



# Type II U-Boat Modifications & Vent Patterns

Dougie Martindale  
Accurate Model Parts



## Contents

⊕	Part I	Introduction
⊕	Part II	Type IIA
⊕	Part III	Type IIB
⊕	Part IV	Type IIC
⊕	Part V	Type IID
⊕	Part VI	Inside Tower
⊕	Part VII	Other Details
⊕	Part VIII	Tower Styles List
⊕	Part IX	Acknowledgements & Sources

## Part I - Introduction

### Type IIs

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 IIs	
Variant	Number of boats
IIA	6
IIB	20
IIC	8
IID	16

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

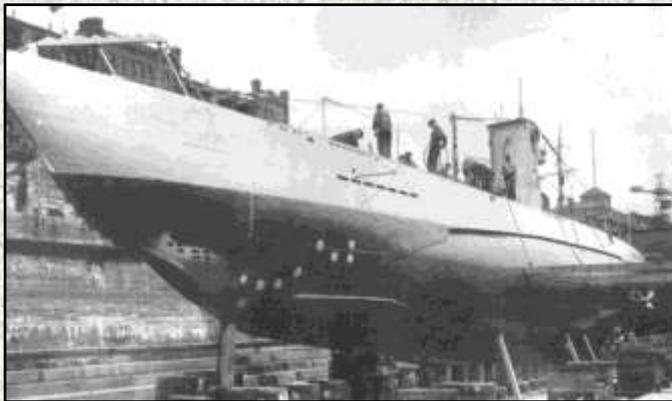
Type II specifications					
Measurement	Measured in	IIA	IIB	IIIC	IID
Displacement (surface)	Tons	254	279	291	314
Displacement (submerged)	Tons	303	328	341	364
Length (total)	Metres	40.90	42.70	43.90	43.97
Beam	Metres	4.08	4.08	4.08	4.92
Speed (surface)	Knots	13.0	13.0	12.0	12.7
Speed (submerged)	Knots	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.

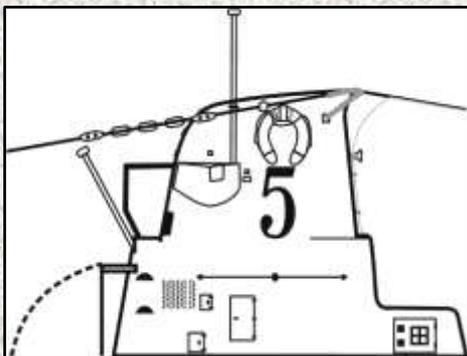
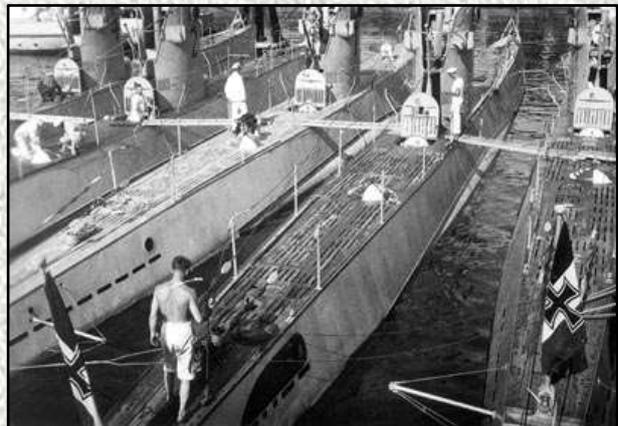
The shape of the Type IIA is rather pleasing to the eye, making a very nice subject for a model. The Type II and Type VII share many similar features: netcutter, bollards, wooden deck design, jumping wires, insulators, and the style of free-flooding holes are all similar or even identical to the VII 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 (A1): 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.

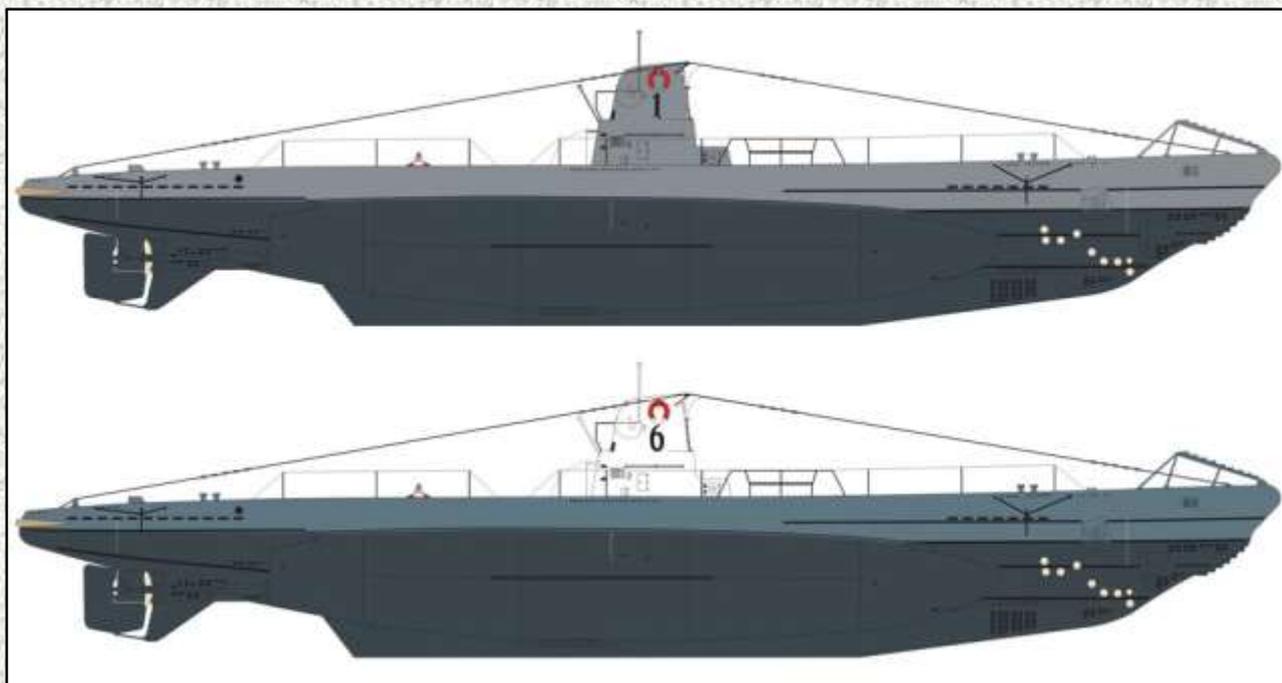


Left (A2): The second boat, U 2, in dry-dock. Here we can see some of the free-flooding vent holes cut into the hull. The circles above the forward dive planes belong to the GHG (*Gruppenhorchgerät* - group listening apparatus) hydrophones.

Right (A3): 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 (A5): 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 (A4): 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

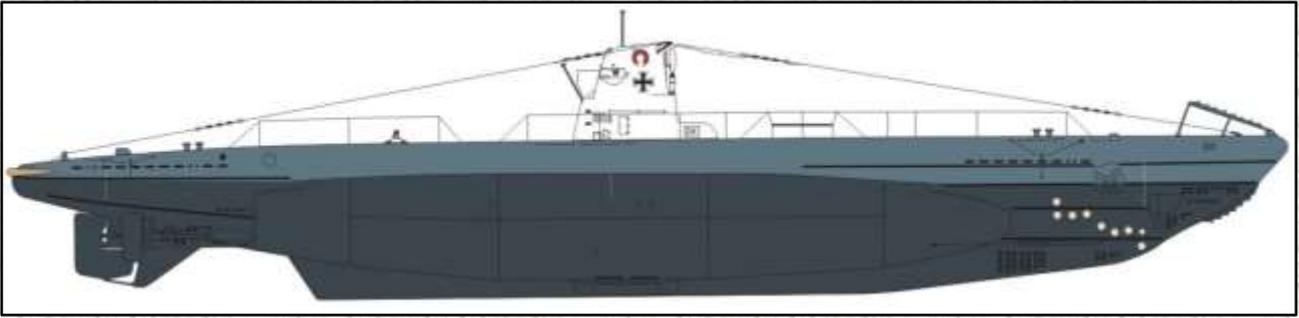
### Part III - Type IIB

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.

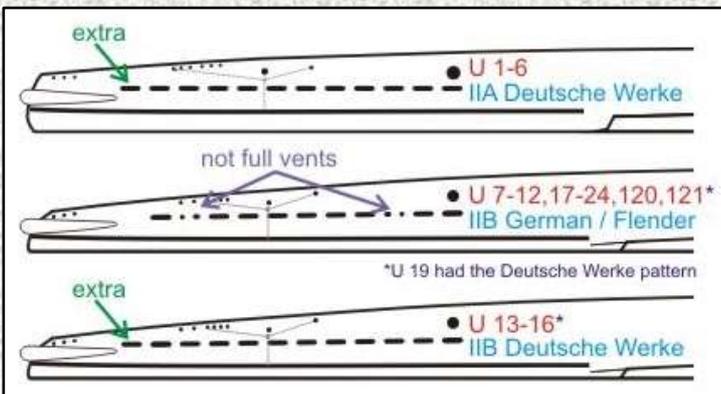
The hull of the IIB, which was 1.8 metres longer than the IIA, looks very similar to previous variant.

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



Above (B1): 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

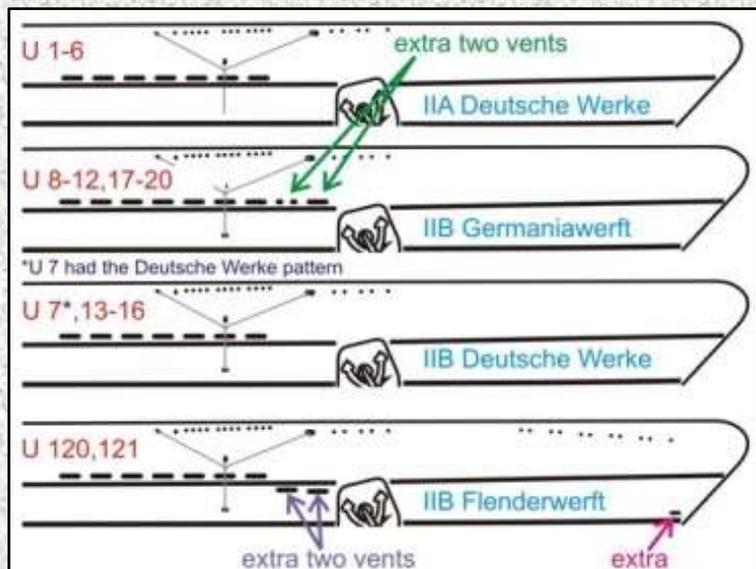


Left (B2): The *Germaniawerft* and *Flenderwerft* boats had two exclusive features. The first is having one fewer vent at the rear (11 rather than 12). The second is that two of the vents were each split into two small holes (one circular and one oval). U 19 was a *Germaniawerft* boat but for some reason had the *Deutsche Werke* pattern.

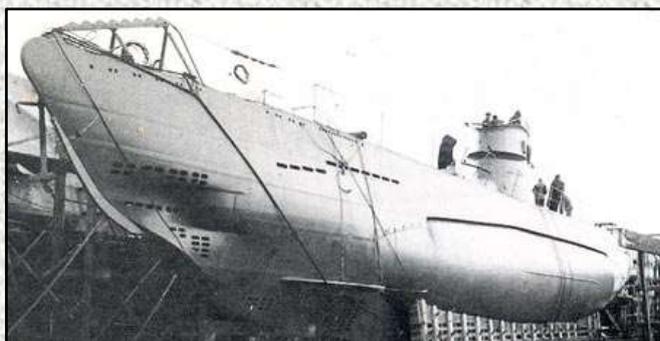
Front vents

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 (B3): 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.

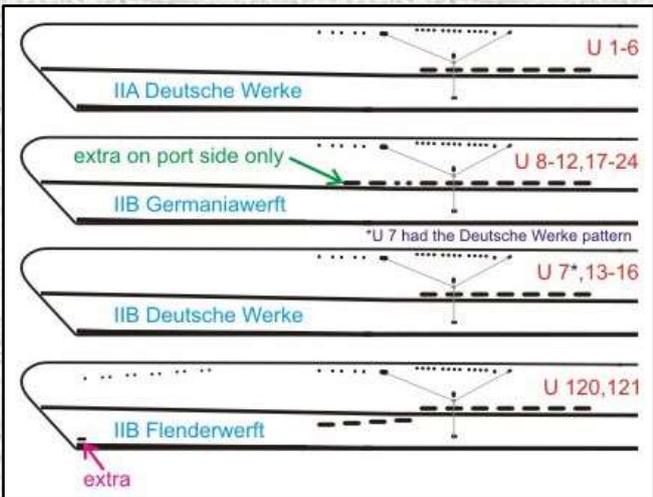


**Port side** - On the port side there was always an extra hole at the front of the forward holes; this is because there was no anchor recess on the port side.



Left (B4): Here can be seen the vents on the bow of U 120 on the 16<sup>th</sup> 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 (B5): 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.

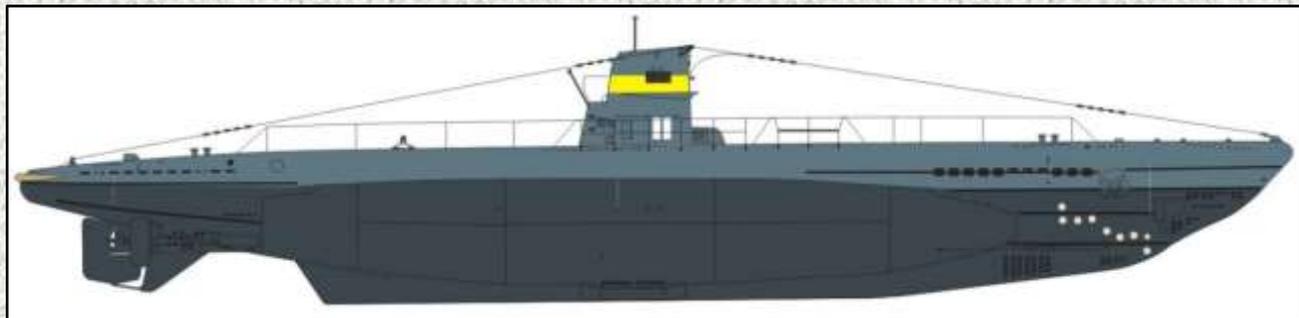
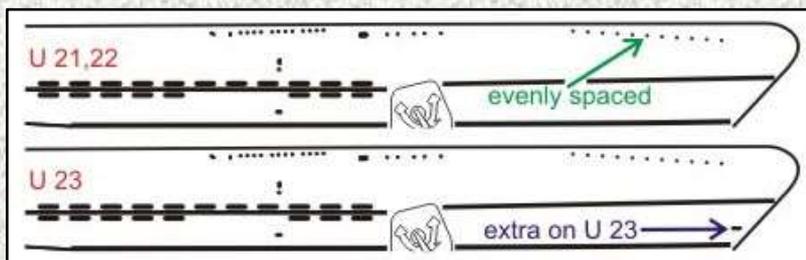


**Additional vents**

**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 VIIIs.

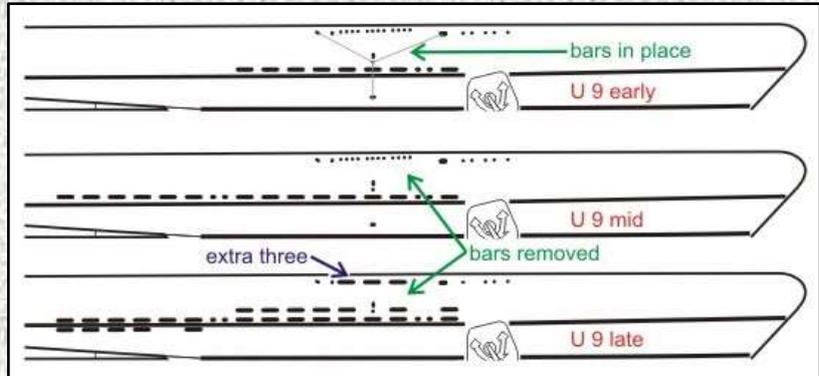
Left (B6): The pattern used upon U 21, U 22 and U 23 when launched. Additional vents would later be added to U 23 but not U 21 or U 22.

Below (B7): U 21 when serving in the 21<sup>st</sup> U-Flottille in Pillau in 1943. The yellow band indicates a training role while the two white bars are school boat symbols.

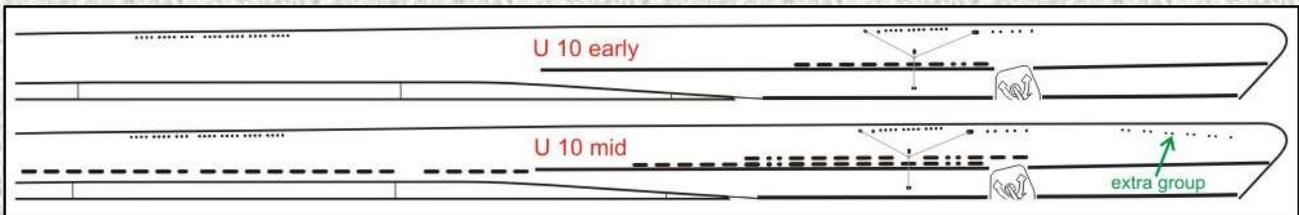


**U 9** - Over time more vents were added to some boats in the hope that this would allow for marginally increased diving times. U 9 is a prime example of one boat in which holes were progressively added over time. In the mid-version, vents were added to the rear of the old group. Later, when the boat 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 (B8): 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.

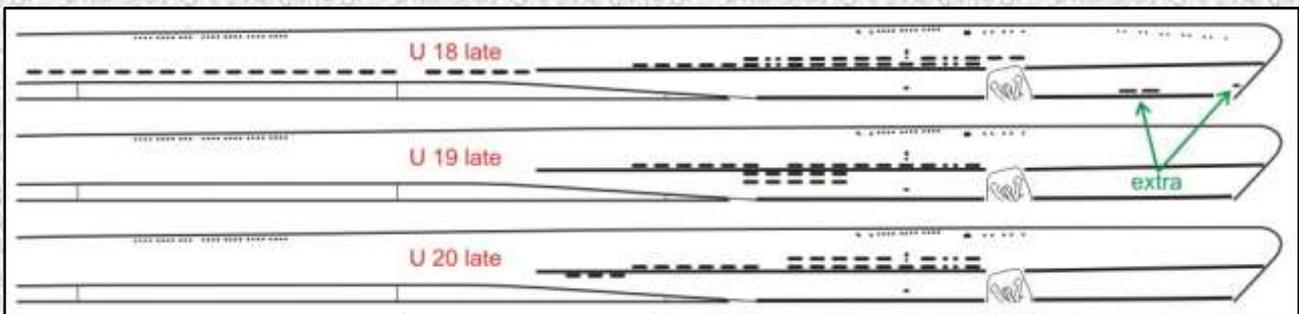


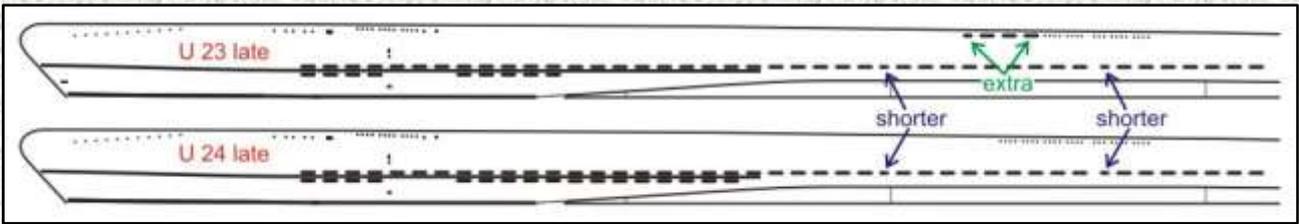
**U 10** - U 10 had a significant number of vents added quite early in the pre-war period. These extra holes extended all the way back over the mid-hull section of the boat. The boat also featured 11 small circular holes near the bow in a paired arrangement. It could be that the vents on this boat were 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 (B9): 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.

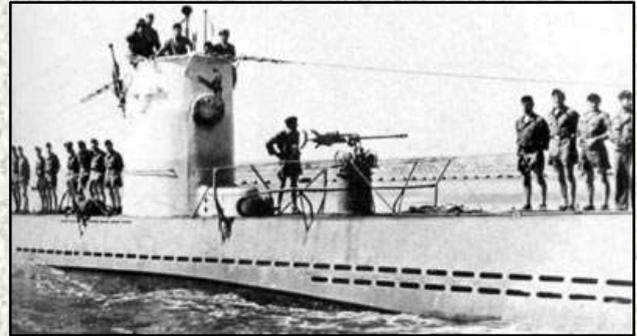
Below (B10): The late version of U 18 adopted the same vent pattern employed earlier upon U 10. The difference is that a small hole was added next to the stem plus two elongated gaps added above the torpedo doors. This change was made to U 18 in the pre-war period. The different patterns upon U 19 and U 20 were exclusive to these boats and act as very handy identifying features.





Above (B11): 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 (B12): 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.



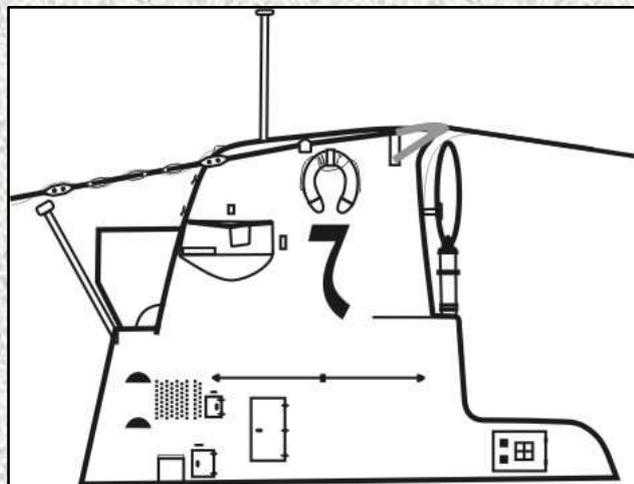
### Type IIB tower

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 (B13): 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.



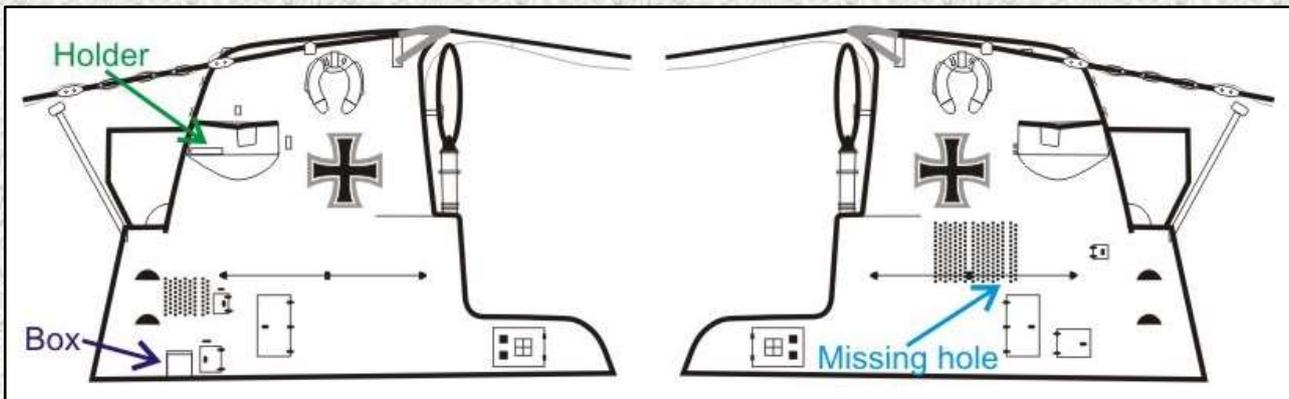
Below right (B14): On this drawing of U 7, note the large housing for the navigation lights (aft of the pre-war number 7). This bulky housing projected significantly out from the tower to allow the light to shine forwards without impediment.



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 (B15): 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.

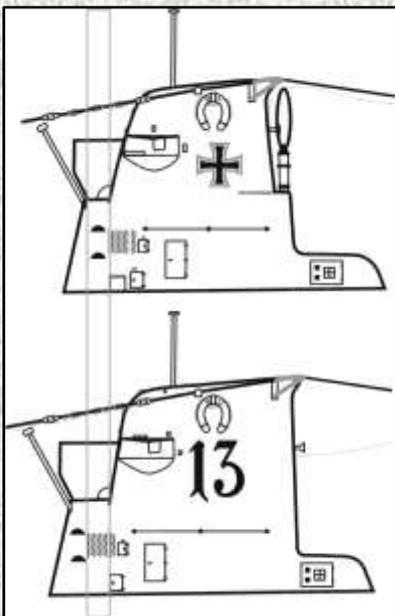


Differences between early boats - The following differences existed in respect to the IIAs and early IIBs -

- 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.

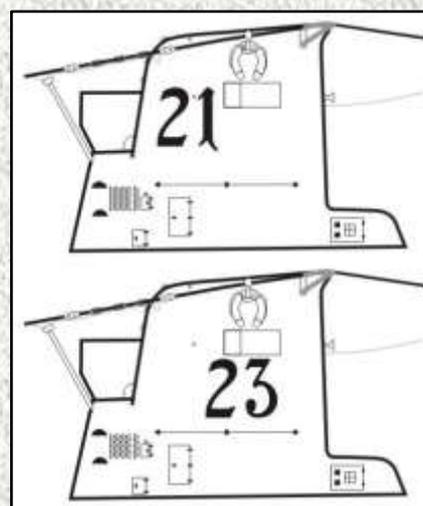
U 13 - U 20 (style 3A) - When style 3A was implemented upon U 13 to U 24, the D/F loop was housed within the tower bulwark. The step at the front of the tower was also dispensed with, meaning that the front face of the tower on these boats was straight all the way from the magnetic compass fairing upwards.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

Right (B16): 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 VIIIs.

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.



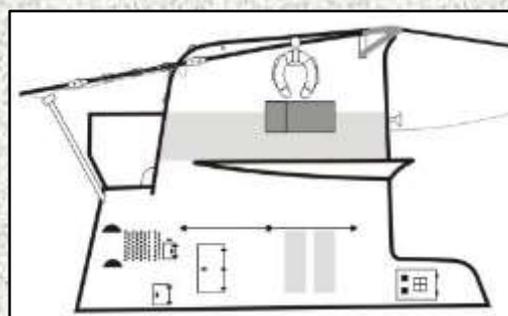
Above (B17): The different locations of the pre-war numbers on U 21 and U 23.

Below (B18): 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.

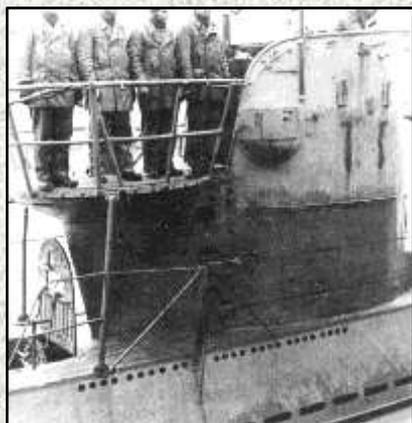
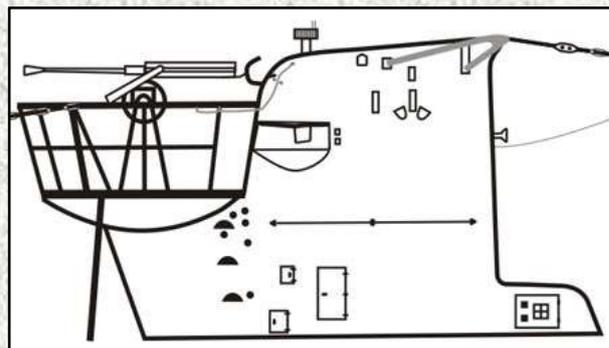


**Wintergarten** - In the summer of 1943, the Black Sea boats were all fitted with an additional 20mm Flak gun on an enlarged “wintergarten” platform at the rear of the tower. On the newly-installed wintergarten, some stanchions were thicker than others (one vertical bar and the top horizontal bar were 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 VIIIs, 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 (B19): 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 (B20): U 18 on the 29<sup>th</sup> 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)

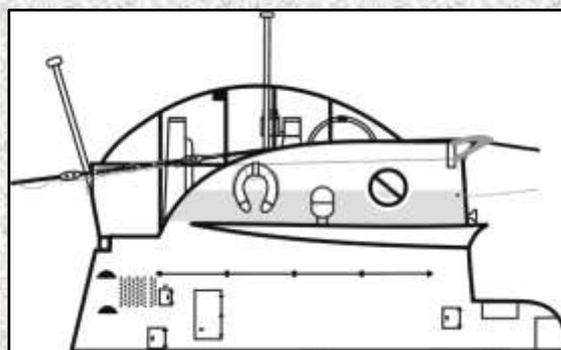
The final two IIBs, U 120 and U 121, were launched in March and April 1940, several years after the other IIBs. Indeed all of the IICs had been launched when these two boats went down the slipways. The reason that they were built much later is that they were originally intended for the Yugoslav Navy (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 (B21): 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

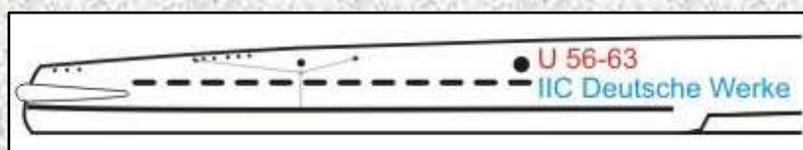
## Part IV - Type IIC

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.

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

### 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).



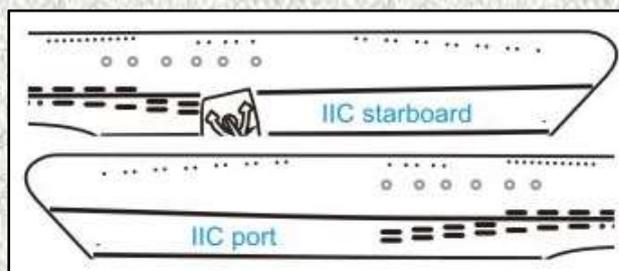
Above (C1): The pattern of 12 holes was used on all the IIAs, IICs and IIDs (and some IIBs as well). The large circular hole is the diesel exhaust outlet, which was in place on all Type IIs on the starboard side only. Some boats had a dark grey or black patch painted around the outlet to disguise the dirt stains which accumulated around the hole.

**Front / mid-hull vents**

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.

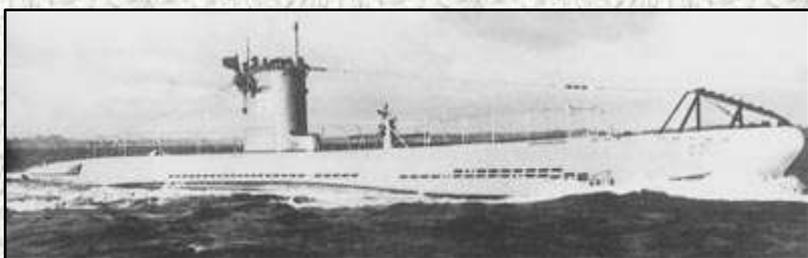
The pattern used on the IICs is very similar to that used upon the IIDs U 137, U 138 and U 139. The point of differentiation between the IIC pattern and the three IIDs is that the latter boats had one fewer vent at the rear.

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.



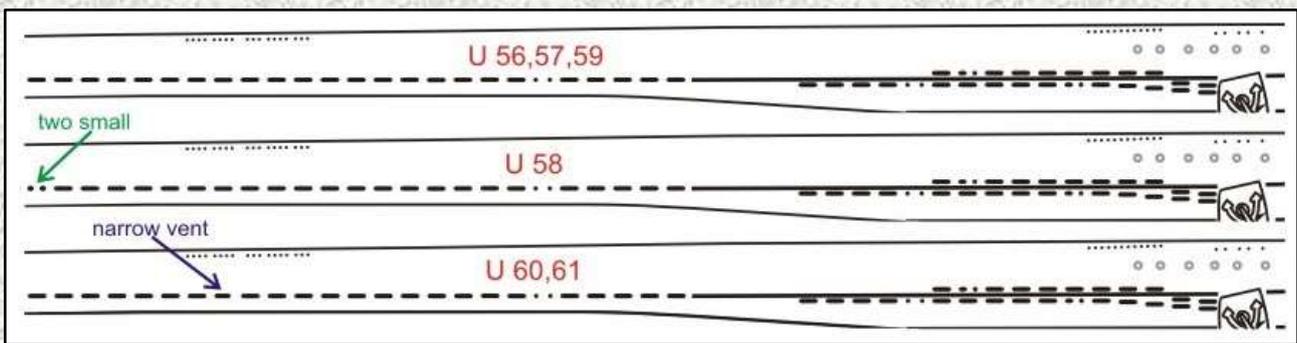
Above (C2): As with earlier sub-variants, due to the absence of anchor recess there were extra vents at the front of the port side. Note the 13 small holes (rather than 11 on U 18) near the top of the bow in a paired arrangement. There is also a tiny hole near the stem. The double row of vents on the 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.

Right (C3): In this photo of U 60 on the 1<sup>st</sup> 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 (C4): U 59 during the pre-war period with the net cutter on the bow.

Below (C5): 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.



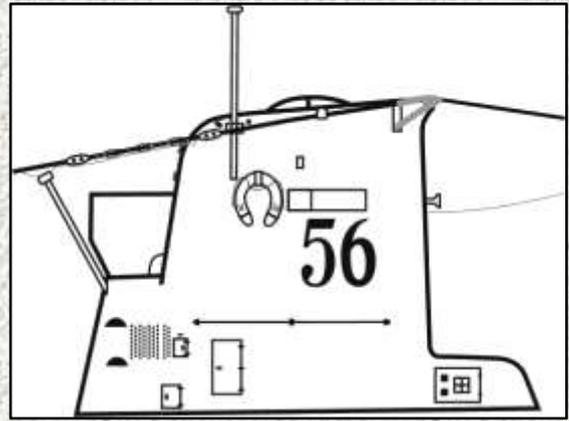
## Type IIC tower

**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.



Above (C6): 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.

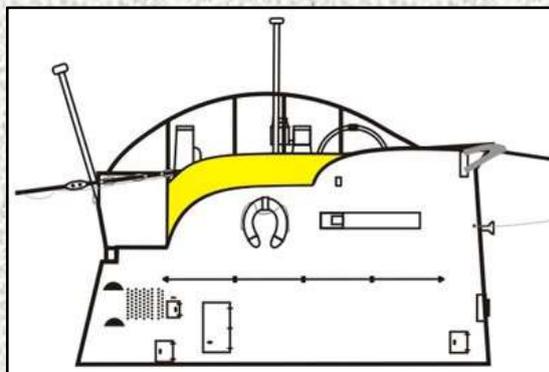


Left (C7): Here can be seen the tower of U 61, with the curved railings extending high above the tower bulwarks. Note the absence of the magnetic compass fairing compared with the unidentified IIC on the right. On U 61 the hatch at the front can be seen, as can the square and cross marker on the outer 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 (C8): 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

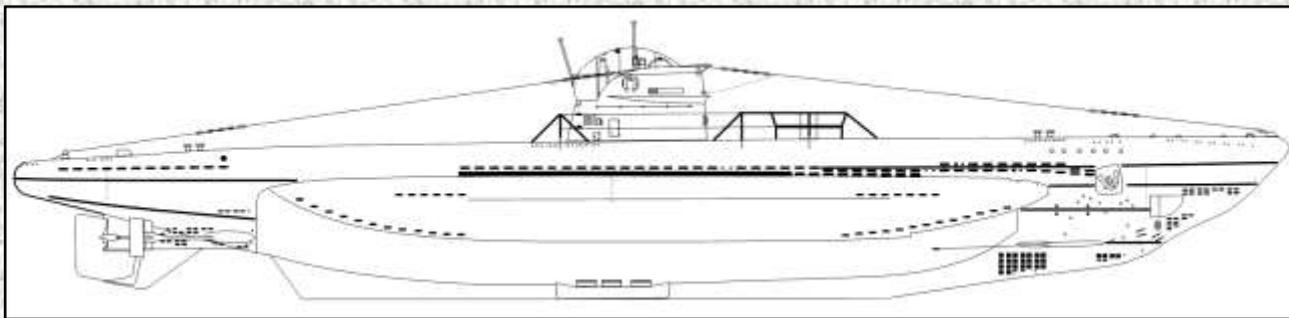
The final sub-variant is the Type IID, of which 16 boats were built. These boats had saddle tanks added on either side of the hull for additional fuel storage. This increased the range to 5,650 miles, some 1,850 miles greater than the IICs. The improvement had a very great difference to their operational 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.

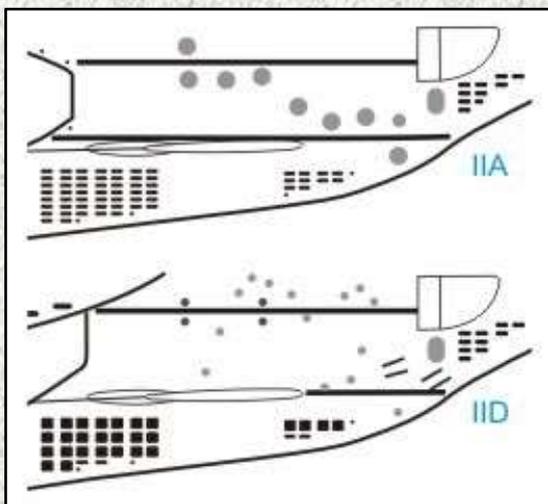
Type IID batches	
Shipyard	Boats
Deutsche Werke, Kiel	U 137 - U 152

### 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.



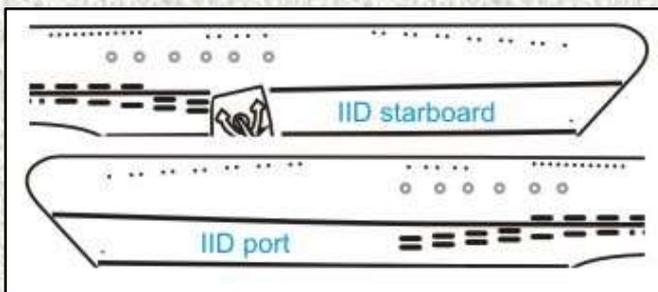
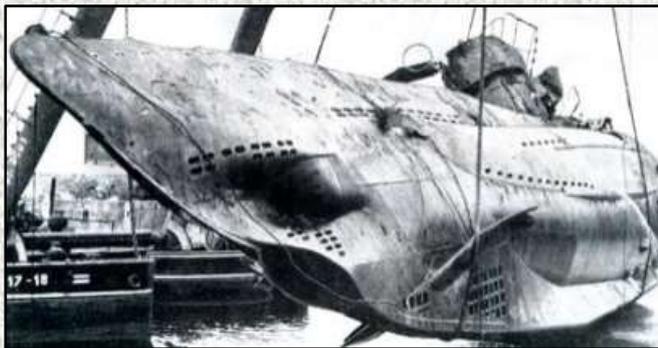
Above (D1): A side profile drawing of the Type IID U 142. There are several points of differentiation from earlier sub-variants. The main one is the presence of the multiple vents on the saddle tanks which are exclusive to the IID. Note that earlier boats such as U 137 had nine vents in the forward pattern rather than the seven vents above. The Kort nozzle shroud around the starboard propeller can also be seen.



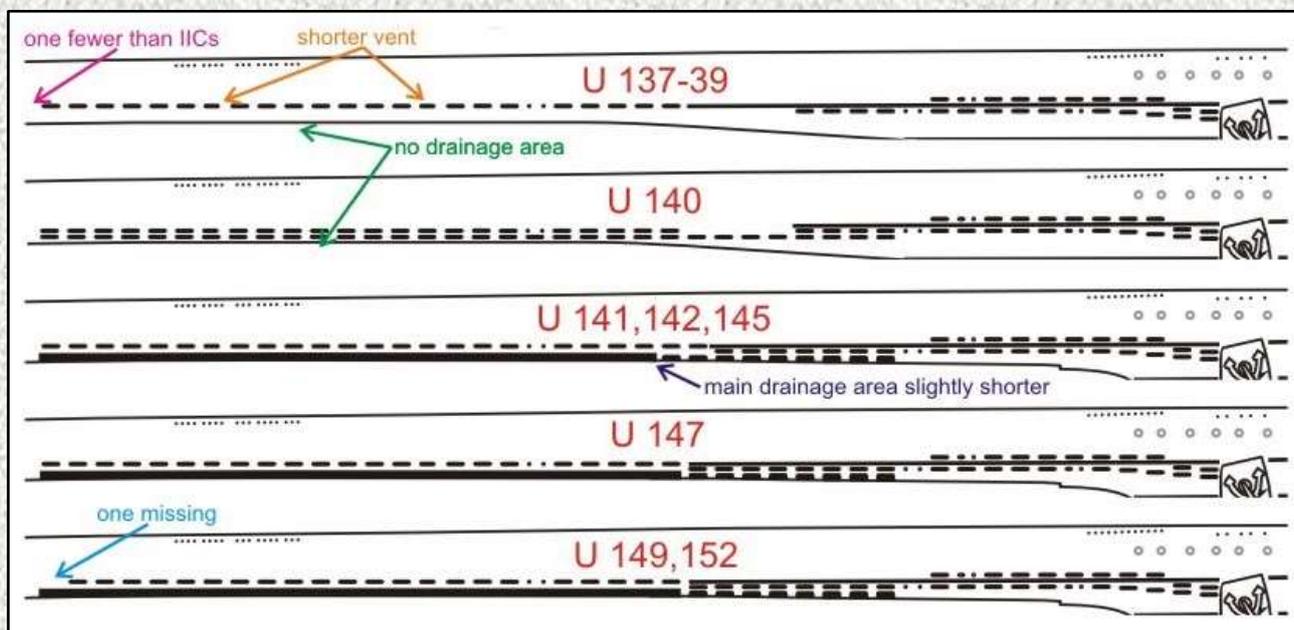
Left (D2): Here can be seen a comparison between the lower bow of the IIA and the IID. One main difference is that vents were combined to make 27 very large vents. These large vents were also in place on the IICs but not the IIBs. Another difference which is evident here is that the GHG plates were much smaller than the older versions.

Above right (D3): 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 (D4): 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.



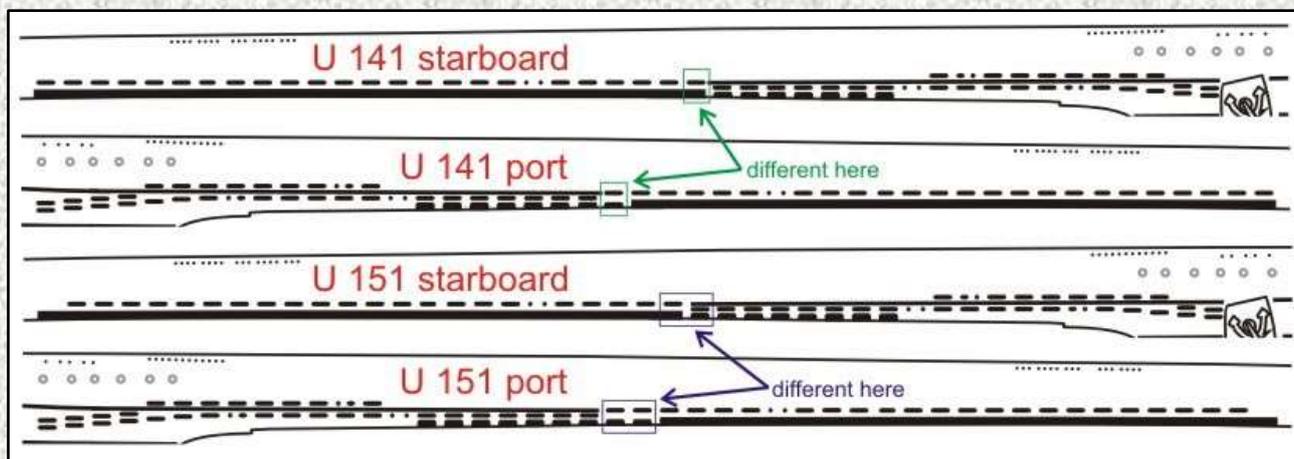
In regard to the main vents, the first four IIDs looked much like the IICs except that they had one fewer vent at the rear than the immediate predecessors. The next boat, U 140, was completely unique in having a full double row of vents in the mid-hull area. The remainder of the class (U 141 to U 152) 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.

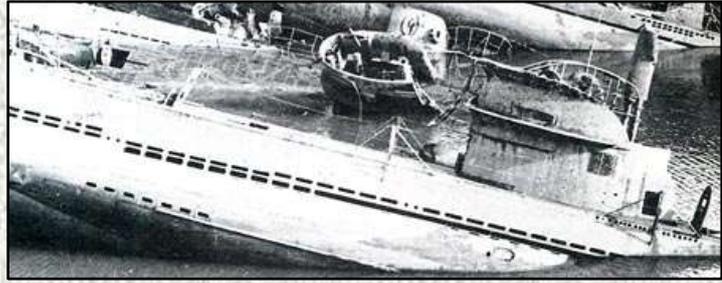


Above (D5): On the IICs there were 19 vents to the rear of the two dots. On a number of IIDs there were 18 vents, which is a useful point of differentiation. On U 149 and U 152 there were 17 to the rear of the two dots.

Left (D6): U 137 under the command of Herbert Wohlfarth. Note the 20mm on top of the conical mount.

Below (D7): There were slight differences between the port and starboard sides which should always be borne in mind when identifying IIDs in photos.

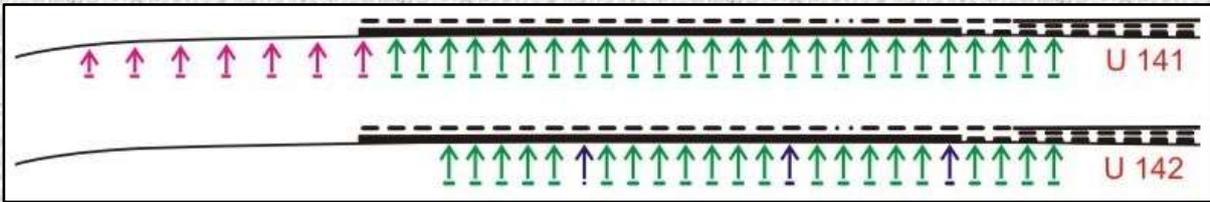




Above (D8): Here can be seen U 151 looking rather worse for wear at the end of the war. The nine holes just ahead of the main drainage area were not the standard height of the rest of the main vents. Instead they became progressively greater in height as one moves forward. The most interesting aspect of this photo is the electro-pneumatic *schnorchel* at the rear of the tower.

Above left (D9): 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 (D10): 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.

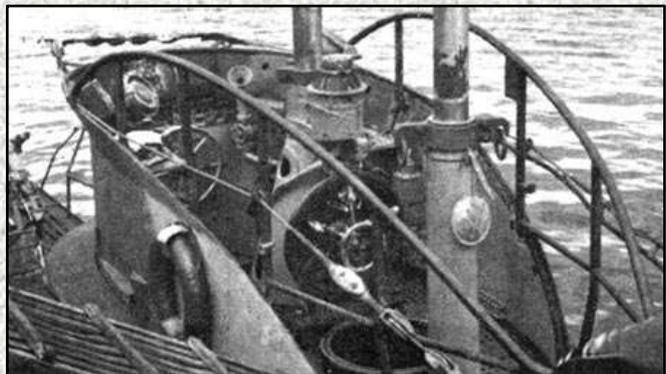


**Type IID tower**

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.

Below (D11): The curved bars on each side of the tower of the camouflaged U 141 can be seen to good effect here.

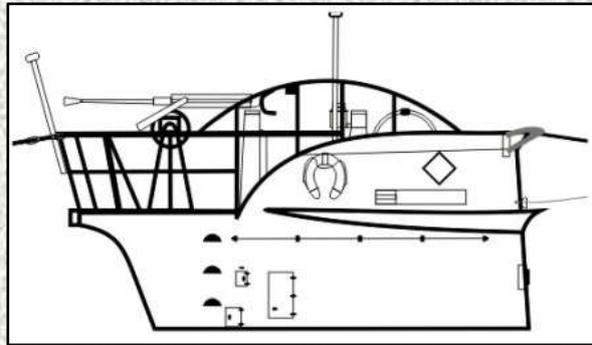
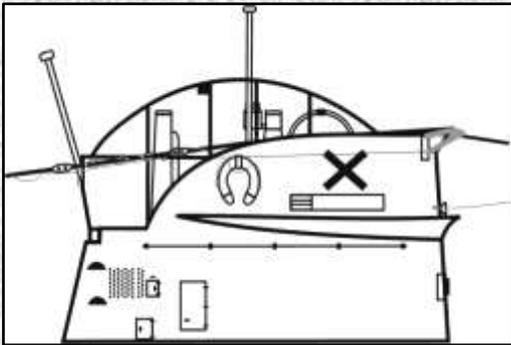




Left (D12): The very low height of the tower can be seen in this photo in which the top of the bulwark only comes up to chest height. It is easy to appreciate why the curved railing bars needed to be added above the tower.

Below left (D13): 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 (D14): 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.

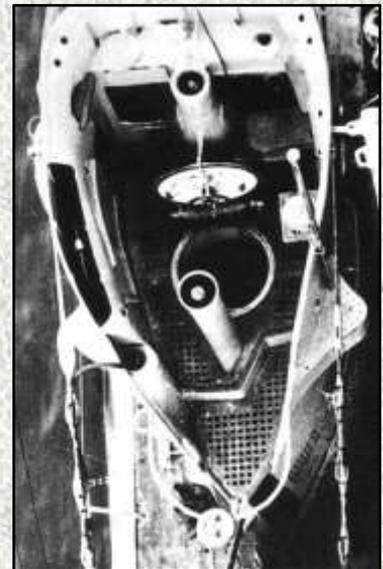
Type IIAs (style 1) - The very first towers were uncluttered by the various equipment which would later be added. In the middle of the Type IIA tower sat the hatch, which opened at the front (rather than the rear as on the VIIs). To suspend the open hatch in place there was a catch on the hatch lid which 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 (E1): 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 starboard side.

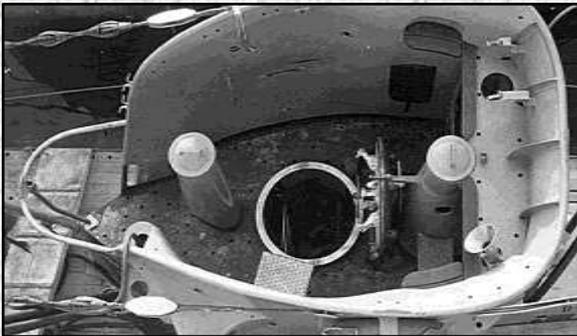


The most notable omission is the lack of UZO column, which was used on the VIIIs and IXs to aim torpedoes during surface attacks. There is no obvious bracket on the Type IIA towers to allow a portable UZO to be housed. Whether this was retrofitted to boats at a later stage is unclear. There was also 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 (E2): 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 (E3): 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 E2 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 VIIIs). 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 VIIIs 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 VIIIs.

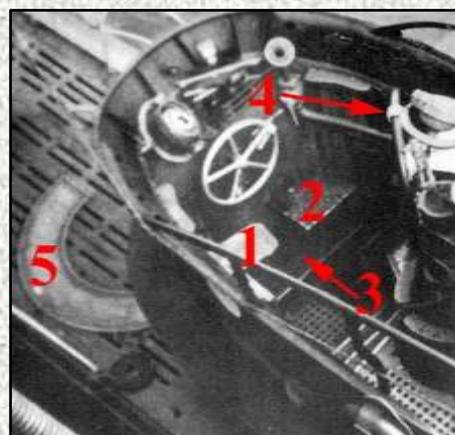
Note: The second compass repeater was retrofitted to Style 2 towers (and perhaps Style 1 towers as well) at some point.

**Style 4** - Space was tight enough on the towers of Type VIIIs 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 (E4): 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 VIIIs. 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 (E5): 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.

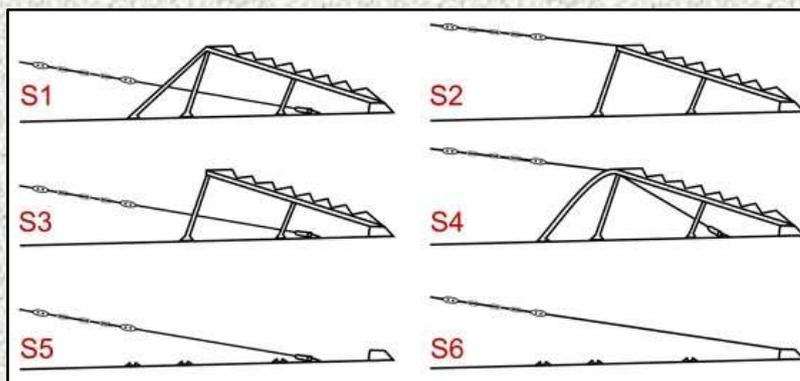
In the Battle Of The Atlantic, quadruple 20mms and, a little later, a single or even double 37mm, were deemed essential to the survival of the VIICs and IXs. By comparison the armament on board the Type IIs assigned to a secondary training role was insignificant. The presence of a single 20mm weapon 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 (F1): 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 VIIIs 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 1<sup>st</sup> 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.

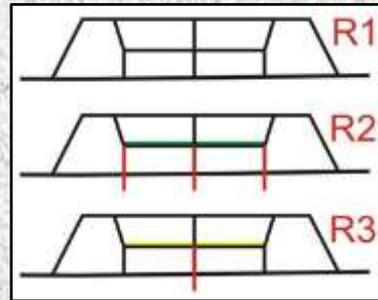
## Railings

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

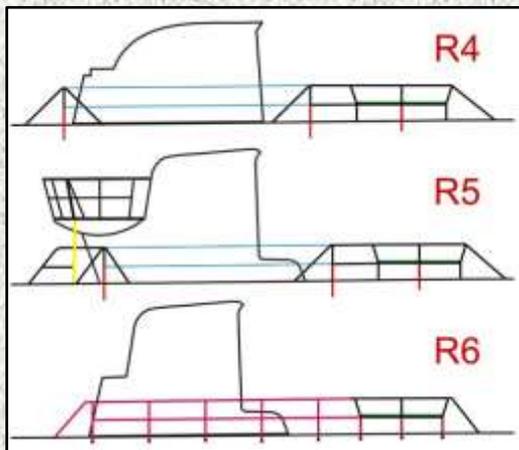
position, there being none at all around the tower or the aft deck (see railing style R1 in the drawings). After a few years (but still prior to hostilities) a curved one-piece wooden seat was added to the existing railings on the IIAs and IIBs. When the wooden seats were added, three vertical support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

Right (F2): 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 (F3): 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 VIIIBs. 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.

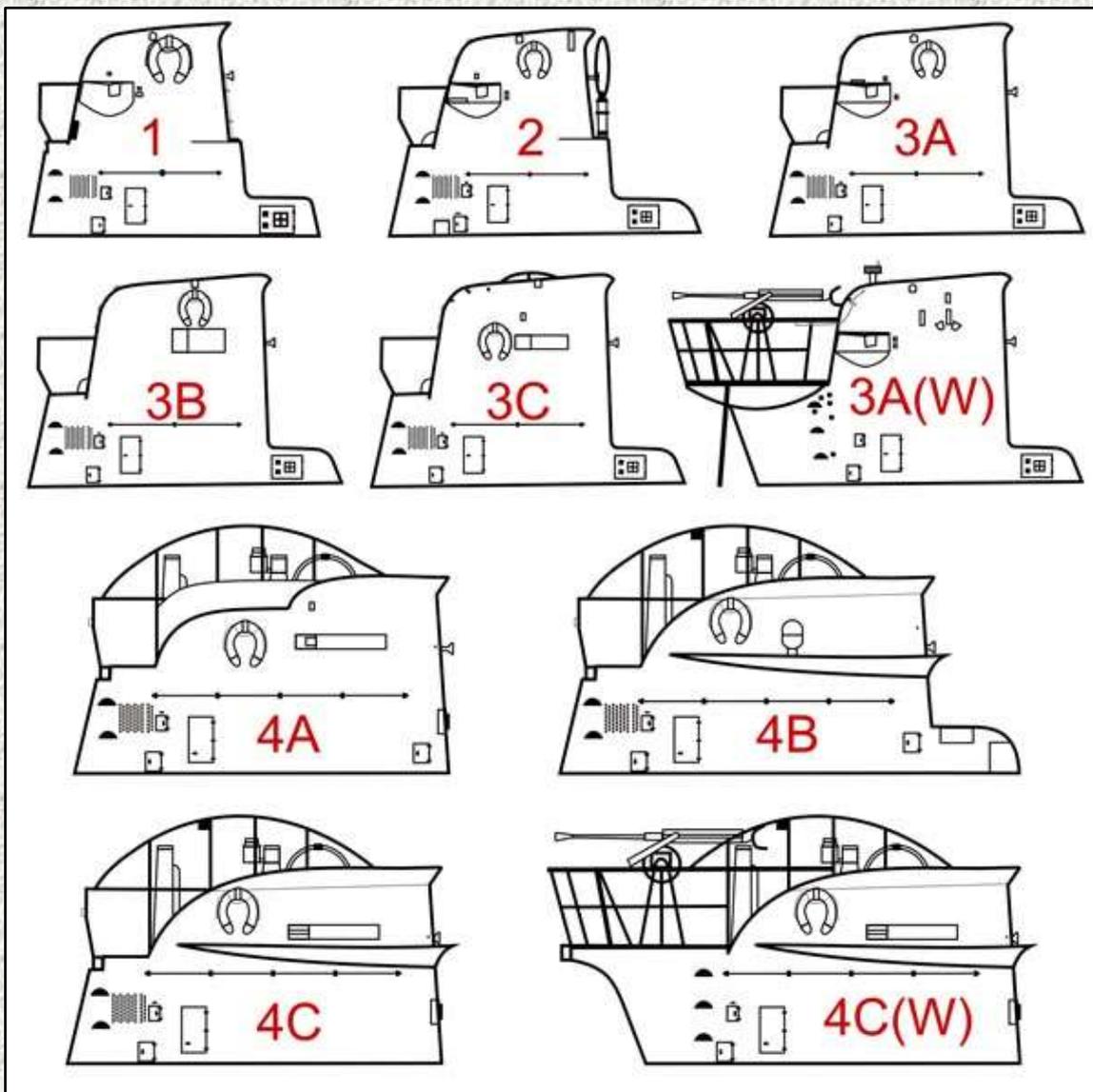
Training - Training boats had a yellow stripe around the towers and a yellow band on the foredeck near the bow. The heads of both periscopes were also painted yellow. Each boat was ascribed its own white school symbol which was painted on the tower.

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 VIAs). 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 (G1): The designations with the letter W are the towers after the wintergarten was added.

## **Part IX - Acknowledgements & Sources**

### **Acknowledgements**

**M**y thanks to Ron Keller for sending me a number of photos of Type IIDs. Thank you also to my assistant Ellie Martindale for helping me with my typing.

### **References**

Högel, Georg. *U-Boat Emblems Of World War II 1939-1945*. Schiffer Military History, 1999.  
 Rössler, Eberhard. *Vom Original zum Modell: Uboottyp II*. Bernard & Graefe Verlag, 1999.  
 Sharpe, Peter. *U-Boat Fact File*. Midland Publishing Limited, 1998.  
 Trojca, Waldemar. *Ubootwaffe, Marine-Klienkampfverbände 1939-1945*. Model Hobby, 2004.  
 Williamson, Gordon. *Kriegsmarine U-Boats 1939-1945 (1)*. Osprey Publishing, 2002.  
*U-Boot Im Focus* Edition 6. Luftfahrtverlag-Start, 2010.  
*U-Boot Im Focus* Edition 8. Luftfahrtverlag-Start, 2012.  
*U-Boot Im Focus* Edition 13. Luftfahrtverlag-Start, 2016.  
<http://dubm.de/en/the-spanish-civil-war/>  
[http://paths.sheffield.ac.uk/wikiana/wiki/Anechoic\\_tiles](http://paths.sheffield.ac.uk/wikiana/wiki/Anechoic_tiles)  
<http://uboat.net/types/>  
<http://www.uboat.net/technical/schnorchel.htm>

### **Photograph sources**

Armes Militaria magazine: *Les U-Boote Au Combat 1. 1939-1940, Les Premiers Succes*. Hors-Serie No 66. Histoire & Collections, 2007.  
 ⊕ D12.

Baxter, Ian. *Images Of War: The U-Boat War 1939-1945; Rare Photographs From Wartime Archives*. Pen & Sword Military, 2008.  
 ⊕ A1, A3.

Breyer, Siegfried and Koop, Gerhard. *The German Navy At War 1935-1945 Volume 2: The U-Boat*. Schiffer Military History.  
 ⊕ C2.

Ground Power Special Issue August 1996: *German U-Boat of WWII (1)*. Delta Publishing Co. Ltd, 1996.  
 ⊕ D6.

Herzog, Bodo. *U-Boote Im Einsatz – 1939-1945: U-Boats In Action*. Podzun-Verlag.  
 ⊕ B20.

Kutta, Timothy J., *U-Boat War*. Squadron/Signal Publications, Inc., 1998.  
 ⊕ C3.

Miller, David. *U-Boats: The Illustrated History Of The Raiders Of The Deep*. Pegasus Publishing Ltd., 2000.  
 ⊕ E5.

Roessler, Eberhard. *Vom Original zum Modell: Uboottyp II*. Bernard & Graefe Verlag, 1999.

⊕ A2, B4, D3, D8, E1.

Showell, Jak P. Mallmann. *U-Boats In Camera*. Sutton Publishing, 1999.

⊕ E3.

Showell, Jak P. Mallmann. *U-Boats Under The Swastika*. Ian Allan Ltd., 1987.

⊕ B12, C7.

Trojca, Waldemar. *Ubootwaffe, Marine-Kleinkampfverbände 1939-1945*. Model Hobby, 2004.

⊕ D11.

### Recommended reading

⊕ Roessler, Eberhard. *Vom Original zum Modell: Uboottyp II*. Bernard & Graefe Verlag, 1999.  
A superb German language resource on the Type II U-boat. Features numerous photos of the Type II.

⊕ Merensilta, Timo. *Vesikko: Suomenlahden Hiljainen Vartija*. Hobby-Kustannus Oy, 2009.  
The definitive guide to the *Vesikko*, covering every aspect of the boat. Although it primarily covers the *Vesikko* this book provides information on the background to the Type IIs. Captions are in English.

Copyright © Dougie Martindale / Accurate Model Parts, 2017

