-20 | IIB |
| Style 3B | 21-24 | IIB |
| Style 3C | 56-60, 62, 63 | IIC |
| Style 4A | 61 | IIC |
| Style 4B | 120, 121 | IIB |
| Style 4C | 137-152 | IID |




Above (D58): The designations with the letter W are the towers after the wintergarten was added.

# Late War Type VIIC & VIIC/41 Configurations

# Contents



## Part I - Introduction

In the article "*Type VII U-Boat Modifications*" (see the original Wolf Pack collection), the implementation of the Atlantic bow, planked deck and Askania compass fairing on Type VIIC and VIIC/41 U-boats were discussed. In this article I would like to further explore all three topics. Where possible I will provide details of which boats had each feature and the time frame when the changes took place. It is patently impossible to collect photos showing every angle of all 659 boats of this variant and therefore the conclusions are limited by the resources currently available to the author.

In the following discussion an attempt has been made to estimate the time period over which each feature was implemented. It is of critical importance to maintain a consistent reference point so that all boats can be compared with each other. The reference point which is given throughout this article is the launching date.

Although the information herein may be of interest to all U-boat enthusiasts, the article is primarily intended to assist a modeller who is striving to be historically accurate in relation to the configuration of a particular late war boat. To assist this task, advice is given towards the end of this article about how one may select individual features so that almost any VIIC or VIIC/41 boat can be depicted.

## Part II - Atlantic Bow

### Evidence of Atlantic bow on Type VIICs

The German Kriegsmarine built vast quantities of the medium-sized Type VII U-boat in several different variants. The most numerous variant was the Type VIIC, with 572 examples being launched and commissioned into the Kriegsmarine. A sub-variant, referred to as the VIIC/41, was also produced, with 87 boats being commissioned. The characteristic of the VIIC/41 was that it had a thicker pressure hull which allowed this sub-variant to dive to greater depths than the VIIC.

There is a common misconception which has developed in regard to the VIIC and VIIC/41. There was an assumption by many (including the author) that all VIICs were fitted with the standard bow and that all VIIC/41s were fitted with a longer, wider bow known as the "Atlantic bow" (*Atlantiksteven*). It has been further assumed that the Atlantic bow was an exclusive feature of the VIIC/41 and that this feature may allow us to identify this sub-variant from the regular VIICs.

A number of period photos provide us with incontrovertible proof that this view is erroneous. Contrary to popular opinion, the Atlantic bow was in fact fitted to a large number of VIICs and *was not exclusive to VIIC/41s*. In the table presented in Part V, the list shows that the Atlantic bow can be identified within period photographs on no fewer than 25 VIICs. Although it is next to

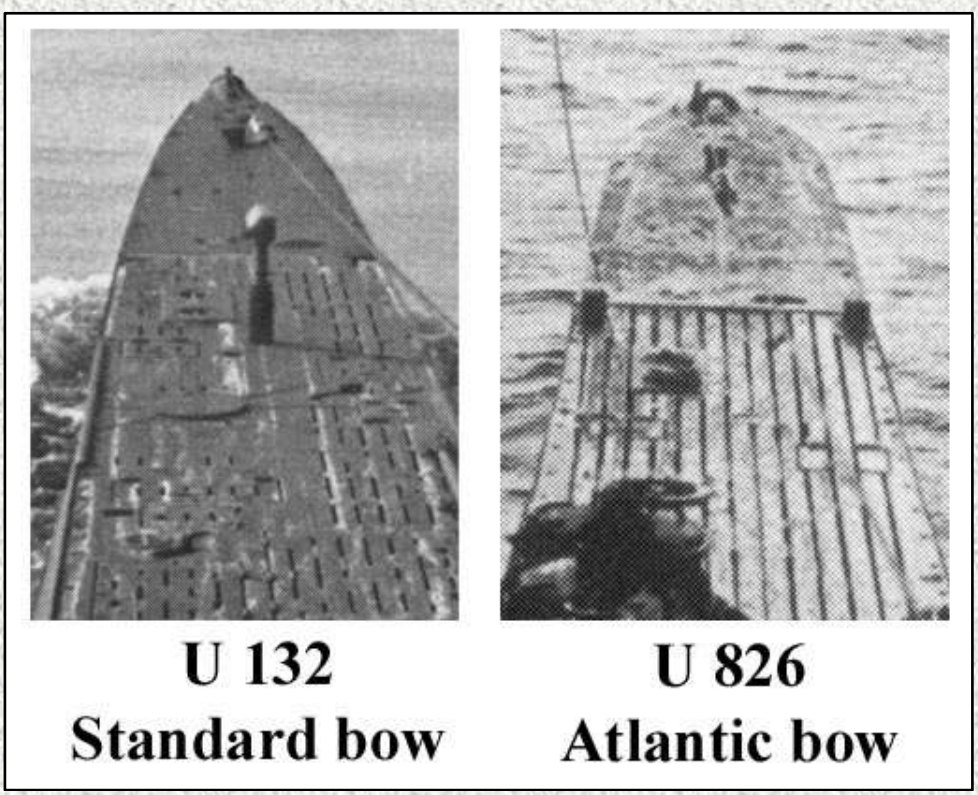
impossible to determine the exact number of VIICs with the Atlantic bow, interpretation of the information contained in the table may suggest a number in excess of 170. When we compare this figure with the 87 VIIC/41s (all of which had the Atlantic bow), it can be seen that at least 65% of all the Atlantic bows featured on VIICs.

Other than photographic evidence, there are existing plans which do back up the theory of the late VIICs having the Atlantic bow. On a reputable plan showing a boat with all the late war features - including Atlantic bow, planked deck, Turm IV and *schnorchel* - the plan is labelled as "VIIC (1944)" rather than VIIC/41.

If one is to accept that the Atlantic bow did feature on the later VIICs - and the photographic evidence is overwhelming - then we must also accept there is an error in very reputable books and websites. In the specifications provided by reliable sources, the length of the Type VIIC is specified as 67.10 metres. The length of the Type VIIC/41 is specified as 67.23 metres, the 13cm additional length being attributed the Atlantic bow. The length of the VIIC/41 is not in question, for as all boats of this sub-variant had the Atlantic bow then the length of 67.23 metres must be correct for all VIIC/41s. However, the shorter length of 67.10 metres, hitherto applicable to all VIICs, can no longer be accepted in relation to every Type VIIC. All of the early VIICs were produced with the standard bow and would undoubtedly have conformed to the overall length of 67.10 metres. But the later VIICs, built with the Atlantic bow, would surely have measured 67.23 metres. Therefore the length of VIICs varied depending on the type of bow employed.

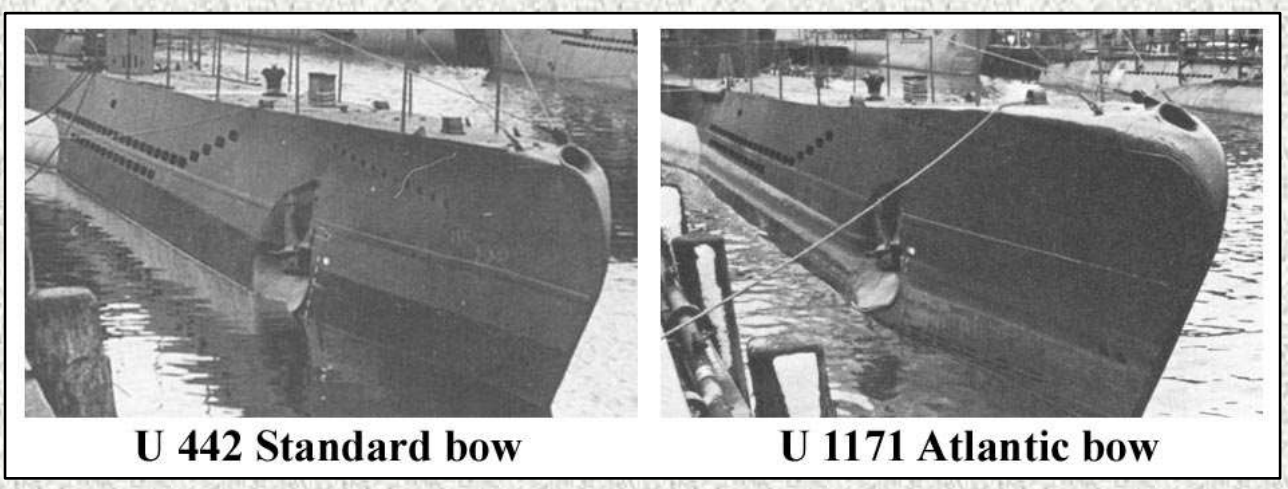
One of the major facets of the bow type - whether standard or Atlantic - was that it was not retrofitted on existing boats. Boats which were launched with the standard bow therefore retained this smaller style until their demise. Another point can be made in relation to the Atlantic bow. For VIICs and VIIC/41s with the Atlantic bow, it can be said that there were no external differences between these sub-variants. Since the thickness of the pressure hull cannot be reflected upon a model, from a purely modelling perspective we may think of the VIICs and VIIC/41s as being essentially the same. Assuming that one chooses a VIIC with late war features, we can therefore use Revell's late war VIIC/41 kit (RV5045) to model a mid to late war VIIC.

## Identifying bow type




Left (E1a and E1b): These two images illustrate the difference in profile between the early standard bow and the later Atlantic bow. The latter type is quite clearly much wider towards the tip of the bow. A comparison between the slotted deck on U 132 and the planked deck on U 826 can also be made here.

Below (E2a and E2b): The difference between the bow types can also be discerned from other angles. Here we can see that on U 442 the deck level does not rise up towards the bow. However, on U 1171 the deck towards the bow is clearly at a higher level than on the forward deck. The rising of the deck towards the bow can be used as a very useful identifying characteristic of the Atlantic bow. This does not necessarily mean that distinguishing the bow type is straightforward since the differences between bow types are not always easily discernable from certain angles.



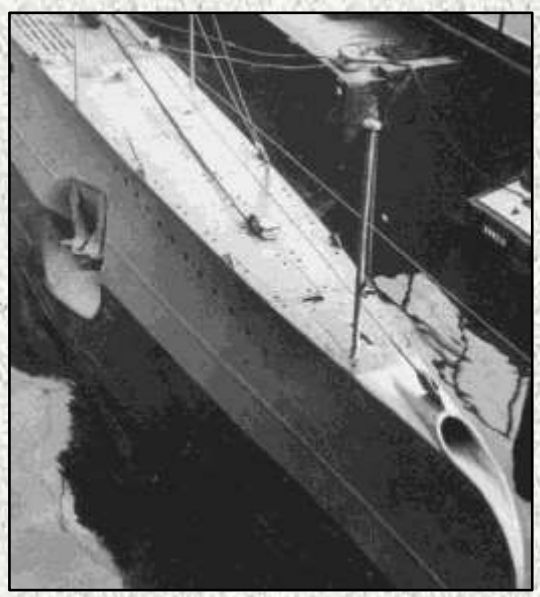
U 442 Standard bow | U 1171 Atlantic bow

## Implementation of Atlantic bow

The important question to be answered is when the Atlantic bow replaced the standard bow on boats being launched down the slipways. To attempt to answer this question I have formulated the table in Part V. This shows all VIICs and VIIC/41s listed in order of launch date, with SB referring to Standard Bow and AB referring to Atlantic Bow. Every entry in bold print represents a bow type identified on a particular boat within a period photograph. Certain reasonable assumptions can be made in regard to date and batch and these are given in regular font type.

The order date for the Atlantic bow was placed on the 19th July 1941 but it can be seen that it took some time before this could be implemented upon launched boats. From the table it can be seen that the earliest boat which is known through photographic evidence to possess the Atlantic bow is U 711. This VIIC was launched as early as the 25th June 1942. Unfortunately this does not mean that every boat launched after this date had the Atlantic bow - if only it were that easy!

Right (E3): Another method to help us distinguish bow type is to look at the hole at the top of the stem, through which a tow rope could be passed. As illustrated in this photo of U 431, in the standard bow the edge of the hull casing runs up to the side of this hole. When we look at the Atlantic bow on U 1171, we can see a noticeable gap between the edge of the hull casing and the hole. The image of U 431 also shows another helpful feature. In this photo we can see two triangular shapes on either side of the deck. These were the support brackets for the net cutter, which was removed from all VIICs in early 1941. When the net cutter was removed the triangular brackets remained in place. If we see these supports we can be sure that we are looking at a standard bow.



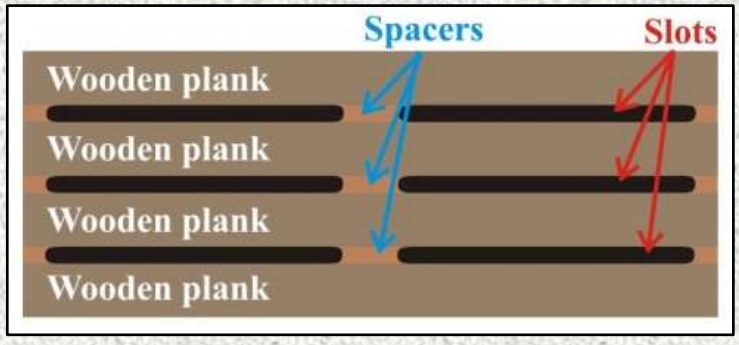
The table also indicates that the latest boat which is known through photographic evidence to have the standard bow is U 471, launched on the 6th March 1943. This does not mean that we can assume that all boats after this date had the Atlantic bow and that is why several cells in relation to boats launched after this date have been left blank. All boxes in between U 711 and U 471 (in a lovely pink font) represent the approximate range of the process of change from standard to Atlantic bow. It would be imprudent to make assumptions about many of the boats in this range. This leaves us with an unsatisfactory situation where we cannot, at least with only the author's present resources, specify what bow type was used on many boats launched in this period. Modellers may wish to refrain from choosing such boats in case evidence by other researchers proves their choice of bow type to be erroneous.

Although the implementation range in the table runs from the 25th June 1942 until the 6th March 1943, it should be pointed out that the Atlantic bow was very likely implemented on many boats launched before March 1943. While it is true that the standard bow featured on U 471, launched in Flensburg on the 6th March 1943, the penultimate occurrence of the standard bow was on U 362, launched on the 21st October 1942. It may be that the standard bow on U 471 was an exception and not representative of the majority of boats. Overall, we might consider that by November 1942 almost all of the VIICs were being launched with the Atlantic bow.

Conclusion - It appears that the Atlantic bow began to appear on launched boats towards the end of June 1942. With the exception of a few boats, most VIICs were being launched with the Atlantic bow by November 1942.

## Part III - Deck Type

All the early VIICs were completed with the slotted deck arrangement. In this style, there was a noticeable gap (slot) between the wooden planks. In between the ends of the slots were positioned wooden spacers, under which the supports were positioned. The result was a distinctive style of deck (referred to as the "slotted deck" by the author) which can be seen on early boats of various types such as the Type IIs, Type VIIs and Type IXs.




In the mid-war period the new build Type VIICs and IXs were launched with a much simplified form of deck. The slot and spacer arrangement was dropped in favour of a simple system whereby water drained away through the gaps between the long wooden planks. The result was a completely different style of deck that is very easy to differentiate from the earlier slotted deck.

Above: The width of the slots (25mm), the width of the wooden planks (75mm) and the length of the spacers (75mm) were consistent within the "slotted deck" used on all early Kriegsmarine U-boat types. The length of the slots differed at some areas of the deck, either due to the supports underneath or the presence of wooden or metal hatches.

Left (E4): The distinctive pattern of slots on the "slotted deck" on an early VIIC. The spacers between the end of the slots can also be distinguished at the bottom right hand side of the photo. The slots were a standard width and allowed water upon the deck to drain through the deck.

### Implementation of planked deck

Above (E5): The forward deck of U 826 shows the "planked deck" used on later VIICs and VIIC/41s. It can be seen that this style of deck was much simpler, requiring far fewer man hours to produce.

Once again the task we face is to try to establish the period of time over which the feature was implemented, in this case when the planked deck (PD) replaced the slotted deck (SD). The results of the analysis of period photos are produced within the final column within the table in Part V. The first observed instance of the planked deck from the author's sources is on the VIIC U 360, launched on the 28th July 1942; the final observed instance of the slotted deck is on the VIIC U 745, launched on the 16th April 1943. In between these dates the boxes are coloured purple to indicate the range of change from slotted to planked deck.

In the bow type results there is a single outlier which drags out the implementation range. The same is true for the results of the deck arrangements, for in this case it is U 345 which appears to be an outlier. The penultimate instance of the slotted deck is U 957, a VIIC launched much earlier, on the 21st November 1942. We might consider that by December 1942 almost all of the VIICs were being launched with the planked deck.

It should be noted that the planks also extended to the tower floor, replacing the square-shaped holes which had previously been the norm.

Conclusion - It appears that the planked bow began to appear on launched boats towards the end of July 1942. With the exception of a few boats, most VIICs were being launched with the planked deck by December 1942.

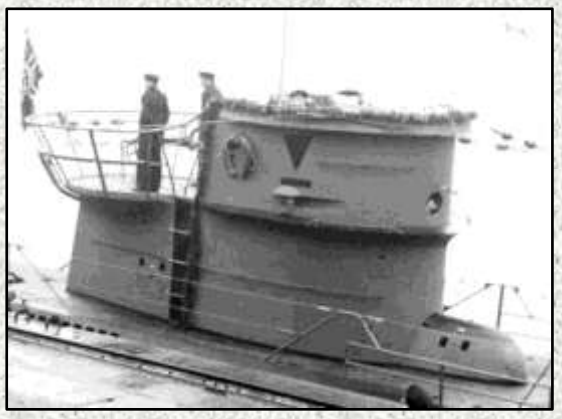
Cautionary note - The conclusions drawn from the table in Part V rely exclusively upon the assessment of period photographs presently available to the author. These conclusions are limited by the relatively small number of photos in the author's collection. As more photographs become available it may be possible to identify a planked deck on a boat launched before U 360 or a slotted deck on a boat launched after U 745, thus allowing us to expand the implementation range beyond what is stated in the conclusion above.

## Part IV - Magnetic Compass Fairing

The standard magnetic compass fairing was positioned at the foot of the front of the tower on all early and mid-war VIICs. It also featured on some late-war boats and it is this type which features on the Revell kits.

Towards the end of the war, a very different type known as the Askania fairing replaced the standard fairing. The Askania fairing was a stand-alone unit directly ahead and separate from the tower. The name Askania derives from the company of the same name which manufactured the device. Founded in 1871, the company produced precision instruments for the aeronautical and naval industries, including depth gauges for U-boats and instruments for aircraft cockpits. The company is presently extant, currently producing a range of quality watches. On the museum page on their website there appears to be a magnetic compass repeater not dissimilar to the type mounted at the front of the attack periscope housing on U-boats. Regarding their involvement with the compass fairing, it is possible that other companies contributed to the manufacture of the fairings but for simplicity we shall continue to refer to the compass and the fairing as the Askania type.

## Implementation of Askania



Above (E6): The standard magnetic compass fairing on U 408. As the photo illustrates, the fairing abutted the front of the tower.

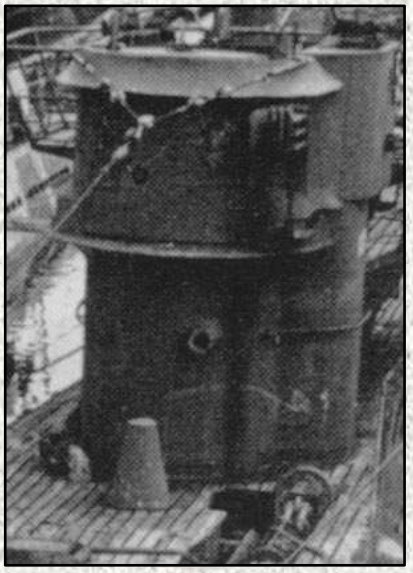
Below (E7): The Askania magnetic compass fairing on U 1109. This new style of fairing was in the same position ahead of the tower but was a completely different shape and was a stand-alone feature. This type of fairing was also introduced to Type IXs around the same time period.

According to *U-Boot Im Focus 2*, the new Askania magnetic compass was ordered on the 15th October 1942. The order may indeed have been placed on that date but period photos show that implementation took place at a much later date. The information below has been attained solely through assessment of period photographs.

The following boats retained the standard fairing at the following time periods -

- U 223, U 667, U 703 and U 707 in October 1943.
- U 290 in February 1944.
- U 275, U 673 and U 953 in April 1944.
- U 1105 in July 1944.
- U 711 and U 995 in July 1944.
- U 1060 in October 1944.
- U 968 in December 1944.
- U 953 in February 1945.

The earliest instance of the Askania fairing in period photos is on U 235 in October 1943. U 235 was used as a test boat and it is quite likely that this was the first VIIC to be fitted with the Askania fairing. It should be noted that the Type IX U 534 also had the Askania fairing in 1943 and it is assumed that this boat was used to test the feature on a Type IX.



The Askania fairing can be seen on the following boats at the following dates -

- U 1172 in March 1944.
- U 778 in spring 1944.
- U 957 in summer 1944.
- U 362 in July 1944.
- U 483 prior to August 1944.
- U 393 and U 929 in autumn 1944.
- U 930 in December 1944.

The above information suggests that the Askania fairing was tested in the autumn of 1943 but actual implementation began around the spring of 1944. It would, however, take some time to convert the hundreds of boats (VIICs, VIIC/41s and IXs) within the fleet and this conversion process was not completed by the cessation of hostilities.

End of war (standard) - The following boats still had the standard housing at the end of hostilities in May 1945 - U 278, U 281, U 471, U 766, U 977 and U 978.

End of war (Askania) - The following boats had the Askania housing at the end of hostilities in May 1945 - U 249, U 250, U 299, U 362, U 369, U 393, U 483, U 719, U 749, U 776, U 778, U 929, U

930, U 957, U 1007, U 1009, U 1022, U 1023, U 1052, U 1058, U 1101, U 1105, U 1109, U 1165, U 1171, U 1172, U 1192, U 1197 and U 1305.

Of the 35 VIICs and VIIC/41s which have been observed in photos, only six (17%) retained the standard magnetic compass housing by the end of hostilities. This suggests that the majority had been converted to the Askania type by the end of the war.

Unfortunately for modellers there were at least three versions of the fairing. The most common version seen in photos had a fairing in which both the leading and trailing edges were sloped. However, U 299 had a version with a vertical leading edge and a sloped trailing edge; and the version on U 776 was longer in length and had a vertical edge on both the leading and trailing edge. Although the Askania company produced the actual magnetic compass it is possible that one or more different companies actually manufactured the fairing itself, thus leading to the three or more variations of fairing evidenced in photos.

Conclusion - The Askania fairing was tested on U 235 in October 1943. There is photographic proof to confirm that the actual implementation of this feature began as early as March 1944. Other photos may prove that other boats were fitted even earlier than this time. Implementation was not universal by the cessation of hostilities.

Above (E8): Three boats in Lisahally in Northern Ireland at the end of June 1945. U 278, on the left, has the standard magnetic compass fairing, whereas U 1058 (in the centre) and U 1109 (on the right) both have the newer Askania type. U 278 was one of the boats which did not have the opportunity to convert to the Askania housing before the end of hostilities. Other differences can be seen between the three boats. For example, only U 1058 has the *schnorchel* pipe on the port side of the tower.

## Part V - Individual Boat Details

In the table below are listed the 659 Type VIICs and VIIC/41s which were launched and commissioned into the Kriegsmarine. By sorting in order of launch date, a few points become obvious. The first is that there was no regard for chronology with regard to the U-numbers: for example, U 551 was launched on the 14th September 1940 and U 328 was launched nearly four years later, on the 24th July 1944. It may be assumed that U 69 was the first VIIC but the list shows that this boat was the ninth VIIC to be launched. U-numbers were often assigned with a deliberate lack of chronological order, presumably to confuse the enemy about the number and type of boats being produced by German yards.

Unless one explores the launch dates it may be assumed that VIIC/41s were built after VIIC production ceased. One benefit of the table is that it illustrates that there was a year-long overlap when both VIICs and VIIC/41s were being launched down the slipways in various shipyards. It can be seen that the first launch of a VIIC/41 (U 1163 on the 12th June 1943) took place over a year before the final launch of a VIIC (U 779 on the 17th June 1944).

The VIICs and VIIC/41s were built in sixteen different shipyards. Details of the batches are provided below, with blue text indicating VIICs and brown text indicating VIIC/41s. The purple text shows the shipyard code used in the main table. Each of the batches has been numbered with a B prefix and this batch number system is also used in the main table. The batches are important because boats belonging to the same batch often had the same features.

*Danziger Werft*, Danzig (Dan, Danzig)
B1 = 401-404, B2 = 405-408, B3 = 409-412, B4 = 413-416, B5 = 417-420, B6 = 421-424, B7 = 425-428, B8 = 429-430 + 1161-1162 (total of 32 VIICs)
B9 = 1163-1166, B10 = 1167-1170, B11 = 1171-1172 (total of 10 VIIC/41s)

*F Schichau*, Danzig (Sch, Danzig)
B1 = 431-434, B2 = 435-438, B3 = 439-442, B4 = 443-444, B5 = 445-448, B6 = 449-450 + 731-734, B7 = 735-740, B8 = 741-746, B9 = 747-750, B10 = 1191-1198, B11 = 1199-1204, B12 = 1205-1210, B13 = 825-826 (total of 62 VIICs)
B14 = 827-828 (total of 2 VIIC/41s)

*Nordsee-Werke*, Emden (Nor, Emden)
B1 = 331-334, B2 = 335-336, B3 = 337-338, B4 = 339-340, B5 = 341-344, B6 = 345-348, B7 = 349-350 + 1101-1102, B8 = 1103-1106 (total of 26 VIICs)
B9 = 1107-1110 (total of 4 VIIC/41s)

*Flensburger Schiffbau Gesellschaft*, Flensburg (Fle, Flensburg)
B1 = 351-354, B2 = 355-358, B3 = 359-360, B4 = 361-362, B5 = 363-366, B6 = 367-370 (total of 20 VIICs)
B7 = 1301-1304, B8 = 1305-1308 (total of 8 VIIC/41s)

*Blohm & Voss*, Hamburg (B&V, Hamburg)
B1 = 551-558, B2 = 559-562, B3 = 563-574, B4 = 575-586, B5 = 587-598, B6 = 599-610, B7 = 611-634, B8 = 635-646, B9 = 647-650 + 951-958, B10 = 959-982, B11 = 983-994 (total of 144 VIICs)
B12 = 995 + 997-1006, B13 = 1007-1010 + 1013-1018, B14 = 1019-1025 (total of 28 VIIC/41s)

*H C Stülcken Sohn*, Hamburg (Stü, Hamburg)
B1 = 701-706, B2 = 707-708, B3 = 709-710, B4 = 711-714, B5 = 715-718, B6 = 719-722, B7 = 905 & 907 (total of 24 VIICs)

*Howaltswerke*, Hamburg (How, Hamburg)
B1 = 651-662, B2 = 663-668, B3 = 669-674, B4 = 675-680, B5 681-683 (total of 33 VIICs)

*Deutsche Werke*, Kiel (DW, Kiel)
B1 = 451-454, B2 = 455-458, B3 = 465-468, B4 = 469-474, B5 = 475-480, B6 = 481-486 (total of 29 VIICs)

*Germaniawerft*, Kiel (GW, Kiel)
B1 = 93-98 + 69-70, B2 = 71-72, B3 = 201-204, B4 = 205-212, B5 = 221-226, B6 = 227-232,

B7 = 235-240, B8 = 241-246, B9 = 247-250, B10 = 1051-1058 (total of 58 VIICs)
B11 = 1063-1065 (total of 3 VIIC/41s)

*Howaltswerken*, Kiel (How, Kiel)
B1 = 371-374, B2 = 375-382, B3 = 383-386, B4 = 387-390, B5 = 391-394, B6 = 396-398, B7 = 399-400 + 1131-1132 (total of 31 VIICs)

*Flender-Werft*, Lübeck (Fle, Lübeck)
B1 = 88-92, B2 = 301-302, B3 = 303-304, B4 = 305-308, B5 = 309-312, B6 = 313-316, B7 = 903-904 (total of 23 VIICs)
B8 = 317-322, B9 = 323-328 (total of 12 VIIC/41s)

*Neptun-Werft*, Rostock (Nep, Rostock)
B1 = 921-924, B2 = 925-928 (total of 8 VIICs)
B3 - 929-930 (total of 2 VIIC/41s)

*Stettiner Orderwerke*, Stettin (SO, Stettin)
B1 = 821-822 (total of 2 VIICs)

*Stettiner Vulcan Werke*, Stettin (SV, Stettin)
B1 = 901 (total of 1 VIIC)

*Vegesacker Werft (Bremen Vulcan)*, Vegesack (BV, Vegesack)
B1 = 77-82, B2 = 132-136, B3 = 251-255, B4 = 256-261, B5 = 262-267, B6 = 268-273, B7 = 274-279, B8 = 280-291 (total of 52 VIICs)
B9 = 292-297, B10 = 298-300 + 1271-1273, B11 = 1274-1279 (total of 18 VIIC/41s)

*Kriegsmarinewerft*, Wilhelmshaven (KW, Wilhelmshaven)
B1 = 751-762, B2 = 763-768, B3 = 771-776, B4 = 777-779 (total of 27 VIICs)

Totals - 572 VIICs + 87 VIIC/41s = 659 (this only includes boats launched and commissioned)
Note: U 1103 to U 1106 are given as VIIC/41s in some sources and VIICs in another source. They are given as VIICs here.

In the main table below, the following codes have been used -

- SB = Standard Bow
- AB = Atlantic Bow
- SD = Slotted Deck
- PD = Planked Deck

When bold print has been used, the bow type has been identified on a particular boat in a period photograph. Regular print has been used when the bow type is assumed to have featured on the individual bow. An example of how such assumptions have been made is as follows. It is known through photographic evidence that U 617 and U 622 both featured the standard bow. Since both boats were within the same batch (B&V, Hamburg batch 6) it can be reasonably assumed that all boats in between (U 618, U 619, U 620 and U 621) also had the standard bow.

Boxes that have been left blank are when no reasonable assumptions can be made with the current resources. The entries in red font colour are the earliest and latest known examples of bow type. All entries in between are in pink font and this represents the process of change from standard to Atlantic bow. The same system has been used in the deck column.

| List of commissioned VIICs and VIIC/41s in order of launch date | | | | | |
|---|---|---|---|---|---|
| **Boat** | **Type** | **Shipyard / batch** | **Launch date** | **Bow type** | **Deck type** |
| U 93 | VIIC | GW, Kiel B1 | 08/06/40 | **SB** | **SD** |
| U 94 | VIIC | GW, Kiel B1 | 12/06/40 | **SB** | **SD** |
| U 95 | VIIC | GW, Kiel B1 | 18/07/40 | **SB** | **SD** |
| U 96 | VIIC | GW, Kiel B1 | 01/08/40 | **SB** | **SD** |
| U 97 | VIIC | GW, Kiel B1 | 15/08/40 | **SB** | **SD** |
| U 98 | VIIC | GW, Kiel B1 | 31/08/40 | **SB** | **SD** |
| U 551 | VIIC | B&V, Hamburg B1 | 14/09/40 | **SB** | SD |
| U 552 | VIIC | B&V, Hamburg B1 | 14/09/40 | **SB** | **SD** |
| U 69 | VIIC | GW, Kiel B1 | 19/09/40 | **SB** | **SD** |
| U 70 | VIIC | GW, Kiel B1 | 12/10/40 | **SB** | **SD** |
| U 71 | VIIC | GW, Kiel B2 | 31/10/40 | **SB** | **SD** |
| U 553 | VIIC | B&V, Hamburg B1 | 07/11/40 | **SB** | **SD** |
| U 554 | VIIC | B&V, Hamburg B1 | 07/11/40 | SB | SD |
| U 751 | VIIC | KW, Wilhelmshaven B1 | 16/11/40 | SB | SD |
| U 72 | VIIC | GW, Kiel B2 | 22/11/40 | SB | **SD** |
| U 77 | VIIC | BV, Vegesack B1 | 23/11/40 | SB | **SD** |
| U 78 | VIIC | BV, Vegesack B1 | 07/12/40 | SB | SD |
| U 201 | VIIC | GW, Kiel B3 | 07/12/40 | **SB** | **SD** |
| U 555 | VIIC | B&V, Hamburg B1 | 07/12/40 | SB | SD |
| U 556 | VIIC | B&V, Hamburg B1 | 07/12/40 | SB | SD |
| U 401 | VIIC | Dan, Danzig B1 | 16/12/40 | SB | SD |
| U 331 | VIIC | Nor, Emden B1 | 20/12/40 | **SB** | **SD** |
| U 651 | VIIC | How, Hamburg B1 | 21/12/40 | SB | SD |
| U 557 | VIIC | B&V, Hamburg B1 | 22/12/40 | **SB** | **SD** |
| U 558 | VIIC | B&V, Hamburg B1 | 23/12/40 | SB | **SD** |
| U 402 | VIIC | Dan, Danzig B1 | 28/12/40 | **SB** | **SD** |
| U 203 | VIIC | GW, Kiel B3 | 04/01/41 | **SB** | **SD** |
| U 559 | VIIC | B&V, Hamburg B2 | 08/01/41 | SB | **SD** |
| U 560 | VIIC | B&V, Hamburg B2 | 10/01/41 | SB | **SD** |
| U 204 | VIIC | GW, Kiel B3 | 23/01/41 | **SB** | **SD** |
| U 561 | VIIC | B&V, Hamburg B2 | 23/01/41 | SB | SD |
| U 562 | VIIC | B&V, Hamburg B2 | 24/01/41 | SB | SD |
| U 79 | VIIC | BV, Vegesack B1 | 25/01/41 | **SB** | **SD** |
| U 371 | VIIC | How, Kiel B1 | 27/01/41 | SB | **SD** |
| U 431 | VIIC | Sch, Danzig B1 | 02/02/41 | **SB** | **SD** |
| U 432 | VIIC | Sch, Danzig B1 | 03/02/41 | SB | **SD** |
| U 563 | VIIC | B&V, Hamburg B3 | 05/02/41 | SB | **SD** |
| U 564 | VIIC | B&V, Hamburg B3 | 07/02/41 | **SB** | **SD** |
| U 652 | VIIC | How, Hamburg B1 | 07/02/41 | SB | **SD** |
| U 202 | VIIC | GW, Kiel B3 | 10/02/41 | SB | SD |
| U 80 | VIIC | BV, Vegesack B1 | 11/02/41 | **SB** | **SD** |
| U 565 | VIIC | B&V, Hamburg B3 | 20/02/41 | **SB** | SD |
| U 566 | VIIC | B&V, Hamburg B3 | 20/02/41 | SB | **SD** |
| U 81 | VIIC | BV, Vegesack B1 | 22/02/41 | **SB** | **SD** |
| U 403 | VIIC | Dan, Danzig B1 | 26/02/41 | **SB** | SD |
| U 451 | VIIC | DW, Kiel B1 | 05/03/41 | **SB** | SD |

| | | | | | |
|---|---|---|---|---|---|
| U 567 | VIIC | B&V, Hamburg B3 | 06/03/41 | **SB** | **SD** |
| U 568 | VIIC | B&V, Hamburg B3 | 06/03/41 | **SB** | **SD** |
| U 372 | VIIC | How, Kiel B1 | 08/03/41 | SB | **SD** |
| U 82 | VIIC | BV, Vegesack B1 | 15/03/41 | SB | SD |
| U 433 | VIIC | Sch, Danzig B1 | 15/03/41 | SB | SD |
| U 434 | VIIC | Sch, Danzig B1 | 15/03/41 | SB | SD |
| U 205 | VIIC | GW, Kiel B4 | 20/03/41 | SB | **SD** |
| U 332 | VIIC | Nor, Emden B1 | 20/03/41 | SB | SD |
| U 569 | VIIC | B&V, Hamburg B3 | 20/03/41 | SB | SD |
| U 570 | VIIC | B&V, Hamburg B3 | 20/03/41 | **SB** | **SD** |
| U 653 | VIIC | How, Hamburg B1 | 22/03/41 | SB | **SD** |
| U 337 | VIIC | Nor, Emden B3 | 26/03/41 | SB | SD |
| U 351 | VIIC | Fle, Flensburg B1 | 27/03/41 | **SB** | SD |
| U 452 | VIIC | DW, Kiel B1 | 29/03/41 | SB | SD |
| U 752 | VIIC | KW, Wilhelmshaven B1 | 29/03/41 | **SB** | **SD** |
| U 206 | VIIC | GW, Kiel B4 | 04/04/41 | **SB** | SD |
| U 404 | VIIC | Dan, Danzig B1 | 04/04/41 | SB | **SD** |
| U 571 | VIIC | B&V, Hamburg B3 | 04/04/41 | SB | **SD** |
| U 373 | VIIC | How, Kiel B1 | 05/04/41 | **SB** | **SD** |
| U 572 | VIIC | B&V, Hamburg B3 | 05/04/41 | SB | SD |
| U 132 | VIIC | BV, Vegesack B2 | 10/04/41 | SB | **SD** |
| U 574 | VIIC | B&V, Hamburg B3 | 12/04/41 | SB | SD |
| U 701 | VIIC | Stü, Hamburg B1 | 16/04/41 | SB | **SD** |
| U 573 | VIIC | B&V, Hamburg B3 | 17/04/41 | **SB** | SD |
| U 338 | VIIC | Nor, Emden B3 | 20/04/41 | SB | **SD** |
| U 207 | VIIC | GW, Kiel B4 | 24/04/41 | **SB** | SD |
| U 753 | VIIC | KW, Wilhelmshaven B1 | 26/04/41 | SB | SD |
| U 133 | VIIC | BV, Vegesack B2 | 28/04/41 | SB | **SD** |
| U 453 | VIIC | DW, Kiel B1 | 30/04/41 | SB | **SD** |
| U 454 | VIIC | DW, Kiel B1 | 30/04/41 | SB | SD |
| U 575 | VIIC | B&V, Hamburg B4 | 30/04/41 | SB | **SD** |
| U 576 | VIIC | B&V, Hamburg B4 | 30/04/41 | SB | SD |
| U 654 | VIIC | How, Hamburg B1 | 03/05/41 | SB | SD |
| U 352 | VIIC | Fle, Flensburg B1 | 07/05/41 | SB | SD |
| U 374 | VIIC | How, Kiel B1 | 10/05/41 | SB | SD |
| U 577 | VIIC | B&V, Hamburg B4 | 15/05/41 | SB | SD |
| U 578 | VIIC | B&V, Hamburg B4 | 15/05/41 | SB | SD |
| U 134 | VIIC | BV, Vegesack B2 | 17/05/41 | SB | SD |
| U 208 | VIIC | GW, Kiel B4 | 21/05/41 | SB | **SD** |
| U 702 | VIIC | Stü, Hamburg B1 | 24/05/41 | SB | SD |
| U 579 | VIIC | B&V, Hamburg B4 | 28/05/41 | SB | **SD** |
| U 580 | VIIC | B&V, Hamburg B4 | 28/05/41 | **SB** | **SD** |
| U 435 | VIIC | Sch, Danzig B2 | 31/05/41 | SB | SD |
| U 405 | VIIC | Dan, Danzig B2 | 04/06/41 | **SB** | **SD** |
| U 655 | VIIC | How, Hamburg B1 | 05/06/41 | SB | SD |
| U 375 | VIIC | How, Kiel B2 | 07/06/41 | **SB** | **SD** |
| U 135 | VIIC | BV, Vegesack B2 | 12/06/41 | SB | SD |
| U 581 | VIIC | B&V, Hamburg B4 | 12/06/41 | SB | SD |
| U 582 | VIIC | B&V, Hamburg B4 | 12/06/41 | SB | **SD** |

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| U 333 | VIIC | Nor, Emden B1 | 14/06/41 | **SB** | **SD** |
| U 406 | VIIC | Dan, Danzig B2 | 16/06/41 | SB | SD |
| U 436 | VIIC | Sch, Danzig B2 | 21/06/41 | SB | SD |
| U 455 | VIIC | DW, Kiel B2 | 21/06/41 | SB | **SD** |
| U 456 | VIIC | DW, Kiel B2 | 21/06/41 | SB | **SD** |
| U 583 | VIIC | B&V, Hamburg B4 | 26/06/41 | SB | SD |
| U 584 | VIIC | B&V, Hamburg B4 | 26/06/41 | SB | SD |
| U 339 | VIIC | Nor, Emden B4 | 30/06/41 | SB | SD |
| U 136 | VIIC | BV, Vegesack B2 | 05/07/41 | SB | SD |
| U 355 | VIIC | Fle, Flensburg B2 | 05/07/41 | SB | **SD** |
| U 754 | VIIC | KW, Wilhelmshaven B1 | 05/07/41 | SB | SD |
| U 656 | VIIC | How, Hamburg B1 | 08/07/41 | SB | SD |
| U 585 | VIIC | B&V, Hamburg B4 | 09/07/41 | SB | SD |
| U 376 | VIIC | How, Kiel B2 | 10/07/41 | **SB** | **SD** |
| U 586 | VIIC | B&V, Hamburg B4 | 10/07/41 | SB | **SD** |
| U 408 | VIIC | Dan, Danzig B2 | 16/07/41 | **SB** | **SD** |
| U 703 | VIIC | Stü, Hamburg B1 | 16/07/41 | **SB** | **SD** |
| U 587 | VIIC | B&V, Hamburg B5 | 23/07/41 | SB | SD |
| U 588 | VIIC | B&V, Hamburg B5 | 23/07/41 | **SB** | SD |
| U 251 | VIIC | BV, Vegesack B3 | 26/07/41 | **SB** | **SD** |
| U 437 | VIIC | Sch, Danzig B2 | 26/07/41 | **SB** | **SD** |
| U 589 | VIIC | B&V, Hamburg B5 | 06/08/41 | SB | SD |
| U 590 | VIIC | B&V, Hamburg B5 | 06/08/41 | SB | SD |
| U 657 | VIIC | How, Hamburg B1 | 12/08/41 | SB | SD |
| U 252 | VIIC | BV, Vegesack B3 | 14/08/41 | SB | SD |
| U 334 | VIIC | Nor, Emden B1 | 15/08/41 | SB | **SD** |
| U 377 | VIIC | How, Kiel B2 | 15/08/41 | **SB** | **SD** |
| U 88 | VIIC | Fle, Lübeck B1 | 16/08/41 | SB | SD |
| U 407 | VIIC | Dan, Danzig B2 | 16/08/41 | **SB** | **SD** |
| U 340 | VIIC | Nor, Emden B4 | 20/08/41 | SB | SD |
| U 591 | VIIC | B&V, Hamburg B5 | 20/08/41 | SB | SD |
| U 592 | VIIC | B&V, Hamburg B5 | 20/08/41 | SB | SD |
| U 755 | VIIC | KW, Wilhelmshaven B1 | 23/08/41 | SB | **SD** |
| U 209 | VIIC | GW, Kiel B4 | 28/08/41 | SB | **SD** |
| U 704 | VIIC | Stü, Hamburg B1 | 28/08/41 | **SB** | **SD** |
| U 253 | VIIC | BV, Vegesack B3 | 30/08/41 | **SB** | **SD** |
| U 593 | VIIC | B&V, Hamburg B5 | 03/09/41 | **SB** | **SD** |
| U 594 | VIIC | B&V, Hamburg B5 | 03/09/41 | SB | SD |
| U 438 | VIIC | Sch, Danzig B2 | 06/09/41 | **SB** | SD |
| U 658 | VIIC | How, Hamburg B1 | 11/09/41 | SB | SD |
| U 378 | VIIC | How, Kiel B2 | 13/09/41 | SB | SD |
| U 356 | VIIC | Fle, Flensburg B2 | 16/09/41 | SB | SD |
| U 595 | VIIC | B&V, Hamburg B5 | 17/09/41 | SB | SD |
| U 596 | VIIC | B&V, Hamburg B5 | 17/09/41 | **SB** | **SD** |
| U 89 | VIIC | Fle, Lübeck B1 | 20/09/41 | **SB** | SD |
| U 254 | VIIC | BV, Vegesack B3 | 20/09/41 | **SB** | SD |
| U 409 | VIIC | Dan, Danzig B3 | 23/09/41 | SB | SD |
| U 597 | VIIC | B&V, Hamburg B5 | 01/10/41 | SB | SD |
| U 598 | VIIC | B&V, Hamburg B5 | 02/10/41 | SB | SD |

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| U 457 | VIIC | DW, Kiel B2 | 04/10/41 | SB | **SD** |
| U 458 | VIIC | DW, Kiel B2 | 04/10/41 | **SB** | **SD** |
| U 255 | VIIC | BV, Vegesack B3 | 08/10/41 | **SB** | **SD** |
| U 341 | VIIC | Nor, Emden B5 | 10/10/41 | SB | SD |
| U 439 | VIIC | Sch, Danzig B3 | 11/10/41 | SB | SD |
| U 705 | VIIC | Stü, Hamburg B1 | 13/10/41 | SB | SD |
| U 410 | VIIC | Dan, Danzig B3 | 14/10/41 | **SB** | **SD** |
| U 659 | VIIC | How, Hamburg B1 | 14/10/41 | SB | SD |
| U 335 | VIIC | Nor, Emden B2 | 15/10/41 | **SB** | **SD** |
| U 379 | VIIC | How, Kiel B2 | 15/10/41 | SB | **SD** |
| U 599 | VIIC | B&V, Hamburg B6 | 15/10/41 | SB | SD |
| U 600 | VIIC | B&V, Hamburg B6 | 16/10/41 | SB | SD |
| U 756 | VIIC | KW, Wilhelmshaven B1 | 18/10/41 | **SB** | **SD** |
| U 90 | VIIC | Fle, Lübeck B1 | 25/10/41 | SB | SD |
| U 256 | VIIC | BV, Vegesack B4 | 28/10/41 | SB | SD |
| U 601 | VIIC | B&V, Hamburg B6 | 29/10/41 | SB | **SD** |
| U 602 | VIIC | B&V, Hamburg B6 | 30/10/41 | SB | SD |
| U 380 | VIIC | How, Kiel B2 | 05/11/41 | SB | SD |
| U 440 | VIIC | Sch, Danzig B3 | 08/11/41 | SB | SD |
| U 342 | VIIC | Nor, Emden B5 | 10/11/41 | SB | SD |
| U 353 | VIIC | Fle, Flensburg B1 | 11/11/41 | SB | **SD** |
| U 411 | VIIC | Dan, Danzig B3 | 15/11/41 | SB | SD |
| U 603 | VIIC | B&V, Hamburg B6 | 16/11/41 | SB | SD |
| U 604 | VIIC | B&V, Hamburg B6 | 16/11/41 | **SB** | **SD** |
| U 660 | VIIC | How, Hamburg B1 | 17/11/41 | **SB** | **SD** |
| U 257 | VIIC | BV, Vegesack B4 | 19/11/41 | SB | SD |
| U 706 | VIIC | Stü, Hamburg B1 | 24/11/41 | SB | SD |
| U 605 | VIIC | B&V, Hamburg B6 | 27/11/41 | SB | SD |
| U 606 | VIIC | B&V, Hamburg B6 | 27/11/41 | SB | **SD** |
| U 91 | VIIC | Fle, Lübeck B1 | 30/11/41 | SB | SD |
| U 336 | VIIC | Nor, Emden B2 | 04/12/41 | SB | SD |
| U 607 | VIIC | B&V, Hamburg B6 | 11/12/41 | SB | SD |
| U 608 | VIIC | B&V, Hamburg B6 | 11/12/41 | SB | SD |
| U 661 | VIIC | How, Hamburg B1 | 11/12/41 | SB | SD |
| U 258 | VIIC | BV, Vegesack B4 | 13/12/41 | SB | SD |
| U 441 | VIIC | Sch, Danzig B3 | 13/12/41 | **SB** | **SD** |
| U 757 | VIIC | KW, Wilhelmshaven B1 | 14/12/41 | SB | SD |
| U 412 | VIIC | Dan, Danzig B3 | 15/12/41 | **SB** | SD |
| U 707 | VIIC | Stü, Hamburg B2 | 18/12/41 | SB | SD |
| U 343 | VIIC | Nor, Emden B5 | 21/12/41 | SB | SD |
| U 210 | VIIC | GW, Kiel B4 | 23/12/41 | SB | SD |
| U 609 | VIIC | B&V, Hamburg B6 | 23/12/41 | SB | **SD** |
| U 610 | VIIC | B&V, Hamburg B6 | 24/12/41 | SB | SD |
| U 259 | VIIC | BV, Vegesack B4 | 30/12/41 | **SB** | **SD** |
| U 611 | VIIC | B&V, Hamburg B7 | 08/01/42 | SB | SD |
| U 612 | VIIC | B&V, Hamburg B7 | 09/01/42 | SB | SD |
| U 92 | VIIC | Fle, Lübeck B1 | 10/01/42 | SB | SD |
| U 354 | VIIC | Fle, Flensburg B1 | 10/01/42 | SB | **SD** |
| U 381 | VIIC | How, Kiel B2 | 14/01/42 | SB | SD |

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| U 211 | VIIC | GW, Kiel B4 | 15/01/42 | **SB** | SD |
| U 413 | VIIC | Dan, Danzig B4 | 15/01/42 | SB | SD |
| U 442 | VIIC | Sch, Danzig B3 | 17/01/42 | **SB** | SD |
| U 662 | VIIC | How, Hamburg B1 | 22/01/42 | SB | SD |
| U 613 | VIIC | B&V, Hamburg B7 | 29/01/42 | SB | SD |
| U 614 | VIIC | B&V, Hamburg B7 | 29/01/42 | SB | SD |
| U 443 | VIIC | Sch, Danzig B4 | 31/01/42 | **SB** | SD |
| U 615 | VIIC | B&V, Hamburg B7 | 08/02/42 | SB | SD |
| U 616 | VIIC | B&V, Hamburg B7 | 08/02/42 | SB | SD |
| U 260 | VIIC | BV, Vegesack B4 | 09/02/42 | SB | SD |
| U 617 | VIIC | B&V, Hamburg B7 | 14/02/42 | **SB** | SD |
| U 261 | VIIC | BV, Vegesack B4 | 16/02/42 | SB | SD |
| U 618 | VIIC | B&V, Hamburg B7 | 20/02/42 | SB | **SD** |
| U 444 | VIIC | Sch, Danzig B4 | 26/02/42 | SB | SD |
| U 758 | VIIC | KW, Wilhelmshaven B1 | 01/03/42 | SB | SD |
| U 619 | VIIC | B&V, Hamburg B7 | 09/03/42 | SB | SD |
| U 620 | VIIC | B&V, Hamburg B7 | 09/03/42 | SB | SD |
| U 262 | VIIC | BV, Vegesack B5 | 10/03/42 | **SB** | **SD** |
| U 212 | VIIC | GW, Kiel B4 | 11/03/42 | SB | **SD** |
| U 221 | VIIC | GW, Kiel B5 | 14/03/42 | **SB** | SD |
| U 263 | VIIC | BV, Vegesack B5 | 18/03/42 | SB | SD |
| U 445 | VIIC | Sch, Danzig B5 | 19/03/42 | SB | **SD** |
| U 621 | VIIC | B&V, Hamburg B7 | 19/03/42 | SB | SD |
| U 622 | VIIC | B&V, Hamburg B7 | 19/03/42 | **SB** | **SD** |
| U 382 | VIIC | How, Kiel B2 | 21/03/42 | SB | SD |
| U 708 | VIIC | Stü, Hamburg B2 | 24/03/42 | SB | SD |
| U 301 | VIIC | Fle, Lübeck B2 | 25/03/42 | SB | SD |
| U 414 | VIIC | Dan, Danzig B4 | 25/03/42 | SB | SD |
| U 663 | VIIC | How, Hamburg B2 | 26/03/42 | SB | SD |
| U 222 | VIIC | GW, Kiel B5 | 28/03/42 | SB | SD |
| U 465 | VIIC | DW, Kiel B3 | 30/03/42 | SB | SD |
| U 466 | VIIC | DW, Kiel B3 | 30/03/42 | SB | SD |
| U 357 | VIIC | Fle, Flensburg B2 | 31/03/42 | **SB** | SD |
| U 623 | VIIC | B&V, Hamburg B7 | 31/03/42 | SB | SD |
| U 624 | VIIC | B&V, Hamburg B7 | 31/03/42 | SB | SD |
| U 264 | VIIC | BV, Vegesack B5 | 02/04/42 | SB | SD |
| U 446 | VIIC | Sch, Danzig B5 | 11/04/42 | SB | SD |
| U 709 | VIIC | Stü, Hamburg B3 | 14/04/42 | SB | SD |
| U 625 | VIIC | B&V, Hamburg B7 | 15/04/42 | SB | SD |
| U 626 | VIIC | B&V, Hamburg B7 | 15/04/42 | SB | SD |
| U 223 | VIIC | GW, Kiel B5 | 16/04/42 | SB | SD |
| U 383 | VIIC | How, Kiel B3 | 22/04/42 | SB | SD |
| U 265 | VIIC | BV, Vegesack B5 | 23/04/42 | SB | SD |
| U 302 | VIIC | Fle, Lübeck B2 | 25/04/42 | **SB** | SD |
| U 664 | VIIC | How, Hamburg B2 | 28/04/42 | SB | **SD** |
| U 627 | VIIC | B&V, Hamburg B7 | 29/04/42 | SB | SD |
| U 628 | VIIC | B&V, Hamburg B7 | 29/04/42 | SB | SD |
| U 358 | VIIC | Fle, Flensburg B2 | 30/04/42 | SB | SD |
| U 447 | VIIC | Sch, Danzig B5 | 30/04/42 | SB | SD |

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| U 224 | VIIC | GW, Kiel B5 | 07/05/42 | **SB** | SD |
| U 415 | VIIC | Dan, Danzig B4 | 09/05/42 | **SB** | **SD** |
| U 416 | VIIC | Dan, Danzig B4 | 09/05/42 | SB | SD |
| U 266 | VIIC | BV, Vegesack B5 | 11/05/42 | SB | SD |
| U 629 | VIIC | B&V, Hamburg B7 | 12/05/42 | SB | SD |
| U 630 | VIIC | B&V, Hamburg B7 | 12/05/42 | SB | SD |
| U 710 | VIIC | Stü, Hamburg B3 | 12/05/42 | SB | SD |
| U 303 | VIIC | Fle, Lübeck B3 | 16/05/42 | SB | SD |
| U 467 | VIIC | DW, Kiel B3 | 16/05/42 | SB | SD |
| U 468 | VIIC | DW, Kiel B3 | 16/05/42 | SB | SD |
| U 267 | VIIC | BV, Vegesack B5 | 23/05/42 | SB | SD |
| U 448 | VIIC | Sch, Danzig B5 | 23/05/42 | | SD |
| U 631 | VIIC | B&V, Hamburg B7 | 27/05/42 | | SD |
| U 632 | VIIC | B&V, Hamburg B7 | 27/05/42 | | SD |
| U 225 | VIIC | GW, Kiel B5 | 28/05/42 | SB | SD |
| U 384 | VIIC | How, Kiel B3 | 28/05/42 | SB | |
| U 759 | VIIC | KW, Wilhelmshaven B1 | 30/05/42 | | |
| U 417 | VIIC | Dan, Danzig B5 | 06/06/42 | | |
| U 268 | VIIC | BV, Vegesack B6 | 09/06/42 | SB | |
| U 665 | VIIC | How, Hamburg B2 | 09/06/42 | | SD |
| U 633 | VIIC | B&V, Hamburg B7 | 10/06/42 | | SD |
| U 634 | VIIC | B&V, Hamburg B7 | 10/06/42 | | SD |
| U 359 | VIIC | Fle, Flensburg B3 | 11/06/42 | SB | |
| U 304 | VIIC | Fle, Lübeck B3 | 13/06/42 | | SD |
| U 449 | VIIC | Sch, Danzig B6 | 13/06/42 | | |
| U 226 | VIIC | GW, Kiel B5 | 18/06/42 | SB | SD |
| U 760 | VIIC | KW, Wilhelmshaven B1 | 21/06/42 | | |
| U 269 | VIIC | BV, Vegesack B6 | 24/06/42 | SB | |
| U 635 | VIIC | B&V, Hamburg B8 | 24/06/42 | | SD |
| U 636 | VIIC | B&V, Hamburg B8 | 25/06/42 | | **SD** |
| U 711 | VIIC | Stü, Hamburg B4 | 25/06/42 | **AB** | **SD** |
| U 450 | VIIC | Sch, Danzig B6 | 04/07/42 | | |
| U 637 | VIIC | B&V, Hamburg B8 | 07/07/42 | | SD |
| U 385 | VIIC | How, Kiel B3 | 08/07/42 | **SB** | |
| U 638 | VIIC | B&V, Hamburg B8 | 08/07/42 | | SD |
| U 227 | VIIC | GW, Kiel B6 | 09/07/42 | SB | SD |
| U 270 | VIIC | BV, Vegesack B6 | 11/07/42 | **SB** | |
| U 418 | VIIC | Dan, Danzig B5 | 11/07/42 | | |
| U 666 | VIIC | How, Hamburg B2 | 18/07/42 | | SD |
| U 639 | VIIC | B&V, Hamburg B8 | 22/07/42 | | SD |
| U 640 | VIIC | B&V, Hamburg B8 | 23/07/42 | | SD |
| U 305 | VIIC | Fle, Lübeck B4 | 25/07/42 | **AB** | **SD** |
| U 731 | VIIC | Sch, Danzig B6 | 25/07/42 | | SD |
| U 360 | VIIC | Fle, Flensburg B3 | 28/07/42 | SB | **PD** |
| U 271 | VIIC | BV, Vegesack B6 | 29/07/42 | | |
| U 228 | VIIC | GW, Kiel B6 | 30/07/42 | SB | SD |
| U 641 | VIIC | B&V, Hamburg B8 | 06/08/42 | | SD |
| U 642 | VIIC | B&V, Hamburg B8 | 06/08/42 | | **SD** |
| U 469 | VIIC | DW, Kiel B4 | 08/08/42 | SB | |

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| U 470 | VIIC | DW, Kiel B4 | 08/08/42 | SB | |
| U 712 | VIIC | Stü, Hamburg B4 | 10/08/42 | AB | **SD** |
| U 272 | VIIC | BV, Vegesack B6 | 15/08/42 | | |
| U 420 | VIIC | Dan, Danzig B5 | 18/08/42 | | |
| U 732 | VIIC | Sch, Danzig B6 | 18/08/42 | | SD |
| U 386 | VIIC | How, Kiel B3 | 19/08/42 | | |
| U 229 | VIIC | GW, Kiel B6 | 20/08/42 | SB | SD |
| U 643 | VIIC | B&V, Hamburg B8 | 20/08/42 | | |
| U 644 | VIIC | B&V, Hamburg B8 | 20/08/42 | | |
| U 419 | VIIC | Dan, Danzig B5 | 22/08/42 | | |
| U 306 | VIIC | Fle, Lübeck B4 | 29/08/42 | AB | SD |
| U 667 | VIIC | How, Hamburg B2 | 29/08/42 | | **SD** |
| U 273 | VIIC | BV, Vegesack B6 | 02/09/42 | | |
| U 645 | VIIC | B&V, Hamburg B8 | 03/09/42 | | |
| U 646 | VIIC | B&V, Hamburg B8 | 03/09/42 | | |
| U 733 | VIIC | Sch, Danzig B6 | 05/09/42 | | **SD** |
| U 361 | VIIC | Fle, Flensburg B4 | 09/09/42 | SB | PD |
| U 230 | VIIC | GW, Kiel B6 | 10/09/42 | **SB** | SD |
| U 647 | VIIC | B&V, Hamburg B9 | 16/09/42 | | |
| U 648 | VIIC | B&V, Hamburg B9 | 16/09/42 | | |
| U 274 | VIIC | BV, Vegesack B7 | 19/09/42 | | |
| U 734 | VIIC | Sch, Danzig B6 | 19/09/42 | | |
| U 421 | VIIC | Dan, Danzig B6 | 24/09/42 | | |
| U 713 | VIIC | Stü, Hamburg B4 | 24/09/42 | AB | |
| U 761 | VIIC | KW, Wilhelmshaven B1 | 26/09/42 | | |
| U 307 | VIIC | Fle, Lübeck B4 | 30/09/42 | AB | **SD** |
| U 649 | VIIC | B&V, Hamburg B9 | 30/09/42 | | |
| U 231 | VIIC | GW, Kiel B6 | 01/10/42 | **SB** | **SD** |
| U 387 | VIIC | How, Kiel B4 | 01/10/42 | | **SD** |
| U 650 | VIIC | B&V, Hamburg B9 | 01/10/42 | | |
| U 668 | VIIC | How, Hamburg B2 | 05/10/42 | | **SD** |
| U 669 | VIIC | How, Hamburg B3 | 05/10/42 | | |
| U 275 | VIIC | BV, Vegesack B7 | 08/10/42 | | |
| U 422 | VIIC | Dan, Danzig B6 | 10/10/42 | | |
| U 735 | VIIC | Sch, Danzig B7 | 10/10/42 | | |
| U 951 | VIIC | B&V, Hamburg B9 | 14/10/42 | | SD |
| U 952 | VIIC | B&V, Hamburg B9 | 14/10/42 | | SD |
| U 232 | VIIC | GW, Kiel B6 | 15/10/42 | **SB** | **PD** |
| U 362 | VIIC | Fle, Flensburg B3 | 21/10/42 | **SB** | **PD** |
| U 276 | VIIC | BV, Vegesack B7 | 24/10/42 | **AB** | **PD** |
| U 953 | VIIC | B&V, Hamburg B9 | 28/10/42 | | **SD** |
| U 954 | VIIC | B&V, Hamburg B9 | 28/10/42 | | SD |
| U 308 | VIIC | Fle, Lübeck B4 | 31/10/42 | AB | |
| U 736 | VIIC | Sch, Danzig B7 | 31/10/42 | | |
| U 235 | VIIC | GW, Kiel B7 | 04/11/42 | **AB** | **PD** |
| U 277 | VIIC | BV, Vegesack B7 | 07/11/42 | AB | PD |
| U 423 | VIIC | Dan, Danzig B6 | 07/11/42 | | **PD** |
| U 388 | VIIC | How, Kiel B4 | 12/11/42 | | |
| U 714 | VIIC | Stü, Hamburg B4 | 13/11/42 | AB | |

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| U 955 | VIIC | B&V, Hamburg B9 | 14/11/42 | | SD |
| U 956 | VIIC | B&V, Hamburg B9 | 14/11/42 | | SD |
| U 737 | VIIC | Sch, Danzig B7 | 21/11/42 | | |
| U 762 | VIIC | KW, Wilhelmshaven B1 | 21/11/42 | | |
| U 957 | VIIC | B&V, Hamburg B9 | 21/11/42 | **AB** | **SD** |
| U 958 | VIIC | B&V, Hamburg B9 | 21/11/42 | AB | SD |
| U 236 | VIIC | GW, Kiel B7 | 24/11/42 | **AB** | **PD** |
| U 424 | VIIC | Dan, Danzig B6 | 28/11/42 | | PD |
| U 278 | VIIC | BV, Vegesack B7 | 02/12/42 | **AB** | **PD** |
| U 959 | VIIC | B&V, Hamburg B10 | 03/12/42 | AB | |
| U 960 | VIIC | B&V, Hamburg B10 | 03/12/42 | AB | |
| U 309 | VIIC | Fle, Lübeck B5 | 05/12/42 | AB | |
| U 738 | VIIC | Sch, Danzig B7 | 12/12/42 | | |
| U 715 | VIIC | Stü, Hamburg B5 | 14/12/42 | AB | |
| U 670 | VIIC | How, Hamburg B3 | 15/12/42 | | |
| U 671 | VIIC | How, Hamburg B3 | 15/12/42 | | |
| U 279 | VIIC | BV, Vegesack B7 | 16/12/42 | AB | PD |
| U 237 | VIIC | GW, Kiel B7 | 17/12/42 | **AB** | PD |
| U 363 | VIIC | Fle, Flensburg B3 | 17/12/42 | | **PD** |
| U 961 | VIIC | B&V, Hamburg B10 | 17/12/42 | AB | |
| U 962 | VIIC | B&V, Hamburg B10 | 17/12/42 | AB | |
| U 389 | VIIC | How, Kiel B4 | 19/12/42 | | |
| U 425 | VIIC | Dan, Danzig B7 | 19/12/42 | | PD |
| U 739 | VIIC | Sch, Danzig B7 | 23/12/42 | | |
| U 740 | VIIC | Sch, Danzig B7 | 23/12/42 | | |
| U 963 | VIIC | B&V, Hamburg B10 | 30/12/42 | AB | **PD** |
| U 964 | VIIC | B&V, Hamburg B10 | 30/12/42 | AB | PD |
| U 310 | VIIC | Fle, Lübeck B5 | 03/01/43 | AB | |
| U 280 | VIIC | BV, Vegesack B8 | 04/01/43 | AB | PD |
| U 238 | VIIC | GW, Kiel B7 | 07/01/43 | AB | PD |
| U 965 | VIIC | B&V, Hamburg B10 | 14/01/43 | AB | PD |
| U 966 | VIIC | B&V, Hamburg B10 | 14/01/43 | AB | PD |
| U 716 | VIIC | Stü, Hamburg B5 | 15/01/43 | AB | |
| U 281 | VIIC | BV, Vegesack B8 | 16/01/43 | AB | PD |
| U 763 | VIIC | KW, Wilhelmshaven B2 | 16/01/43 | | **PD** |
| U 311 | VIIC | Fle, Lübeck B5 | 20/01/43 | AB | |
| U 364 | VIIC | Fle, Flensburg B4 | 21/01/43 | | PD |
| U 390 | VIIC | How, Kiel B4 | 23/01/43 | | **PD** |
| U 239 | VIIC | GW, Kiel B7 | 28/01/43 | AB | PD |
| U 344 | VIIC | Nor, Emden B5 | 29/01/43 | | SD |
| U 282 | VIIC | BV, Vegesack B8 | 03/02/43 | AB | PD |
| U 741 | VIIC | Sch, Danzig B8 | 04/02/43 | | |
| U 742 | VIIC | Sch, Danzig B8 | 04/02/43 | | |
| U 967 | VIIC | B&V, Hamburg B10 | 04/02/43 | AB | PD |
| U 968 | VIIC | B&V, Hamburg B10 | 04/02/43 | AB | **PD** |
| U 426 | VIIC | Dan, Danzig B7 | 06/02/43 | **AB** | **PD** |
| U 427 | VIIC | Dan, Danzig B7 | 06/02/43 | **AB** | **PD** |
| U 969 | VIIC | B&V, Hamburg B10 | 11/02/43 | AB | PD |
| U 970 | VIIC | B&V, Hamburg B10 | 11/02/43 | AB | PD |

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| U 283 | VIIC | BV, Vegesack B8 | 17/02/43 | AB | PD |
| U 240 | VIIC | GW, Kiel B7 | 18/02/43 | AB | PD |
| U 717 | VIIC | Stü, Hamburg B5 | 20/02/43 | AB | |
| U 971 | VIIC | B&V, Hamburg B10 | 22/02/43 | AB | PD |
| U 972 | VIIC | B&V, Hamburg B10 | 22/02/43 | AB | PD |
| U 312 | VIIC | Fle, Lübeck B5 | 27/02/43 | **AB** | |
| U 672 | VIIC | How, Hamburg B3 | 27/02/43 | | |
| U 673 | VIIC | How, Hamburg B3 | 27/02/43 | | |
| U 391 | VIIC | How, Kiel B5 | 05/03/43 | | PD |
| U 284 | VIIC | BV, Vegesack B8 | 06/03/43 | AB | **PD** |
| U 471 | VIIC | DW, Kiel B4 | 06/03/43 | **SB** | **PD** |
| U 472 | VIIC | DW, Kiel B4 | 06/03/43 | | PD |
| U 365 | VIIC | Fle, Flensburg B4 | 09/03/43 | | PD |
| U 973 | VIIC | B&V, Hamburg B10 | 10/03/43 | AB | PD |
| U 345 | VIIC | Nor, Emden B6 | 11/03/43 | | SD |
| U 428 | VIIC | Dan, Danzig B7 | 11/03/43 | AB | PD |
| U 743 | VIIC | Sch, Danzig B8 | 11/03/43 | | |
| U 744 | VIIC | Sch, Danzig B8 | 11/03/43 | | **SD** |
| U 974 | VIIC | B&V, Hamburg B10 | 11/03/43 | AB | PD |
| U 764 | VIIC | KW, Wilhelmshaven B2 | 13/03/43 | | PD |
| U 990 | VIIC | B&V, Hamburg B11 | 16/03/43 | AB | **PD** |
| U 975 | VIIC | B&V, Hamburg B10 | 24/03/43 | AB | PD |
| U 976 | VIIC | B&V, Hamburg B10 | 25/03/43 | AB | PD |
| U 718 | VIIC | Stü, Hamburg B5 | 26/03/43 | AB | |
| U 313 | VIIC | Fle, Lübeck B6 | 27/03/43 | AB | |
| U 429 | VIIC | Dan, Danzig B8 | 30/03/43 | AB | PD |
| U 977 | VIIC | B&V, Hamburg B10 | 31/03/43 | **AB** | **PD** |
| U 978 | VIIC | B&V, Hamburg B10 | 01/04/43 | AB | PD |
| U 285 | VIIC | BV, Vegesack B8 | 03/04/43 | AB | **PD** |
| U 921 | VIIC | Nep, Rostock B1 | 03/04/43 | AB | PD |
| U 392 | VIIC | How, Kiel B5 | 10/04/43 | AB | PD |
| U 287 | VIIC | BV, Vegesack B8 | 13/04/43 | AB | PD |
| U 346 | VIIC | Nor, Emden B6 | 13/04/43 | AB | PD |
| U 979 | VIIC | B&V, Hamburg B10 | 15/04/43 | AB | PD |
| U 980 | VIIC | B&V, Hamburg B10 | 15/04/43 | AB | PD |
| U 366 | VIIC | Fle, Flensburg B4 | 16/04/43 | AB | PD |
| U 745 | VIIC | Sch, Danzig B8 | 16/04/43 | AB | **SD** |
| U 746 | VIIC | Sch, Danzig B8 | 16/04/43 | AB | PD |
| U 314 | VIIC | Fle, Lübeck B6 | 17/04/43 | AB | PD |
| U 473 | VIIC | DW, Kiel B4 | 17/04/43 | AB | **PD** |
| U 286 | VIIC | BV, Vegesack B8 | 21/04/43 | AB | PD |
| U 430 | VIIC | Dan, Danzig B8 | 22/04/43 | AB | PD |
| U 765 | VIIC | KW, Wilhelmshaven B2 | 22/04/43 | AB | **PD** |
| U 719 | VIIC | Stü, Hamburg B6 | 28/04/43 | AB | PD |
| U 981 | VIIC | B&V, Hamburg B10 | 29/04/43 | AB | **PD** |
| U 982 | VIIC | B&V, Hamburg B10 | 29/04/43 | AB | PD |
| U 674 | VIIC | How, Hamburg B3 | 08/05/43 | AB | PD |
| U 675 | VIIC | How, Hamburg B4 | 08/05/43 | AB | PD |
| U 1161 | VIIC | Dan, Danzig B8 | 08/05/43 | AB | PD |

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| U 983 | VIIC | B&V, Hamburg B11 | 12/05/43 | AB | PD |
| U 984 | VIIC | B&V, Hamburg B11 | 12/05/43 | AB | PD |
| U 747 | VIIC | Sch, Danzig B9 | 13/05/43 | AB | PD |
| U 748 | VIIC | Sch, Danzig B9 | 13/05/43 | AB | PD |
| U 288 | VIIC | BV, Vegesack B8 | 15/05/43 | AB | PD |
| U 393 | VIIC | How, Kiel B5 | 15/05/43 | AB | PD |
| U 985 | VIIC | B&V, Hamburg B11 | 20/05/43 | AB | **PD** |
| U 986 | VIIC | B&V, Hamburg B11 | 20/05/43 | AB | PD |
| U 347 | VIIC | Nor, Emden B6 | 21/05/43 | AB | PD |
| U 289 | VIIC | BV, Vegesack B8 | 25/05/43 | AB | PD |
| U 475 | VIIC | DW, Kiel B5 | 28/05/43 | AB | **PD** |
| U 315 | VIIC | Fle, Lübeck B6 | 29/05/43 | **AB** | **PD** |
| U 766 | VIIC | KW, Wilhelmshaven B2 | 29/05/43 | **AB** | **PD** |
| U 1162 | VIIC | Dan, Danzig B8 | 29/05/43 | AB | PD |
| U 922 | VIIC | Nep, Rostock B1 | 01/06/43 | AB | PD |
| U 987 | VIIC | B&V, Hamburg B11 | 02/06/43 | AB | PD |
| U 988 | VIIC | B&V, Hamburg B11 | 03/06/43 | AB | PD |
| U 476 | VIIC | DW, Kiel B5 | 05/06/43 | AB | PD |
| U 720 | VIIC | Stü, Hamburg B6 | 05/06/43 | AB | PD |
| U 749 | VIIC | Sch, Danzig B9 | 10/06/43 | **AB** | PD |
| U 750 | VIIC | Sch, Danzig B9 | 10/06/43 | AB | PD |
| U 367 | VIIC | Fle, Flensburg B5 | 11/06/43 | AB | PD |
| U 1163 | VIIC/41 | Dan, Danzig B9 | 12/06/43 | AB | PD |
| U 290 | VIIC | BV, Vegesack B8 | 16/06/43 | AB | **PD** |
| U 989 | VIIC | B&V, Hamburg B11 | 16/06/43 | AB | PD |
| U 316 | VIIC | Fle, Lübeck B6 | 19/06/43 | AB | PD |
| U 394 | VIIC | How, Kiel B5 | 19/06/43 | AB | PD |
| U 991 | VIIC | B&V, Hamburg B11 | 24/06/43 | AB | PD |
| U 992 | VIIC | B&V, Hamburg B11 | 24/06/43 | AB | **PD** |
| U 241 | VIIC | GW, Kiel B8 | 25/06/43 | AB | PD |
| U 348 | VIIC | Nor, Emden B6 | 25/06/43 | AB | PD |
| U 821 | VIIC | SO, Stettin B1 | 26/06/43 | AB | PD |
| U 291 | VIIC | BV, Vegesack B8 | 30/06/43 | AB | PD |
| U 477 | VIIC | DW, Kiel B5 | 03/07/43 | AB | PD |
| U 1164 | VIIC/41 | Dan, Danzig B9 | 03/07/43 | AB | PD |
| U 676 | VIIC | How, Hamburg B4 | 06/07/43 | AB | PD |
| U 677 | VIIC | How, Hamburg B4 | 06/07/43 | AB | PD |
| U 1191 | VIIC | Sch, Danzig B10 | 06/07/43 | AB | PD |
| U 993 | VIIC | B&V, Hamburg B11 | 08/07/43 | AB | **PD** |
| U 994 | VIIC | B&V, Hamburg B11 | 08/07/43 | **AB** | **PD** |
| U 767 | VIIC | KW, Wilhelmshaven B2 | 10/07/43 | AB | PD |
| U 1192 | VIIC | Sch, Danzig B10 | 16/07/43 | **AB** | **PD** |
| U 478 | VIIC | DW, Kiel B5 | 17/07/43 | AB | PD |
| U 903 | VIIC | Fle, Lübeck B7 | 17/07/43 | AB | PD |
| U 242 | VIIC | GW, Kiel B8 | 20/07/43 | AB | PD |
| U 292 | VIIC/41 | BV, Vegesack B9 | 20/07/43 | AB | PD |
| U 1165 | VIIC/41 | Dan, Danzig B9 | 20/07/43 | **AB** | **PD** |
| U 349 | VIIC | Nor, Emden B7 | 22/07/43 | AB | PD |
| U 995 | VIIC/41 | B&V, Hamburg B12 | 22/07/43 | **AB** | **PD** |

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| U 721 | VIIC | Stü, Hamburg B6 | 23/07/43 | AB | PD |
| U 293 | VIIC/41 | BV, Vegesack B9 | 30/07/43 | AB | PD |
| U 1193 | VIIC | Sch, Danzig B10 | 05/08/43 | AB | PD |
| U 1194 | VIIC | Sch, Danzig B10 | 05/08/43 | AB | PD |
| U 904 | VIIC | Fle, Lübeck B7 | 07/08/43 | AB | PD |
| U 923 | VIIC | Nep, Rostock B1 | 07/08/43 | AB | PD |
| U 479 | VIIC | DW, Kiel B5 | 14/08/43 | AB | PD |
| U 480 | VIIC | DW, Kiel B5 | 14/08/43 | AB | PD |
| U 350 | VIIC | Nor, Emden B7 | 17/08/43 | AB | PD |
| U 369 | VIIC | Fle, Flensburg B5 | 17/08/43 | AB | PD |
| U 997 | VIIC/41 | B&V, Hamburg B12 | 18/08/43 | AB | PD |
| U 998 | VIIC/41 | B&V, Hamburg B12 | 18/08/43 | AB | PD |
| U 768 | VIIC | KW, Wilhelmshaven B2 | 22/08/43 | AB | PD |
| U 294 | VIIC/41 | BV, Vegesack B9 | 27/08/43 | AB | PD |
| U 396 | VIIC | How, Kiel B6 | 27/08/43 | AB | PD |
| U 1166 | VIIC/41 | Dan, Danzig B9 | 28/08/43 | AB | PD |
| U 1167 | VIIC/41 | Dan, Danzig B10 | 28/08/43 | AB | PD |
| U 317 | VIIC/41 | Fle, Lübeck B8 | 01/09/43 | **AB** | PD |
| U 243 | VIIC | GW, Kiel B8 | 02/09/43 | AB | **PD** |
| U 244 | VIIC | GW, Kiel B8 | 02/09/43 | AB | PD |
| U 1195 | VIIC | Sch, Danzig B10 | 02/09/43 | AB | PD |
| U 1196 | VIIC | Sch, Danzig B10 | 02/09/43 | AB | PD |
| U 296 | VIIC/41 | BV, Vegesack B9 | 05/09/43 | AB | PD |
| U 295 | VIIC/41 | BV, Vegesack B9 | 13/09/43 | AB | PD |
| U 1101 | VIIC | Nor, Emden B7 | 13/09/43 | AB | PD |
| U 999 | VIIC/41 | B&V, Hamburg B12 | 17/09/43 | AB | PD |
| U 1000 | VIIC/41 | B&V, Hamburg B12 | 17/09/43 | AB | PD |
| U 678 | VIIC | How, Hamburg B4 | 18/09/43 | AB | PD |
| U 679 | VIIC | How, Hamburg B4 | 18/09/43 | AB | PD |
| U 722 | VIIC | Stü, Hamburg B6 | 21/09/43 | AB | PD |
| U 247 | VIIC | GW, Kiel B9 | 23/09/43 | AB | PD |
| U 370 | VIIC | Fle, Flensburg B5 | 24/09/43 | AB | PD |
| U 318 | VIIC/41 | Fle, Lübeck B8 | 25/09/43 | AB | PD |
| U 481 | VIIC | DW, Kiel B6 | 25/09/43 | **AB** | **PD** |
| U 482 | VIIC | DW, Kiel B6 | 25/09/43 | AB | **PD** |
| U 924 | VIIC | Nep, Rostock B1 | 25/09/43 | AB | **PD** |
| U 771 | VIIC | KW, Wilhelmshaven B3 | 26/09/43 | AB | PD |
| U 1197 | VIIC | Sch, Danzig B10 | 30/09/43 | **AB** | **PD** |
| U 1198 | VIIC | Sch, Danzig B10 | 30/09/43 | **AB** | PD |
| U 1168 | VIIC/41 | Dan, Danzig B10 | 02/10/43 | AB | PD |
| U 1169 | VIIC/41 | Dan, Danzig B10 | 02/10/43 | AB | **PD** |
| U 397 | VIIC | How, Kiel B6 | 06/10/43 | AB | PD |
| U 1001 | VIIC/41 | B&V, Hamburg B12 | 06/10/43 | AB | PD |
| U 1002 | VIIC/41 | B&V, Hamburg B12 | 06/10/43 | AB | PD |
| U 248 | VIIC | GW, Kiel B9 | 07/10/43 | AB | PD |
| U 297 | VIIC/41 | BV, Vegesack B9 | 09/10/43 | AB | PD |
| U 901 | VIIC | SV, Stettin B1 | 09/10/43 | AB | PD |
| U 1103 | VIIC | Nor, Emden B8 | 12/10/43 | AB | PD |
| U 1199 | VIIC | Sch, Danzig B11 | 12/10/43 | AB | PD |

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| U 1170 | VIIC/41 | Dan, Danzig B10 | 14/10/43 | AB | PD |
| U 319 | VIIC/41 | Fle, Lübeck B8 | 16/10/43 | AB | PD |
| U 249 | VIIC | GW, Kiel B9 | 23/10/43 | **AB** | **PD** |
| U 298 | VIIC/41 | BV, Vegesack B10 | 25/10/43 | AB | PD |
| U 1003 | VIIC/41 | B&V, Hamburg B12 | 27/10/43 | AB | PD |
| U 1004 | VIIC/41 | B&V, Hamburg B12 | 27/10/43 | AB | **PD** |
| U 483 | VIIC | DW, Kiel B6 | 30/10/43 | AB | **PD** |
| U 1200 | VIIC | Sch, Danzig B11 | 04/11/43 | AB | PD |
| U 1201 | VIIC | Sch, Danzig B11 | 04/11/43 | AB | PD |
| U 299 | VIIC/41 | BV, Vegesack B10 | 06/11/43 | AB | PD |
| U 320 | VIIC/41 | Fle, Lübeck B8 | 06/11/43 | AB | PD |
| U 398 | VIIC | How, Kiel B6 | 06/11/43 | AB | PD |
| U 925 | VIIC | Nep, Rostock B2 | 06/11/43 | AB | PD |
| U 321 | VIIC/41 | Fle, Lübeck B8 | 07/11/43 | AB | PD |
| U 250 | VIIC | GW, Kiel B9 | 11/11/43 | **AB** | **PD** |
| U 1202 | VIIC | Sch, Danzig B11 | 11/11/43 | **AB** | PD |
| U 368 | VIIC | Fle, Flensburg B5 | 16/11/43 | AB | PD |
| U 1005 | VIIC/41 | B&V, Hamburg B12 | 17/11/43 | AB | PD |
| U 1006 | VIIC/41 | B&V, Hamburg B12 | 17/11/43 | AB | PD |
| U 484 | VIIC | DW, Kiel B6 | 20/11/43 | AB | PD |
| U 680 | VIIC | How, Hamburg B4 | 20/11/43 | AB | PD |
| U 681 | VIIC | How, Hamburg B5 | 20/11/43 | AB | PD |
| U 905 | VIIC | Stü, Hamburg B7 | 20/11/43 | AB | PD |
| U 300 | VIIC/41 | BV, Vegesack B10 | 23/11/43 | AB | PD |
| U 1171 | VIIC/41 | Dan, Danzig B11 | 23/11/43 | **AB** | **PD** |
| U 245 | VIIC | GW, Kiel B8 | 25/11/43 | **AB** | **PD** |
| U 1172 | VIIC/41 | Dan, Danzig B11 | 03/12/43 | AB | PD |
| U 399 | VIIC | How, Kiel B7 | 04/12/43 | AB | PD |
| U 246 | VIIC | GW, Kiel B8 | 07/12/43 | AB | PD |
| U 1104 | VIIC | Nor, Emden B8 | 07/12/43 | AB | PD |
| U 773 | VIIC | KW, Wilhelmshaven B3 | 08/12/43 | AB | PD |
| U 1007 | VIIC/41 | B&V, Hamburg B13 | 08/12/43 | AB | **PD** |
| U 1008 | VIIC/41 | B&V, Hamburg B13 | 08/12/43 | **AB** | **PD** |
| U 1271 | VIIC/41 | BV, Vegesack B10 | 08/12/43 | AB | PD |
| U 1203 | VIIC | Sch, Danzig B11 | 09/12/43 | AB | PD |
| U 1204 | VIIC | Sch, Danzig B11 | 09/12/43 | AB | PD |
| U 1052 | VIIC | GW, Kiel B10 | 16/12/43 | AB | PD |
| U 322 | VIIC/41 | Fle, Lübeck B8 | 18/12/43 | AB | PD |
| U 1301 | VIIC/41 | Fle, Flensburg B6 | 22/12/43 | AB | PD |
| U 774 | VIIC | KW, Wilhelmshaven B3 | 23/12/43 | AB | PD |
| U 1272 | VIIC/41 | BV, Vegesack B10 | 23/12/43 | AB | PD |
| U 926 | VIIC | Nep, Rostock B2 | 28/12/43 | AB | PD |
| U 1205 | VIIC | Sch, Danzig B13 | 30/12/43 | AB | PD |
| U 1206 | VIIC | Sch, Danzig B12 | 30/12/43 | AB | PD |
| U 772 | VIIC | KW, Wilhelmshaven B3 | 31/12/43 | AB | PD |
| U 1009 | VIIC/41 | B&V, Hamburg B13 | 05/01/44 | AB | **PD** |
| U 1010 | VIIC/41 | B&V, Hamburg B13 | 05/01/44 | AB | PD |
| U 1207 | VIIC | Sch, Danzig B12 | 06/01/44 | AB | PD |
| U 400 | VIIC | How, Kiel B7 | 08/01/44 | AB | PD |

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| U 1273 | VIIC/41 | BV, Vegesack B10 | 10/01/44 | AB | PD |
| U 323 | VIIC/41 | Fle, Lübeck B9 | 12/01/44 | AB | PD |
| U 1053 | VIIC | GW, Kiel B10 | 13/01/44 | AB | PD |
| U 1208 | VIIC | Sch, Danzig B12 | 13/01/44 | AB | PD |
| U 485 | VIIC | DW, Kiel B6 | 15/01/44 | AB | PD |
| U 1102 | VIIC | Nor, Emden B7 | 15/01/44 | AB | PD |
| U 1013 | VIIC/41 | B&V, Hamburg B14 | 19/01/44 | AB | PD |
| U 1014 | VIIC/41 | B&V, Hamburg B14 | 19/01/44 | AB | PD |
| U 1274 | VIIC/41 | BV, Vegesack B11 | 25/01/44 | AB | PD |
| U 1051 | VIIC | GW, Kiel B10 | 03/02/44 | AB | PD |
| U 1015 | VIIC/41 | B&V, Hamburg B14 | 07/02/44 | AB | PD |
| U 1016 | VIIC/41 | B&V, Hamburg B14 | 08/02/44 | AB | PD |
| U 1275 | VIIC/41 | BV, Vegesack B11 | 08/02/44 | AB | PD |
| U 1209 | VIIC | Sch, Danzig B12 | 09/02/44 | AB | PD |
| U 1210 | VIIC | Sch, Danzig B12 | 09/02/44 | AB | PD |
| U 1303 | VIIC/41 | Fle, Flensburg B6 | 10/02/44 | AB | PD |
| U 775 | VIIC | KW, Wilhelmshaven B3 | 11/02/44 | AB | PD |
| U 324 | VIIC/41 | Fle, Lübeck B9 | 12/02/44 | AB | PD |
| U 486 | VIIC | DW, Kiel B6 | 12/02/44 | AB | PD |
| U 825 | VIIC | Sch, Danzig B13 | 16/02/44 | AB | PD |
| U 822 | VIIC | SO, Stettin B1 | 20/02/44 | AB | PD |
| U 1054 | VIIC | GW, Kiel B10 | 24/02/44 | AB | PD |
| U 1276 | VIIC/41 | BV, Vegesack B11 | 25/02/44 | AB | PD |
| U 907 | VIIC | Stü, Hamburg B7 | 01/03/44 | AB | PD |
| U 1017 | VIIC/41 | B&V, Hamburg B14 | 01/03/44 | AB | PD |
| U 1018 | VIIC/41 | B&V, Hamburg B14 | 01/03/44 | AB | PD |
| U 776 | VIIC | KW, Wilhelmshaven B3 | 04/03/44 | **AB** | **PD** |
| U 682 | VIIC | How, Hamburg B5 | 07/03/44 | AB | PD |
| U 683 | VIIC | How, Hamburg B5 | 07/03/44 | AB | PD |
| U 826 | VIIC | Sch, Danzig B13 | 09/03/44 | **AB** | **PD** |
| U 827 | VIIC/41 | Sch, Danzig B14 | 09/03/44 | AB | PD |
| U 1055 | VIIC | GW, Kiel B10 | 09/03/44 | AB | PD |
| U 828 | VIIC/41 | Sch, Danzig B14 | 16/03/44 | AB | PD |
| U 1277 | VIIC/41 | BV, Vegesack B11 | 18/03/44 | AB | PD |
| U 1019 | VIIC/41 | B&V, Hamburg B15 | 22/03/44 | AB | PD |
| U 1020 | VIIC/41 | B&V, Hamburg B15 | 22/03/44 | AB | PD |
| U 325 | VIIC/41 | Fle, Lübeck B9 | 25/03/44 | AB | PD |
| U 777 | VIIC | KW, Wilhelmshaven B4 | 25/03/44 | AB | PD |
| U 1056 | VIIC | GW, Kiel B10 | 30/03/44 | **AB** | **PD** |
| U 1131 | VIIC | How, Kiel B7 | 03/04/44 | AB | PD |
| U 1302 | VIIC/41 | Fle, Flensburg B6 | 04/04/44 | AB | PD |
| U 1021 | VIIC/41 | B&V, Hamburg B15 | 13/04/44 | AB | PD |
| U 1022 | VIIC/41 | B&V, Hamburg B15 | 13/04/44 | AB | PD |
| U 928 | VIIC | Nep, Rostock B2 | 15/04/44 | AB | PD |
| U 1278 | VIIC/41 | BV, Vegesack B11 | 15/04/44 | AB | PD |
| U 1057 | VIIC | GW, Kiel B10 | 20/04/44 | AB | PD |
| U 1105 | VIIC | Nor, Emden B8 | 20/04/44 | **AB** | **PD** |
| U 326 | VIIC/41 | Fle, Lübeck B9 | 22/04/44 | AB | PD |
| U 1132 | VIIC | How, Kiel B7 | 29/04/44 | AB | PD |

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| U 927 | VIIC | Nep, Rostock B2 | 03/05/44 | AB | PD |
| U 1023 | VIIC/41 | B&V, Hamburg B15 | 03/05/44 | **AB** | **PD** |
| U 1024 | VIIC/41 | B&V, Hamburg B15 | 03/05/44 | AB | PD |
| U 778 | VIIC | KW, Wilhelmshaven B4 | 06/05/44 | AB | **PD** |
| U 1058 | VIIC | GW, Kiel B10 | 11/05/44 | AB | **PD** |
| U 1025 | VIIC/41 | B&V, Hamburg B15 | 24/05/44 | AB | PD |
| U 1106 | VIIC | Nor, Emden B8 | 26/05/44 | AB | PD |
| U 327 | VIIC/41 | Fle, Lübeck B9 | 27/05/44 | AB | PD |
| U 1063 | VIIC/41 | GW, Kiel B11 | 08/06/44 | AB | PD |
| U 779 | VIIC | KW, Wilhelmshaven B4 | 17/06/44 | AB | PD |
| U 1109 | VIIC/41 | Nor, Emden B9 | 19/06/44 | AB | **PD** |
| U 1064 | VIIC/41 | GW, Kiel B11 | 22/06/44 | **AB** | PD |
| U 1107 | VIIC/41 | Nor, Emden B9 | 30/06/44 | AB | PD |
| U 1305 | VIIC/41 | Fle, Flensburg B7 | 13/07/44 | AB | PD |
| U 1110 | VIIC/41 | Nor, Emden B9 | 21/07/44 | AB | PD |
| U 328 | VIIC/41 | Fle, Lübeck B9 | 24/07/44 | AB | **PD** |
| U 1065 | VIIC/41 | GW, Kiel B11 | 03/08/44 | AB | **PD** |
| U 1304 | VIIC/41 | Fle, Flensburg B6 | 04/08/44 | AB | PD |
| U 1108 | VIIC/41 | Nor, Emden B9 | 05/09/44 | **AB** | PD |
| U 1307 | VIIC/41 | Fle, Flensburg B7 | 29/09/44 | AB | PD |
| U 1306 | VIIC/41 | Fle, Flensburg B7 | 25/10/44 | AB | PD |
| U 1308 | VIIC/41 | Fle, Flensburg B7 | 22/11/44 | AB | PD |
| U 1279 | VIIC/41 | BV, Vegesack B11 | 00/05/44 | AB | PD |
| U 929 | VIIC/41 | Nep, Rostock B3 | 00/06/44 | **AB** | **PD** |
| U 930 | VIIC/41 | Nep, Rostock B3 | 00/09/44 | **AB** | PD |

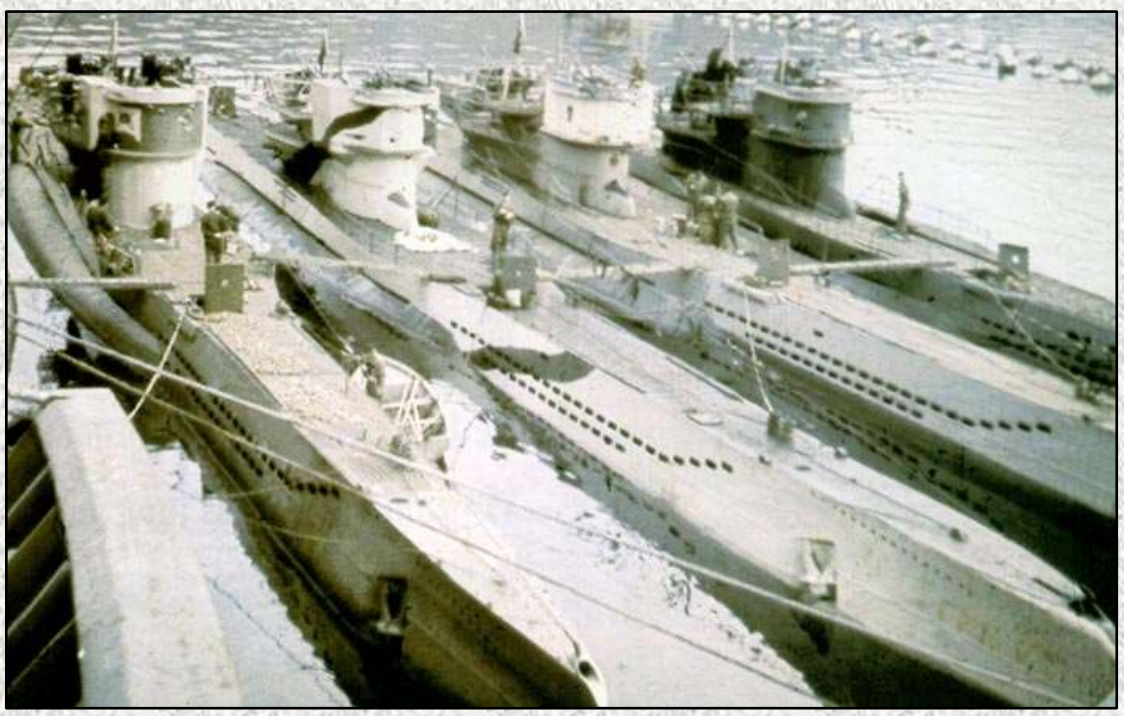
## Part VI – Late War Configurations

Above (E9): This photo shows the commissioning ceremony of U 235 on the 4th November 1942. At that time the boat had the very unusual configuration of Atlantic bow, planked deck and Turm 0 tower. In October 1943 the boat was then outfitted with a Turm II and *schnorchel*. It may be possible through mixing and matching elements of both Revell kits to depict almost all of the VIICs and VIIC/41s but depicting the test boat U 235 in 1942 or 1943 would present more involved modifications.

Most of the features fitted to the U-boat fleet were introduced to new boats or retrofitted to existing boats. Such features do not cause us difficulty if we know the time frame when they were implemented. For example, the Turm IV tower is a reasonably straightforward topic since it was decreed that by August 1943 any operational boat must be fitted with a Turm IV tower. The *schnorchel* often causes no significant trouble as details of which boats were fitted with this device, together with the month in which they were added, is available online on www.uboat.net.

There are, however, two exceptions - the type of bow arrangement (either standard or Atlantic bow) and the type of deck arrangement (either slotted or planked deck). Both these features were *not retrofitted* to existing boats due to the time and cost involved and were only fitted to new build boats. This

presents a degree of difficulty for us because this led to no standardisation with regard to these two particular features. If we are to take a look at the U-boat fleet in the late war period, boats exhibited a range of different features.



Above (E10): In this extremely useful colour image, taken in Hammerfest on the 30th July 1944, each of the four boats has a different configuration. This presents a perfect illustration of the lack of standardisation in the late war period. The only boat in this photo which has the same arrangements as Revell's RV5045 kit is U 997.

In photo E10 each of the four boats (from left to right) has the following configuration -

- VIIC U 362 (on left hand side) - standard bow, planked deck, Askania, no *schnorchel*, coal scuttle on starboard side only.
- VIIC U 711 (second from left, with black stripes) - Atlantic bow, slotted deck, standard magnetic compass fairing, no *schnorchel*, coals scuttle on both sides.
- VIIC U 278 (second from right) - Atlantic bow, planked deck, standard magnetic compass fairing, no *schnorchel*, coal scuttle on port side only.
- VIIC/41 U 997 (on right hand side) - Atlantic bow, planked deck, standard magnetic compass fairing, *schnorchel*, no coal scuttle.

Note 1: The above configurations represent the boats as they appeared on the 30th July 1944. Later in the war the configurations of some of the boats changed. For example, U 711 was fitted with a *schnorchel* prior to sinking; U 362 was later outfitted with the Askania compass fairing; the coal scuttles were removed in the following months.
Note 2: The fact that U 362 and U 711 are the complete opposite in respect to the bow and deck type indicates that the bow type and deck type were completely independent features.

This lack of standardisation presents quite serious difficulty for modellers who wish to model a particular mid-to-late war VIIC. There are different methods we can use to try to ensure that our model accurately depicts the features on a real boat. One method is to choose a boat which has the same configuration as the Revell kits so that no modifications are necessary. Another method involves identifying the configuration upon a desired boat and then changing the features on the kit

to accurately reflect that U-boat. The process involved in these methods is not difficult but what makes this task challenging is the relative dearth of late-war photos available to most modellers. Even enthusiasts with a broad range of photographic material collected over time can struggle to identify all the features upon an individual boat so as much detail as possible has been provided in this article in regard to the features on individual boats.

## Choosing the features

The first step is to consider certain questions in relation to the features you wish to see on your model -

- Deck type - slotted or planked?
- Bow type - standard or Atlantic?
- Magnetic compass - standard early type or late war Askania?
- *Schnorchel* - Yes or no?
- Tower - Turm 0, Turm II or Turm IV?
- Armament - 37mm automatic or Vierling on lower platform?
- Coal scuttles - present or not?

Deck and bow type - If these are not visible in period photos refer to the table in Part V.

Magnetic compass - If this feature is not visible in period photos refer to Part IV above.

*Schnorchel* - The exact details regarding when each boat received the *schnorchel* is not known but the following hyperlink contains details of many boats which received this feature and, crucially, the month of implementation - http://www.uboat.net/technical/schnorchel_fitted.htm

There were several different styles of *schnorchel*. Readers are referred to the pdf "*An Illustrated Guide To U-Boat Research*" by Simon Morris (available on the AMP website) which provides superb drawings and information regarding the different styles.

Turm IV tower - The Turm IV tower type (which is present on the late-war Revell kits) does not present any difficulty since, with the exception of the test boat U 235, all boats with the *schnorchel* had a Turm IV tower. The FuMO 30 box (which is also present on the late-war Revell kits) also presents no selection difficulties. This is because implementation of this radar began in late 1942 and any boat with a Turm IV tower had the FuMO 30 box.

Armament - The 37mm automatic (which is present on the lower platform on the late-war Revell kits) is a feature which cannot be ignored in the selection process. This weapon replaced the 20mm Vierling on the lower platform around the autumn of 1943, with the implementation process being prolonged by supply issues. If you do not possess confirmatory evidence of the 37mm on your chosen boat, it may be prudent to choose a time frame of summer 1944 or afterwards, by which time the 37mm would have been fitted.

Coal scuttles - This additional complication (groan!) is observable in photo E10. Three boats have armoured boxes (*Kohlenkasten* - coal scuttles) on one or both sides of the tower and these were intended to help protect crews from anti-aircraft fire. In the photo, U 362 has a box on the starboard side, U 711 has a box on both sides and U 278 has a box on the port side. The order to implement this feature was placed on the 4th June 1943 but instability due to their heavy weight resulted in an order to remove the boxes being placed on the 30th October 1943. The date of photo E10 - 30th July 1944 - shows that the removal had yet to be completed by this time. By the end of the war this feature tends to be missing from U-boats and it is likely that most (perhaps all) boats did not have

these armoured boxes by the start of 1945.

## Choosing a boat (without modification)

If the modeller does not wish to change any of the features then they will have to find a boat with planked deck, Atlantic bow, Turm IV tower, 37mm on lower platform, *schnorchel*, normal compass fairing and no coal scuttles. To start the selection process, it is advisable to try to select a boat which was fitted with the *schnorchel before* the standard magnetic compass housing was changed to the Askania type (thus ensuring both features were in place at the same time). Then the boat number can be checked in the table above to ensure the boat had a planked deck and an Atlantic bow.

It is impossible with current resources to identify all the boats which had the same configuration as the late war Revell kits (RV5045 and RV5100). It is also recognised that modellers with finite resources will struggle to identify even a few boats in this configuration. Therefore a short list of boats which did have this same configuration (planked deck, Atlantic bow, Turm IV, *schnorchel*, standard magnetic compass, no coal scuttles) is presented here -

- U 278 at the end of hostilities or afterwards at Lisahally.
- U 281 at the end of hostilities or afterwards at Loch Ryan.
- U 483 in August 1944.
- U 778 in spring 1944.
- U 968 in November 1944 at Narvik.
- U 977 at the end of hostilities or afterwards at Mar del Plata in Argentina.
- U 978 at the end of hostilities or afterwards at Loch Ryan.
- U 997 in July 1944 at Hammerfest.
- U 1172 in March 1944.

Also provided in the above list is the time period when the configuration has been observed in photos. Modellers should be careful to depict their boat at the same time period.

U 763 - This boat almost certainly had the same configuration but the presence of the Atlantic bow cannot be guaranteed.

U 977 - When the very heavily weathered U 977 sailed into Mar del Plata in Argentina it was in the same configuration as the Revell kit (albeit with some minor differences in radar and radar warning antennae). It should be noted that the standard magnetic compass housing was no longer present when the boat sailed on the US Victory Tour in November 1945.

Below (E11): U 977 departed on war patrol on the 2nd May 1945 and arrived at Mar del Plata in Argentina on the 17th August 1945. During the epic 108-day voyage, the boat is said to have spent 66 days continuously submerged. Normally it is advisable to keep weathering to a minimum and resist overdoing the amount of rust and other weathering features. The excessive degree of rusting evident in this photo taken in August 1945 shows that no such restrictions are in place for those of us who wish to depict U 977 at this time. The standard magnetic compass fairing can be seen in front of the tower.

U 995 - This museum boat was launched on the 22nd July 1943 with the standard magnetic compass housing and no *schnorchel*. It is unclear if the boat changed to the Askania fairing by the end of the war. The fact that the boat had the standard magnetic compass housing during her post-war service in the Norwegian Navy in the 1950s and early 1960s suggests that U 995 probably did have the standard compass fairing at the end of the war.

The confusing issue is that U 995 currently has the Askania fairing, which was added in the late 1960s or early 1970s during the extensive restoration process to convert her from her Norwegian configuration back to a format representative of late war German U-boats. It is quite likely that the Askania fairing added at this time was simply to replicate a generic late-war VIIC/41 rather than U 995's original German configuration (since U 995 probably never had the Askania fairing during Kriegsmarine service).

Although absolute evidence is lacking, U 995 would probably have been in the same configuration at the end of the war as the Revell kit.

## Choosing a boat (with modification)

If the modeller is willing to make modifications to the Revell kit it becomes possible to model most of the VIICs and VIIC/41s in the fleet. This can be undertaken either by the employment of scratchbuilding (in the case of the Askania fairing), aftermarket accessories or by mixing features of each Revell kit to gain the features desired. In the case of the 72nd scale kits this may prove to be expensive because both the RV5015 and RV5045 kit would need to be purchased in order to build one mid-war boat. It may be more expedient to model in 144th scale because the low cost of the kits means that mixing and matching from both kits may not be prohibitively expensive.

It is necessary to identify the features on each of the Revell kits, which are as follows -

| Revell kit features | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Kit Number** | **Scale** | **Deck type** | **Bow type** | **Tower** | ***Schnorchel*** | **Magnetic compass** | **Coal scuttles** |
| RV5015 | 72 | Slotted | Standard | Turm 0 | No | Normal | No |
| RV5045 | 72 | Planked | Atlantic | Turm IV | Yes | Normal | No |
| RV5038 | 144 | Slotted | Standard | Turm 0 | No | Normal | No |
| RV5100 | 144 | Planked | Atlantic | Turm IV | Yes | Normal | No |

It is then a case of mixing and matching from the two kits to find the desired configuration. These configurations can be found in 72nd scale by mixing in the following ways -

Planked deck, Atlantic bow, *schnorchel*
Hull - RV5045
Deck - RV5045
*Schnorchel* - RV5045

Planked deck, Atlantic bow, no *schnorchel*
Hull - RV5045
Deck - RV5045
Task required - fill in the large *schnorchel* gap in the deck

Planked deck, standard bow, *schnorchel*
Hull - RV5015
Deck - RV5045 for main deck; merge with front section of RV5015
*Schnorchel* - RV5045

Planked deck, standard bow, no *schnorchel*
Hull - RV5015
Deck - RV5045 for main deck; merge with front section of RV5015
Task required - fill in the large *schnorchel* gap in the planked deck

Slotted deck, Atlantic bow, *schnorchel*
Hull - RV5045
Deck - RV5015 for main deck; merge with front section of RV5045
*Schnorchel* - RV5045
Task required - cut a large *schnorchel* gap out of the slotted deck
Note: An aftermarket slotted deck such as AMP72-02 is inadvisable here as it would prove extremely difficult to cut out a *schnorchel* gap in a brass deck.

Slotted deck, Atlantic bow, no *schnorchel*
Hull - RV5045
Deck - RV5015 for main deck; merge with front section of RV5045
Note: An aftermarket slotted deck such as AMP72-02 can be used but will have to be used in conjunction with the front section of RV5045.

Note: The 144$^{th}$ kits can be mixed and matched in similar fashion.

Askania - The final issue to be considered is the magnetic compass fairing. If your chosen boat had the standard fairing there is no need for any alteration to be made. If your boat had the Askania fairing then you will need to remove the standard fairing on the Revell kit and replace it with a scratchbuilt Askania type. As previously mentioned there were at least three versions of this feature. If there are no photographs showing your boat with the fairing, it would be sensible to choose the most common type in which both the leading and trailing edges were sloped.

# List Of U-Boat Modifications & Identification Features

# Contents



# Part I - Introduction

### Content of modification tables and identification lists

The tables and lists presented here are intended to act as a handy reference pointer to the U-boat modifications that have been described in both Wolf Pack collections. The modifications are spread out over several articles so it may prove useful to have them listed here in one place in chronological order. I have divided the modifications into features prevalent in all types and to features that are particular to certain U-boat types. Other self-contained areas such as radar and countermeasures have been assigned their own tables for easy reference purposes.

It is important to recognise what the modification tables do and do not record. **The tables in Part II and Part III record only the features retrofitted to existing boats**. An example is the deletion of the net cutter, which was ordered in March 1941 and implemented throughout the fleet in the months which followed. The tables do not list all the differences between features on all boats. For example, the VIIB U 99 possessed a different attack periscope housing to the VIIB U 48 because U 99 was built at a slightly later period when a later style of housing was favoured. This difference is not charted in the modification tables because it was not retrofitted to existing boats such as U 48. Since the modification tables only cover features that were retrofitted to existing boats, it is devoid of the many important features which characterised certain sub-variants or batches of boats. To fill in the gap, I have prepared a list of characteristic identification features that is intended to be used in conjunction with the modification tables. **The lists of identification features in Part IV record the main visual differences between sub-variants and these differences were not retrofitted to existing boats**. These features are presented in extended list format so that I could add some explanatory descriptive text. It is hoped that the combination of modifications tables and identification lists may allow a novice student to identify U-boats and their characteristic features more easily.

When trying to assess boats I find it very useful to refer to one book which lists the type, launch date, commissioning date and all the dates and locations of departure and arrival for all war patrols. This information is all available online but I find it extremely useful to refer to one book in order to quickly find this information and compare with other boats. The book I use is for this purpose is *U-Boat Fact File: Detailed Service Histories of the Submarines Operated by the Kriegsmarine 1935-1945* by Peter Sharpe (Midland Publishing Limited, 1998).

### Some explanatory points

In the tables, the code in the second column refers to the following -

- F - fitting for first time

- D - deletion (complete removal with nothing being added in its place)
- R - replacing with an alternative item or upgrading of existing equipment

The black text in the feature column refers to the page number in the original Wolf Pack collection whereas the green text refers to the pages within this collection.

Be very wary of the order date given in the third column. If an order for removal was issued on the 1st January 1942, this does NOT mean that your chosen boat will have had this feature removed on that date. Normally the feature would be fitted or removed when time and opportunity presented itself. Often this would occur during the next refit but there are many factors which may have delayed this process. For example, the installation of a 37mm automatic to the lower platform of a Turm IV took months to implement throughout the fleet due to supply issues. Additionally, the implementation of non-essential features may have been delayed due to a requirement to rush the boat back to sea. Lastly, in a few cases implementation occurred at a much later time period. An example is the fitting of the *Askania* magnetic compass fairing, which was implemented a year after the order date.

The dates given in the Tested column are derived from books or from my own assessment of period photos. The latter would typically involve me noticing that a feature is present on a boat before the order for implementation was issued. An example is the *S-Gerät* bow device, ordered on the 11th October 1940, but present in a period photograph in September 1940. The obvious conclusion, made in the presumption that the date of the photo is correct and the date of the order is also accurate, is that the bow device was tested at least a month prior to the order being issued.

The text in the "To op. boats" shows the date, month or approximate time period when the feature **began** to be implemented upon operational boats.

Some of the details, particularly the order dates, have been taken from authoritative U-boat history books. Other dates are the result of my own research and assessment of period photographs. For example, for the removal of the Type VII breakwaters I looked at every VII photograph at my disposal for this feature. This became a lengthy process because I would often have to determine the time period when the photo was taken. If I judged the date to be accurate, I would then be able to note down the date and whether the feature was present or not. At the end of this process I would have reliable data from which to extract conclusions. I could then make deductions as to the time period over which the feature was gradually withdrawn. Lastly, this time period was compared to the removal order date to see if there was a direct correlation. This process was conducted for most of the modifications in the tables.

The accuracy of this process is limited by the sample size. With the removal of the breakwaters I consider that I had a large enough sample size (enough photos) to enable me to obtain enough data from which to draw reliable conclusions. For a different feature - the shroud around propellers on Type IIs - I had very scant evidence. This made the sample size unacceptably low and as a result I was not able to draw any conclusions as to implementation date or frequency of use.

Another limiting factor for the information herein is the accuracy of the information sourced from books and articles. It was necessary for me to choose wisely the books from which to extract information. Some books and magazines have demonstrated an exactitude which allowed me to take the information on face value. Other sources are less reliable and I have tried to avoid propagating their mistakes. Period photographs are often found to be erroneous with regard to boat identity, location and date. The authors of some books, which I shall not name and shame, have demonstrated a god given talent for misidentification that seems to be carried out with reckless abandon. A book in which a Type IX is mislabelled as a VIIC cannot be relied upon in any capacity. Some authors, with commendable awareness of the difficulties involved, err on the side of caution and do not make any attempt to identity of the boat or a date when the photo was taken. This has required me to try to establish the identity and date by taking into account the boat's type, location, paint colour, insignia, tonnage flags, crewmen, modifications, identification features and, to establish whether a boat is returning or departing, the condition of the paint. As my knowledge of

more and more identification features and modifications has increased, it has become easier to make assumptions on the content within photographs. Yet full identification is often impossible. I always opt on the side of caution when identifying particular boats and particular dates but an attempt at this enterprise is necessary to progressively build up enough information to learn more and more about U-boat modifications. In a work of this nature there will invariably be errors. The information in these tables is merely the most accurate information I have at present given the resources I have at my disposal. In time I hope that some of the modification dates can be improved when more information becomes available or when other researchers, with different resources, study the subject. At first glance the tables may look to be detailed, but they are very far from exhaustive and there is still so much left to learn about the modifications and when they were implemented.

## Part II - Modifications Applicable To All Types

Note: These modifications were retrofitted to existing boats when possible.

| Pre-war modifications prior to war | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Large white tower U-numbers (P70/72) | D | - | - | 19/08/39 | Painted over |
| Small oval plates at bow (P70/72) | D | - | - | 19/08/39 | - |
| Bronze eagle plaque on tower (P70/72) | D | - | - | 19/08/39 | - |
| Red horseshoe lifebelts on tower (P70/72) | R | - | - | 19/08/39 | Lifebelts retained but white text removed |
| Red / white lifebuoys on deck (P70/72) | D | - | - | 19/08/39 | Painted black on IXs |

Note: The features in the diesel exhaust outlet tables have been covered in pages 55 to 56 of the original Wolf Pack collection.

| Diesel exhaust outlets (not applicable for Type IIs) | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Style 2 | R | - | - | Spring 40 | Replaced style 1 |
| Style 3 | F | - | - | 41 | Shroud added on some boats only |
| Style 4 | R | - | - | Late 41 | Replaced style 2 & 3 |
| Style 5 | R | - | - | Mid 42 | Replaced style 4 |
| Style 6 | R | - | - | 44 / 45 | Fitted when *schnorchel* installed |

| General modifications applicable to all main types | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Net cutters (P71) | F / D | - | - | Usually 39 | Removed and then re-installed |
| Anti-vibration wires to both periscopes (P74) | F | - | - | 40 | - |
| Net cutters (P80/81) | D | 01/03/41 | - | Mar / Apr 41 | - |
| *S-Gerät* bow device (P88) (P27) | F | 11/10/40 | Sep 40 on U 551 | After order | Not on Type IIs |
| Mountings on tower for removable machine guns (P34) | F | 27/07/42 | - | Spring 41 | Single machine guns seen on VIIB and VIIC towers from spring 41 (on rare occasions a twin MG34) |
| Additional wooden strips to inside of tower bulwark (P91/92) | F | 24/07/41 | - | After order | - |
| Wooden strips to UZO and periscope bases (P92) | F | 06/12/41 | - | After order | - |
| *S-Gerät* bow device blanked off (P89) (P27) | R | 24/04/42 | - | After order | Order of 24/04/42 for removal but feature only blanked off |
| KDB (P92) (P34) | D | 24/04/42 | - | After order | Not universal |
| Mast antenna (P33) | D | 19/11/42 | - | After order | Deleted when FuMO 30 box fitted |
| FuMO 30 box (P102) (P33) | F | 19/11/42 | - | After order | Not on Type IIs |
| Deck gun on forward deck (P99) (P35) | D | 27/04/43 | - | After order | 88mm retained on Baltic and Arctic VIICs; some long range IXs retained 105mm |
| Anti-slip strips around deck gun (P99) (P35) | D | 27/04/43 | - | After order | Removed with deck gun |
| Base plate for deck gun (P99) (P35) | D | 27/04/43 | - | After order | Removed with deck gun |
| *Kohlenkasten* (coal scuttles) (P95) | F | 04/06/43 | - | After order | Not universal; boxes varied in type; not on Type IIs |
| *Kohlenkasten* (coal scuttles) (P95) | D | 30/10/43 | - | After order | Deleted due to excessive weight |
| *Askania* magnetic compass fairing (P99) (P47) | R | 15/10/42 | - | Oct 43 | Replaced old magnetic housing; not on Type IIs; at least 3 styles of *Askania* fairing in use |

| | | | | | |
|---|---|---|---|---|---|
| *Schnorchel* (P97/98) (P46) | F | - | Sep / Oct 43 | Nov 43 | Fixed type replaced by hinged types at later stage; see list on uboat.net (link below) |
| Dive plane wires | R | - | - | 43 or early 44 | VIICs and IXs |
| A-shaped bracket on bottom of rudders | R | - | - | 43 or early 44 | VIICs and IXs |
| *Balcongerät* (P102) (P46) | F | - | Jan 43 | Early 44 | Not on Type IIs |
| *S-Gerät* blanked bow device (P89) (P28) | D | - | - | Late 43 / early 44 | Completely removed from stem |
| New UZO (P96) (P47) | R | - | - | 44 | Replaced old style UZO |
| Rear jumping wire tripod support changed (P33/46) | R | - | - | Mid to late war | May not have been retrofitted |
| Dinghy on either side at the very rear of lower platform | F | - | - | Late war | Some boats only; one in each of the two pressure-tight pods |
| *Bali* antenna and supporting pole moved from port side of tower bulwark | R | - | - | Late 1944 | Moved between periscopes on IXs; moved behind rear periscope on VIICs |

A list of the boats fitted out with the *schnorchel* can be found at -

http://www.uboat.net/technical/schnorchel_fitted.htm

## Part III - Modifications Applicable To Certain Types

| Modifications specific to Type IAs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Wooden deck changed from small circles to slotted deck | R | - | - | Pre-war | - |
| 5 front vents changed from horizontal to diagonal; 2 additional covered vents added under the 5 front vents; 7 additional vents added in centre | F | - | - | Pre-war | Vents change occurred in U 26 before U 25 |
| Spray deflector | F | - | - | 1939 | - |
| Additional 6 vents (2 columns of 3) added to hull casing | F | - | - | By early war | On U 25; possibly on U 26 as well |

| Modifications specific to Type IIs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Insulators moved behind splitter (P126) | R | - | - | Pre-war | IIAs and early IIBs |
| Net cutter S2 (P123/124) | R | - | - | Pre-war | Replaced S1 |
| Conical mount (P122) | F | - | - | Pre-war | Some IIAs and IIBs |
| 3 supports and seat for deck railings (P125) | F | - | - | Pre-war | IIAs and IIBs (style R2) |
| Barrel container (P121/122) | F | - | - | 38 or 39 | IIAs and IIBs (IICs had conical mount) |
| Net cutter (P124) | R | - | - | Late 38 or 39 | S6 introduced |
| Extra vents added (P105) | F | - | - | Around 39 | To U 9, U 10, U 18, U 21, U 22 and U 23 |
| Side marker moved to top of magnetic compass housing (P112) | R | - | - | Around 39 | On IICs only |
| Net cutter (P124) | R | - | - | Summer 39 | Style unknown; IICs and IIDs had S4 |
| Additional repeater on pole behind sky periscope (P120) | F | - | - | ? | IIAs and IIBs |
| Waterproof 20mm barrel (P122) | R | - | - | Early war | Replaced non-waterproof barrel |
| Red and white lifebuoy (P126) | F | - | - | Early war | Training boats only |
| Bronze eagle on tower (P126) | F | - | - | Early war | Training boats only |
| Additions to deck railings (P125) | F | - | - | Early to mid war | Either R 4 or R6 |
| Supports bars on hull casing (P125) | D | - | - | Early to mid war | Near to top of hull casing (bow and stern) |
| Extra vents added (P105) | F | - | - | 42 | Black Sea (BS) boats |
| Small machine guns on tower bulwark (P108) | F | - | - | 43 | On BS boats; before 20mm added to tower |
| 20mm on wintergarten platform at rear of tower (P108/109) | F | - | - | Summer 43 | On Black Sea (BS) boats; fitted on U 142 and U 146 by 1944 |
| Twin 20mm on tower (P108) | R | - | - | Early 44 | Replaced single 20mm on BS boats |
| 20mm feature removed (P122) | R | - | - | Late war | IIDs |
| Extendable *schnorchel* on tower (P127) | F | - | - | Late war | On U 143, U 145, U 149, U 150 and U 151 |

| Modifications specific to Type VIIAs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| 3 or 5 extra round holes added behind rear pattern | F | - | - | ? | 3 extra on U 27 to U 32 and U 34; 5 extra on U 33 and U 35 |
| Some vent holes filled in at front of forward groups (both sides) | F | - | - | 39 | Evidenced upon U 29 and U 30 |
| Extra group of ventilation holes added to port side of tower | F | - | - | 39 | These extra holes covered over when L-shaped trunks added |
| Double rear jumping wires replaced with single jumping wire | R | - | - | Autumn 39 | Included two connector bars |
| Spray deflector | F | - | On U 30 spring 40 | Autumn 40 | Added later on VIIAs than on VIIBs; normally added to VIIAs with addition of L-shaped trunks |

Note: U 30 may have been used as a test boat. It appears to have been the first U-boat to have the 20mm re-sited to the tower (it was not configured with a spray deflector at this time). The boat also appears to be the first to have been fitted with the L-shaped trunks as photos show that by the spring of 1940 (earlier than normal) the spray deflector and L-shaped air trunks were present on the boat.

| Modifications specific to Type VIIAs and VIIBs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Moving of 20mm from aft deck to tower (P72/73) | R | - | - | Winter 39 / 40 | Included rebuilding of aft end of tower |
| Anti-slip strips around 20mm on aft deck (P73) | D | - | - | Winter 39 / 40 | Removed when 20mm moved to tower |
| Air supply grill with vertical bars on starboard side (P74/75) | F | - | Tested on U 48 pre-war | Winter 39 / 40 | Removed when L-shaped trunks fitted; probably VIIBs only |
| Detachable mount on top of UZO | R | - | - | Late 39 or early 40 | Possibly VIIBs only |
| L-shaped air supply trunking (P75) | F | 29/07/40 | Tested on U 30 spring 40 | Summer & autumn 40 | Additional grips and ladder added |
| Extra deck railings on either side of tower (P76/77) | F | - | - | Summer & autumn 40 | Required when L-shaped trunks fitted |
| Teardrop shaped air supply fairing in centre of tower (P76) | F | - | - | Spring 41 | L-shaped trunking removed at this time |

Note: Since U 48 had the air supply grill with vertical bars **before** the commencement of hostilities, it is probable that this boat was used to test this feature. At this time, perhaps in August 1939, U 48 was configured uniquely, having the air supply grill, no spray deflector, no breakwaters, and with the 20mm still on the aft deck.

| Modifications specific to Type VIIBs, VIICs and VIIC/41s | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Breakwaters (P71) | F | - | - | Aug / Sep 39 | - |
| Small spray deflector (P72) | F | - | - | Aug / Sep 39 | On VIIBs only (small version not fitted to VIIAs) |
| Normal spray deflector (P73) | R | - | - | Oct / Nov 39 | Replaced small spray deflector; normal deflector added before 20mm moved |
| Mounting plate for signal headlamp | F | 26/09/40 | - | After order | On attack periscope base |
| Extra horizontal bar added at mid-height to deck railings (P90) | R | 03/02/41 | - | After order | Railings differed between some boats; some had misshapen bar at front |
| Breakwaters (P81) | D | 21/05/41 | - | Apr / May / Jun 41 | Retained upon post-operational VIIB training boats |
| Experimental wind deflector (P82/83) | F | - | Late 40, 41 | - | On U 70 and U 71 only; replaced with conventional deflector in 41 |
| Wind deflector (P82) | F | 29/05/41 | Nov 40 | After order | Fitted over course of Dec 40 to Dec 41; not always fitted to Mediterranean boats |
| Shelf at front of tower (P95) | F | 07/05/42 | - | After order | Not universal |
| Additional deck railings outboard of lower platform | F | - | - | Dec 42 | Fitted when Turm II added; sometimes with deck extensions |
| 88mm ammunition hatch on deck (P99) | D | - | - | Spring 43 | Removed with 88mm |
| Dinghy in pressure-tight container (P99) | R | - | - | Spring 43 | Dinghy on port side moved to position vacated by 88mm |
| Deck railings simplified (P100/101) | R | - | - | Spring 43 | Following removal of 88mm deck gun |
| Protective board at top of forward hull casing | F | - | - | Spring 43 | Either leather or wooden, on either side of hull casing |
| Torpedo storage tubes under deck (P99) | D | - | - | Mid war | - |
| Pipes for *Schnorchel* | F | - | - | Nov 43 | Not universal |

| | | | | | |
|---|---|---|---|---|---|
| on deck to starboard side of tower | | | | | |
| One life raft container on port side of forward deck | F | - | - | Late 43 | On some boats only |
| 3 or 4 life raft containers on port side of forward deck (P99) | F | - | - | Late 44 | Usually 4 life rafts, sometimes 3; not universal |

| Modifications specific to Type IXs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Spray deflector (P27) | F | - | - | 39 (before war) | Added before wind deflector |
| 2 grips added above navigation light channel; 4 added below | F | - | - | 39 (before war) | Added after spray deflector, possibly before wind deflector |
| Wind deflector (P27) | F | - | - | Autumn 39 | - |
| Horizontal breakwaters (P26) | F | - | - | Early war | Small feature at either side of deck |
| Vertical breakwaters (P26) | F | - | - | Early war | In front of 105mm; some had horizontal but not vertical |
| Non-waterproof 20mm replaced with waterproof 20mm | R | - | - | Winter 39 / 40 | New waterproof 20mm did not have to be stored below |
| Air supply grills with horizontal bars on sides of tower | R | - | - | Early 40 | 3 sets of grills on starboard side, 2 sets on port side; replaced original multiple sets of round holes (4 to 7 depending on boat) |
| 37mm semi-automatic on aft deck | F | - | - | Usually Dec 40 - May 41 | - |
| Hinged Perspex spray deflector added to top of tower | F | - | - | Early 41 | On some boats only (U 107, U 160) |
| Breakwaters (P26) | D | 21/05/41 | - | 41 / 42 | - |
| Three grills on the outside of the tower near the top of the bulwark (IXBs only) | D | - | - | Spring / summer 41 | U 108 still had the 3 sets of grills (with horizontal bars) in Dec 41 |
| 37mm automatic on aft deck (P34) | R | - | - | Late 42 | Replaced 37mm semi-automatic |
| 37mm automatic on aft deck (P35) | D | - | - | Summer 43 | Deleted from aft deck when Turm IV fitted (37mm moved into position vacated by 105mm on some) |
| Armoured doors in | F | - | - | Mid-war | Not universal |

| | | | | | |
|---|---|---|---|---|---|
| tower (P34) | | | | | |
| Torpedo storage tubes under deck (P44) | D | - | - | Early 44 | - |
| Cut out foredeck (*Schnelltauchback*) (P46) | F | - | - | Jun 44 | List on P17 of *Vom Original IXC* book |
| Torpedo rails on deck | F | - | - | Late war | - |
| *Zweibel* (P47) | F | - | - | Late war | U 889 only |

| Modifications specific to Type XBs | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Pressure tight torpedo containers | F | - | - | Late 42 / early 43 | One on either side, on top of the saddle tanks |
| Breakwaters | D | - | - | Spring 43 | Removed with 105mm deck gun |
| Additional torpedo container on forward deck | F | - | - | Spring 43 | In position vacated by 105mm (on U 219 and U 220 only) |
| 37mm automatic on aft deck | D | - | - | Summer 43 | Deleted from aft deck when Turm IV fitted |
| Life raft containers on forward deck | F | - | - | Late war | 3 on port side, 2 on starboard side |
| Converted for long range transport (U 219) | R | - | - | Jan 44 - Aug 44 | Mineshafts on saddle tanks replaced with cargo holds, *schnorchel* added |
| Converted for long range transport (U 234) | R | - | - | 44 / early 45 | Mineshafts on saddle tanks replaced with cargo holds, twin 37mm fitted, cut out foredeck, *schnorchel* |

# Part IV - Other Modifications

| Turm changes and associated armament arrangements | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Turm 0 (P28) | F | - | - | All early boats | Fitted to all early boats; 1 * 20mm |
| Turm I (P28) | R | - | 42 | None | Tested on U 193 and U 553 only; 2 * twin MG151s upper + 1 * 20mm lower |
| *Mittelmeerturm* (P94) (P28) | R | - | - | Between Aug 42 - Sep 43 | Fitted La Spezia; 2 * twin Breda + 1* 20mm |
| Turm II (P92/93) (P29) | R | - | - | Dec 42 | 1 * 20mm upper + 1 * 20mm lower |
| Turm III (P29) | R | - | Apr / May 43 | - | For VIIDs only; 2 * 20mm; tested for short period then replaced by Turm II |
| Turm IV (P92) (P29) | R | 14/11/42 | - | Spring 43 | 2 * twin 20mm upper + 1 * Vierling lower (later 37mm lower) |
| Turm V | R | 14/08/43 | - | After order | Turm IV + plated forward platform; U 345 & U 362 |
| Turm VI | R | 14/08/43 | - | After order | Turm IV + open forward platform; U 673 & U 973 |
| Turm VII | R | 14/08/43 | - | After order | Platform encircling tower; 1 * twin 37mm forward + 1 * twin 37mm aft |
| Flak towers (P94) | F | 16/04/43 – 20/05/43 | - | Apr - Jun 43 | 1 * Vierling upper + 1* 37mm lower + 1* Vierling forward; U 256 U 441, U 621 & U 953 |
| Flak to Turm IV | R | 11/11/43 | - | Nov / Dec 43 | Flak boats changed to Turm IV |

| Features associated with Turms | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Lattice mesh on tower (P36) | F | - | - | Spring 43 | Part of Turm IV |
| Ammunition containers on tower (P36) | F | - | - | Spring 43 | Part of Turm IV |
| Vierling (P36/37) | F | 14/06/43 | Apr / May 43 | Summer 43 | Initial weapon used on lower Turm IV platform |
| Container tube with 20mm barrel | F | - | - | As above | Fitted along with Vierling |
| 37mm automatic on lower platform (P38) | R | 15/10/43 | - | After order; took time due to supply issues | Replaced Vierling on lower platform |
| Container tube with 37mm barrel (P93) (P38) | F | - | - | As above | Fitted along with 37mm automatic |
| Twin 37mm automatic (P37) | R | - | - | Late war | Replaced single 37mm; only a few boats fitted |

| Radar | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| FuMO 29 | F | - | Late 41 | 42 | - |
| FuMO 30 | R | - | 13/12/42 | Late 42 / early 43 | Replaced FuMO 29 |
| FuMO 61 | R | - | Aug 43 | Mar 44 | Replaced FuMO 30 |

| Radar warning sets | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| FuMB 1 *Metox* | F | 26/08/42 | Jul 42 | Aug 42 | Took time to implement banned Aug 43 |
| FuMB 2 *Metox* | R | - | - | Late 42 or early 43? | This version replaced first *Metox* version |
| FuMB 9 *Wanze* G1 | F | - | - | Aug 43 | Replaced *Metox*; banned 05/11/43 |
| FuMB 9 *Wanze* G2 | R | - | - | Late Nov 43 | Replaced *Wanze* G1 |
| FuMB 7 *Naxos* | F | - | Jun 43 | Oct 43 | - |
| FuMB 10 *Borkum* | F | - | - | Nov 43 | *Borkum* used in conjunction with *Wanze* G2 and *Naxos* |
| Improved FuMB 7 *Naxos* | R | - | - | Early 44 | Replaced earlier *Naxos* version |
| FuMB 24 *Fliege* | F | - | - | Apr 44 | Used FuMB Ant 24 *Cuba 1* |
| FuMB 26 *Tunis* | F | - | - | Mid 44 | Combination of FuMB 24 *Fliege*, FuMB Ant |

| | | | | | |
|---|---|---|---|---|---|
| | | | | | 24 *Cuba 1* and FuMB Ant 25 *Müecke*; replaced *Naxos* |
| FuMB 35 *Athos* | F | - | - | Sep 44 | Very rare |
| FuMB 37 *Leros* | F | - | - | Very late war | XXIs only |

| **Radar warning antenna** (P38-42) | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| FuMB Ant 2 *Biskayakreuz* | F | 26/08/42 | Jul 42 | Aug 42 | Used with *Metox* until Aug 43, carried inside boat thereafter |
| FuMB Ant 3 *Bali 1* | F | 13/03/43 | - | 43 | Also known as *runddipol*; also added to *schnorchel* heads |
| FuMB Ant 5 *Samoa* | F | - | - | 43 | Dipoles fitted to FuMO 30 antenna |
| FuMB Ant 11 *Finger* | F | - | - | Around Oct 43 | - |
| FuMB Ant 4 *Sumatra* | F | - | - | 44 | Dipoles fitted to FuMO 61 antenna |
| FuMB Ant 24 *Cuba 1* | F | - | - | Mid 44 | - |
| FuMB Ant 25 *Müecke* | F | - | - | Mid 44 | - |

| **Countermeasures** (P102) (P43/44) | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| *Bold* | F | - | - | 42 / early 43 | - |
| *Bold 4* | R | - | - | 44 | Replaced *Bold* |
| *Bold 5* | R | - | - | 44 | Replaced *Bold 4* |
| FuMT 1 *Aphrodite* | F | 05/06/43 | Jun 43 | Sep 43 | Hydrogen bottles initially on tower; later added under tower floor |
| FuMT 2 *Thesis* | F | - | - | Jan 44 | Removed spring 44 |
| FuMT 4 *Thesis US* | F | - | 44 | None | Not fitted to operational boats |
| *Tarnmatte* | F | - | - | Late war | To *schnorchel* heads |
| *Bachen-Netz* | F | - | Autumn 43 | ? | To U 968 |
| *Schornsteinfeger* | F | - | Late 43 | ? | - |
| *Alberich* | F | - | 40 | Late war | Tested on U 11 in 1940; fitted to 14 U-boats in total |

| Experimental rockets | | | | | |
|---|---|---|---|---|---|
| **Feature** | **F, D or R** | **Order date** | **Tested** | **To op. boats** | **Other information** |
| Wurfkörper 30cm Wk.Spr.42 | F | - | 31/05/42-05/06/42 | - | U 511; 6 rockets on on aft deck |
| 15cm Borsig | F | - | Early 43 | - | U 511 |
| RAG 8.6mm | F | - | Jun 43 | - | U 984 and U 994 |
| RAG 8.6mm | F | - | Oct / Nov 43 | - | U 441 |
| 30 rockets on tower | F | - | Early 44 | - | U 986 + another boat |
| Wurfkörper 30cm or Wurfkörper 21cm | F | - | Jun 44 | - | U 24 at Constanta |
| Wurfkörper 30cm or Wurfkörper 21cm | F | - | Jul 44 | - | U 9 at Constanta |
| RAG 8.6mm/Wurkörper | F | - | Aug 44 | - | U 19 at Constanta |
| Solid fuel | F | - | Late 44 | - | U A in Baltic |
| *Laffrentz* (towed floating pontoons) | F | - | Late war | - | U 1063 |

# Part V - Identification Features Of U-Boat Variants

The following is a list of some of the more common identification features which I have found useful in identifying a sub-variant or a batch of U-boats from a particular shipyard. As previously mentioned, these identification features were not retrofitted to existing boats. Also of note is that the U-numbers are inclusive (U 21 to U 24 would refer to U 21, U 22, U 23 and U 24).

One very helpful resource in identifying boats is Georg Högel's *U-Boat Emblems Of World War II 1939-1945* (Schiffer Military History, 1999). The book includes a large number of personal and flotilla insignia, UAK and training symbols, all of which can directly identify particular U-boats.

## Identifying main types

The main types of U-boat operating within the Kriegsmarine were the IA, II, VII, IX, XB, XIV, XXI and XXIII. In addition, there were a limited number of experimental Walter boats (V80 and a few XVIIs) and a few foreign boats which were pressed into naval service. However, for the most part, the U-bootwaffe consisted of the main types above. Assuming you are presented with a good view of the upper hull then it is usually quite uncomplicated to determine the type of U-boat.

The first thing to ask is if the boat is a conventional boat or an Elektroboat. The streamlined hulls of the Elektroboats (XXIs, XXIIIs and research boats) make identification of these late war types very straightforward. It does not take long to familiarise oneself with the two main Elektroboat types and be able to distinguish between the large ocean going XXI and the small coastal XXIII.

If you see a photo of a conventional U-boat, look at the main drainage area in the central area of the boat. If the main drainage area has a long line of rectangular drainage holes then you are looking at a IA, IX or XIV. If there is an additional line of drainage holes directly above the rectangles then the boat is an XIV. If this long line is not present, then the boat will be either a IA or IX. It is possible to mistake a IA for an IX but the section below (Identifying characteristics of Type IAs) should provide some clues as to how to tell apart the two types.

If the main drainage area does not have rectangular holes then you are looking at a small Type II or a medium size VII. After some study into shapes and profiles, it usually possible to tell the

difference between the small Type II and its larger brother, the VII. Other than size, the tower profile and vent patterns allow us to differentiate between the two types with relative ease.

Now that you know the type (e.g. Type VII) you can then try to narrow it down into a sub-variant (VIIB) and then, if possible, into batch (e.g. U 54 to U 55). Some of the information required in this process is presented below.

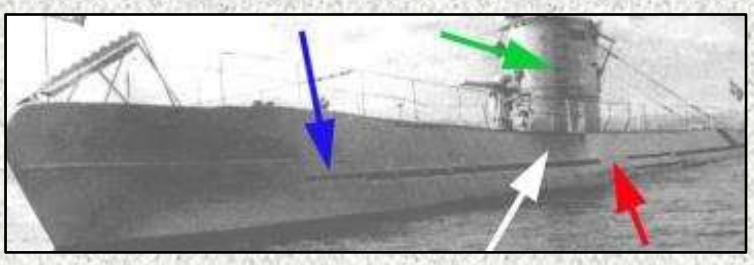
## Identifying characteristics of Type IAs

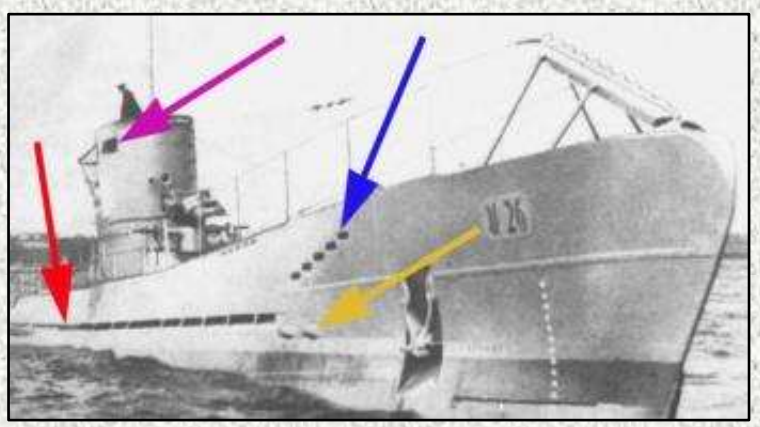
The two large Type IAs (U 25 and U 26) are very reminiscent of the very early IXAs. One method of distinguishing between the two types is to look at the top of the hull casing in the area outboard of the deck gun. On the IAs this area bulged outwards whereas on the IXAs this area was flat. Another distinguishing feature - one which is unique to the Type IA - is the position of the navigation lights high up on the tower. One more is the tower rungs - the IAs had nine rungs arranged vertically on the port side but none on the starboard side.

Care should be taken over the vents as more were added to the boats prior to the war. Details of the additional vents can be found in Part III of this article (P163).

Above right (F1): U 25 before any modifications were made to the vent patterns. The green arrow points to the nine grips arranged vertically on the port side of the tower. The white arrow points to the bulge in the area of the deck casing around the deck gun.

Below right (F2): U 26 after the vents had been altered. The blue arrow shows how the new vents were arranged in a diagonal line rather than the horizontal line that can be seen in photo 1. The two extra covered vents are illustrated by the orange arrow. The red arrow points to the seven extra vents added along the centre of the boat. Lastly, the purple arrow points to the navigation light and its unique location high up on the tower of Type IAs.






## Identifying characteristics of Type IIs

Vent patterns - A basic overview of the Type II vent patterns is given below. For more details please refer to the article "*Type II U-Boat Modifications & Vent Patterns*".

Front vent patterns -

- U 1 to U 6, U 7, U 13 to U 16 - 7 vents.
- U 8 to U 12, U 17 to U 20 - 9 vents (second from front was two much smaller ovals).
- U 21 to U 23 - 11 on top; 8 on bottom.
- U 120 and U 121 - 7 on top; 2 on bottom.
- U 56 to U 63 - 24 vents and two small circles above mid-hull plus multiple on front set.
- U 137 to U 139 - 23 vents and two small circles above mid-hull plus multiple on front set.
- U 140 - double row above mid-hull plus multiple on front set.
- U 141 to U 152 - row above a main drainage area; double row ahead of drainage area;

multiple on front set.
Note 1: The numbers above show the number on the starboard side; the port side had one or more extra vents due to the absence of anchor recess.
Note 2: The numbers show the vents originally on boats before any additions.

Rear vent patterns -
- IIAs, IICs and IIDs, U 13 to U 16, U 19 - 12 vents.
- U 7 to U 12, U 17, U 18, U 20 to U 24, U 120, U 121 - 11 vents (two of the vents consisted of two circles rather than ovals).

Lower vents - In regard to the vents ahead and below the forward dive plane, the IICs and IIDs were different in that pairs of vents were merged to form 27 large vents. (P114)

Saddle tank vents - The IIDs are clearly identifiable by the extra lines of vents in their saddle tanks. At the bottom side of each saddle tank there was a curved line of 13 vents at the front and 12 at the rear. Additionally there were more vents higher up, with seven at the front (or nine on some boats) and six and the rear. (P113/114)

Tower styles -
- Style 1 (U 1 to U 6) - dashboard, no wheel.
- Style 2 (U 7 to U 12) - dashboard, no wheel, D/F loop on outside.
- Style 3A (U 13 to U 20) - D/F loop in housing, large navigation light housing.
- Style 3B (U 21 to U 24) - D/F loop in housing, normal light channel.
- Style 3C (U 56 to 60, U 62, U 63) - D/F loop in housing, narrow light channel.
- Style 4A (U 61) - large tower with bars, no spray deflector, two curves on top of bulwark.
- Style 4B (U 120, U 121) - large tower with bars and magnetic compass fairing, unique light housing.
- Style 4C (U 137 to U 152) - large tower with bars.

Note 1: Wintergartens and machine guns on bulwark were added to Black Sea boats and some IIDs.
Note 2: The spray deflector was present upon the IIDs plus U 120 and U 121. With the exception of U 21, it was not retrofitted to existing boats.

Pre-war bow identification plates - The IIAs had rectangular pre-war bow identification plates; IIBs and IICs had oval identification plates. (P107)

Six circular plates near bow - These six plates per side were exclusive to the IICs and IIDs. (P111)

U 6 - The deck style on U 6 consisted of small circles rather than slots. (P126)

U 9 - U 9 can be distinguished by the metal Iron Cross insignia on either side of the tower. (P106)

U 11 - The experimental tower was tested in February and March 1938 was then replaced by the normal tower. The *Alberich* coating was applied to the tower and hull in 1940. (P127)

Kort nozzles - The shrouds around the propellers were applied to IIDs (and U 16). (P113)

Air identification plate - The semi-circular air identification metal plate was placed behind the gun position and orientated sideways on U 120, U 121 and the IIDs. (P126)

**Identifying characteristics of Type VIIAs**

VIIAs - There are three major identifying characteristic of the VIIAs -

- Single rudder (as opposed to the pair of rudders on other VII variants).
- Torpedo tube on the aft deck.
- Vents running along the top of the hull casing (quite different from other VII variants).

Another exclusive VIIA feature was the mesh added within the stanchions on the forward deck railings.

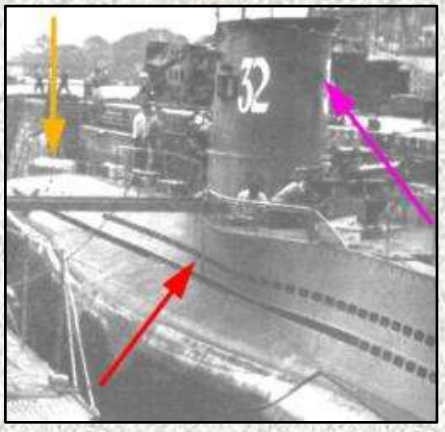
There are a number of shipyard specific features on the VIIAs and some are listed below.

*AG Weser* VIIAs (U 27 to U 32) - The main methods of identifying boats from this batch are -

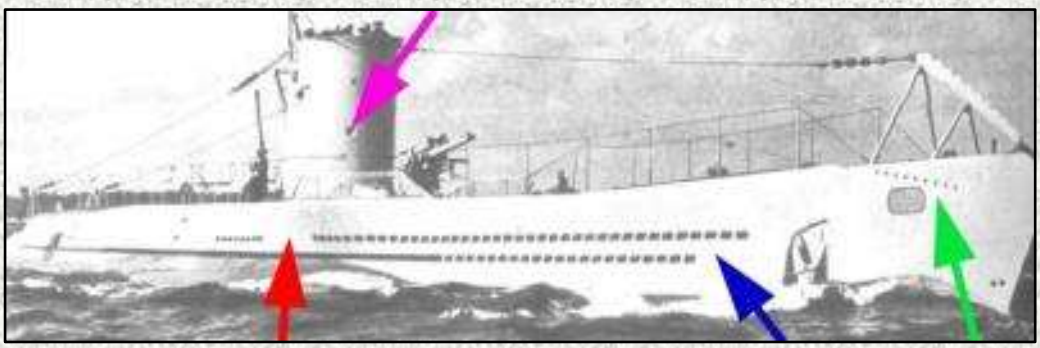
- Above the saddle tanks, the main vents ran in an unbroken line from the front all the way back to behind the tower.
- In the main forward pattern on the port side, on the top line, the third vent back from the front was missing.
- There were four circular holes near the bow.
- On the front of the tower, the foghorn opening was higher up and slightly offset to port.
- On the tower, the square and circle markers were **above** the two square drainage holes.

*Germaniawerft* VIIAs (U 33 to U 36) - The main methods of identifying boats from this batch are -

- There was a noticeable gap in the main vents above the saddle tanks.
- In the main pattern on the starboard side, the front three vents on the bottom line were missing.
- There was an extra 16 circular holes at the top of the hull casing (eight small ovals on U 33).
- There were nine circular holes near the bow.
- On the front of the tower, the foghorn opening was lower down up and slightly offset to starboard.
- On the tower, the square and circle markers were **below** the two square drainage holes.




Right (F3): An *AG Weser* VIIA, U 32, showing the unbroken line of vents running above the saddle tanks. The purple arrow shows the position of the large foghorn opening on the *AG Weser* boats. The orange arrow points to the aft torpedo tube, which protruded out of the aft deck.



Above (F4): Four VIIAs, such as U 35 pictured here, were built at the *Germaniawerft* shipyard. These had several vent pattern differences compared to the *AG Weser* boats: the red arrow shows the vents missing along the main pattern; the blue arrow shows the three vents missing near the front (on the lower row); and the green shows the nine circular holes (as opposed to four on the other batch). Lastly, the purple arrow points to the foghorn opening, which can be compared to the photo of U 32 above.

## Rear jumping wires of early VIIs

There were several key differences in the rear jumping wires mounted behind the tower.

Two jumping wires, with extra wires on starboard side - These additional wires were present on the **starboard** side of the rear jumping wires **only** on the VIIAs in the pre-war period.

Single rear jumping wire (early tower) - Around the start of the war, with the 20mm still on the aft deck, the double jumping wire arrangement on the VIIAs was cast aside in favour of a single rear jumping wire. This exclusive feature of the VIIAs was unique in that there were two connector bars. One connector was located between the top of the tripod supports and another connector was located between the two jumping wires (just behind the tower).

Single rear jumping wire (late tower) - The single rear jumping wire was retained upon the VIIAs when the rear tower was rebuilt to accommodate the 20mm. However, in this configuration a single jumping wire ran back from the top railing on the tower.

Two jumping wires, with extra wires on port side - These additional wires were present on the **port** side of the rear jumping wires **only** on the following boats (P86) -

- Early VIIBs (U 45 to U 55, U 99 to U 102).
- Early VIICs (U 93 to U 98).

Two jumping wires, no extra wires - This was the configuration that became standard and it was employed upon all VIIBs and VIICs not listed above.

## Identifying characteristics of Type VIIs (A, B and C)

When studying the points below, it is helpful to know which batches were built and launched first. The first VIIC *Germaniawerft* batch was U 93 to U 98 and these were built slightly earlier than any other VIICs. U 69 to U 72 were originally going to be numbered as 99 to 102 (directly following on from 93 to 98) but then the batches were reserved, with U 69 to U 72 swapping numbers with U 99 to U 102 (99 to 102 became VIIBs). The batch U 69 to U 72 became the second VIIC batch built at *Germaniawerft*. Built and launched at the same time period were the early *Blohm & Voss* boats U 551 to U 558.

VIIAs and early VIIBs - If you spot the following features then the boat is either a VIIA or an early VIIB (U 45 - U 55) -

- Early attack periscope base (P71).
- 20mm on aft deck (P71).
- Numerous small round ventilation holes on both sides of the tower (P71).
- An alternative set of deck railings which included a seat on the rear set (P77).

Note: All existing boats had the 20mm re-sited to an enlarged rear tower in the winter of 1939 / 1940 (P72/73).

KDB cover - Up to and including the early part of 1940, a cover was often in place over the raised KDB in port photos of VIIBs. After this period this feature is generally absent.

Slope of trailing edge - One major identifying characteristic of the VIIAs and VIIBs, when the 20mm was located on the tower, was that the trailing edge undercut the rear of the tower. On VIICs the trailing edge sloped in the opposite direction (P78).

Air intake and trunking - This is a very good way of identifying early VIIAs and VIIBs. The air trunking issue was an issue which plagued the VIIAs and VIIBs, with all but the last of the methods adopted to address this problem proving to be unsatisfactory. The arrangement employed in the VIICs was presumably acceptable as no modifications to the intakes were ever required on this sub-variant. If you do see any of the following features, you can assume you are looking at a VIIA or VIIB and can pin the photo down to the following time periods -

- Multiple small circular holes on the outside of the starboard side of the tower (1938 or 1939) (P71).
- Extra grill with vertical bars on starboard side (early 1940 to late summer 1940) (P74/75).
- L-shaped trunks on either side of tower (summer 1940 to spring 1941) (P75).
- Teardrop shaped fairing in middle of tower (spring 1941 onwards) (P75).

Note 1: U 48 had the grill with vertical bars in August 1939.
Note 2: U 30 had the L-shaped trunks in the spring of 1940.

L-shaped trunks - There were different styles between the air trunks on VIIAs and VIIBs -

- Sharper edged shaped trunk with horizontal grill at top (U 29 to U 32, U 34, U 74, U 85, U 99 and U 101).
- Rounded trunks with criss-cross grill on vertical sides (U 46 to U 48).
- Rounded trunks with a grill with vertical bars on vertical sides (U 52, U 73, U 75 and U 83).

Note 1: The boats which were sunk before they were able to be fitted with the trunks are U 28, U 33, U 35, U 36, U 45, U 49, U 50, U 53, U 54 and U 55.
Note 2: U 28, U 51, U 76, U 84, U 86, U 87, U 100 and U 102 would have had trunks but I have no information on the style employed.

Slat intake grills - This was a feature on U 69 to U 72, U 93 to U 98, U 331, and U 551 to U 557. The known styles are as follows (P79) -

- SG1 - U 95 (no lip), U 96 and U 97.
- SG2 - U 69, U 71, U 93, U 94 and U 331 (U 331 had seven spaces, the rest had six spaces).
- SG3 - U 552, U 553, U 555 and U 557.

Note: Presumably all *Blohm & Voss* boats from U 551 to U 557 had SG3.

No mast antenna housing - The following early VIICs did not have the mast antenna housing (MAH) -

- U 69 to U 72, U 93 to U 98, U 331, and U 551 to U 557 (these boats had the slat gill) (P80).
- U 558 to U 574 plus other boats including U 392, U 651 and U 751 (these boats had the mesh grill) (P80).

Tower top edge - The top edge of the tower had a shallower curve on (P74) --

- All VIIAs.
- Early VIIBs (U 45 to U 53).

Note: Other VIIBs boats not listed above, and all VIICs, had a more pronounced curve at the top of the tower. It is likely, but not certain, that the VIIBs U 54 and U 55 had the more pronounced curve.

Housing for weather balloon bottle and filler hose - This housing was present ahead of the sky periscope housing on the towers on (P84) -

- All VIIAs.
- Early VIIBs (U 45 to U 55, U 99 to U 102).
- Early VIICs (U 93 to U 98).

Note: Previously referred to as a mobile voice pipe.

Coping - The coping was **not** present around the whole of the tower bulwark on (P85) -

- All VIIAs.
- Early VIIBs (U 45 to U 55, U 99 to U 102).
- Early VIICs (U 93 to U 98).

Early attack periscope base - The early style featured on (P71) -
- All VIIAs.
- Early VIIBs (U 45 to U 55).

Standard attack periscope base - The standard style featured on (P88) -
- Mid and late VIIBs (U 73 to U 76, U 83 to U 87, U 99 to U 102).
- All VIICs.

Note: There were some differences in the railings employed upon the standard attack periscope base.

One-piece wooden seat on tower - This one-piece wooden seat on either side of tower was a shipyard specific item employed upon the following *Germaniawerft* boats -
- All VIIAs.
- U 45 to U 54, U 99 to U 102 (VIIBs).
- U 93 to U 98, U 201 to U 212 (VIICs).

Note: All other boats had three separate seats on either side of the tower.

Tower floor drainage pattern - On the tower floor, the VIIBs and early VIICs built at *Germaniawerft* had the drainage slots in the tower floor aligned with the length of the boat.
- All VIIAs.
- U 45 to U 54, U 99 to U 102 (VIIBs).
- U 93 to U 98, U 201 to U 212 (VIICs).

Note: Other boats not listed above had the main groups of square drainage slots arranged in groups which were aligned towards the 20mm mount.

Small forward radio aerial inlet - Above the spray deflector, offset slightly to starboard, was the forward radio inlet. The following boats had the **small** forward radio inlet (P85) -
- All VIIAs.
- Most VIIBs (U 45 to U 55, U 73 to U 76, U 83, U 99 to U 102).
- Very early VIICs (U 93 to U 98).

Note: U 52 originally had the smaller inlet but it appears to have been retrofitted with the large radio inlet (the larger inlet is visible when U 52 was a post operational training boat in late 1941 or 1942). However, U 46, U 48 and U 101 all have the small inlet during this same period so this feature cannot have been retrofitted to all boats.

Large forward radio aerial inlet - The following boats had the **large** forward radio inlet (P85) -
- Very late VIIBs (U 85 to U 87).
- All VIICs with the **exception of** U 93 to U 98.

Note: I do not have information regarding the inlet on U 84.

L-shaped radio connectors at the rear of tower - The feature was **not** present on (P86) -
- All VIIAs.
- Most VIIBs (U 45 to U 55, U 73 to U 76, U 83, U 99 to U 102).
- Very early VIICs (U 93 to U 98).

Note: Boats such as U 73 and U 83 had this feature added when their towers were changed to the *Mittelmeerturm*.

The feature **was** present on (P86) -

- The very late VIIBs (U 85 to U 87).
- All VIICs with the **exception of** U 93 to U 98.

I do not have information regarding the connectors on U 84.

Navigation lights on tower - Both of the side navigation lights on either side of the tower, and the single navigation light at the rear, varied between batches and may be used to differentiate between boats (P87).

Deck railings - The deck railings also varied between some boats (P90/91).

No stern torpedo tube - U 83, U 203, U 331, U 352, U 401, U 431 and U 651.

Two forward torpedo tubes only - U 72, U 78, U 80, U 554 and U 555.

Mediterranean boats - For VIIBs and VIICs operating in the Mediterranean theatre, look out for a *Mittelmeerturm* tower or for splotch type camouflage patterns (P32/94).

Planked deck - From the autumn of 1942, all new build VIIs were built with planked decks rather than slotted decks. This feature was not retrofitted to existing boats. We may surmise that (P96/97) -

- If you see a slotted deck then the boat was built before the autumn of 1942.
- If you see a planked deck then the boat was built in the autumn of 1942 or later.

*Schnorchel* - If this device was fitted to the port side of the deck then it is a Type VIIC or VIIC/41. A helpful list of each individual boat that was fitted with the *schnorchel*, including the month this feature was added, can be found at - http://www.uboat.net/technical/schnorchel_fitted.htm

Atlantic bow - As discussed in more detail in the article "*Late War Type VIIC & VIIC/41 Configurations*", although the order to implement the Atlantic bow was issued on the 19th July 1941 the feature began to appear on launched boats towards the end of June 1942. With the exception of a few boats, most VIICs were being launched with the Atlantic bow by November 1942. This feature was not exclusive to VIIC/41s and was fitted to late VIICs and VIIC/41s.

Radar drive shaft housing - On the majority of early VIICs there was a semi-circular bulge on the port side of the tower. This was used to house the shaft for the mast antenna and, in the mid-war period, the shaft for the radar antenna. In the final VIIC/41s, including U 400, U 825, U 826, U 953, U 1056, U 1305, the towers were not built with the normal semi-circular housing but with an alternative housing consisting of a rectangular shape with rounded edges.
Note: My thanks to Simon Morris for this information.

## Vent patterns for VIIBs and VIICs

Main vent patterns - The differences are covered in the article "*Type VIIC Free-Flooding Vent Patterns*" within the original Wolf Pack collection. In particular you should be looking at the main vent patterns ahead of the saddle tanks (P52-54).

Round exhaust outlet - If you see a VIIB with a round diesel exhaust outlet, the photo will have been taken prior to around the summer of 1940. The boat must be U 45 to U 55, or U 99 to U 102. It cannot be a later VIIB or any of the VIICs (P73).

All VIIBs - The easiest way to distinguish a VIIB from a VIIC is to look for the following features, which are specific only to VIIBs -

- Extra group of vents at the rear of the front pattern (P77/78).
- No vents above upper torpedo door (P58).
- One vent near stem (rather than two or three on the VIICs) (P59).

Curved line of vents - These vents, directly above the central drainage area in the area vacated by the breakwaters, differed between boats (P60/61).

Paired circular vents above torpedo doors - If these 12 holes are arranged in pairs the boat was built in the *Blohm & Voss* shipyard (P59).

Four extra medium-sized vents above saddle tanks - If the VIIB or VIIC had these extra four single vents then the boat was constructed in the *Bremer Vulkan-Vegesacker Werft* shipyard (P57).

## Identifying characteristics of other Type VII variants

VIIDs - These six minelayers (U 213 to U 218) were nearly ten metres longer than VIICs. A plug within the centre section of the boat allowed five vertical mineshafts to be located abaft the tower. The top of the mineshafts protruded out of a long thin structure that can be seen directly behind the tower and it is this structure which makes identification of this sub-variant straightforward.

Certain complications arose on this sub-variant when additional armament was deemed necessary. The additional guns were normally added within an additional lower platform directly behind the original tower. However, there was no space for a lower platform on the VIIDs due to the presence of the mineshaft structure. The original proposal to negotiate this problem was Turm III, which had an upper platform - with a pair of guns sitting side by side - and no lower platform. It is not clear how many boats were converted to Turm III or how long this arrangement lasted for. In any case, this arrangement was apparently not considered satisfactory because VIIDs were fitted with a form of Turm II in late 1942 or early 1943.

Later in 1943, when additional armament was considered essential, U 218 was given a form of Turm IV. By the latter stages of the war U 218 possessed the standard fit of a pair of twin 20mms on the upper platform and a 37mm on the lower platform. On the forward deck of this boat, the old magnetic compass fairing had been replaced by the free-standing *Askania* type, a *schnorchel* was present, and there was a hatch in the location vacated by the 88mm deck gun. Unlike many boats in this period, the forward deck railings were retained.

Above (F5): U 213 showing clearly the small superstructure which was abaft the tower on all VIIDs. The five vertical mineshafts were in place along the length of this structure, right up to the rear end of the Turm 0 tower.

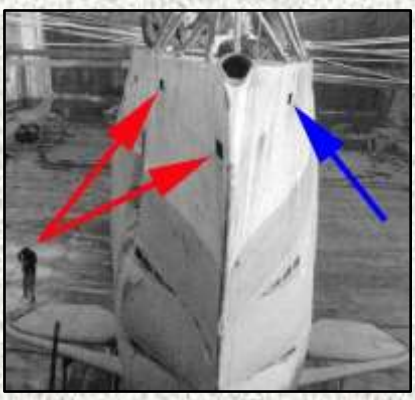
Right (F6): U 218 in September 1943 with a form of Turm II, consisting of a gun with shield on the upper platform and a single 20mm on the lower platform. Comparison with the photo of U 213 above shows the problem associated with any form of lower platform on VIIDs, namely that the lower platform obscured the top of a few of the mineshafts.

VIIFs - These four boats (U 1059 to U 1062) were intended as torpedo transports. Ten metres longer than VIICs, they can easily be distinguished by their extended length and by the double row of vents which ran along the hull casing above the saddle tanks.

## Identifying characteristics of Type IXs

Bow vent patterns - An easy way to distinguish between early and late variants is by looking at the vents at the top of the bow area.

- All IXAs and IXBs, port side - 1 vent (3 metres back from bow).
- All IXAs and IXBs, starboard side - 1 vent (3 metres back from bow) and another vent lower down and next to stem.
- All IXCs and IXDs, port side - 2 vents at top (3 metres and 4 metres back respectively).
- All IXCs and IXDs, starboard side - 2 vents at top (3 metres and 4 metres back respectively).



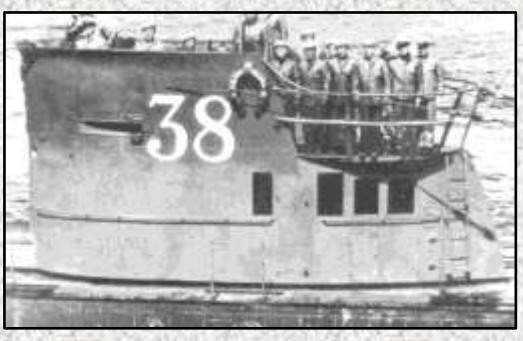
Left (F7): Looking directly at the bow of U 103 in a Lorient dry-dock, we are afforded a view of both sides of the bow. The red arrows point to the two vents on the starboard side while the single blue arrow points to the vent on the port side. This arrangement was in place on the IXAs and IXBs.

Right (F8): The arrangement on the IXCs and IXDs had two vents at the top (same on both sides).

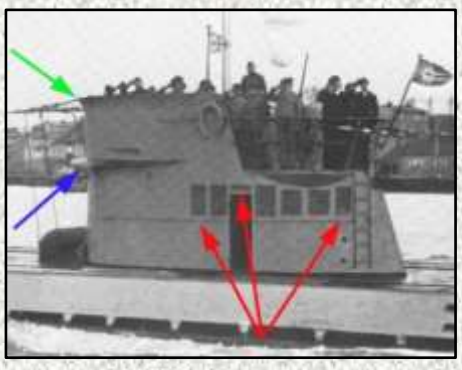
Main vent patterns - The IXC and IXC/40 patterns can be found on page 26 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle.

Deck railings - Refer to page 17 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle.

Sets of air intake holes on tower (IXAs only) - The first Type IXs built (IXAs) originally had between four and seven sets of air intakes per side on the outside of the tower. Each set consisted of a number of small circular holes. The number of sets varied between boats and this is a good way of identifying particular boats. This feature was removed in early 1940 to make way for what would become the standard IX intakes, which consisted of two sets of grills on the port side and three sets of grills on the starboard side.




Left (F9): The IXA U 38 in the pre-war period. There is no spray deflector (halfway up tower) or wind deflector at all. Note the four sets of intake grills at the rear of the tower, the number of which varied on the IXAs.



Left (F10): The IXA U 37 in the early-war period. The red arrows show seven intake groups of intake as opposed to the four of U 38. The green arrow points to the curve at the top of the tower, which was shallower on the very early boats. The blue arrow indicates the spray deflector built just above midway up the tower. Later this would be further extended to the rear.

Left (F11): A wartime shot of the IXA U 38 in the pre-war period. We can see the spray deflector extending all the way back to the rear of the bulwark. Another obvious feature is the presence of the full-length wind deflector at the top of the tower. An additional point to notice is that two of the four intake groups have been removed, leaving only two in place.

Position of 105mm deck gun - One of the main ways to distinguish a Type IXA from later variants is to look for the position of the 105mm deck gun. On IXAs the gun was forward of the entry hatch; on IXBs and IXCs the gun was behind the entry hatch.

Grips above and below navigation light channel - When launched, the earliest IXAs had no grips on the side of the front tower. In late 1939, U 37, U 38 and U 39 were given six grips on each side of the tower, two directly above the navigational light channel and four below the spray deflector. U

43, U 44 and all subsequent boats had the grips farther back on the tower (behind the navigation light). It is unclear where the grips were added to U 40, U 41 and U 42.

Grill intakes near to top of tower - The IXB was the only sub-variant which **did have** the three sets of grill intakes (with horizontal bars) per side on the outside of the tower, near to the top of the bulwark. These were removed, starting around the spring of 1941.

Left (F12): The three sets of grill intakes at the top of the tower on U 106 marks this boat as an IXB. When the grills were removed in 1941, the wind deflector was not extended to the rear of the bulwark. Therefore, the presence of a shorter wind deflector or the three grill intakes can be said to be identification features of the IXB variant.

Periscopic rod aerial housing - This feature on the port side of the tower was **not** present on -

- All IXAs (U 37 to U 44).
- Early IXBs (U 64, U 65, U 103 to U 107, U 122 to U 124).

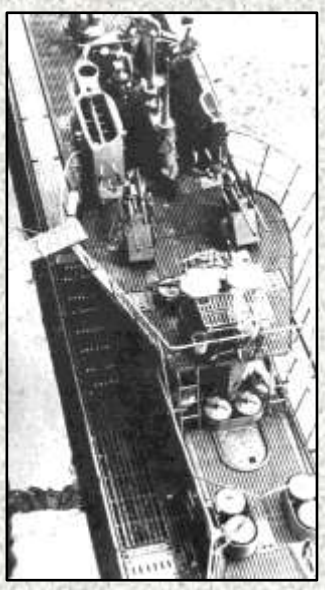
This feature was present on -

- Later IXBs (U 108 to U 111).
- All IXCs.
- All IXDs.

Long range radio mast - This feature was supposedly fitted to U 183, U 184, U 185 and U 187.

Covers for torpedo storage tubes - There was an initial style, employed pre-war upon U 37, with a semi-circular bulge. But the two main styles were the metal type (with five rows of circular holes) and the wooden type (with seven planks). I have not been able to establish any pattern between boats and batches. Furthermore, photos sometimes show a mix of styles employed upon a boat at same time.

Below (F13): The IXD U 862 late in the war. The Turm IV towers on this sub-variant were much larger than the usual Turm IVs, with a large area containing ready use ammunition lockers at the rear of the top platform and a long rectangular area at the front of the lower platform.



IXDs - The 30 Type IXDs were heavier and almost ten metres longer than earlier variants. These were initially fitted with Turm 0, with U 200 having this arrangement in May 1943. Later in 1943 they were replaced with the Turm IV arrangement.

Planked deck - From the autumn of 1942, all new build IXs were built with planked decks rather than slotted decks. This feature was not retrofitted to existing boats. We may surmise that (P45) -

- If you see a slotted deck then the boat was built before the autumn of 1942.
- If you see a planked deck then the boat was built in the autumn of 1942 or later.

Cut out foredeck - Known as *Schnelltauchback*, implementation began in June 1944. A list appears on page 17 of *Vom Original zum Modell: Uboottyp IXC* by Fritz Köhl and Axel Niestle. (P46)

*Schnorchel* - If this device was fitted to the starboard side of the deck then it is a Type IX or XB. A helpful list of each individual boat that was fitted with the *schnorchel*, including the month this feature was added, can be found at - http://www.uboat.net/technical/schnorchel_fitted.htm

## Identifying characteristics of other types

XBs - These eight boats were the largest and heaviest U-boats in Kriegsmarine service and were more often employed in the supply role rather than as minelayers. In the centre section, just outboard of the hull casing, there is a long, wide, horizontal area populated with mineshafts. This horizontal surface bends to meet the vertical sides of the hull casing, lending the type an ungainly appearance which cannot be mistaken with any other type. There was also a set of mineshafts on the forward deck.

Above (F14): Clearly visible on this XB photo are the large round vertical mineshafts on the long, flat horizontal surfaces of the saddle tanks. In late 1942 and early 1943, a long tubular pressure tight storage container was added over this area.

Below (F15): The XB U 119 on the 17th August 1942. The blue arrow points to the curve between the vertical hull casing and the long horizontal area on either side of the hull. The green arrow points to the mineshafts.

The Turm II on the XBs was quite short, allowing space for the 37mm on the aft deck to be retained.

XIVs - These ten U-boats (U 459 to U 464, U 487 to U 490) were used in the resupply role, transferring torpedoes, fuel and supplies to VIICs and IXs at sea. Although these boats were the same length as the VIICs, the XIVs displaced over twice the weight and were 50% wider than the VIICs. This inevitably resulted in a fatter boat, with a much wider deck and a chubby stern. As they were not designed to sink shipping, the XIVs were not fitted with a deck cannon.

On first glance it is possible to mistake an XIV for an IX so we should be aware of a few helpful identification aids. Firstly, unlike IXs, the Type XIVs had no magnetic compass fairing at the front of the tower (U 459 did initially have this feature but it was removed in early 1942). Secondly is the main drainage area. Both the IXs and XIVs had the line of rectangular shaped holes but the distinguishing feature here is that the XIVs had an additional (and very long) row of vents on top.

As with all types, additional armament was added in the mid-war period. In mid-June 1943, U 462 had an additional separate flak platform (with a Vierling) added behind the tower, with a walkway to enable crewmembers to pass to and from the main tower. In the summer of 1943, U 488 had a lower platform (with a Vierling) added and an additional array of vents immediately at the top of the hull casing.

For additional study on this type, please refer to the definitive source on the subject, Axel Urbanke's *Suppliers Of The Grey Wolves: The Story Of The German Submarine Tankers 1941 - 44* (Luftfahrtverlag-Start, 2013).

Far left (F16): A characteristic feature of the XIVs is the single line of medium-sized free-flooding vents running in an unbroken line just above the main drainage area.

Near left (F17): The plump rear end of the Type XIVs lends it an appearance which sets it apart from other types.

Elektroboats - The streamlined hulls of these more advanced U-boats (XXIs and XXIIIs) are completely different from any of the conventional types. It is also very simple to distinguish between the two types, with the ocean going Type XXI being far larger than the coastal Type XXIII.

Experimental boats - There were several research U-boats built to test the Walter propulsion system - the V-80 prototype, two XVIIAs, three XVIIBs.

Foreign U-boats - There were a few foreign boats which were commissioned into Kriegsmarine service. The only one of real note is the U A, a large, ungainly U-boat built for the Turkish Navy as the *Batiray*. When war broke out this boat was withheld from Turkey and pressed into Kriegsmarine service.

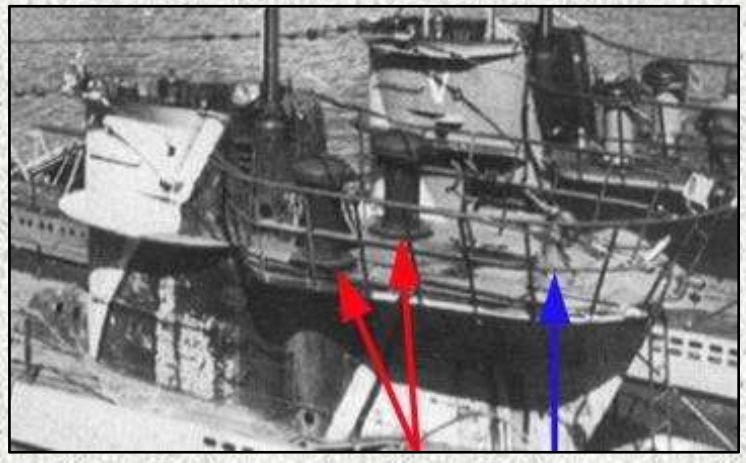
Above (F18): Unless we are having a spectacularly bad day at the office we cannot mistake U A for any other boat in Kriegsmarine service. As can be seen in this photo, taken in December 1941, the 105mm is partially enclosed at the front end of the tower and a row of viewing ports is just behind. The spray deflector mounted halfway up the tower is a feature we are used to seeing upon U-boats but this elongated version on U A must surely win the prize for the longest deflector.

## Identifying characteristics of tower (Turm) versions (P93/94) (P28-32)

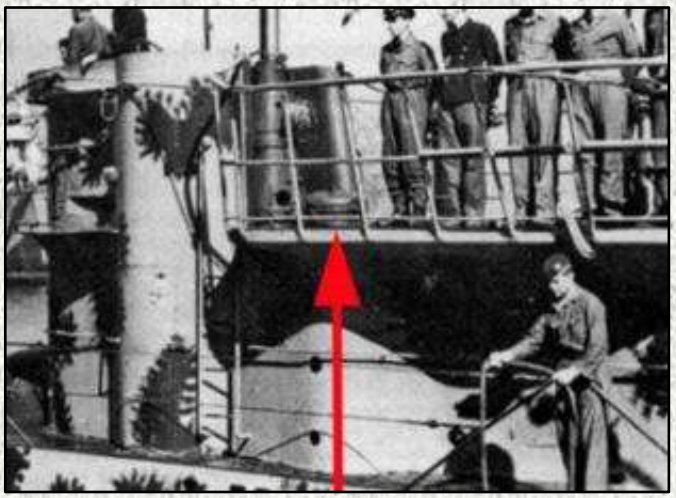
The term *Turm* (meaning tower in German) relates to the *style* of tower and armament outfit employed on a U-boat. In 1944 the Type VIIC, VIID, IXC, IXD and XB U-boats were all outfitted with Turm IV, with the same armament outfit and the same platform arrangements. However, since there were differences in size between the variants, the actual Turm IV towers were slightly different sizes on each variant. But the same basic tower arrangement was present in all types and we are able to refer to a Turm arrangement regardless of U-boat variant.

The first and most obvious question to ask is if the tower has one or two tower platforms. If there is only one platform then we can see a Turm 0 or *Mittelmeerturm*. If there are two platforms it is a Turm II or Turm IV. As can be seen below, differentiating between a Turm 0 or *Mittelmeerturm* is very straightforward. The differences between a Turm II and Turm IV are less obvious but with careful study and some practice it is usually possible.

Turm 0 or *Mittelmeerturm* - Type VIIBs and VIICs which served in the Mediterranean had their normal Turm 0 tower modified to *Mittelmeerturm* standard when the boat visited La Spezia. The *Mittelmeerturm* tower is easily distinguished by its far greater length and the slope of the rear edge, which undercuts the tower. Another way of discerning a *Mittelmeerturm* is the increased number of vertical stanchions required on such a lengthened tower arrangement. The standard weapons fit for this tower was a pair of twin 13.2mm Breda machine guns, housed in waterproof pressure-proof pods (sitting side by side) plus a single 20mm behind on the centreline. Sometimes the twin Breda guns were housed inside the large pods, other times the twin barrels are visible atop the pods.



Above (F19): U 73 and U 561 in September 1942. The red arrows point to the pressure-proof pods housing the twin 13.2mm machine guns on U 73. The guns are presently contained within the pods. In some photos, the twin barrels are ready for use and are visible above the pods. The blue arrow points to the single 20mm at the rear of the tower. Note also the additional number of vertical stanchions required to surround the extended *Mittelmeerturm*.



Right (F20): The large pods make identification straightforward but on a few occasions photos show the pods recessed into the tower, with only the top of the pod being visible. This is the case with this image of U 596, with the red arrow pointing to the base of the pod lid. Another identification feature of the Mediterranean U-boats is the camouflage pattern, which was customarily applied in Italian ports.

Turm II or IV - The easiest way to identify a Turm II is to recognise a single 20mm on the upper platform and a single 20mm on the lower platform. The Turm IV was markedly different in having a pair of twin 20mms sitting side by side on the upper platform.

If the armament cannot be established, then a photo taken directly from the rear may assist you. You should ask yourself how wide the upper platform is in relation to the lower platform. The upper platform on a Turm II was roughly the same width as the lower platform. By contrast, the upper platform on a Turm IV was wider than the lower platform (it was wider to accommodate a pair of weapons rather than one single weapon).

There is one distinguishing feature between Turm II on Type VIIs and IXs -

- VIIs had two levels.
- IXs had three levels.

Extra gun platforms - There were a few boats which had a completely separate anti-aircraft structure built on the aft deck. A walkway was built to permit men to move between this round platform and the main tower area. The boats to feature this arrangement included the IXA U 43, the VIIB U 84 and the XIV U 462. This arrangement may not have been utilised for long periods since the completely separate round platform would have impacted negatively upon hydrodynamic performance.

Experimental towers - As mentioned previously, the Type IIB U 11 had an experimental tower (P126), with smooth surfaces to cut down on hydrodynamic resistance, between February and March 1938. The boat reverted back to the normal IIB profile thereafter.

Another test which involved hydrodynamic resistance was made using the Type IXA U 37, which had been relegated to training duties in 1941 after a very successful combat career. The Type IX tower was removed and a Type XXI tower added, presumably to measure how much hydrodynamic benefit was afforded by the use of the streamlined XXI tower as opposed to the older conventional tower. During tests conducted in the Baltic in 1944, this unique combination of XXI tower and IX hull made for a quite surreal permutation.

## Part VI - The VIIA "U 26" - An Imposter?

### A working example

To conclude this article I wish to provide a working example of how the information on modifications and features can be used to infer the variant shown in a photograph. The choice of image for this purpose is one which is, to my mind, the most fascinating of any historical photograph I have seen to date. Published in *U-Boot Im Focus 3*, the photo clearly shows an eagle on the front of the tower and large white identification numbers on either side, as per standard pre-war practice. The U-number is clearly discernible on the tower so initially we may assume we have been handed the identity on a plate. In normal circumstances I would say, yes, we can absolutely rely upon these numbers to tell us the boat's identity. But in this case there appears to be an exception. The photo clearly shows a frontal view a Type VIIA tower, but inexplicably it is the number 26 which we can see on the tower. Yes, that is right, I have not made a typo error. I really do mean 26, a number which corresponds with U 26, one of only two Type IA U-boats, and absolutely not with any of the VIIA U-boats. The wrong number has, without question, been painted on either side of the VIIA tower.

Close inspection of the photo reveals that the boat is a Type VIIA, and not the real Type IA U 26, due to the following reasons -

- The most obvious point concerns the width of the tower, which corresponds with a VIIA. The IAs, being much larger boats, had a much wider tower.

- The position of the foghorn high up on the port side indicates a VIIA between U 27 to U 32. The IAs had the foghorn offset to the starboard side.
- The navigation light is in the typical VII position. The IAs had the light higher up the tower.
- The deck railings have sets of mesh enclosed between stanchions. This feature was only present on VIIAs.
- The wooden deck is a VII deck, with ten slots on either side of the 88mm gun. The IAs had a much wider deck, with a few small round holes on either side of the gun rather than slots.

Assuming the number 26 had not been modified by censors, and the quality of the image would suggest that it was not censored, there can only be two possible explanations for the application of the number 26 on a Type VIIA - either accidental or deliberate.

So, was the number merely an accident, or is the VIIA an "imposter"?

## Accidental?

The possibility that the wrong number was applied for a prank, or that the painter was duped into applying the wrong number, is highly implausible and not worthy of serious consideration. But it may have been possible for a hapless worker to apply the wrong number, more so in view of the fact that the boat's real number may have been 27 or 28, directly after 26 in the numbering sequence. So perhaps it is possible - though only just - that an incredible breakdown in communication resulted in the wrong number being applied by accident? Despite building the best looking submarines ever constructed, the German shipyard industry was not immune to making elementary errors. Neither were the sailors of the Kriegsmarine, some of whom can be seen posing behind the 88mm for the photo in question. But if the number had been applied in error, it stretches the bounds of believability to suggest that these crewmen would not have noticed that the number did not correspond to their own boat. Yet the men could still have allowed themselves to be photographed on the deck while being fully recognisant of the wrong number on the tower.

In summary, though rather implausible, the accidental application of the wrong U-number cannot be disproved. If it did occur then let us hope that Dönitz did not find out, otherwise the offending worker would have, at best, been directed to an alternative source of employment.

Left (F21): The wonderful photo from *U-Boot im Focus 3* showing a Type VIIA U-boat with an identity crisis. I think we can safely assume the men knew the U-number of the boat they were serving upon. And it is hard to imagine they could fail to notice that this did not match up with the large number 26 on the tower, a number corresponding to a completely different type of boat. If a deliberate deception had been enacted then one wonders what the crew of the imposter boat was told about the wrong U-number on the tower.

## Deliberate?

This leads us to a more interesting possibility, that of deliberate deception. The prevailing naval intelligence culture of the time may or may not be relevant but it is worthy of consideration. Following the 1935 Anglo-German Naval Agreement, the German Navy was allowed to build U-boats up to a limit of 22,050 tons. Due to these imposed limitations, Germany had to restrict the building of some variants, be very selective with regard to which types to build, and even cancel intended construction of other types. There does not appear to be any suggestion that the limitations were actually exceeded in this period but due to the naval restrictions, territorial gains on continental Europe, and the political situation in Germany, it is certain that many countries, and in particular Britain, France and the US, were observing with interest the growth of the German military inventory in the pre-war period. No reminders were necessary of what the U-boats of the Kaisermarine had accomplished so the Allies would have been particularly vigilant about the type and quantities of new U-boats being built in the resurgent Germany. It may have been desirable in this period for Germany to fool the naval intelligence analysts of these foreign powers into thinking that the Kriegsmarine had fewer, or perhaps more, boats of a certain type and to cause confusion as to what the different variants looked like and their associated features.

What specifically could the painting of a VIIA with the number 26 have accomplished?

One possible benefit could have been the instigation of general confusion with regard to U-boat numbers and types. There is a precedent for this. Originally U 69 to U 72 were supposed to have been Type VIIBs, and U 99 to U 102 were the numbers reserved for Type VIICs. In fact the numbers of these two batches were swapped over, with the VIICs becoming U 69 to U 72, and the VIIBs becoming U 99 to U 102. For example, the real VIIB U 99, commanded with such distinction by Otto Kretschmer, was originally envisioned as being U 69. And the real VIIC U 69 was originally intended to be U 99. This swapping of U-numbers, and indeed the policy of not always numbering boats chronologically (U 552 was launched well before U 352), served to befuddle foreign observers and make it harder for them to follow how many boats were sliding down German slipways.

Another advantage might have been to confuse over the VIIAs which were coming into service. If the imposter was actually the newest VIIA, let us say U 32, then nobody would report back sighting U 32. This might lead to the erroneous assumption that U 32 was not operational and, furthermore, that the Kriegsmarine had one fewer VIIA U-boat.

A different advantage regards type. By painting an IA number on a VIIA, this might confuse an observer over the respective features on the Type IAs and VIIAs.

## A more specific purpose?

These reasons are plausible but would they actually warrant the deliberate application of a wrong number? Perhaps we think of a more specific reason, one which warranted such action?

Let us think more specifically and apply logic. It was the number 26 which was painted on the tower so *why the number 26*? Perhaps it could be related to what the *real* U 26 was doing at the time? Did the real U 26 have its own number or did it assume the identity of another boat? Assuming for a moment that the real U 26 was adorned with its own number, then Germany would have had two U-boats with the number 26 on the tower at the same time. I think we can reasonably expect both “U 26”s not to have been operating in the same location at the same time as any observers would have to be pretty dim not to recognise the inherent contradiction.

So, if the real U 26 was not in the same location as the imposter, where was the real U 26? Could the imposter be a ploy to cover up the whereabouts of the real U 26? An agent who viewed the “U 26” imposter in a German port could easily assume it was the real U 26 and report back sighting the Type IA U 26. The next logical step is to ask why Germany might want to “hide” the real U 26 or why they might desire that observers believe that U 26 was in German waters.

One theory, as suggested to me by Jon Kelly, would be in connection to *Operation Ursula*. Named after Dönitz's daughter, *Ursula* was a secret operation in which U 33 and U 34 were sent to patrol Spanish waters in November and December 1936. Since the patrols were in clear contravention of the Non Intervention Agreement, boats were stripped of any identification marks and crews were sworn to lifelong secrecy. In April 1937 a sea control regime was initiated and this led to a number of German U-boats sailing on legitimate patrols, wearing Spanish Civil war stripes on their tower and deck. U 26 was one of these boats, operating in July and August 1937. However, any deliberate wrong numbering would surely not have been effected at this time because the U-bootwaffe involvement in mid-1937 and afterwards was legitimate.

It is the period *before* the legitimate phase - at the end of 1936 or perhaps at the start of 1937 - that is of interest as this is the time when the Kriegsmarine was known to have conducted illegitimate operations with U 33 and U 34. It may be relevant to state that other countries, and not just Germany, broke the Non Intervention Agreement. The illicit involvement of other countries makes any further breaches by Germany seem less serious than might have been the case should Germany have been the only offender.

If the real U 26 had actually sneaked off to covertly patrol Spanish waters on another Ursula-style mission before the sea control regime was commenced, then there would be a specific reason to provide misinformation on the whereabouts of the real U 26. To serve this purpose, the "imposter U 26" might have been painted with the number 26 to lead observers to think that the real U 26 remained in a German port.

I would like to stress that there is absolutely no evidence at all for any of the theories above. Please do not misconstrue these possible scenarios as being anything other than mere speculations arising from a fun little puzzle. The imposter photo does not, in any shape or form, provide any evidence of deliberate deception or some super-secret illicit mission of U 26. Perhaps, after all, it was just a simple mistake by a rather simple painter.

## Be vigilant

The imposter "U 26" may well have been an isolated occurrence. But just in case a deliberate ploy had been enacted, or that the same painter wielded his little brain and big paintbrush on another boat, we should be aware that other boats might have had incorrect U-numbers. To conclude, not only must we be mistrustful of any captions given in books or in photos being sold online, now we cannot even take the authenticity of the white pre-war identification numbers for granted.

# A Guide To AMP U-Boat Decals
(current as of March 2018)

# Contents



# Part I - Introduction

Accurate Model Parts (AMP) began in 2007 with the release of two waterslide decal designs for U-boats - the white Type VIIC waterline draught marks and the snorting bull insignia. Since then we have added other designs including waterline draught marks for other types and scales and the emblems of famous boats such as U 96, U 201 and U 505.

This article provides an overview of AMP decals. Detailed information about the waterline draught marks, snorting bull, laughing sawfish and snowman can already be found in other existing downloadable articles and it is not intended to replicate this information herein. In these cases brief details are given together with a pointer to where the more detailed information may be found. In the cases of the Type IX emblems, the detail is provided in this text together with placement guides. The placement guides for the waterline draught mark decals can be found on our decals webpage and within the waterline article.

A full listing of all of our decals can be found in Part VI.

### Matching boat, insignia and configuration

Many Kriegsmarine U-boats were adorned with insignia on their conning towers. The quality and origin of insignia varied greatly, with some being merely sketches (*malings*) which were present for short periods. Other designs (*emblemes*) possessed greater artistic merit and lasted for numerous patrols. Another type of insignia was the *bootswappen*, which were coat of arms belonging to a German town or city. U-boats would also often sport flotilla emblems to indicate the flotilla they were assigned to. Another common insignia was the crew emblem, which was borne to show the officers' class that the boat's commander graduated from. Depending on the predilection of the commander and the space available on the tower, a flotilla emblem or crew emblem may or may not have been sported in addition to a personal emblem.

To be historically accurate it is advisable for modellers to pick a certain U-boat and depict the boat at either a particular date or time period. Our choice of U-boat will often be dictated by our interest in a particular insignia. We should be wary that an individual boat would not necessarily have worn an insignia throughout their whole career. Another consideration is that a change of commander, or change of flotilla, would often see an existing insignia replaced with a new one. The insignia itself would also be liable to slight modification when the boat was repainted. U 47, for example, had multiple versions of the snorting bull insignia.

Another aspect we should be aware of regards the endless modifications made to the U-boat fleet. If we take Revell's IXC kit, and wish to model U 505, we might first identify that the kit is configured with a Turm IV, two twin 20mms and a 37mm automatic. Following on from this, we might try to identify the period in which U 505 had this configuration. Next we ascertain the insignia the boat had during the time period when this configuration was in place. In the course of

this type of research it may become apparent that the insignia we wish was not applied when the boat had the configuration in the kit. For example, in the case of U 505 we should make an alteration to the boat's armament in order to add the axe insignia to our model.

This research process includes matching a particular boat **and** a particular paint scheme **and** a particular insignia **and** a particular configuration. This method is beset with complications due to the absence of adequate research material. It is very difficult to collect photos showing the paint scheme, insignia and configuration of one boat during every patrol. To assist customers buying our decals, we have chosen three boats - U 96, U 201 and U 505 - and written articles to try to match boat, paint scheme, insignia and configuration at every stage of each boat's career.

### Other articles

To avoid repetition, the detail within the snorting bull, U 96, U 201 and U 505 articles is not incorporated here. The snorting bull article and U 96's laughing sawfish article are part of the original Wolf Pack collection whereas the U 201 and U 505 articles are contained in this collection.

The downloadable article "*U 505: Modifications, Colours & Insignia*" addresses the armament and tower configurations (Turm 0, Turm II and Turm IV) of the Type IXs and this should be referred to prior to any purchase of Type IX decals. Similar information pertaining to the Type VIICs can be found in the article "*Type VII Modifications*", which can be found within the original Wolf Pack collection.

The AMP decals themselves (together with accompanying placement guides) can be found at - http://amp.rokket.biz/decals.shtml

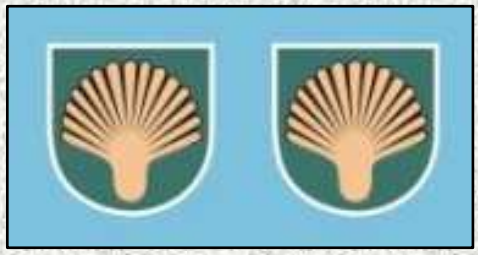
## Part II - Type IX Decals

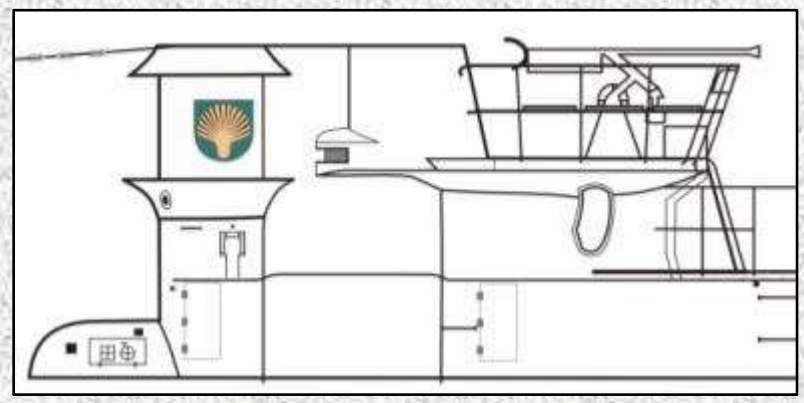
### T9-SHELL-72

Our most recent emblem designs are in support of Revell's 1/72nd Type IXC U-boat kit (RV5114). Although the kit has many commendable aspects, most of the decals included in the kit require replacement. Firstly, the waterline draught marks have the inaccurate two-digit system that was never used on the real Type IXs (see Part V). Secondly, the kit decals for the scallop shell have a red shield background. Colour period photos indicate that red was not used in the shield upon the real U 505. Our replacement shell decal - T9-SHELL-72 - includes a dark green shield background. A full discussion of this subject can be found within the U 505 article.

Below left: The design for AMP's T9-SHELL-72 decals includes a green shield and white border. The thin black border on the kit decals is not replicated in our design because it is not present in period photos of the real boat.

Below right: The position and size of the shield decals is correct on the Revell kit instructions so modellers may refer to use these instructions when positioning AMP decals on their model.

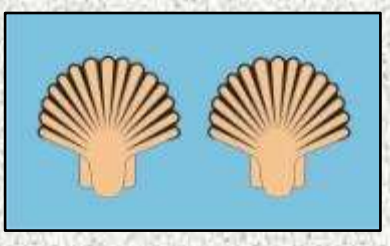




Please note that this version of the shell, with the shield background, is only suitable for the final patrol of U 505, when the boat was captured by US naval forces. The 2nd U-Flottille decal that is included in the Revell kit is perfectly acceptable and requires no aftermarket replacement.

Right (G1): U 505 in the aftermath of her capture by US naval forces in June 1944. Note the degree of paint peeling and salt staining on the tower. For full accuracy, modellers could try to add this peeling and salt on **top** of the AMP decals.

It should be considered that the flotilla emblem and the shell emblems on either flank of the tower were all subject to the high degree of paint peeling and salt staining that was found on the outer surfaces of U 505's tower. These decals should be suitably modified (preferably by painting over but instead you could scrape away small sections of the decal) to faithfully replicate this appearance. This type of weathering should not be applied to the "CAN DO JUNIOR" kit decal since this red text had only just been applied by US personnel to celebrate their capture of the German boat.

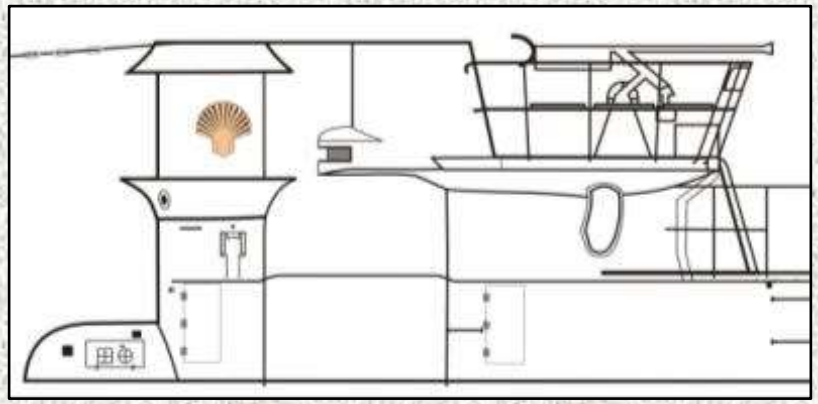


Above left (G2): U 505 enters Brest at the end of her penultimate patrol in January 1944. We can see the first version of the scallop shell (without any shield background) and the 2nd U-Flottille emblem. A rescue operation prompted an early postponement to this patrol. Since the patrol was so short in duration, the amount of weathering and paint peeling should be kept to a minimum.

Below left: The design for AMP's T9-SHELL-EARLY-72 decals has no green shield. The shell was the personal emblem of U 505's third and final commander, Harald Lange.

Below: Once again the Revell kit instructions may be used as a guide when positioning the shell emblem on a model.

## T9-SHELL-EARLY-72

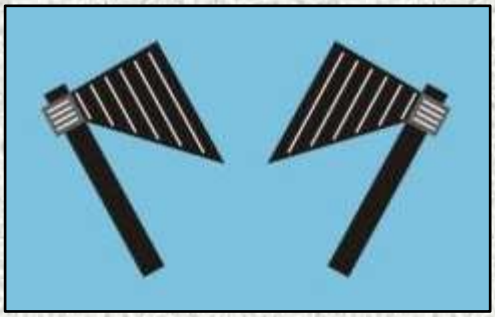


When U 505 sailed on her penultimate (second last) patrol, between the 25th December 1943 and the 2nd January 1944, a different version of the scallop shell insignia was present on the tower. This "early" version of the scallop shell (which features in AMP decal T9-SHELL-EARLY-72) included no shield background at all. The early shell was located in the same position, on either flank of the tower.

## T9-AXE-72

Earlier in U 505's career, when Peter Zschech was in command of the boat, a large axe emblem was added to the tower just below the spray deflector. This was in place from patrols 4 to 11 (from the 4th October 1942 to the 7th November 1943).

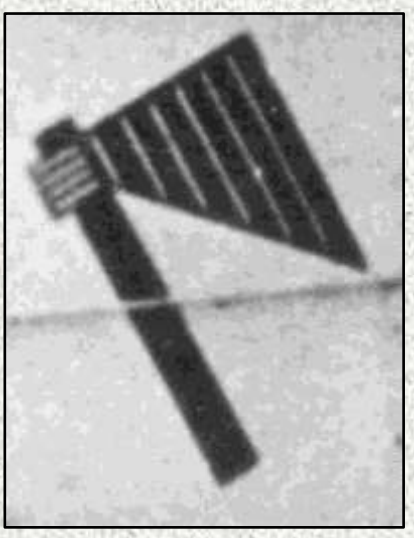
The AMP version, which copies the axe seen in photo G3, has the following characteristics -



- black handle.
- dark grey axe support with four lines.
- large axe with a straight edge and six lines.

The version in Georg Högel's emblem book (*U-Boat Emblems Of World War II 1939-1945*) has the following characteristics -

- wooden handle.
- dark grey axe support with five white lines.
- large axe with a curved edge and four white lines.



The version that can be found on uboat.net has the following characteristics -

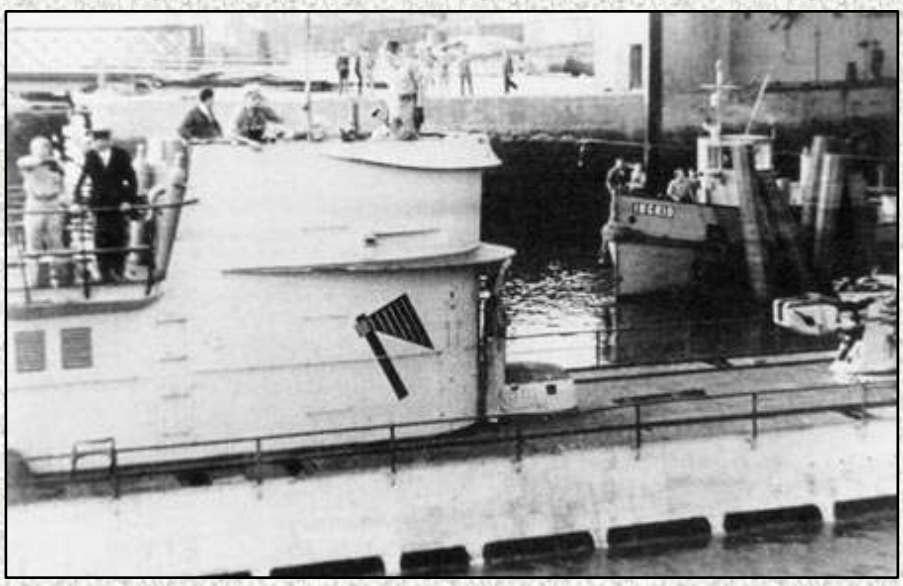
- wooden handle.
- dark grey axe support with no white lines.
- smaller axe with a straight edge and four white lines.

Above: The design for AMP's T9-AXE-72 decals follows the axe seen in photos of U 505 rather than the versions in books or the internet. The axe on the left hand side of the decal sheet is for the starboard side of the tower.

Left (G3): This close up image (which is part of photo G4) permits a much closer view of the axe.

Below (G4): This photo was taken during the short period when U 505 had a Turm II tower. The image shows the very large size of the axe and its position underneath the spray deflector.

As can be seen in photo G4, the large axe was placed underneath the spray deflector, with the top of the handle in roughly the same horizontal position as the navigation light. The axe on the port side, which was a mirror image of the starboard axe, was located in the same position. Both axes had the blade pointing to the front.



**Note: Customers who buy T9-AXE-72 are provided with two axes and one set of Olympic rings. There is therefore no need to purchase an additional set of Olympic rings.**

Customers who have

bought axe decals should be aware that some modification should be made to the Revell IXC kit in order to portray U 505 with the axe emblem. A detailed discussion can be found in our downloadable article "*U 505: Modifications, Colours & Insignia*" and it is recommended that you read the relevant passages before deciding to buy our axe decals. However, as a brief overview, the Revell kit is configured with a Turm IV tower, two twin 20mms on the upper platform and one 37mm automatic on the lower platform. The modifications you might consider making to the Revell kit in order to depict U 505 with the axe (from the start of patrol 5 to the end of patrol 11) are -

- changing the 37mm automatic on lower platform to a 20mm Vierling.
- removing the *Balcongerät* from the lower hull.

The four-barrelled 20mm Vierling can be found in the following aftermarket sets -

- CMK / Czech Master Kits CMKN7223 - Type IXC Vierling 20mm (future releases).
- CMK / Czech Master Kits CMKN7220 - Type IXC weapons set - includes Vierling 20mm and 105mm deck gun (future releases).

The naval (Kriegsmarine) 20mm Vierling was effectively the same as the army (Heer) 20mm Vierling. This is advantageous as it means that one could add a 20mm Vierling from an army vehicle directly onto a U-boat model. If you are unwilling to purchase the CMK products above, a 20mm Vierling can be sourced from the following German army kits -

- Revell 80-3195 - Sd.Kfz. 7/1 mobile anti-aircraft battery (includes Army Vierling).
- Italeri 7026 - German guns set (includes Army Vierling).

There are other ways of sourcing a Vierling. For example, if you have Revell's 1/72nd Schnellboot S-100 & Flak 38 kit (05002), you could build the Schnellboot with a 37mm and use the 20mm Vierling on a U-boat model.

(Many thanks to Jon Kelly for all the information relating to the Vierling kits. A list of all accessories can be found in his downloadable article "*U-Boat & S-Boat Models & Accessories*").

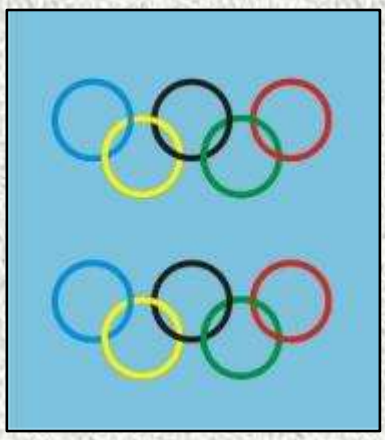
## T9-RINGS-72

A number of commanders celebrated their inclusion in the officers' class of 1936 (Crew 36) by applying the Olympic rings emblem to the towers of the boats they commanded. This emblem derived its origin from the Berlin Olympic Games of 1936. Many boats, of different variants, all possessed this symbol: U 3, U 20, U 23, U 37, U 59, U 183, U 203, U 227, U 314, U 344, U 387, U 394, U 407, U 426, U 440, U 467, U 505, U 534, U 546, U 555, U 643, U 710, U 760, U 869, U 1230 and U 3504. Some boats had one set of rings while others had two sets. **AMP decal set T9-RINGS-72 includes two sets of rings.**

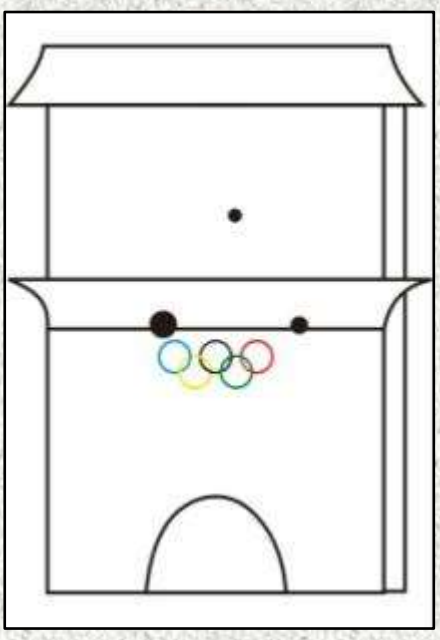
Rings on U 505 - Although we have no photographic evidence, it is reputed that when Peter Zschech commanded U 505 there was a set of Olympic rings on the tower. We do not have access to photos of the front of the tower under Zschech so it presumed that the rings were present in this position. Without photographs we are not in a position to state whether the rings were above or below the spray deflector.

**It is reiterated that customers who buy T9-AXE-72 are provided with two axes and one set of Olympic rings. There is therefore no need to purchase an additional set of Olympic rings.**

Right: The design for AMP's T9-RINGS-72 decals. The decals can be used on Type IIs, VIICs and IXs. In some case modellers will only need one set of rings but there are two sets of rings included in this decal set so that all boats can be covered. Details of the rings on Type IXs follow below, while the rings on Type VIICs and Type IIs can be found in Part III and Part IV respectively.



Rings on other Type IXs - Some boats had one set of rings at the front of the tower, while others had two sets (a set on either side of the tower). The following is a list of the Type IXs which are known to have had the Olympic rings insignia. Details of their placement are given where known.



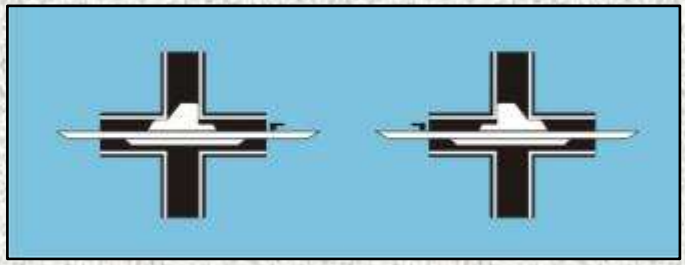
- U 37 - Two sets, just above and forward of the navigation light. Note there appears to have been a dark background (perhaps black) painted behind each ring. The rings were probably only present when Gustav-Adolf Janssen was in command in the period between November 1941 and June 1942. The boat had a Turm 0 at this time.
- U 183 - Unknown position. Likely between November 1943 and April 1945.
- U 534 - One set at the front of the tower, in the position shown in the drawing above. This is confirmed on photos of the boat with a Turm II and *Hellgrau 50* upper hull. Since Herbert Nollau was in command throughout the boat's career it is possible that U 534 retained the rings until her sinking.
- U 546 - One set at the front of the tower.
- U 869 - One set at the front of the tower, just below the wind deflector.
- U 1230 - Unknown position.

Above: The position in this drawing follows U 534 in 1943. With respect to U 505, it may be preferable to add the Olympic rings in this position.

Please note that U 37 had a Turm 0 tower when the rings were in place so the Revell tower would have to be extensively modified to depict this boat. Another difficulty is that U 37 is a Type IXA and this would require serious modifications to the Revell kit.

All of the other boats on this list (U 183, U 534, U 546, U 869 and U 1230) should have had the Olympic rings along with the same configuration as the Revell IXC kit (Turm IV, two twin 20mms and one 37mm). It is therefore possible to add the Olympic rings directly to the Revell IXC kit to depict these boats.

Below: The design for AMP's T9-10UF-72 decals. The U-boat in the emblem should point forward so the example on the right hand side is the port emblem.



**T9-10UF-72**

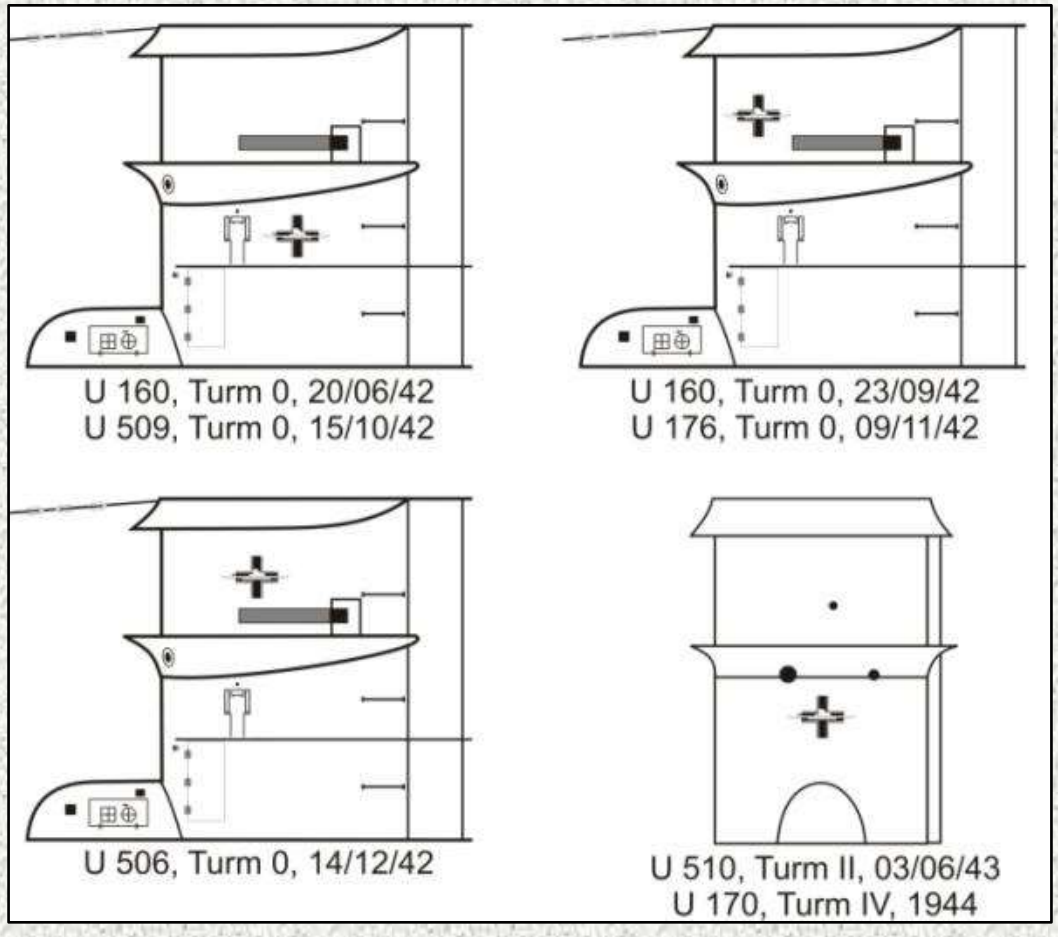
The following Type IX U-boats are reputed to have borne the emblem of the 10th U-Flottille - U 155, U 160, U 161, U 170, U 172, U 174, U

175, U 176, U 506, U 508, U 509, U 510, U 513, U 514, U 515, U 516, U 523, U 525, U 539 and U 543.

The design of AMP's T9-10UF-72 decals was conducted using several photos, including the excellent photo of U 509 on page 16 of *U-Boot im Focus 9* and a similarly useful image of U 506 on page 11 of *U-Boot im Focus 10.* These photos show small differences between the emblem painted on these boats and the drawing of the 10th U-Flottille that can be found in Georg Högel's authoritative book *U-Boat Emblems Of World War II 1939-1945* and in online sources. The real photos of U 506 and U 509 (as well as a photo of U 160) show that a small and basic gun drawing was used in the real emblem rather than the number 10 used in Högel's book. It is possible that some IXs did have the number 10 on their version but it is clear that U 506 and U 509 had a gun in this position. The AMP decal version includes the gun.

Another difference concerns the width of the bars on the iron cross. The black bars on Högel's version are wide, whereas the narrower AMP decal version follows the version evidenced in the photos of U 160, U 506 and U 509.

Below: The drawings show the positions of the 10th U-Flottille emblem at seven different time periods. The emblem does appear to be the same size on the boats. It can be seen that on U 160 the emblem was relocated from below the spray deflector to above the spray deflector. Note that all dates show the date when the boat left on patrol.




The position of the emblem varied among boats. As can be seen from the drawings above, U 170 and U 510 had one emblem at the front of the tower whereas other boats had the same symbol on either side of the tower. **There are two sets of emblems included in each purchase of T9-10UF-72 to allow any boat to be modelled.**

The drawings above show the positions of the emblem at various points in 1942, 1943 and 1944. In 1942, when the boats had a Turm 0, the emblems were located on either side of the tower.

In 1943 and 1944, when the Turm II and Turm IV towers were used, there was a singular emblem placed at the front of the tower below the spray deflector. This suggests that in 1943 the position at either side of the tower was replaced by the position directly at the front of the tower. There is not enough information here for this to constitute evidence, but in the absence of any further indicators, **it is advised to add the emblem to the position directly in front of the tower when modelling a Turm II or Turm IV tower**.

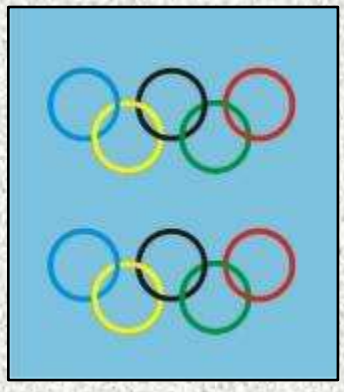
One aspect which might be used as supporting evidence is that the 2nd U-Flottille emblem was added is this same singular position below the spray deflector. This is perhaps the position which became favoured for flotilla emblems since it allowed for the addition of a personal emblem above the spray deflector.

**It is considered that the following boats has the emblem of the 10th U-Flottille at the same time as the configuration used in the Revell IXC kit - U 170, U 510, U 516, U 539 and U 543.** This means that the AMP 10th U-Flottille decals can be used on these five boats without any modification to the kit. As discussed above, if customers do not have any photos of these boats showing emblem position, **it would be advisable to add the emblem at the front of the tower, directly below the spray deflector.**

Left (G5): A camouflaged U 160 returning from patrol to Lorient in 1942. The position of the 10th U-Flottille emblem can clearly be seen in a central position below the spray deflector. There was a similar (mirror-imaged) example at the same position on the starboard side. In both examples, the U-boat faces forward.

## Part III - Type VII Decals

### T9-RINGS-72



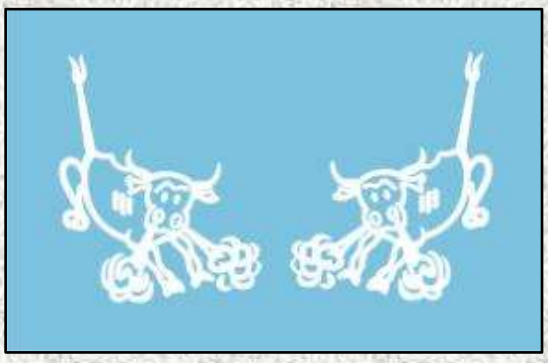
Above: The design for AMP's T9-RINGS-72 decals, which can be used on Type IIs, VIICs and IXs.

The AMP Olympic rings decals are also suitable for a 1/72nd Type VIIC U-boat model. Details are as follows -

- U 203 - When sunk in February 1941, the boat had one set at the front of the tower directly below the coat of arms of Essen.
- U 227 - Unknown.
- U 314 - On port side, probably on starboard side as well.
- U 344 - Unknown.
- U 387 - Unknown.
- U 394 - Unknown.
- U 407 - Prior to September 1942 this boat had the coat of arms of Danzig at the front of the tower, "Los gehts" in white writing on the starboard side and one set of Olympic rings on the port side.
- U 426 - Unknown.
- U 440 - Unknown.
- U 467 - Unknown.
- U 555 - At some stage rings one set of rings was present at the front of the tower (below wind deflector, with "U-Rendtel" in white writing below the rings).
- U 643 - One set below wind deflector.

- U 710 - Unknown.
- U 760 - The rings were parts of a shield emblem which included the number 13 and 13 fishes.

## Snorting bull



Above: The design for AMP's snorting bull decals. These are available in two sizes - normal and large - and in four scales - 144th, 72nd, 48th and 35th scale.

Right (G6): The bull was applied in a variety of sizes, with this example being a particularly large case in point.

The snorting bull was the flotilla emblem of U-boats which served in the 7th U-Flottille. This was often sported in addition to personal emblems.

According to *U-Boat Emblems Of World War II 1939-1945* by Georg Högel, the following U-boats sported the snorting bull insignia at some stages of their careers: U 46, U 47, U 48, U 69, U 73, U 74, U 75, U 77, U 93, U 94, U 96, U 98, U 101, U 103, U 135, U 207, U 213, U 221, U 224, U 227, U 266, U 267, U 281, U 358, U 359, U 382, U 390, U 406, U 409, U 415, U 434, U 436, U 442, U 454, U 455, U 528, U 531, U 551, U 552, U 553, U 561, U 567, U 575, U 576, U 578, U 590, U 593, U 594, U 600, U 607, U 617, U 614, U 618, U 641, U 650, U 662, U 667, U 707, U 709, U 714, U 751 and U 976. With at least 62 boats adopting this emblem, the snorting bull was perhaps the most commom of all U-boat insignia.

A full discussion can be found in the article "*The Snorting Bull Insignia*", which is part of the original Wolf Pack collection. On page 110 can be found details of the positions and sizes of bulls on individual boats. The AMP snorting bull decals are available in two sizes, normal and large, with the suffix on the decal code indicating size (for example, C-72N is for normal and D-72L is for large).

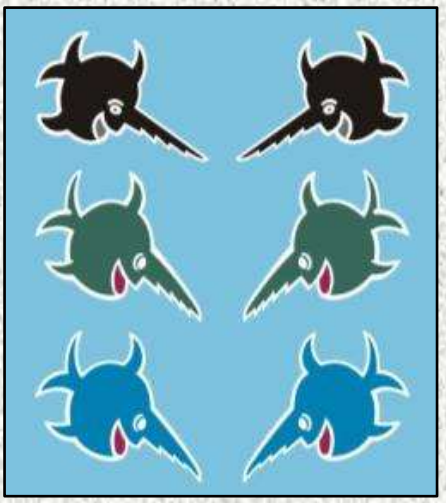
## Laughing sawfish

Another popular emblem is the laughing sawfish, which was present on U 96 for several patrols in 1941. The boat's commander, Heinrich Lehmann-Willenbrock, went on to assume command of the 9th U-Flottille, and when he did so he adopted his former personal emblem as the flotilla emblem.

The war correspondent Lothar-Günther Buchheim was a guest on board U 96 during the boat's seventh patrol. Many years later Buchheim wrote his classic novel *Das Boot* about his experiences aboard this particular patrol. A movie of the same name followed, and like the novel it became a true classic (surely readers require no introduction to this movie!). Although the real U 96 did not sport the sawfish when Buchheim was on board, the emblem was used on the tower of the U-boat in the *Das Boot* movie. There were subtle differences between the real sawfish and the movie version and these differences have been incorporated into the AMP decal design.

The AMP laughing sawfish decals include three versions - the green U 96 version, the blue 9th U-Flottille version and the black *Das Boot* movie version. All three versions are currently included on the sheet for our 72nd, 144th and 350th scale products (SAW72, SAW144 and SAW350). On our 35th and 48th scale decals version is available on separate sheets as follows -
35th scale - SAW35-BLACK, SAW35-GREEN & SAW35-BLUE

48th scale - SAW48-BLACK, SAW48-GREEN & SAW48-BLUE



Above left (G7): U 96 entering St. Nazaire at the end of the fourth patrol on the 22nd May 1941. The gentleman with the white cap is the famous commander, Heinrich Lehmann-Willenbrock.

Above right: The design for AMP's laughing sawfish decals. The black example is the *Das Boot* movie version, the green example is the U 96 version and the blue example is the 9th U-Flottille version. In 35th and 48th scale we offer these versions as three separate decal sets.

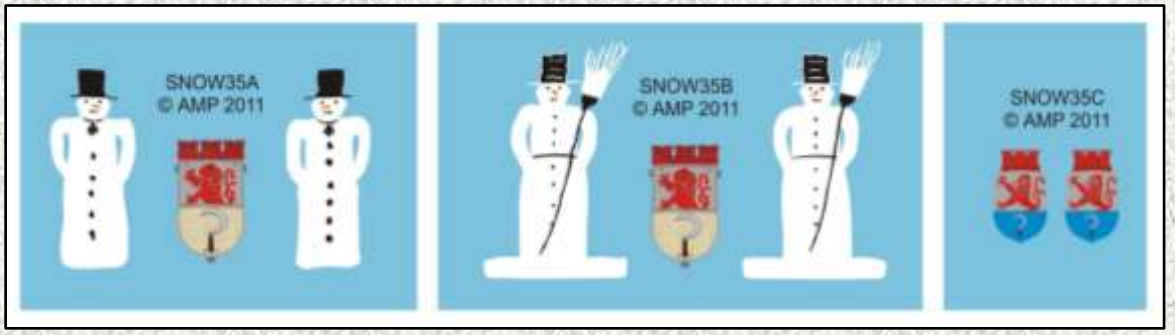
## Remscheid & the snowman

| Decal | Scale | Includes |
|---|---|---|
| SNOW35A | 32/35 | REM-L + SNOW-V2 |
| SNOW35B | 32/35 | REM-L + SNOW-V1 |
| SNOW35C | 32/35 | REM-E |
| SNOW48A | 48 | REM-L + SNOW-V2 |
| SNOW48B | 48 | REM-L + SNOW-V1 |
| SNOW48C | 48 | REM-E |
| SNOW72A | 72 | REM-L + SNOW-V2 |
| SNOW72B | 72 | REM-L + SNOW-V1 |
| SNOW72C | 72 | REM-E |
| SNOW144 | 144 | REM-E + REM-L, SNOW-V1 + SNOW-V2 |

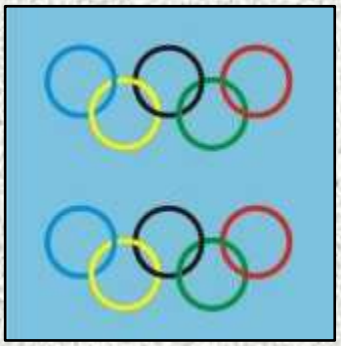
Another of the most popular U-boat emblems is the snowman of Adalbert Schnee's U 201. This striking and memorable emblem derives its origin from the commander's surname Schnee, which is German for "snow". The boat also sported the crest of the city of Remscheid. This was part of the *patenschaft* scheme whereby many German towns and cities sponsored individual U-boats.

There were two distinct versions of the snowman (SNOW-V1 is snowman version 1, SNOW-V2 is snowman version 2). There were also two distinct versions of the Remscheid crest (REM-E is Remscheid early, REM-L is Remscheid late). The table to the right shows the versions included in each decal set. For full details please refer to the article "*U 201: Remscheid & The Snowman*" within this collection.

Right (G8): Adalbert Schnee returns U 201 from a war patrol on the 8th August 1942. The later version of the Remscheid shield (REM-L) can be seen in the central position at the front of the tower, while the 2nd version of the snowman (SNOW-V2) can be seen on the port side.




Above: The design for AMP's snowman and Remscheid decals. As can be seen, in 35th scale there are three individual products (SNOW35A, SNOW35B and SNOW35C). The same individual sets are available in 72nd scale and 48th scales. In our singular 144th decal set (SNOW144) both versions of the snowman and both versions of the Remscheid shield are provided. The decals are also suitable for any 1/32nd scale U-boat model.



Above right: The design for AMP's T9-RINGS-72 decals.

Right (G9): The white pre-war numbers on the tower of the Type IIB U 13.

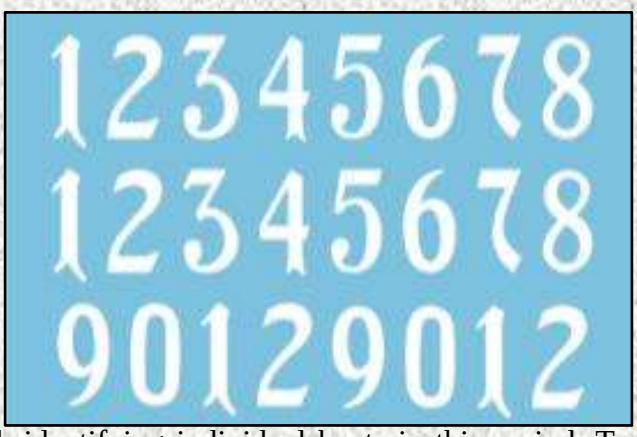
Below right: The design for AMP's ICMTII decals, which are intended for the ICM's 144th Type IIB kit (ICMS009) or for Revell's 144th Type IIB kit (RV5115).


# Part IV - Type II Decals

## T9-RINGS-72

The AMP Olympic rings decals (T9-RINGS-72) are also suitable for Type II U-boats in 1/72nd scale. Details are as follows -

- U 3 - Probably present on this boat when Joachim Zander was in command between March 1942 and September 1942.
- U 20 - One set high up on the front of the tower. Present when serving in Black Sea in 1943, possibly also in 1942.
- U 23 - Present at times during 1942, 1943 and 1944.
- U 59 - Present at times between April 1941 to July 1942.



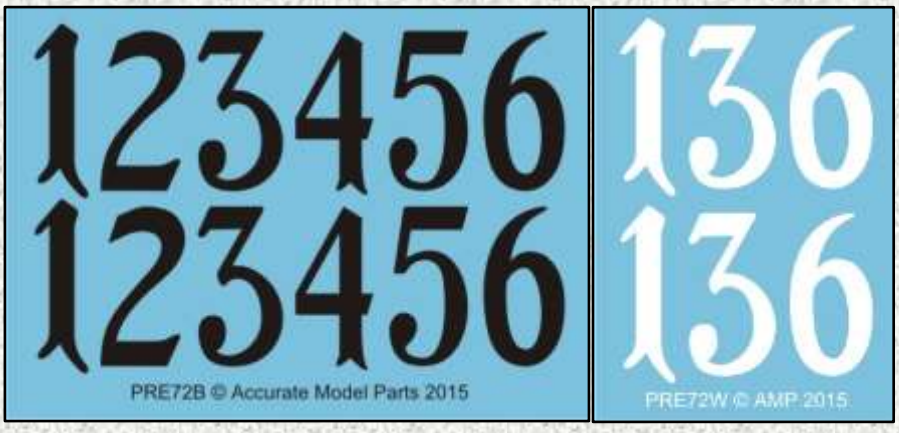

## ICMTII

On all types of U-boat operating in the pre-war period, the boat's number was painted in large numerals on the tower and this helps greatly with identifying individual boats in this period. To support the two 1/144th scale early IIB kits (ICM's ICMS009 and Revell's RV5115), we offer a full set of numbers to allow both sides of the tower of any of the pre-war IIBs to be depicted. The numbers would be suitable for any pre-war 144th scale U-boat but no other pre-war U-boats are currently available in this scale.

## PRE72

To support the Special Navy 1/72nd scale Type IIA kit we offer our mixed-media set 72-01, which includes photo-etched brass, resin, flags and decals. The decal set included with 72-01 includes the pre-war numbers 2, 4 and 5 in white. For modellers who wish to depict U 1, U 3 or U 6, we offer the pre-war numbers 1, 3 and 6 in white within decal set PRE72W.

At an early stage the Type IIAs had the pre-war numbers in black. Our decal set PRE72B includes 1, 2, 3, 4, 5 and 6 in black to allow a boat with black pre-war numbers to be depicted in 72nd scale. The black numbers 1 and 3 are included in the Special Navy decal set but these numbers in the kit decals are thought to be slightly oversized in comparison to period photographs.


Above: The decals included in the 72-01 mixed-media set.

Far left: PRE72B includes black pre-war numbers for U 1 to U 6.

Left: PRE72W is designed to complement the decals included in 72-01, allowing U 1, U 3 and U 6 to be modelled if desired.

## The real Type IIs

It would be helpful at this point to study the pre-war numbers on Type II U-boats as this subject is not covered in any publication to date. The following colour configurations are evidenced in period photographs of Type IIAs and IIBs -

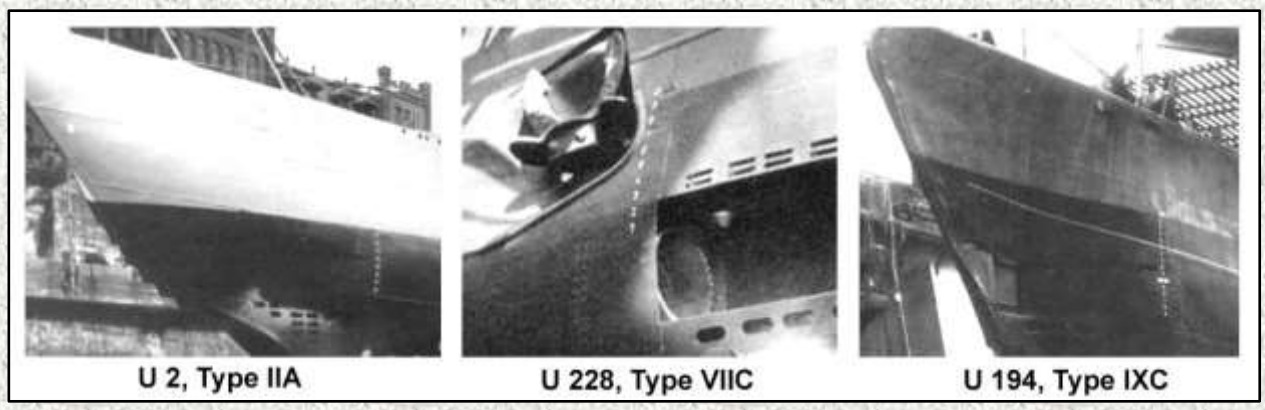
- The very earliest scheme - evidenced upon U 1, U 2, U 3, U 4, U 5 and U 6 - had black pre-war numbers upon either a light grey (*Hellgrau 50*) tower and upper hull or a medium grey (*Dunkelgrau 51*) tower and upper hull. This scheme appears to have been used predominately, if not exclusively, upon IIAs.
- A very common scheme featured white numbers upon a medium grey (*Dunkelgrau 51*) tower and medium grey (*Dunkelgrau 51*) upper hull.
- One of the most pleasant of all U-boat schemes featured upon IIAs and IIBs. This included a white tower and medium grey (*Dunkelgrau 51*) upper hull. In this scheme the pre-war numbers were either black or a medium grey.
- An incredibly striking paint scheme was employed upon the Type IIs serving in the Spanish Civil War. Whereas the Type VIIAs had the civil war striped arranged vertically, the Type IIs had the red, white and black civil war stripes arranged horizontally on the tower. The pre-war number was painted in black upon the white band on the tower. There were also stripes on the forward deck and aft deck. The upper hull and tower were medium grey (*Dunkelgrau 51*).

There was no consistency across the U-boat fleet and it is therefore possible to find photos in which boats sitting side by side in port have different colour schemes.

# Part V - Waterline Draught Marks

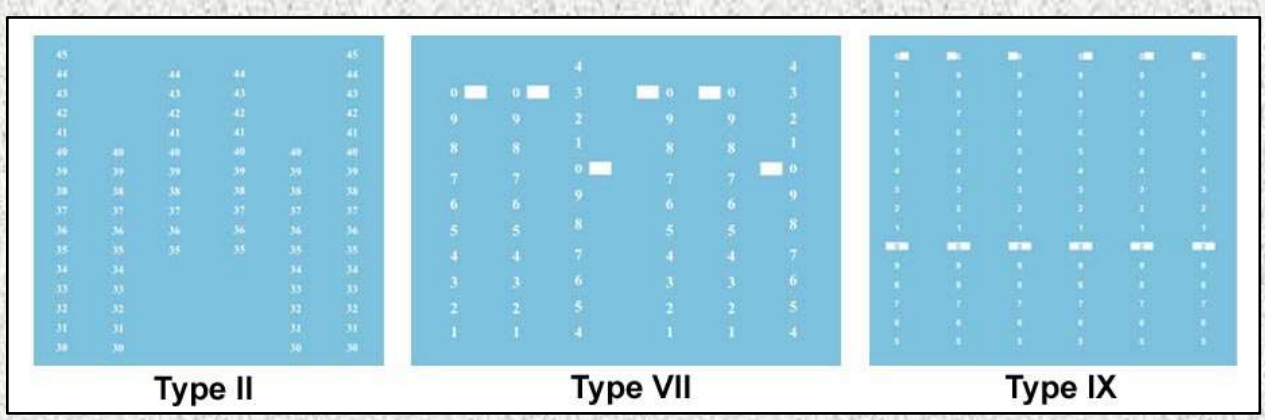
Waterline draught (*draft* in US spelling) marks were customarily applied in six positions to all U-boats. These were applied in white at the bow, amidships and stern of both sides of the hull. The white marks are noticeable on freshly painted boats but they can also be seen on boats returning from patrol. Until recently these white marks have been completely omitted from model kits and their omission prompted us to release sets in several scales for three types of U-boat - the Type IIs, VIIs and IXs.

This subject is an entire subject in itself and readers are directed to the article "*U-Boat Waterline Draught Marks*" for more information.




Above (G10, G11 & G12): These photos show the forward set of waterline marks on three types of U-boat. Each numeral was spaced one decimetre (10cm) apart vertically and indicated the height above the keel. The format varied slightly between U-boat types but did not (with the exception of the VIIA) vary between each sub-variant. For example, the sub-variants of the IX class (IXAs, IXBs, IXCs and IXDs) all had the same format.

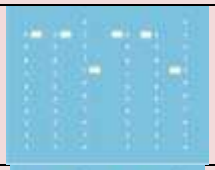
Below: The designs for the AMP waterline draught mark decals. On the two-digit system used on the Type IIs, the numbers indicated the exact number of decimetres above the keel - for example, the number 44 indicated 44 decimetres (4.4 metres) above the keel. Both the VII and IX designs used the one-digit system. The rectangles at the top of both the VII and IX designs indicated the 500cm level above the keel. On the IX design, the wider rectangle indicated 400cm above the keel, with the number 0 being superimposed on top of the white rectangle.




It can be seen in the drawing above that the format employed upon all Type IX U-boats was the one-digit system. Unfortunately the waterline decals within Revell's new 1/72nd Type IXC kit (RV5114) use the two-digit system. It is possible that Revell were wrongly influenced by the two-

digit system on the Type IIs. Whatever the reason, the application of the two-digit system renders Revell's IX waterline draught mark decals entirely unsuitable. The AMP replacement set is K-72W.

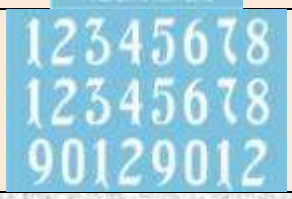
## Part VI - Full AMP Decal Listing

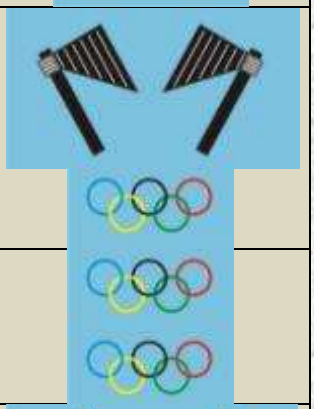
| Decals by Accurate Model Parts - Waterline Draught Marks | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **U-boat type** | **Suitable for the following kits** | **Image** |
| A-72W | 72 | VIIB, VIIC, VIID | Revell VIIC (RV5015), Revell VIIC/41 (RV5045) |  |
| B-144W | 144 | VIIB, VIIC, VIID | Revell VIIC (RV5038), Revell VIIC/41 (RV5100), Revell VIID (RV5009) |  |
| I-32W | 32 | VIIB, VIIC, VIID | OTW VIIC, Andrea VIIC, Engel VIIC, Accurate Armour VIIC (35th scale) |  |
| J-144W | 144 | II | Revell IIB (RV5115), ICM IIB 1939 (ICMS009), ICM IIB 1943 (ICMS010) |  |
| K-72W | 72 | IX | Revell IXC (RV5114) |  |
| L-72W | 72 | II | Special Navy IIA (SN72002) |  |
| O-48W | 48 | VIIB, VIIC, VIID | Trumpeter (TRU6801) |  |

| Decals by Accurate Model Parts - Snorting Bull | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **Size** | **Suitable for the following kits** | **Image** |
| C-72N | 72 | Normal | Revell VIIC (RV5015), VIIC/41 (RV5045), VIIB |  |
| D-72L | 72 | Large | Revell VIIC (RV5015), VIIC/41 (RV5045), VIIB |  |
| E-144N | 144 | Normal | Revell VIIC (RV5038), VIID (RV5009) |  |
| F-144L | 144 | Large | Revell VIIC (RV5038), VIID (RV5009) |  |
| G-35N | 35 | Normal | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| H-35L | 35 | Large | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| M-48N | 48 | Normal | Trumpeter (TRU6801) |  |
| N-48L | 48 | Large | Trumpeter (TRU6801) |  |

| Decals by Accurate Model Parts - U 96's Laughing Sawfish | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **Version** | **Suitable for the following kits** | **Image** |
| SAW35-BLACK * | 35 | *Das Boot* film version | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SAW35-GREEN * | 35 | The real U 96 | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SAW35-BLUE * | 35 | 9th U-Flottille version | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SAW48-BLACK | 48 | *Das Boot* film version | Trumpeter (TRU6801) |  |
| SAW48-GREEN | 48 | The real U 96 | Trumpeter (TRU6801) | |
| SAW48-BLUE | 48 | 9th U-Flottille version | Trumpeter (TRU6801) | |
| SAW72 | 72 | *Das Boot* film version, U 96 & 9th U-Flottille | Revell VIIC (RV5015) |  |
| SAW144 | 144 | *Das Boot* film version, U 96 & 9th U-Flottille | Revell VIIC (RV5038) |  |
| SAW350 | 350 | *Das Boot* film version, U 96 & 9th U-Flottille | Any 350th scale VIIC (Revell, AFV, Flagman, Hobby Boss) or 400th scale VIIC (Mirage) |  |
| * Previous AMP version (SAW35) replaced by SAW35-BLACK, SAW35-GREEN & SAW35-BLUE | | | | |

| Decals by Accurate Model Parts - U 201's Snowman & Remscheid | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **Version** | **Suitable for the following kits** | **Image** |
| SNOW35A | 35 | Remscheid late + Snowman version 2 | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SNOW35B | 35 | Remscheid late + Snowman version 1 | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SNOW35C | 35 | Remscheid early | Accurate Armour (35th), Dream Arts (35th), Andrea (32nd), OTW (32nd), Robbe (40th) |  |
| SNOW48A | 48 | Remscheid late + Snowman version 2 | Trumpeter (TRU6801) |  |
| SNOW48B | 48 | Remscheid late + Snowman version 1 | Trumpeter (TRU6801) |  |
| SNOW48C | 48 | Remscheid early | Trumpeter (TRU6801) |  |
| SNOW72A | 72 | Remscheid late + Snowman version 2 | Revell VIIC (RV5015) |  |
| SNOW72B | 72 | Remscheid late + Snowman version 1 | Revell VIIC (RV5015) |  |
| SNOW72C | 72 | Remscheid early | Revell VIIC (RV5015) |  |
| SNOW144 | 144 | Remscheid early & late + Snowman versions 1 & 2 | Revell VIIC (RV5038) |  |

| Decals by Accurate Model Parts - Pre-war Numbers | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **Version** | **Suitable for the following kits** | **Image** |
| PRE72B | 72 | Set of black pre-war numbers for U 1 to U 6, port and starboard | Special Navy Type IIA |  |
| PRE72W | 72 | Set of white pre-war numbers for U 1, U 3 and U 6, port and starboard | Special Navy Type IIA |  |
| ICMTII | 144 | Full set of pre-war numbers, port and starboard | Revell IIB (RV5115), ICM IIB 1939 (ICMS009) |  |

| Decals by Accurate Model Parts - Type IX Insignia | | | | |
|---|---|---|---|---|
| **AMP code** | **Scale** | **Version** | **Suitable for the following kits** | **Image** |
| T9-SHELL-72 | 72 | U 505 Shell for final patrol (for capture) | Revell IXC (RV5114) |  |
| T9-SHELL-EARLY-72 | 72 | U 505 Shell penultimate patrol | Revell IXC (RV5114) |  |
| T9-AXE-72 | 72 | U 505 Axe (includes one set of Olympic rings) | Revell IXC (RV5114) |  |
| T9-RINGS-72 * | 72 | Olympic rings | Revell IXC (RV5114), Revell VIIC (RV5015) | |
| T9-10UF-72 | 72 | 10th U-Flottille emblem | Revell IXC (RV5114) |  |
| * T9-RINGS-72 (Olympic rings) can be used for Type II, VIIC and IX models | | | | |

# The 1/72nd Wolf Pack

# Contents



## Part I - Introduction

The original Wolf Pack collection included a build article by Wink Grisé, my Accurate Model Parts (AMP) colleague, showcasing his super-detailing project of his chosen boat, U 557. There is no point in including another full Revell VIIC build article as this would be merely replicating what was covered in Wink's fine article. Furthermore, readers may learn more from other modellers' build articles which are of a higher standard to my own.

The three models built by the author are included here due to their direct relevance to three of the articles contained in this second volume. The Special Navy Type IIA links nicely with the Type II modifications article; my U 201 build links with the first article; and my U 505 build ties in neatly with the extended article herein. Additionally, the article is intended to signpost to the various AMP products used in the three builds.

Above (H01): A 1/72nd scale Wolf Pack of the three main U-boat types: the large ocean-going Type IXC, medium ocean-going Type VIIC and small coastal Type IIA.

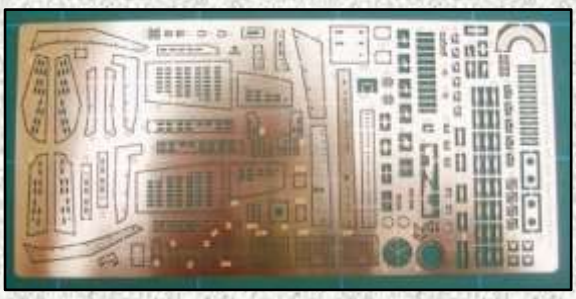
# Part II - Type IIA U 2

The first of AMP's two main sets is 72-01, which corrects and improves Special Navy's 1/72nd Type IIA model kit.

## Choosing boat and time frame

Choosing a boat and selecting a time frame is always a fun decision to make. I very nearly chose to go with the highly unusual and previously unknown camouflage scheme in *U-Boot Im Focus 13*. However, with both U 201 and U 505 both being weathered, I chose to depict the model in pristine condition. The pre-war white tower scheme is, to my mind, extremely pleasant to look at so I chose U 2 with this scheme. Unfortunately I was unable to choose a specific date as I have been unable to determine the exact time frame when the white tower scheme was employed. My best guess is that this scheme was used around 1936 or so. What is relevant about this time frame is that the wooden seats on the deck railings were not present at this early time period.

## AMP set 72-01

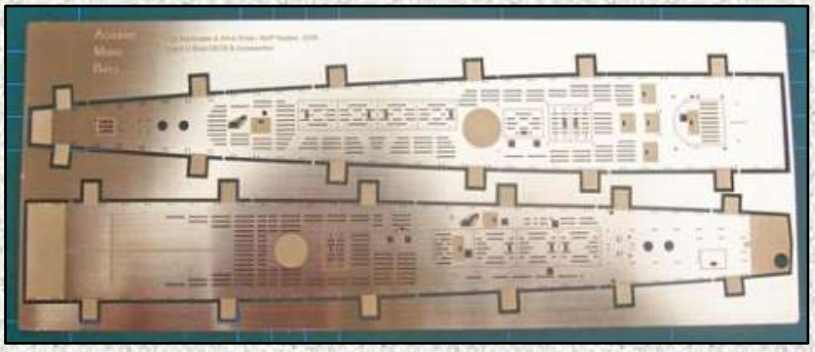


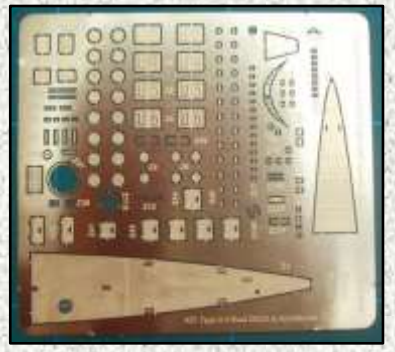
Above left (H02): The first of the four brass frets included in Accurate Model Parts multi-media set 72-01. These include multiple pieces to replace the free-flooding vents on the hull.

Above right (H03): The second fret includes rectangles to depict the doors in the ventral area near the keel, the deck seats that were introduced during the pre-war period, and a nameplate.

Below left (H04): The third fret includes the deck split into two main sections. This depicts the long wooden section of the real deck. The pattern on this deck was designed exclusively using period photos (and took much longer than building the kit!).

Below right (H05): The final fret is thinner and includes parts requiring finer detail. The two main parts have anti-slip bumps on the surface for the metal areas at the bow and stern of the boat. Other details included the metal hatches on the deck, individual pre-war nameplates in place near the bow and circular listening plates near the foreplanes.





Left (H06): The main brass deck section test-fitted on the Special Navy kit.

Left (H07): One of the resin parts allows the join between the four hull parts to be bridged.

Below (H08): When researching the Type IIA deck, it was found that the metal section at the stern was not wide enough compared to plans and period photos. The stern deck section corrects this deficiency. To make the replacement brass deck fit nicely, we include a resin insert which widens the stern appropriately.

Right (H09): The decal sheet included in AMP 72-01 includes white pre-war tower numbers for U 2, U 4 and U 5 as well as waterline draught numbers.

Below (H10): The flag set which is included as standard in 72-01 is DK-RMTC-80X135-072. This is the version with the Iron Cross which was used on the very early Type IIAs.


## Finished model

Above (H11): The finished model with Reichsmarine flag and red-and-white rescue buoy on the aft deck. On the hull can be seen one of the six waterline draught number sets.

Above (H12): Here can be seen the completed model on a wooden stand with the nameplate included in 72-01. The three colours (lower hull dark grey; upper hull *Dunkelgrau 51*; white tower) make for a striking colour scheme. Photos of the real boats in this aesthetic scheme tend to show clean boats free of rust and dirt. Therefore the decision was taken to depict U 2 in pristine condition with no weathering at all. Note the black tower number from AMP decal set PRE72B.

## Other decals



Far left (H13): The other decal sets in the AMP decal range allow any pre-war Type IIA to be modelled. Here can be seen PRE72B, which allows the black tower numbers for U 1 to U 6. These were in place on the white tower scheme (although a few boats had dark grey numbers).

Left below (H14): PRE72W allows the other three boats (U 1, U 3 and U 6) not included in the 72-01 set.

Near left (H15): If modellers do not want to purchase 72-01 they can still add waterline draught numbers to their model via our decal set L-72W.

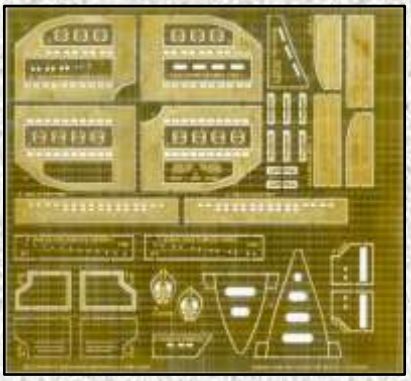
# Part III - Type VIIC U 201

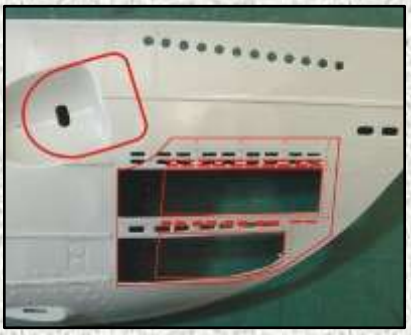
The next model in my Wolf Pack is a Type VIIC built from Revell's RV5015 kit. Given the vast number of VIICs built, my first task was to choose which boat to model and, crucially, the time frame. This is especially important with VIICs due to the multiple modifications and differences between individual boats. Although there are so many boats to choose from, one can only really depict a boat accurately if we have sufficient research material at our disposal. There may be literally hundreds of VIICs but we tend only to have multiple period photos of a few boats. The boats I did have enough photos of included U 93, U 94, U 96, U 201 and U 552, all of which have interesting emblems and patrol history. For each of these boats I had a good idea how the specific features, insignia and paint colours varied over time. Of these boats, it was the very pleasant camouflage scheme and the interesting snowman emblem which made me choose U 201.

## U-Brass

The U-Brass project, which produced a thick photo-etched fret to allow all the free-flooding holes in the Revell hull to be corrected, was covered in Wink's article and needs no explanation here. After correcting the main vents to U 201's pattern, my next step was to apply all the U-Brass pieces to the Revell hull, including the large cheek pieces correcting the overlong torpedo doors.

The other major modification in the hull was to move the anchor recess forward. Another change which is often forgotten is to alter the main drainage area (shortened starboard; length port). There are too many modifications made to the hull to mention in this brief article so readers who are interested should refer to the short article "*Revell Type VIIC Checklist*" in the original Wolf Pack collection.





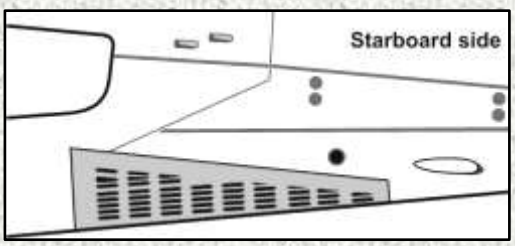
Above right (H16): The thick brass fret belonging to the U-Brass set. This is still available by White Ensign Models.

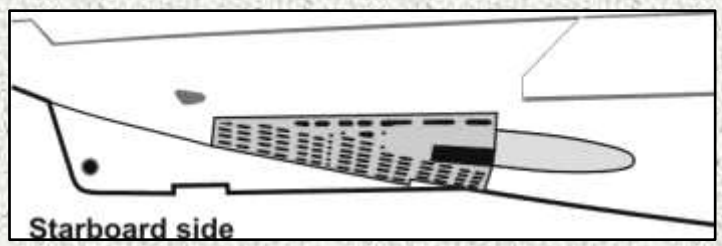
Right (H17): Wink's guide to the movement of the anchor recess and the fitting of the starboard cheek piece. Note how oversized the 12 round holes are near the top of the hull.

## AMP 72-02 hull

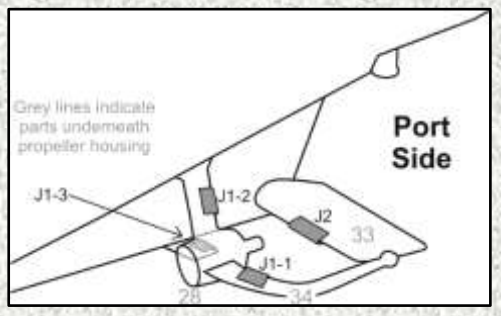
The final two alterations in regard to the free-flooding vents are the areas near the fore and aft diveplanes. The brass pieces on the market by other aftermarket companies all have some deficiencies, either by not correcting Revell's hole sizes and distances or not replicating the pattern fully. In the case of the front piece, some of the holes on the real boats were not perfectly oval put rather elongated holes with odd patterns. On AMP set 72-02 we went with what could be seen in the period photos rather than a neat pattern that would be pleasing to the eye. Fitting the four pieces (two per side) was not overly difficult, though the rear piece was trickier due to the curve in the hull.

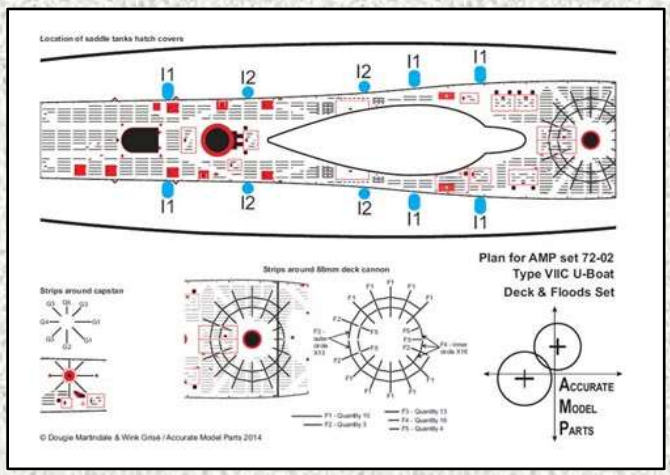
Below (H18 & H19): The 72-02 instruction guide for the fitting of the brass pieces near the fore and rear diveplanes.




Right (H20): The sacrificial anodes on the aft diveplanes and brackets are included in 72-02. These were added to my model as per the position in this instruction booklet image. This subject was discussed in an AMP forum thread several years ago.



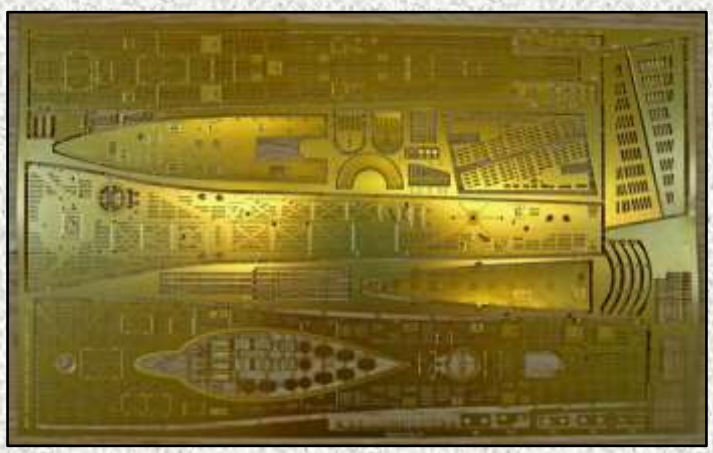




Left (H21): Here can be seen a plan which is included in 72-02 showing the position of the anti-slip strips around the 88mm and capstan. Also included is the position of the saddle tank hatch covers from the brass fret. With the valued assistance of Simon Morris (*NZSnowman*), we found that two of the five covers per side were round and not oval. As always we referred to period photos rather than inaccurate plans.

## AMP 72-02 deck

The next step was to fit the AMP 72-02 deck, which is produced in five sections. This consists of three main brass parts for the wooden area plus two parts for the metal deck areas at the bow and stern. To support the brass deck I added several supports which lie directly underneath the deck. Rather than Zap-A-Cap CA glue I used two-part expoy glue for additional strength, thus providing a secure join between the deck and hull.

Right (H22): The brass fret in 72-02. Other than the five deck sections, the four vent replacement parts near the fore and aft diveplanes can be seen at the top right. The sacrificial anodes and saddle tank covers are positioned in the gap in the tower area. Other parts include the semi-circular air identification late, full-length tower seats for *Germaniawerft* boats and various deck details.



## Painting, decals and flag

Once the tower and 88mm deck gun was added to the photo-etched deck, I painted the model in the aesthetic wavy camouflage which is so distinctive of U 201. I used enamel paints from White Ensign Models' Colourcoats range, thus requiring no mixing to the correct shade. After looking at the period photos many times I opted for *Dunkelgrau 52* (RAL7024) for the dark grey and *Dunkelgrau 51* (RAL7000) for the lighter grey. The obvious colour for the lighter grey might be *Hellgrau 50* (RAL7001) but many years of examining period photos has left me with the firm conclusion that the medium grey *Dunkelgrau 51* was more common than *Hellgrau 50*. Now that the model is completed I am very happy with the choice of *Dunkelgrau 51* (which, despite the name, is nowhere near a dark grey at all) for the lighter grey.

The date chosen for my model is the early morning of the 8th August 1942, prior to U 201 sailing into Brest at the end of patrol 7. When the boat arrived in port shrubbery and victory pennants were present on the tower and a HMS T.133 lifebuoy hung from the forward jumping wire (as per photo A10 on page 15). I chose not to add these features to keep the model clean of embellishments but did add an AMP flag to the tower railings.


Above left (H23): The decal set SNOW72A was used to depict my U 201 model towards the end of patrol 7. Note that both snowmen were not exact mirror images of each other; the differences were incorporated in each design.

Below left (H24): The decal A-72W was used for the waterline draught numbers applied as standard to all U-boats.

Right (H25): The AMP flag DK-KMNE-80X135-072 was used and can be seen flying from the rear of the tower railings. The waterline draught numbers are there (honest!) on the port saddle tank but are mostly obscured by plantlife. Note how the plantlife has been depicted as having built up to the normal waterline level. This tended to occur because U-boats of that vintage were essentially submersibles, spending over 90% on the surface but having the capacity to dive when necessary.

## Weathering

Rust - Now that the basic paint colours were in place the fun could start. Weathering a U-boat model has the potential to make or break a build so it is prudent to spend a fair percentage of the build time on the weathering process. The most common mistake (which obviously I have made previously) is to get carried away with adding rust. When I applied rust to my U 201 model, I added the dark reddish brown in *very* small patches which are mostly only visible close up. Then I added what I think of as the rust residue effect below the main rust patch. The residue is the lighter orange brown colour which appears below the actual rust patch due to the action of water. To research the rust colours and residue effect I spent a profitable afternoon walking around the neighbourhood photographing rusty metal signs and gates. Naturally the motorists who passed were rather puzzled at my fascination with rusty objects. I always find applying rust and rust residue enjoyable but have to repeatedly remind myself of the scale of the model: the little patch of rust added to a 1/72$^{nd}$ scale model should be no more than 1/72$^{nd}$ of the size of the real rust patch on the subject.

General weathering - There is more to weathering a ship model than merely adding rust. Looking at real ships shows various effects on the hulls including paint peeling, staining, fading and good old fashioned dirt. U 201 was not excessively weathered or rusty on the 8$^{th}$ August 1942 but by the same token was far from fresh. There was very little paint peeling in evidence but I did add various colours to dirty up the upper hull and tower. The area around the diesel exhaust outlet was made particularly dirty due to the exhaust staining which built up quickly on the real boats.

Left (H26): The patchy appearance of the upper hull can be seen in this photograph. A few small rust patches can be seen but they were deliberately kept to modest proportions.

Deck weathering - The weathered deck does not show up well on photographs. The process I tend to follow for the wooden area of a U-boat deck is to mix a tin of dark brown paint and use this to paint the entire deck. I will then mix a lighter version of this tin and also a darker version and apply both at various places to achieve a worn appearance. Sometimes I use a wash and other times I use dry-brushing. I also dry-brush some white in small areas to replicate salt staining. This process, though time consuming, is not particularly difficult. Furthermore, given that a patchy appearance is desirable, mistakes can be easy to amend. U-boat decks are not entirely wood, there being various metal details and hatches as well as the metal sections at the bow and stern. For the metal areas I start by painting them black. In some areas I add a little rust, taking care as always not to overdo it. Naturally adding a black wash to a black surface is unproductive. To weather the black horizontal surfaces of a metal deck I tend to dry-brush with white, taking care not to add too much of the white.

Lower hull - The more challenging aspect of weathering a U-boat model (indeed any ship model) is the lower hull. The difficulty is that our understanding of exactly what a U-boat hull looked like after six weeks on patrol is generally poor. When in a harbour I am always on the lookout for any vessel which has been taken out of the water so I can photograph the barnacles and plantlife on the hull. But I have not, for reasons which are self evident, been able to take photos of a U-boat which has just come out of the water. There are some photos showing U-boats in dry-dock and these are extremely useful. Yet the black and white imagery still leaves some doubt as to the colours and texture of a weathered hull. What is beyond doubt is the unsatisfactory nature of leaving the lower hull mostly unweathered while going to town with rusting the upper hull.

The lower hull of my U 201 is not quite a kaleidoscope of colours but does feature a variety of colours including different greens, greys and even white. The green I used for the plantlife adhering to the hull was not just one green colour but three or four green colours applied overall. I also dry-brushed some white to simulate barnacles but kept this to a moderate level. I did add rust to the hull in very limited patches but did not add a rust residue effect (the residue effect cannot take place as there is no rainwater to brush the rust particles down the hull). Towards the normal waterline level I added more green for the plantlife which tends to build up in this area. At the top I added tiny little areas of white as this is often found on boats in port. This leaves a distinct division on the saddle tanks above and below the normal waterline level, as often evidenced on modern submarines. We should recall that VIICs were submersibles which spent over 90% on the surface. Therefore they would mainly weather like a surface ship, with distinct differences in weathering above and below the waterline.

Below (H27): The stern of U 201, with the staining around the exhaust outlet and a patchy lower hull.

Above (H28): A completed model benefits from a wooden stand, brass supports and brass nameplate rather than the plastic stand provided in the Revell kit.

## Part IV - Type IXC U 505

The last of the three models is U 505. As always I found it essential to narrow down the boat to an exact a time period as possible. In this case my model depicts the Type IXC in the time period after her capture on the 4th June 1944 with the red text "CAN DO JUNIOR" on the front face of the tower. This text was not present during the historic capture and was applied after American personnel belonging to the *USS Guadalcanal* boarded the vessel. My model therefore portays U 505 after this text was added. Enthusiasts may recall that the port bow plane of U 505 was ripped off during the second of two collisions with the USS *Pillsbury* but my model depicts the boat before this incident took place.

Damage - As there is no AMP set for this kit I decided to build the model straight out of the box with no real improvements. The only exception was to apply the damage sustained by the boat during the capture (as covered in Part VI of the U 505 article). The damage applied to my model included the severing of the front section of the wind deflector, the addition of cannon damage to the tower and the broken jumping wire on the starboard side (just ahead of the tower). Both deck railings were significantly altered, with the frontal area on the starboard side being completely severed. On the port side the frontal area was buckled outboard and the rear area bent inboard. It was rather fun to add all of this damage to the model, giving it more character than a pristine model.

Right (H29): The broken jumping wires and broken and bent deck tralings can be partly seen in this image.

Painting - The paint colours applied to the model were *Blaugrau 58/1* for the upper hull and *Schiffsbodenfarbe III Grau* for the lower hull (both from the Colourcoats range). I mixed up the dark blue grey *Blauschwarz 58/2* from the Snyder & Short Kriegsmarine paint cards due to this shade not being available in the Colourcoats range.

Weathering - The weathering was completed in much the same fashion as that described in the previous section on U 201. One difference is that more rust had to be applied to the upper hull. I also applied a dark scumline around the waterline as I thought that this was visible in some period photos. In retrospect I think this should be toned down and has been overdone. One of the better aspects of the model is perhaps the very small white areas applied to the upper hull to replicate those seen in the period photos. Presumably this is salt staining rather than paint peeling or some other effect. Another difference between my U 505 model and U 201 model is that the wooden deck on the IXC is more weathered. Certain areas were lightened to indicate wear, with the range of tones being greater than on the U 201 model.

Below (H30): The rust, blackish scumline and various lower hull tones can be seen here. Also visible are the small white salt stain areas on the upper hull. What is surprising here is that the *Blaugrau 58/1* upper hull does not look so different from the lower hull *Schiffsbodenfarbe III Grau* or the brown wooden deck. The waterline draught marks are visible ahead of the anchor recess, though heavily weathered and partially obscured.

Tower weathering - The most important weathering aspect is undoubtedly the paint peeling on the tower. As covered in Part X of the U 505 article, the towers of U 505, U 805, U 858, U 870 and U 889 all exhibited paint peeling which was markedly in excess of their upper hulls. Quite simply, any model which tries to capture (sorry, bad pun!) U 505 on the 4th June 1944 absolutely **has** to feature significant paint peeling. If the modeller does not want to try to emulate the peeling then they should depict the boat at the start of the patrol before any paint deterioration took place. The decision to try to reconstruct the significant paint peeling on U 505 should not be taken lightly as it becomes the centrepoint of the whole model and changes the overall visual effect remarkably.

Once I had decided to try to change the uniform *Blauschwarz 58/2* into a hotch-potch of mixed colours, the first step was to try to work out the exact colour of the bare metal where the paint had peeled away. The colour photo of U 858 with an American flag in 1945 shows the metal as white rather than silver. This could conceivably be because of the effects of salt on the bare metal. However, close inspection of the period photo shows bright sunlight shining directly on the affected area, arguably making the metal appear whiter than the true colour. My choice was to go for a white-silver colour for the exposed area. Quite obviously this was going to contrast greatly with the dark blue *Blauschwarz 58/2* paint which remained.

Once I had mixed a white-silver paint, I began by applying it with an old paintbrush with frayed brushes. I referred constantly to the period photos of U 505, paying particular attention to the amount of peeling in each area. For example, more peeling was evident low down near the front of the tower, where the surfaces were more exposed to wave action. Some areas were painted directly with the old brush while in other areas more subtle effects were added by dry-brushing. In some areas I added too much white-silver and this was rectified by applying more *Blauschwarz 58/2* paint. Several hours were required to get the tower in the condition I wanted. Overall I am reasonably happy with the result, though it obviously will not be winning any IPMS completion awards.

Below (H31): The small white areas on the upper hull are the salt stains seen on the real boat. Yet there is nothing small about the white-silver patches on the tower. If trying to emulate the paint peeling effect there is no option but to dive in and apply a significant amount of peeling. It may be noted that the ammunition containers, guns and railings have no peeling whatsoever as a different type of metal was used here. This is deliberate as only the tower sides of IXs were affected by the paint peeling problem.

Decals - The glaring error in the Revell kit decals is the red shell emblem, which is corrected via AMP's green shell decal set T9-SHELL-72. This was added to the model and then protected with a few coats of Future. Once fully dry I applied a matt varnish over both decals. Then I added the silver-white paint over areas of both shell emblems to simulate the peeling effect on the real boat.

Similarly, when the AMP waterline draught number sets were applied to the hull, sealed with Future and coated in matt varnish, they too were weathered. On the real U 505 the white numbers were added over steel numbers welded to the hull. The numbers were painted white but the white paint tended to fade, peel away by wave action, or be obscured by plantlife or the scumline. These effects were taken into consideration when weathering the decals whereby I painted over some of the numbers to achieve the desired results. The waterline decals can be seen on the finished model but certainly do not stand out in the way that brand new freshly-painted numbers do on pristine model hulls.

Flags - The final task to complete was to add the two AMP flags on a pole secured to the top of the raised rear periscope. As per the period photos, I added a larger American flag above the German Kriegsmarine flag. This neatly signifies the new ownership and the German U-bootwaffe being dominated by the stronger US forces.

Above (H32): Only four waterline draught number sets are included in Revell's kit so AMP produced K-72W with all six sets.

Left (H33): The decal set T9-SHELL-72 from the AMP decal range.

Above (H34): The finished U 505 model.

Below (H35): The three major Kriegsmarine U-boat types in 1/72nd scale. Although the VIIC in the middle looks longer, it is actually the IXC which is the longer and wider of the two types. Note the U 505 model with the two AMP flags in place on the pole above the raised rear periscope.

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http://www.uboatarchive.net/U-257INT.htm (U 91, U 257, U 358 and U 744)
http://www.uboatarchive.net/U-118INT.htm (U 118)
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http://www.uboatarchive.net/U-164INT.htm (U 164)
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A U 201: Remscheid & The Snowman
B U 505: Modifications, Colours & Insignia
C U-Boat Waterline Draught Marks
D Type II U-Boat Modifications & Vent Patterns
E Late War Type VIIC & VIIC/41 Configurations
F List Of U-Boat Modifications & Identification Features
G A Guide To AMP U-Boat Decals
H The 1/72nd Wolf Pack

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