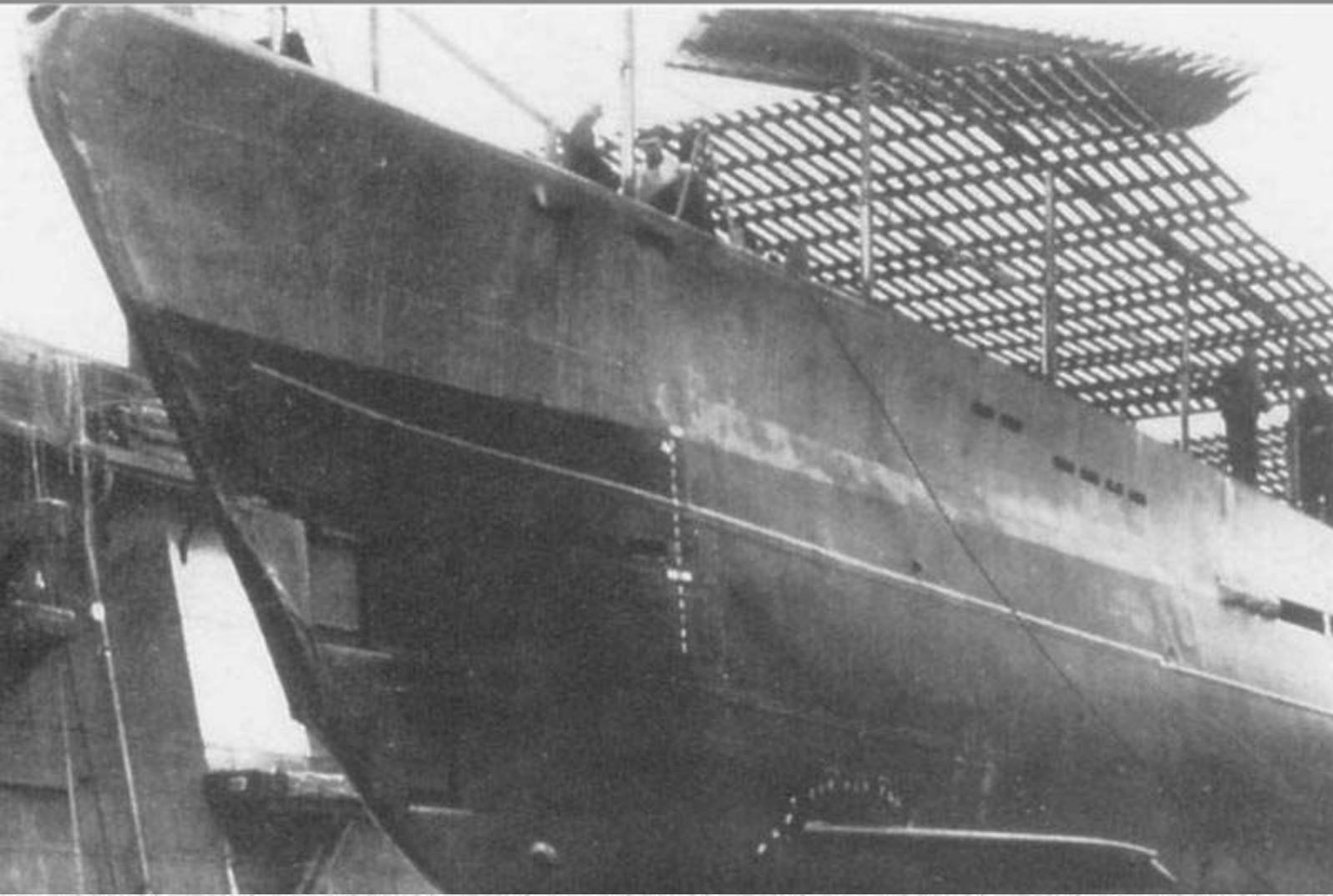


U-Boat Waterline Draught Marks

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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.rokkt.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.

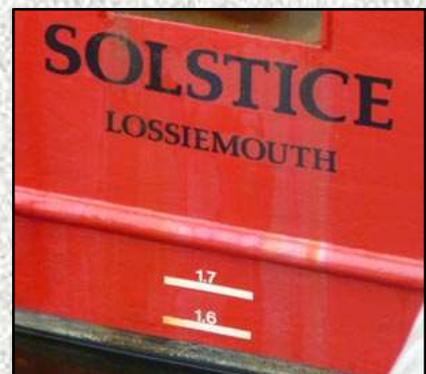
Ships also have a Plimsoll Line (also known as the load line) painted where the hull meets the water surface. Consisting of a circle with a horizontal line running through it, this indicates the safe level to which they can be loaded. However, since submarines are designed to sink, a Plimsoll Line is 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.

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



Above (1): 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.

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.

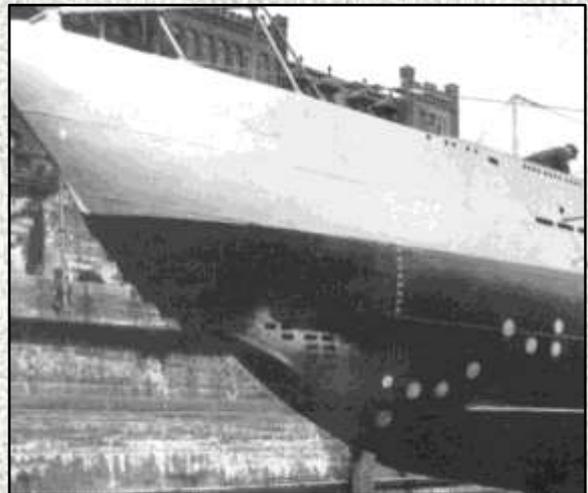
On the few photos of Kaiser's U-boats that I have seen, above the waterline the draught marks were painted black to provide suitable contrast to the light grey paint underneath. On the dark grey paint below the waterline, the draught marks were painted white and this again allowed the numerals to be 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*

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.

Below (2): 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.



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 -

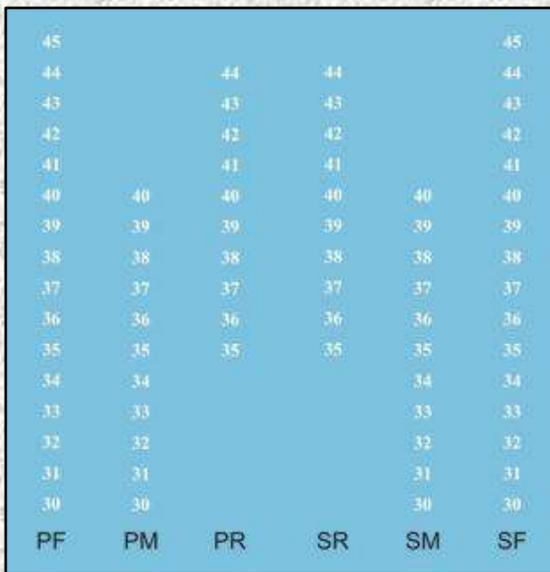
- Six sets of waterline marks (forward end, aft end and amidships on either side).
- Marks spaced vertically at one decimetre (10cm) intervals.
- Each number had **two** numerals.
- The number indicated the height in decimetres above the keel (for example, 39 indicated 390cm above the keel)
- All marks 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

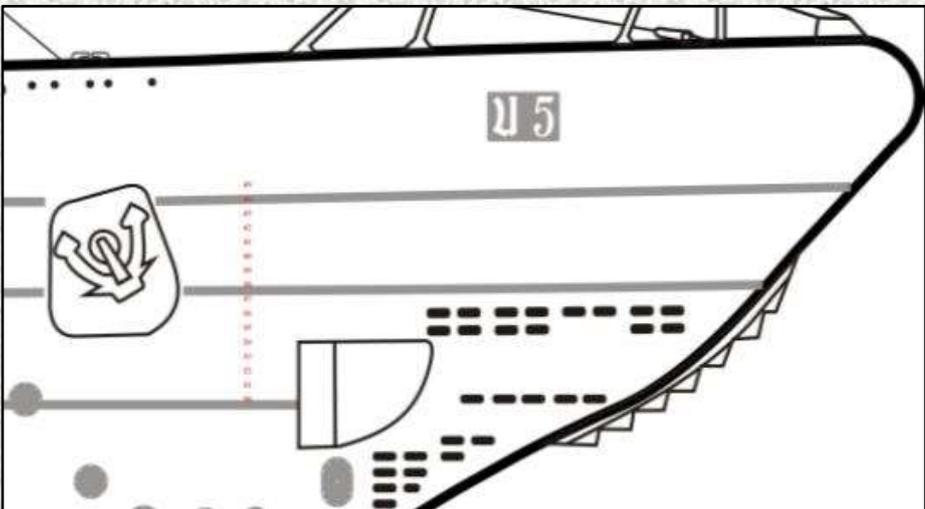


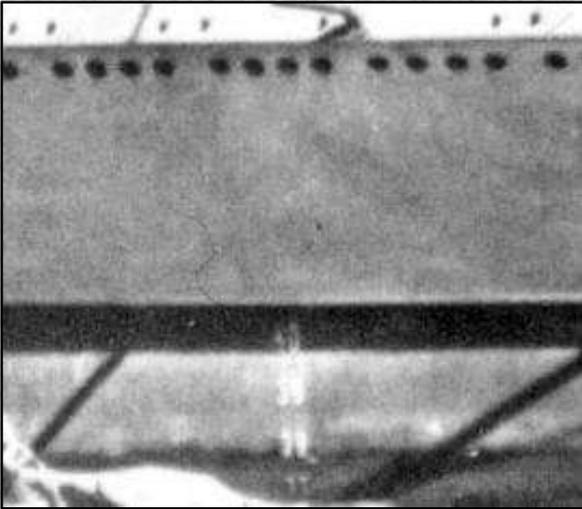
Left: The drawing shows the design of the AMP Type II waterline decals. Each number would be aligned at the same distance above the keel. The number 38, for example, would be aligned 380cm above the keel. Note that the black codes are NOT part of the decals; these are included here to indicate the position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

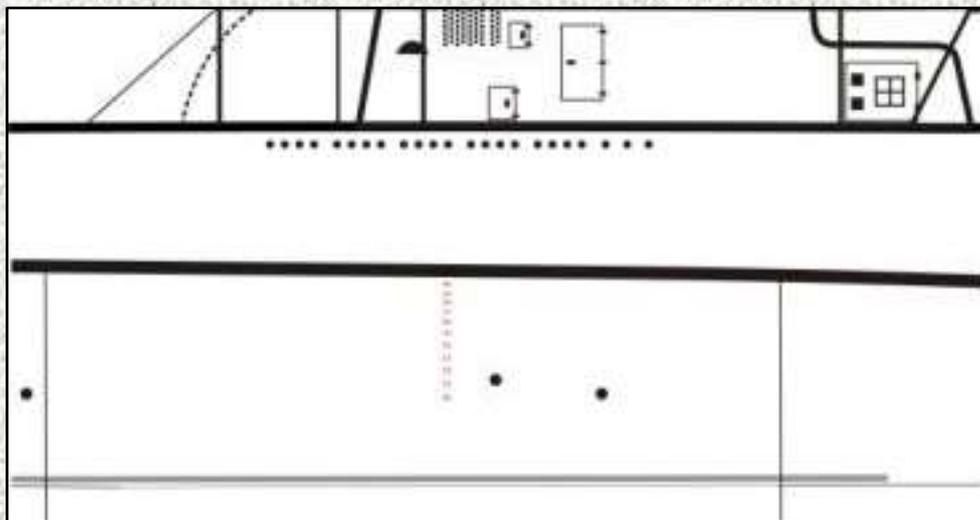
Right: The drawing shows the positions of the forward set on the hull of a Type II U-boat. Although drawn in red for visibility purposes, the real numbers were painted white.





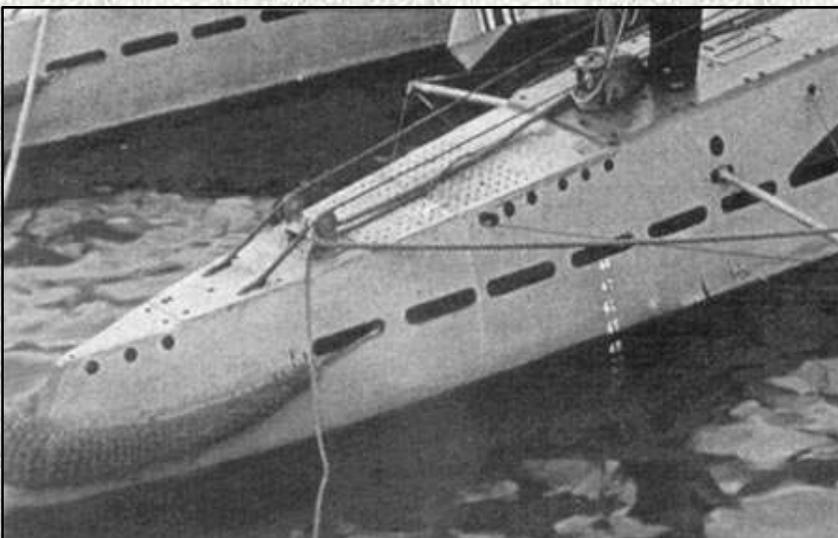
Left (3): In the middle set, the number 40 was positioned at the top of the saddle tank. The numbers did not continue onto the hull casing up to 45.

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 2 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.

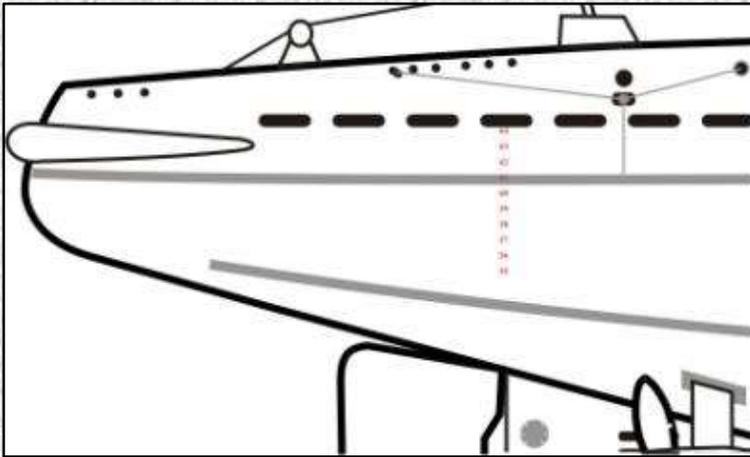
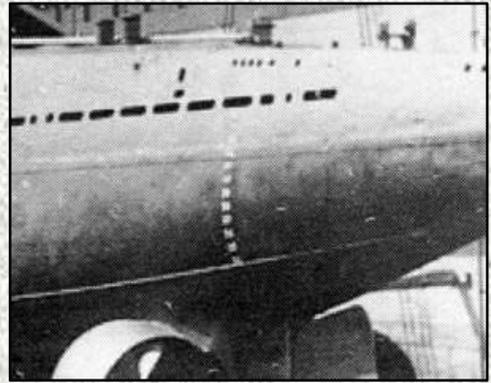
When the Type IIB U 11 was covered with *Alberich* (sound absorbing anechoic tiles), the white waterline numbers were painted on top of the tiles. In one difference to the norm, the rear set on U 11 had only 7 numbers rather than 10.



Left (4): 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 (5): This image shows the rear set extending down the hull casing of U 18 until the number 35 was reached.

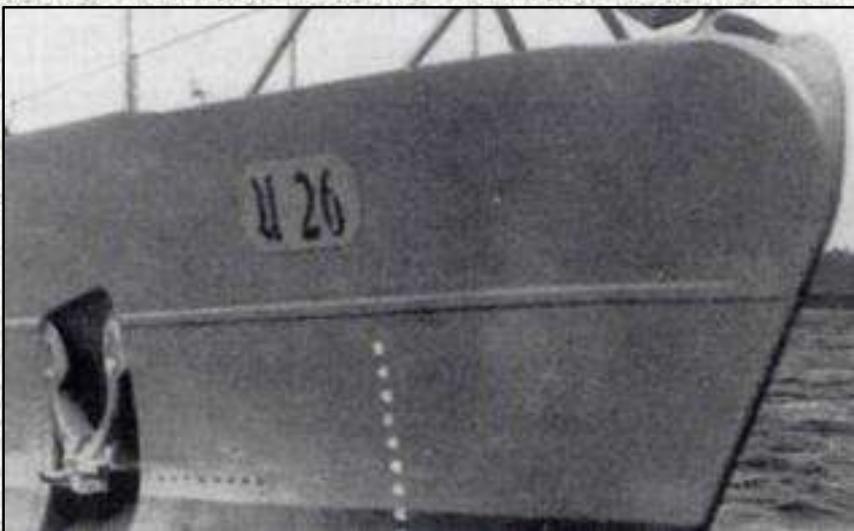
Below: The drawing shows the positions of the rear set on the stern of a Type II U-boat.



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 VIIIs (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 (6): 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.



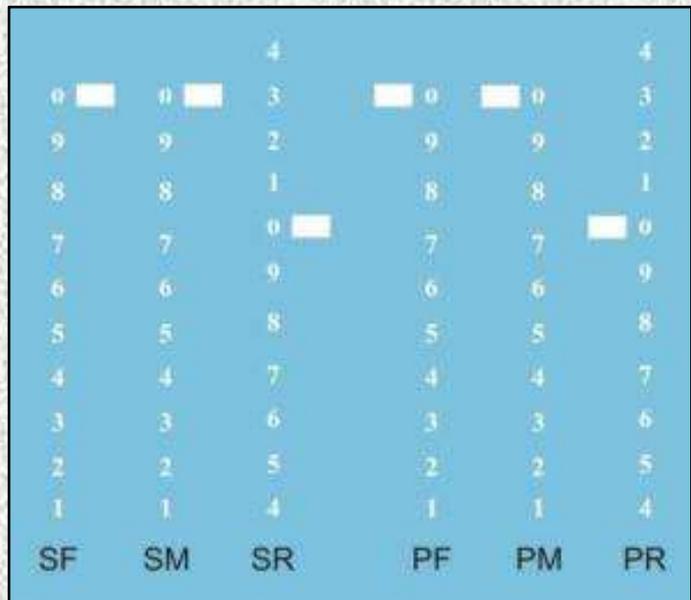
Above (7): Another image taken in the pre-war period, this time of the original VII (VIIA) U 35. The white numbers are clearly shown against the medium grey upper hull paint. Some of the numbers are not so clear against the dark grey lower hull paint. The numbers would have been present but may be obscured beneath a scumline or any slime that tended to accumulate just below the waterline of boats sitting in harbour. On VIAs, 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

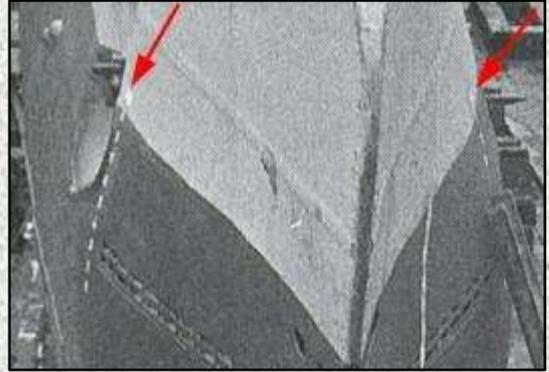
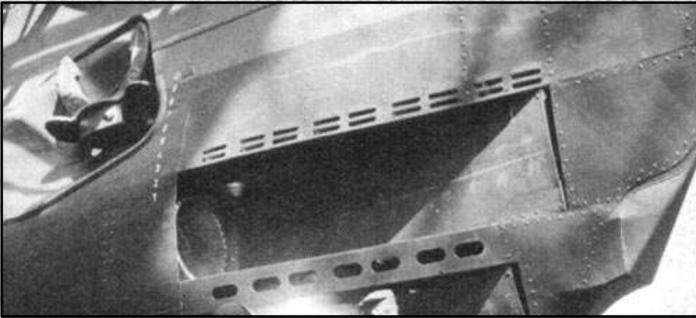
When the first Type VIIBs were launched in 1938 a new one-digit system was implemented. It was this format which would become the norm for any other U-boat type subsequently built for the Kriegsmarine. This one-digit system was characterised by the following -

- 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, XXIIs 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.



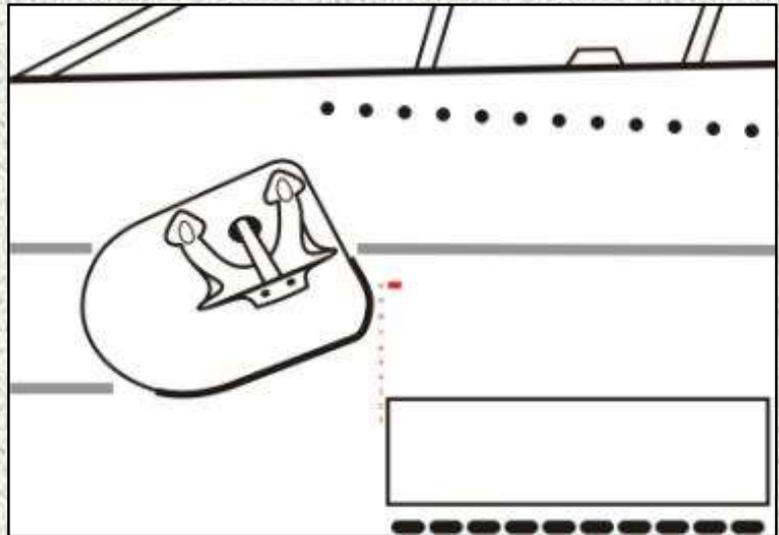
Type VIIBs, VIICs and VIIDs

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 (8): 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 (9): 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.

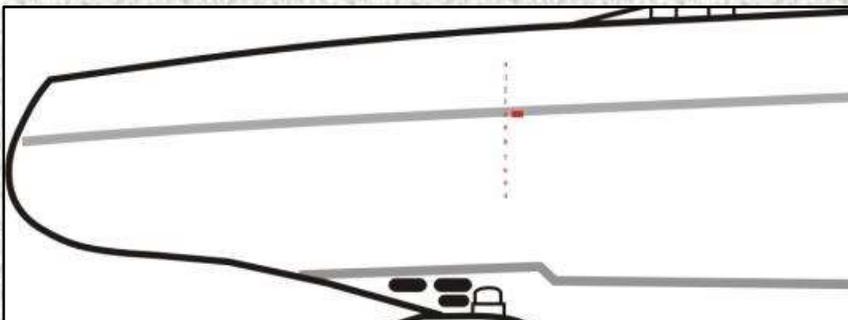
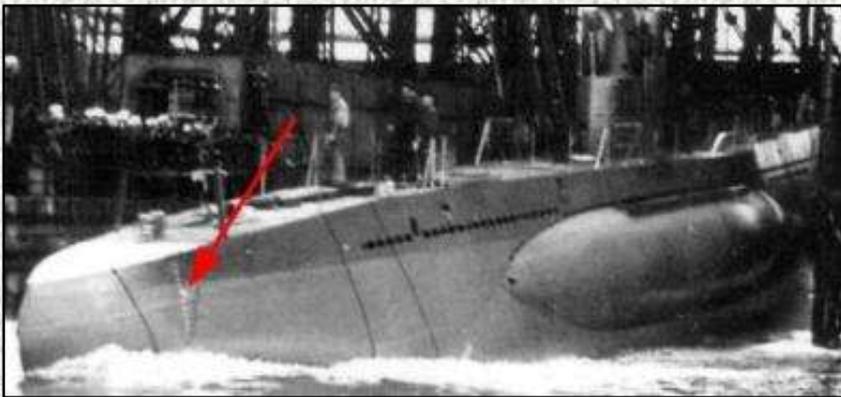
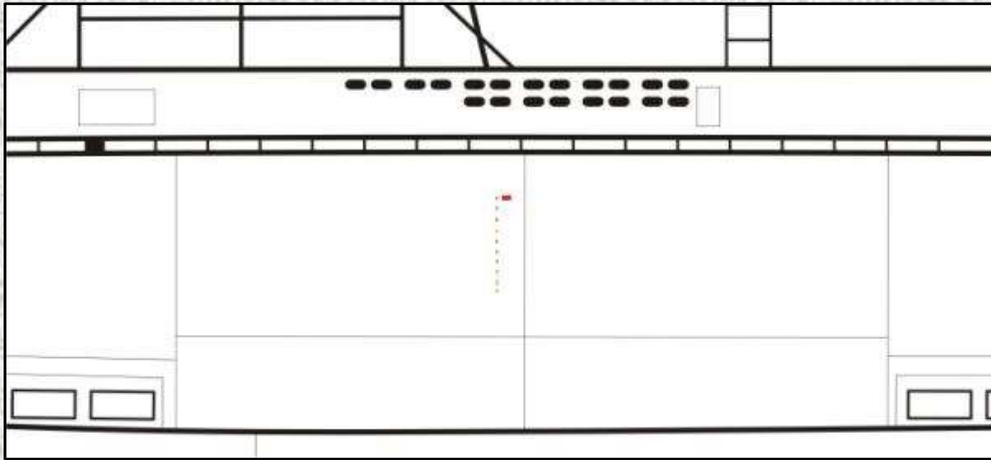


Right: A drawing showing the position of the forward marks on the starboard side of a VIIB hull. On the port side the rectangle was also positioned ahead of the numbers.

Bottom right: (10): 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 $1/72^{\text{nd}}$ of the real 500cm distance from the keel.



Left top: (11): 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 (12): The red arrow points to the white draught marks on this colour shot of a VIIC in construction. Unfortunately our view is obstructed.

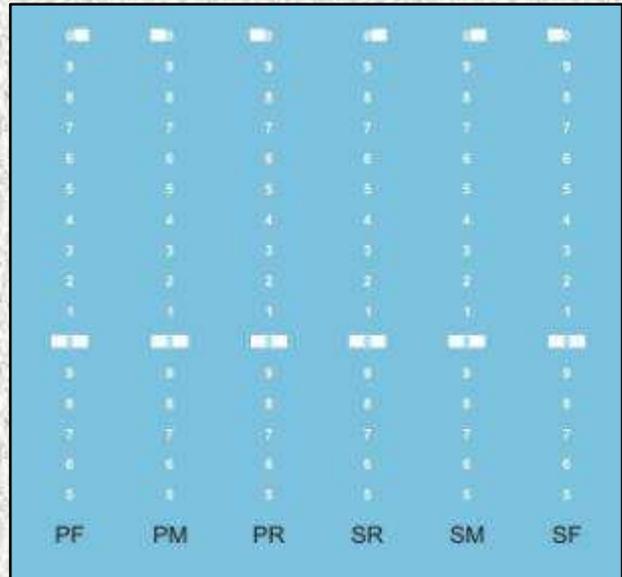
Left bottom: A drawing showing the position of the rear marks on the starboard side of a VIIB hull. It can be seen that the format was different on the rear set in that they ran from the 440cm (number 4 at the bottom) level up to 540cm level (the 4 at the top).

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

- As we have seen on U 228 (see photo 7), 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

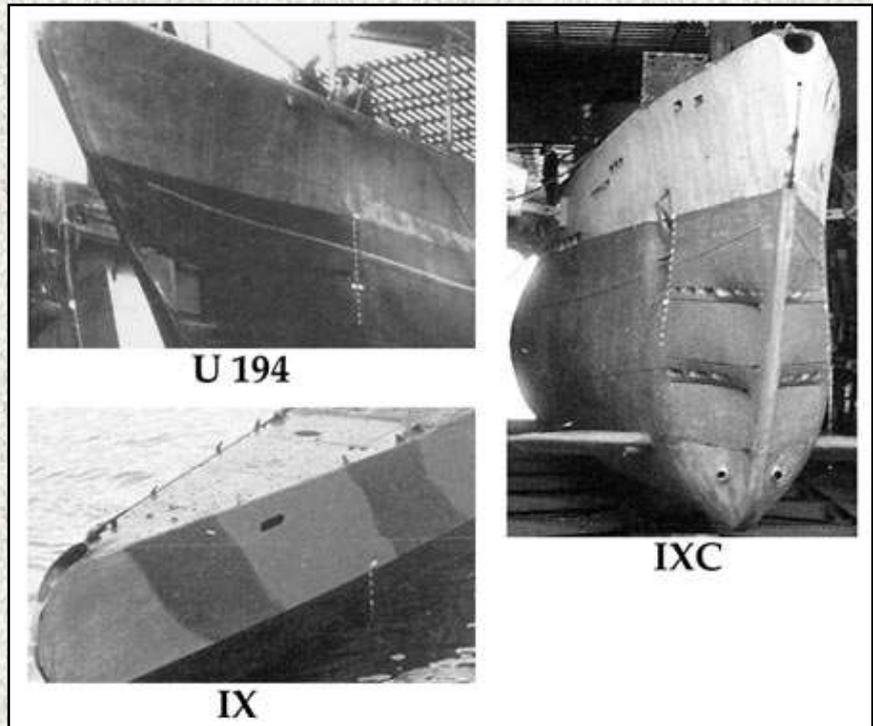
Another major type to utilise the one-digit system was the Type IX class of ocean going submarine.



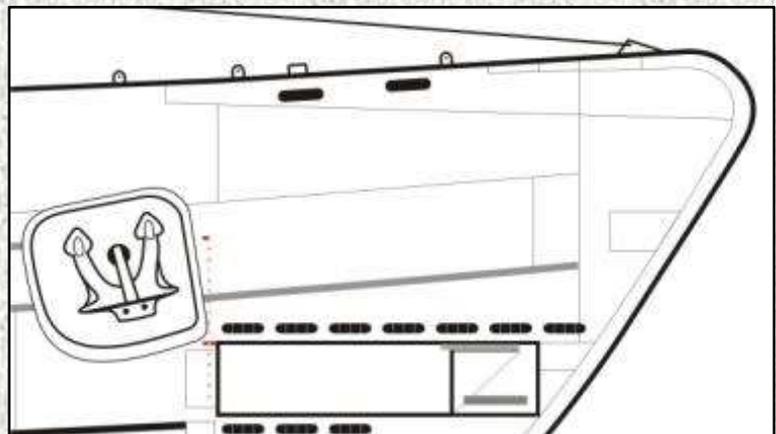
Top right: The drawing above shows the design of the AMP decals (K-72W) for the 1/72nd Revell IXC U-boat. Please consult the earlier table for the black codes. Note the presence of the wide white rectangle at the 400cm. The number 0 was superimposed over this wide white rectangle.

Right (13-15, 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.

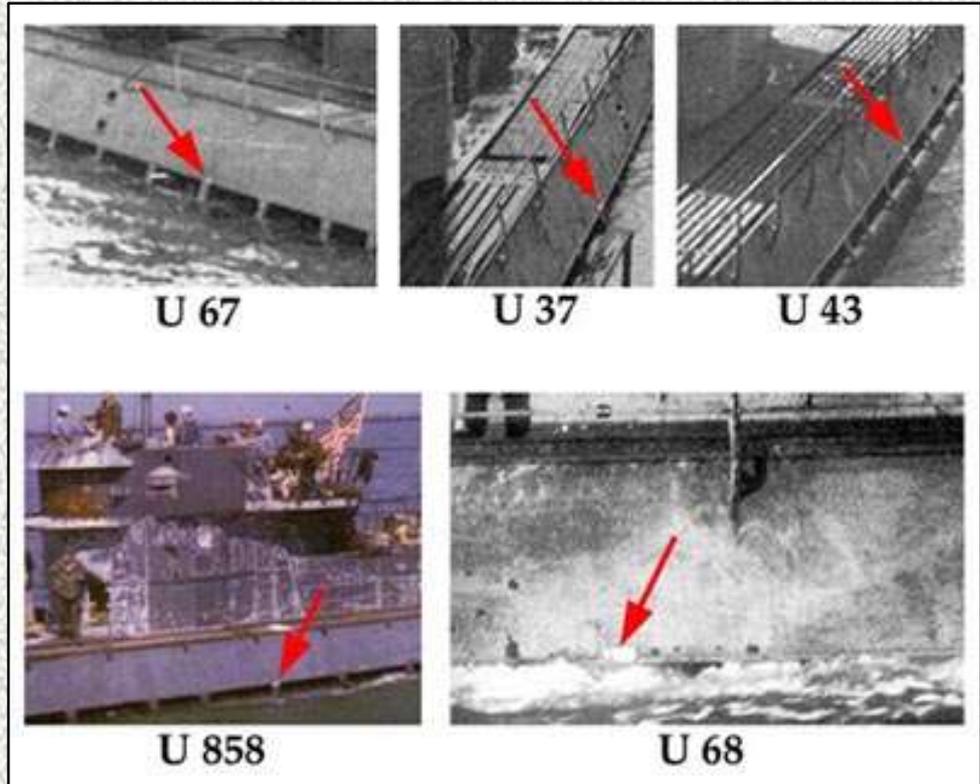
Bottom right: The positioning of the numbers can be seen on the bow of the IXC side profile below.



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.



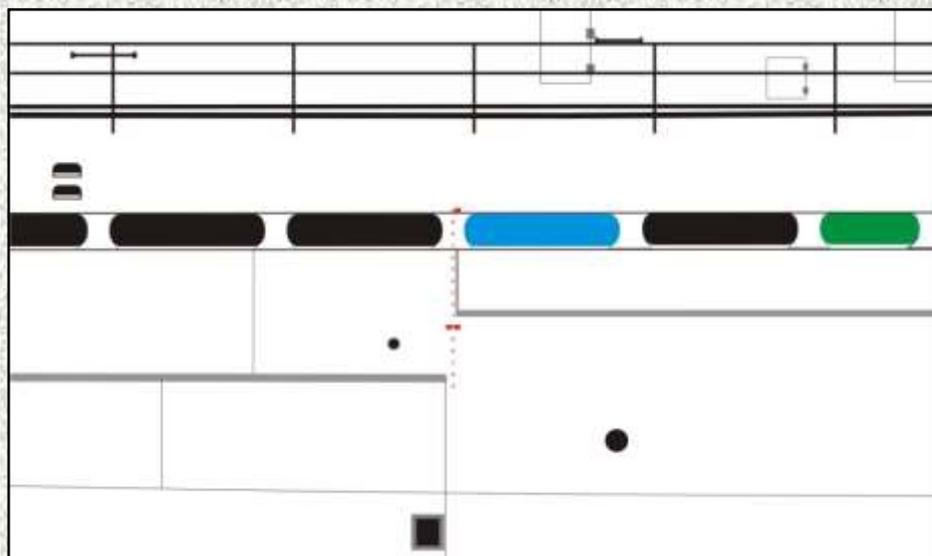
Revell's new Type IX model kit provides only four sets of waterline draught marks on their decal sheet (only the sets at the bow and stern are provided). The omission of the middle set may be a result of the difficulty in identifying the sets amidships. This is primarily because most photos show boats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



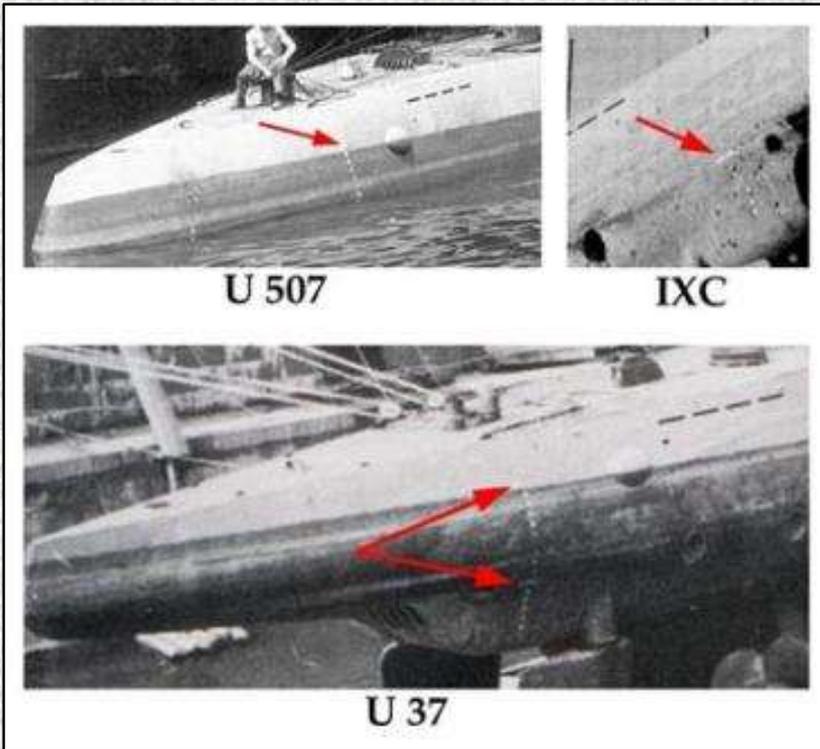
Above (16-20, numbered clockwise from top left): The white rectangle at the top of the middle set has been identified in each of the five Type IXs shown here. The rectangle just ahead of the 0 in the U 68 image is the best example.

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

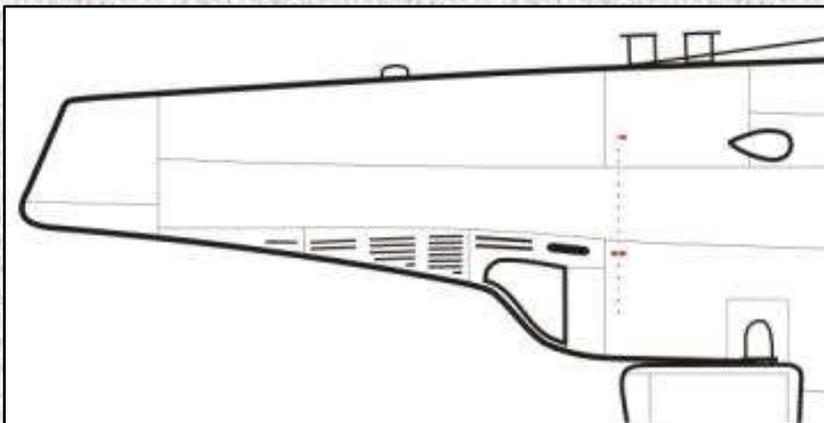


identification of the white rectangle at the top of the set on five IXs. It now becomes clear that any IX with draught marks at the bow and stern would also have a set amidships.



Left (21-23, 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.

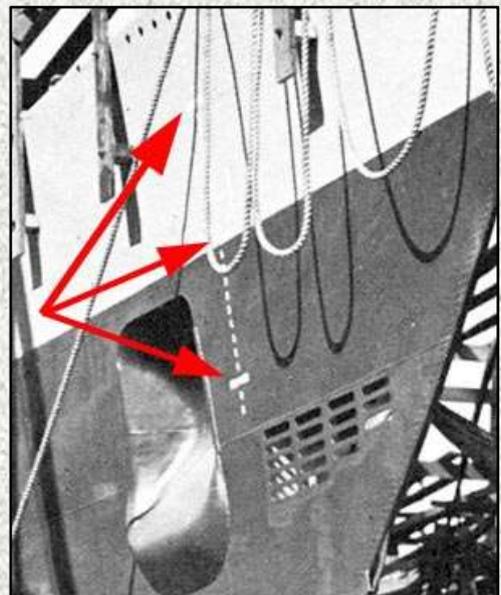
Below left: The positioning of the numbers can be seen on the stern of the IXC side profile.

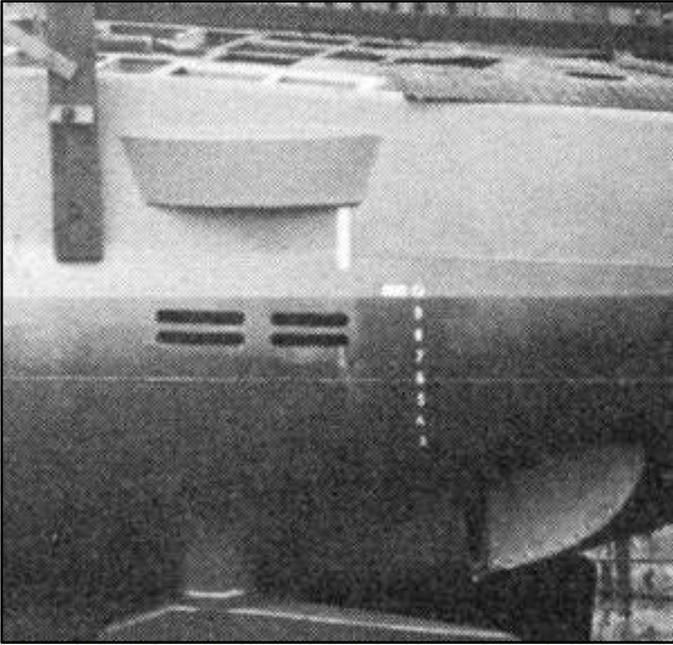


Other types

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.

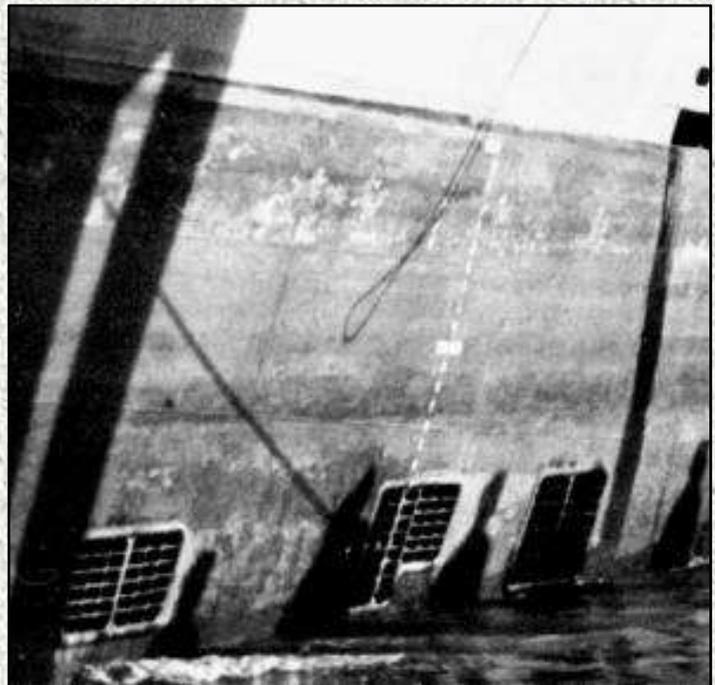
Right (24): The Type XB U 116 on the day of her launch from the *Germaniawerft* shipyards on the 3rd May 1941. The photo is a prime example of the white draught numbers not standing out well against the light grey employed above the waterline. Unlike the Type IXs, which had a wide central rectangle at 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.



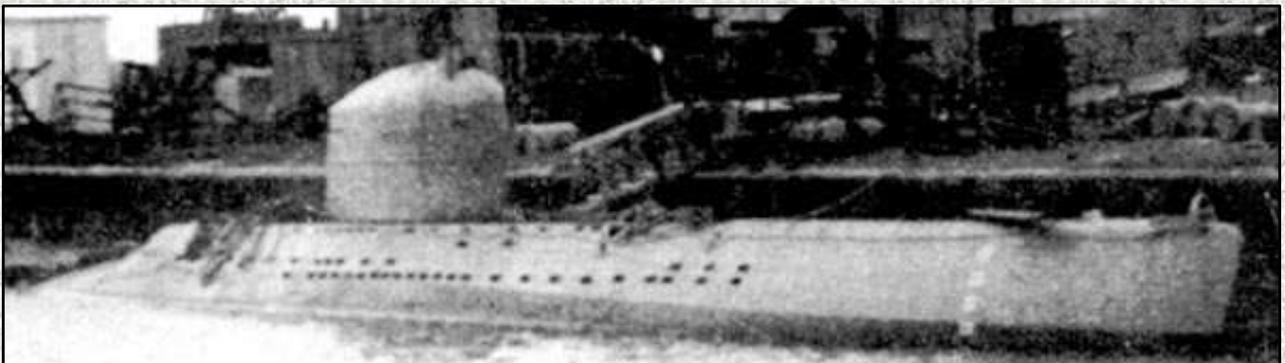


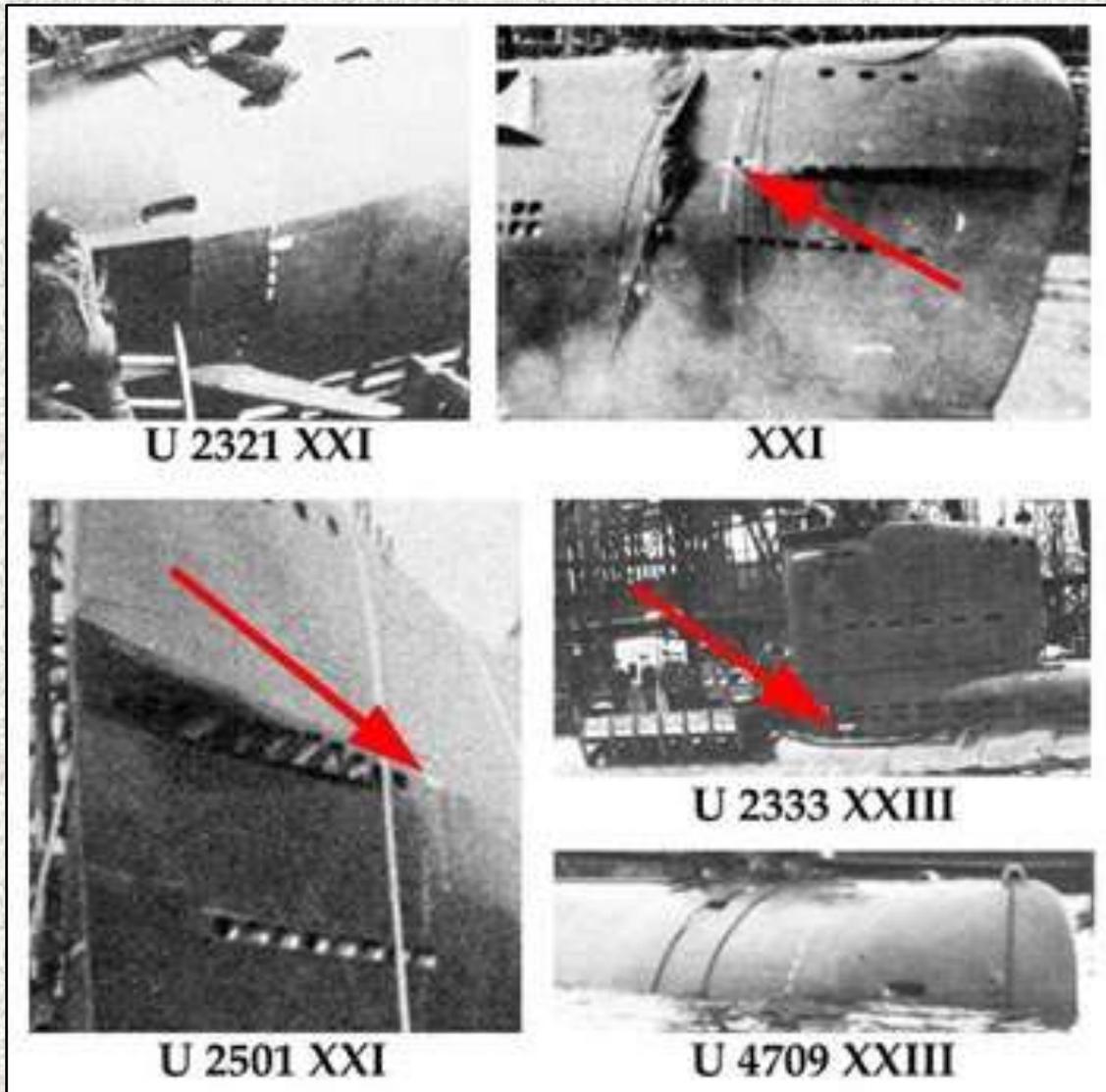
Left (25): Another XB, U 118, on the 6th September 1941, a few weeks before her launch from *Germaniwerft*. Construction photos of very helpful in distinguishing draught marks because such photos show the whole hull and the marks are fresh on the boat. The rear markings ran from 0 at the top to 3 at 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 (26): 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 (27): The Type XVIIIB 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 XXIIIBs. 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 (28-32, numbered clockwise from top left): The exact format of the marks on these photos of Type XXI 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

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 33, 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 7), 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 7. 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 8. If the rectangle was added to the bow, it is likely that a similar rectangle was



Above (33): 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.

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 (23 and 24) but this does not mean they were not present.

Type XIV - Welded numbers cannot be distinguished upon the Type XIV in photo 26.

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 -

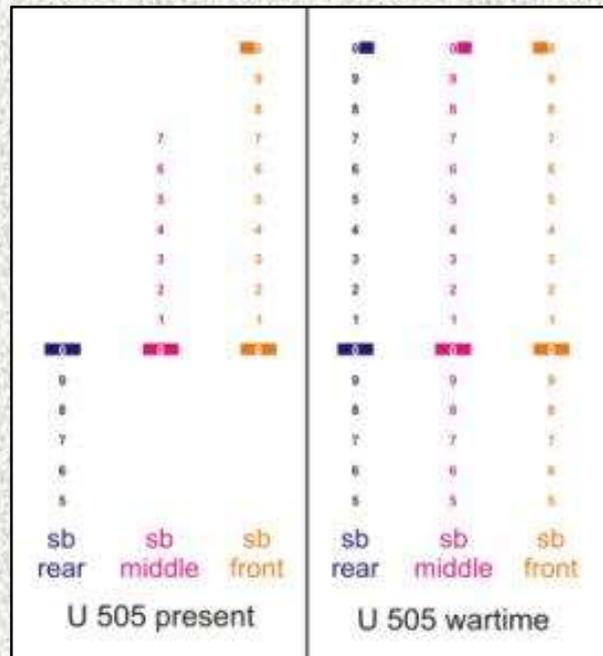
- Rear - The only marks present are 350cm to 400cm inclusive.
- Middle - The only marks present are 400cm to 470cm inclusive.
- Front - The only marks present are 400cm to 500cm inclusive.

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.

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.



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



Far left (34): Taken by Wink Gris  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 (35): 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 (36): 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 (37): 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.

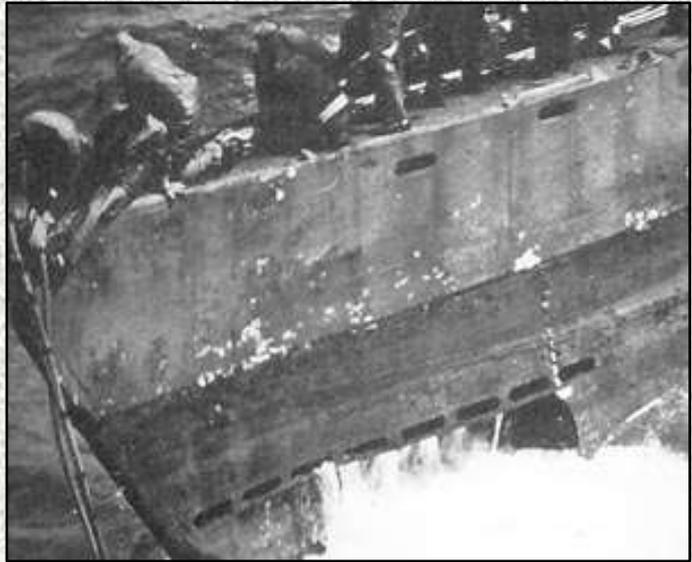
There are several difficulties in observing waterline draught marks. Many photos show boats in the water, with the majority of the numbers hidden beneath the water. In most photos we are fortunate if we can spot one set of numbers on the hull. When we are permitted to observe a full set of marks, the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

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.



Above: (38): 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.

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.rokkt.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 set 72-01 includes waterline decals for 1/72 nd Type II. L-72W available summer 2014			



Left (39): 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 (40): 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.



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.

Right (40): The two-digit system used on Revell's 1/72nd Type IXC kit (RV5114) result in the decals being entirely unsuitable.



Part VII - References & Sources

Acknowledgements

My thanks to Jon Kelly for allowing me to use his U 534 photos and to Wink Gris  for his U 505 and model photos.

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