

= H @-@ class battleship proposals =

The H class was a series of battleship designs for Nazi Germany 's Kriegsmarine , intended to fulfill the requirements of Plan Z in the late 1930s and early 1940s . The first variation , " H @-@ 39 , " called for six ships to be built , essentially as enlarged Bismarck @-@ class battleships with 40 @. @ 6 cm ( 16 @. @ 0 in ) guns . The " H @-@ 41 " design improved the " H @-@ 39 " ship with still larger main guns , with eight 42 cm ( 16 @. @ 5 in ) weapons . Two subsequent plans , " H @-@ 42 " and " H @-@ 43 " , increased the main battery yet again , with 48 cm ( 19 in ) pieces , and the enormous " H @-@ 44 " design ultimately resulted with 50 @. @ 8 cm ( 20 @. @ 0 in ) guns . The ships ranged in size from the " H @-@ 39 " , which was 277 @. @ 8 m ( 911 ft 5 in ) long on a displacement of 56 @, @ 444 t ( 55 @, @ 553 long tons ) , to the " H @-@ 44 " , at 345 m ( 1 @, @ 131 ft 11 in ) on a displacement of 131 @, @ 000 t ( 129 @, @ 000 long tons ) . Most of the designs had a top speed in excess of 30 knots ( 56 km / h ) .

Due to the outbreak of World War II in September 1939 , none of the ships were ever built ; only the first two of the " H @-@ 39 " ships were laid down . What work that had been accomplished was halted ; the assembled steel remained on the slipway until November 1941 , when the Oberkommando der Marine ordered it be scrapped for other purposes . Contracts for the other four " H @-@ 39 " type ships had been awarded , but no work was begun on any of them before they were canceled . None of the subsequent designs progressed further than planning stages .

= = Initial design = =

The earliest design studies for " Schlachtschiff H " ( " Battleship H " ) date to 1935 , and were near repeats of the early designs for the Bismarck @-@ class ships , armed with 35 @-@ centimeter ( 14 in ) guns . Intelligence indicating that the Soviet Navy was planning the Sovetsky Soyuz class with 38 cm ( 15 in ) guns prompted the Germans to increase the caliber of the ship 's armament to 38 cm as well on 5 October 1936 . The Oberkommando der Marine ( OKM ) issued staff requirements at the end of October for a ship of 35 @, @ 000 long tons ( 36 @, @ 000 t ) armed with eight 38 cm guns with a speed of 30 knots ( 56 km / h ; 35 mph ) . The ship 's radius of action was to be at least equal that of the Deutschland @-@ class cruisers .

Design work on the ship that came to be designated H @-@ 39 began in 1937 . The design staff was instructed to improve upon the design for the preceding Bismarck class ; one of the requirements was a larger @-@ caliber main battery to match any battleship built by a potential adversary . It appeared that Japan would not ratify the Second London Naval Treaty , which would bring an escalator clause that permitted signatories to arm battleships with guns of up to 40 @. @ 6 cm ( 16 @. @ 0 in ) caliber . By virtue of the Anglo @-@ German Naval Agreement , signed in 1935 , Germany was considered to be a party to the other international naval arms limitation treaties . In April , Japan refused to sign the treaty ; shortly thereafter , the United States Navy announced it would arm the new North Carolina @-@ class battleships with 40 @. @ 6 cm guns .

Admiral Werner Fuchs , responsible for the staff section in the OKM that determined the operating requirements for the ship , discussed the vessel 's design with Adolf Hitler , the leader of Germany . Hitler demanded guns larger than any possible adversary , but guns of the caliber demanded by Hitler would have required displacements of over 80 @, @ 000 long tons ( 81 @, @ 000 t ) and drafts so deep as to prevent the use of Germany 's ports without significant dredging . Fuchs eventually convinced Hitler that the 40 @. @ 6 cm gun was the optimal choice for the H @-@ 39 design . In 1938 , the OKM developed Plan Z , the projected construction program for the German navy . A force of six H @-@ 39 class battleships was the centerpiece of the fleet . Plan Z was finalized by January 1939 , when Admiral Erich Raeder , the commander of the Kriegsmarine , presented it to Hitler . He approved the plan on 18 January and granted the Kriegsmarine unlimited power to bring the construction program to fruition .

Only four shipyards in Germany had slipways large enough to build the six new battleships . The OKM issued orders for construction of the first two ships , " H " and " J " , on 14 April 1939 . The contracts for the other four ships , " K " , " L " , " M " , and " N " , followed on 25 May . The keels for

the first two ships were laid at the Blohm & Voss dockyard in Hamburg and the Deschimag shipyard in Bremen on 15 July and 1 September 1939 , respectively . The outbreak of war in September 1939 interrupted the construction of the ships . Work on the first two was suspended and the other four were not laid down , as it was believed they would not be finished before the war was over . The keel for " H " had 800 t ( 790 long tons ; 880 short tons ) of steel installed , 3 @, @ 500 t ( 3 @, @ 400 long tons ; 3 @, @ 900 short tons ) of steel had been machined , out of 5 @, @ 800 t ( 5 @, @ 700 long tons ; 6 @, @ 400 short tons ) of steel supplied to Blohm & Voss by that point . Only 40 t ( 39 long tons ; 44 short tons ) of steel had been worked into the keel for " J " , out of 3 @, @ 531 t ( 3 @, @ 475 long tons ; 3 @, @ 892 short tons ) of steel delivered . Steel for the other four ships had been ordered and partially machined for installation , though no assembly work had begun . It was expected to resume work on the ships after a German victory in the war .

The ships neither received names nor were official name proposals published . The names , which appear in several publications ( Hindenburg , Friedrich der Große , Großdeutschland ) are pure speculation . Especially the often mentioned Großdeutschland ( = " Greater Germany " ) is highly unlikely , as Hitler always feared the loss of a vessel with name of Germany ( compare the renaming of Deutschland to Lützow ) . The only hint on the names of the units were given by Hitler himself , who mentioned during documented unofficial talks , that he would propose the names Ulrich von Hutten and Götz von Berlichingen for the ships , as these names are not connected with persons of the third Reich or the country itself , so the loss would not have a significant negative psychological and propaganda effect on the German people .

== = H @-@ 39 specifications == =

#### Characteristics and machinery

As finalized , the H @-@ 39 design called for a ship 266 m ( 873 ft ) long at the waterline and 277 @. @ 8 m ( 911 ft ) long overall . The beam was to have been 37 m ( 121 ft ) with a designed draft of 10 m ( 33 ft ) . At standard displacement , which was 52 @, @ 600 long tons ( 53 @, @ 400 t ) , the draft was slightly under the limit , at 9 @. @ 6 m ( 31 ft ) . With the ship fully loaded , at 62 @, @ 600 long tons ( 63 @, @ 600 t ) , draft rose significantly , to 11 @. @ 2 m ( 37 ft ) . The hull was constructed from transverse and longitudinal steel frames and featured over 90 percent welding . The hull contained twenty @-@ one large watertight compartments and a double bottom that extended for 89 percent of the length of the keel . Four bilge keels were fitted to improve stability . The ships had an estimated complement of 2 @, @ 600 officers and enlisted men .

The ships were to be powered by twelve MAN 9 @-@ cylinder double acting 2 @-@ stroke diesel engines . The engines were arranged in groups of four , on three shafts , and drove three @-@ bladed screws 4 @. @ 8 m ( 16 ft ) in diameter . Four auxiliary boilers were installed to provide backup power ; two were oil @-@ fired and were located between the central transmission rooms . The other two , a pair of exhaust gas boilers , were placed above them . The power @-@ plant was rated at 165 @, @ 000 shaft horsepower ( 123 @, @ 000 kW ) and 260 rpm ; it provided a top speed of 30 knots ( 56 km / h ; 35 mph ) as designed . The vessels could have carried up to 8 @, @ 700 t ( 8 @, @ 600 long tons ; 9 @, @ 600 short tons ) of diesel oil , which enabled a range of 7 @, @ 000 nautical miles ( 13 @, @ 000 km ; 8 @, @ 100 mi ) at 28 kn ( 52 km / h ; 32 mph ) , or 19 @, @ 200 nmi ( 35 @, @ 600 km ; 22 @, @ 100 mi ) at a cruising speed of 19 kn ( 35 km / h ; 22 mph ) .

#### Armament

The main armament was to consist of eight 40 @. @ 6 cm SK C / 34 guns in four twin gun turrets . The 40 @. @ 6 cm ( 16 in ) gun was 50 calibers long and fired at a muzzle velocity of 810 meters per second ( 2 @, @ 657 ft / s ) . The guns were supplied with a total of 960 rounds of ammunition or 120 shells per gun ; each shell weighed 1 @, @ 030 kg ( 2 @, @ 270 lb ) . The guns used a sliding breech block , as was typical for German naval guns of the period ; the breech was fully sealed with a 91 kg ( 201 lb ) brass cartridge that contained the 128 kg ( 282 lb ) main propellant charge . A fore charge weighing 134 kg ( 295 lb ) supplemented the main charge . The turrets allowed for elevation to 30 degrees , which provided a maximum range of approximately 36 @, @ 400 m ( 119 @, @ 400 ft ) . Rate of fire was expected to be two rounds per minute per gun . Fire control radar was

unspecified , but the ships , which were to have been completed by 1944 , presumably would have been equipped with an arrangement similar to that of Tirpitz as she was outfitted in 1943 ? 44 . Several of the 40 @. @ 6 cm guns were constructed before work on the ships was halted ; these were later employed as coastal guns , including at Battery Lindemann in France .

Twelve 15 cm ( 5 @. @ 9 in ) L / 55 C28 guns mounted in six twin turrets comprised the ships ' secondary battery . These were the same secondaries employed on the Scharnhorst and Bismarck classes . The turrets allowed 40 degrees of elevation and had a maximum range of 23 @. @ 000 m ( 75 @. @ 000 ft ) . They fired a 45 @. @ 3 kg ( 100 lb ) shell at a muzzle velocity of 875 m / s ( 2 @. @ 871 ft / s ) , and were primarily intended for defense against surface threats . The ships were also to be armed with six 53 @. @ 3 cm ( 21 @. @ 0 in ) torpedo tubes , all submerged . They were all mounted in the bow , diverging from the centerline by 10 degrees .

Sixteen dual @-@ mounted 10 @. @ 5 cm ( 4 @. @ 1 in ) L / 65 C33 Flak guns provided long @-@ range defense against aircraft . Unlike those mounted on the Scharnhorst and Bismarck classes , these guns were armored to protect their crews from shrapnel , debris , and strafing attacks . The new turrets also provided faster rates of training and elevation as compared to the earlier open mounts . Close @-@ range air defense was provided by a battery of sixteen 3 @. @ 7 cm ( 1 @. @ 5 in ) L / 83 C33 and twenty @-@ four 2 cm ( 0 @. @ 79 in ) C38 guns . The 3 @. @ 7 cm guns were placed in eight twin mounts while the 2 cm guns were arrayed in six Flakvierling quadruple mountings . The 3 @. @ 7 cm guns were closely grouped amidships and had a single , common ammunition hoist . Historians William Dulin and Robert Garzke note that the anti @-@ aircraft battery as designed was too weak to effectively defend against the high @-@ performance aircraft that came into service in the late 1930s and 1940s , and speculate that " it would have been augmented before the ships were completed . "

#### Armor

The design team envisioned the H @-@ class ships fighting at relatively close range , and therefore selected the armor system that had been used by German battleship constructors since the Nassau class of 1907 . The side belt was vertical and was attached directly to the side of the hull , in contrast with the inclined armor belt placed inboard of the side wall used by American and French designers . The side belt , which consisted of Krupp cemented steel armor ( KCA ) , was 300 mm ( 12 in ) thick in the central section that covered the ammunition magazines and machinery spaces . The belt was reduced to 220 mm ( 8 @. @ 7 in ) on either end of the main section ; the stern and bow were unprotected by the main belt . The upper side belt was 145 mm ( 5 @. @ 7 in ) thick . The German navy did not preserve official estimates for the immunity zone , though Garzke and Dulin created an estimate based on the performance of the US 16 in ( 41 cm ) 45 caliber gun firing a 1 @. @ 016 kg ( 2 @. @ 240 lb ) shell . The ships ' main armor would have rendered them proof against the 16 in shell at ranges between 11 @. @ 000 to 21 @. @ 000 m ( 36 @. @ 000 to 69 @. @ 000 ft ) . The 16 in shell could penetrate the upper side belt at any range , however , which left the ships exposed above the waterline .

The underwater protection system was broadly similar to the system employed on the Bismarck class . A 45 mm ( 1 @. @ 8 in ) thick torpedo bulkhead composed of Wotan Weich steel backed the side armor and provided defense against underwater weapons . The bulkhead was placed 5 @. @ 5 m ( 18 ft ) from the side of the hull , though abreast of the turrets and further in the bow and stern , this distance could not be maintained . The distance between the bulkhead and the side of the ship was reduced to 3 @. @ 25 m ( 10 @. @ 7 ft ) in these areas ; the designers compensated for the reduced space by increasing the thickness of the bulkhead to 60 mm ( 2 @. @ 4 in ) in these areas .

Two armored decks composed of Wotan Hart steel protected the ships from plunging fire and aerial weapons . The upper deck was 80 mm ( 3 @. @ 1 in ) thick above the magazines and 50 mm ( 2 @. @ 0 in ) over the machinery spaces . The main armored deck was 120 mm ( 4 @. @ 7 in ) and 100 mm ( 3 @. @ 9 in ) thick , respectively , though on the outboard sloped sections , thickness was increased to augment the protection over the ships ' vitals . Over the magazines , the sloped armor was 150 mm ( 5 @. @ 9 in ) thick ; over the machinery spaces it was 120 mm thick . Concerned with the fate of the battlecruiser Lützow at the Battle of Jutland , the designers opted to provide relatively heavy bow armor for the H @-@ class ships . A 60 to 150 mm ( 2 @. @ 4 to 5 @. @ 9 in ) thick

splinter belt protected the bow from shell fragments . It was reasoned that direct shell hits would cause localized damage that could be better isolated than damage from splinters , which could cause extensive flooding .

The main battery gun turrets were armored with 385 mm ( 15 @. @ 2 in ) thick faces , 240 mm ( 9 @. @ 4 in ) thick sides , and 130 mm ( 5 @. @ 1 in ) roofs . The rear side of the turret was 325 mm ( 12 @. @ 8 in ) thick ; in addition to the protection offered by the greater thickness , it also moved the center of gravity of the mounting to the rear , which helped balance the turret and improve its operation . The barbettes upon which the turrets sat were armored with 365 mm ( 14 @. @ 4 in ) face @-@ hardened steel above the upper armor deck and 240 mm ( 9 @. @ 4 in ) non @-@ cemented steel below the deck . The 15 cm gun turrets had 100 mm ( 3 @. @ 9 in ) thick faces , 40 mm ( 1 @. @ 6 in ) thick sides , and 35 mm ( 1 @. @ 4 in ) thick roofs . Their barbettes had 80 mm ( 3 @. @ 1 in ) thick armor protection . The 10 @. @ 5 cm mounts were protected by 20 mm ( 0 @. @ 79 in ) thick gun shields . The forward conning tower had 350 mm ( 14 in ) thick sides composed of KCA and 200 mm ( 7 @. @ 9 in ) thick roof composed of non @-@ cemented steel . The rear conning tower had 100 mm thick sides and roof , KCA and non @-@ cemented steel , respectively .

= = Design escalation = =

In early July 1940 , Hitler ordered the navy to examine new battleship designs and how wartime experience might be incorporated . A study was completed on 15 July , and contained several recommendations for the H @-@ class ships , including increasing the freeboard and strengthening the horizontal protection . In order to maintain displacement and speed and accommodate the increased weight of the additional armor protection , the design staff drew up an informal design , known as " Scheme A . " The design removed one of the main battery turrets to save weight ; the propulsion system was also increased in power to keep the same speed as the original design . The original diesel @-@ only system was replaced by a hybrid diesel and steam turbine arrangement . The staff also prepared a second design , " Scheme B " , which retained the fourth turret and accepted a much higher displacement . This design also incorporated the mixed propulsion system . These studies were abandoned in 1941 after Hitler decided to halt further battleship construction until after the end of the war . The design staff therefore attempted to improve the armor protection for the H @-@ class . The 1940 designs did not form part of the design chain that resulted in the H @-@ 41 through H @-@ 44 designs .

= = = H @-@ 41 = = =

Bomb damage sustained by Scharnhorst in July 1941 provided the impetus for the effort to increase the horizontal protection for the H @-@ class . The designers were confronted with a significant problem : any increase in armor could correspondingly increase the displacement and more importantly , the draft . It was necessary to maintain the full @-@ load draft of 11 @. @ 5 m of the H @-@ 39 design for operations in the relatively shallow North Sea . The only option that allowed the displacement to be maintained while armor thicknesses to be increased was to reduce the ships ' fuel supplies . A 25 percent cut in range was required , which was deemed unacceptable by the OKM . It was eventually determined that since deep @-@ water anchorages on the Atlantic coast were available , it would be permissible to allow the draft to increase . The initial redesign called for an increase of only 5 @, @ 000 long tons ( 5 @, @ 100 t ) , 40 percent of which was additional deck armor , the remainder being used for a larger @-@ caliber main battery .

One of the most significant changes was the decision to bore out the over @-@ sized 40 @. @ 6 cm guns to 42 cm caliber for the H @-@ 41 design . The design staff determined that modifications to the ammunition hoists and loading equipment would be easily effected and that the original turrets could be retained . The OKM was aware that the British had settled on a 40 @. @ 6 cm gun for the proposed Lion class ; the 42 cm gun would grant the H @-@ 41 design a significant advantage over these new adversaries . The ships ' armament was otherwise unchanged , apart from an increased number of 2 cm anti @-@ aircraft guns , of which there were now to be 34 .

The ships' main armor decks were substantially strengthened : the deck was increased in thickness from 120 mm ( 4 @. @ 7 in ) to 200 mm ( 7 @. @ 9 in ) and the sloped armor at the edges was thickened from 150 mm ( 5 @. @ 9 in ) to 175 mm ( 6 @. @ 9 in ) . Wartime experience with the Scharnhorst class indicated that the torpedo @-@ defense system was insufficiently strong to protect the H @-@ 39 design from underwater damage . Beam was therefore increased , with greater width added at the ends of the armored citadel to allow a greater distance between the side wall and the torpedo bulkhead . The stern section of the torpedo bulkhead was also strengthened structurally to allow it to better contain the force of an underwater explosion . A triple bottom was also included in the design , the first time a feature was used in a German warship design . The loss of Bismarck in May 1941 also influenced the design ; two large skegs were added to the outboard shafts to protect them and increase support for the stern while in drydock . The rudder system was also designed with an explosive charge to detach the rudders in the event they became jammed .

The finalized design was approved by Admiral Raeder on 15 November 1941 . The new design measured 282 m ( 925 ft ) long at the waterline , had a beam of 39 m ( 128 ft ) , and a draft of up to 12 @. @ 2 m ( 40 ft ) at full load . The increase in weight , while engine power remained constant , reduced speed to 28 @. @ 8 kn ( 53 @. @ 3 km / h ; 33 @. @ 1 mph ) . The OKM planned to begin construction six to nine months after demobilization , initially at Blohm & Voss and the Deutsche Werke shipyard in Kiel . Deschimag , which had been awarded the contract for " J " , could no longer be used due to the increase in draft , which precluded travel through the shallow Weser . Following the completion of a new , larger dock at the Kriegsmarinewerft in Wilhelmshaven , work would also be done there . The increased size of the ships would have lengthened the building time from four to five years .

== = H @-@ 42 through H @-@ 44 == =

On 8 February 1942 , Albert Speer became the Reichsminister for Armaments and Munitions and gained influence over the Navy 's construction programs . Speer reassigned some members of the H class design staff to work on new U @-@ boats and other tasks deemed critical to the war effort . The Schiffsnaubaukommission ( New Ships Construction Commission ) , intended to liaise with Speer and the OKM , was created and placed under the direction of Admiral Karl Topp . This group was responsible for the design work that resulted in the H @-@ 42 type , as well as the subsequent designs . The Construction Office of the OKM formally concluded their work on new battleships with the H @-@ 41 type and played no further role in battleship development .

After the completion of the H @-@ 41 design , Hitler issued a request for a larger battleship and placed no restrictions on gun caliber or displacement . The only requirements were a speed of 30 kn ( 56 km / h ; 35 mph ) , horizontal and underwater protection sufficiently strong enough to protect the vessel from all attacks , and a main battery properly balanced with the size of the ship . The results were purely study projects intended to determine the size of a ship with strong enough armor to counter the rapidly increasing power of bombs deployed by the Allies during the war . The Commission did not discuss its activities with Raeder or his successor , Admiral Karl Dönitz , or with other branches in the OKM . As the designs for the H @-@ 42 , H @-@ 43 , and H @-@ 44 battleships were purely conjectural , no actual work was begun . The German navy did not seriously consider construction on any of the designs , which were so large that they could not have been built in a traditional slipway . Indeed , the Construction Office of the OKM sought to disassociate itself from the projects , which they found to be of doubtful merit and unnecessary for German victory .

The first design , H @-@ 42 , was 305 m ( 1 @, @ 001 ft ) long between perpendiculars and had a beam of 42 @. @ 8 m ( 140 ft ) and a draft of 11 @. @ 8 m ( 39 ft ) designed and 12 @. @ 7 m ( 42 ft ) at full load . The designed displacement was 90 @, @ 000 t ( 89 @, @ 000 long tons ; 99 @, @ 000 short tons ) and at full load rose to 96 @, @ 555 long tons ( 98 @, @ 104 t ) . The dimensions for the second , H @-@ 43 , increased to 330 m ( 1 @, @ 080 ft ) between perpendiculars , a beam of 48 m ( 157 ft ) , and design and full load drafts of 12 m ( 39 ft ) and 12 @. @ 9 m ( 42 ft ) , respectively . Design displacement was 111 @, @ 000 t ( 109 @, @ 000 long tons ; 122 @, @ 000 short tons ) and

estimated at 118 @, @ 110 long tons ( 120 @, @ 010 t ) at full load . For the final design , H @-@ 44 , the length rose to 345 m ( 1 @, @ 132 ft ) between perpendiculars , the beam increased to 51 @. @ 5 m ( 169 ft ) , and draft rose to 12 @. @ 7 m ( 42 ft ) as designed and 13 @. @ 5 m ( 44 ft ) at full load . The displacement for H @-@ 44 was 131 @, @ 000 t ( 129 @, @ 000 long tons ; 144 @, @ 000 short tons ) as designed and up to 139 @, @ 272 long tons ( 141 @, @ 507 t ) at full load .

Details on the propulsion systems for these designs are fragmentary and in some cases contradictory . Erich Gröner notes that " some [ had ] pure [ diesel ] engine propulsion , others [ had ] hybrid engine / turbine propulsion systems , " but does not record the type and performance for these propulsion systems . William Garzke and Robert Dulin state that all three designs featured hybrid diesel / steam turbine plants , each supplying 266 @, @ 000 shp ( 198 @, @ 000 kW ) for top speeds of 31 @. @ 9 kn ( 59 @. @ 1 km / h ; 36 @. @ 7 mph ) , 30 @. @ 9 kn ( 57 @. @ 2 km / h ; 35 @. @ 6 mph ) , and 29 @. @ 8 kn ( 55 @. @ 2 km / h ; 34 @. @ 3 mph ) for H @-@ 42 , H @-@ 43 , and H @-@ 44 , respectively . According to Garzke and Dulin , the designs had a speed of 24 kn ( 44 km / h ; 28 mph ) , 23 kn ( 43 km / h ; 26 mph ) , and 22 @. @ 5 kn ( 41 @. @ 7 km / h ; 25 @. @ 9 mph ) , respectively , on just diesel engine power . Both sources agree on a maximum range of 20 @, @ 000 nmi ( 37 @, @ 000 km ; 23 @, @ 000 mi ) at a cruising speed of 19 kn ( 35 km / h ; 22 mph ) .

Information on the armament outfits for the designs is equally contradictory . Both sources agree on the armament for H @-@ 44 , which was to have been eight 50 @. @ 8 cm ( 20 @. @ 0 in ) guns . Gröner indicates that H @-@ 42 and H @-@ 43 were to be armed with eight 48 cm guns , while Garzke and Dulin state that the H @-@ 42 design was to have retained the 42 cm guns from the H @-@ 41 design and H @-@ 43 would have also been armed with 50 @. @ 8 cm pieces . Both works agree that the secondary armament was to have consisted of twelve 15 cm L / 55 guns and sixteen 10 @. @ 5 cm L / 65 guns as in the previous designs , though the lighter weapons are disputed . Gröner states that all three designs were to be equipped with twenty @-@ eight 3 @. @ 7 cm and forty 2 cm anti @-@ aircraft guns , while Garzke and Dulin report only sixteen 3 @. @ 7 cm guns and forty 2 cm guns for H @-@ 43 and H @-@ 44 only ; H @-@ 42 was to have twenty @-@ four 2 cm guns . Both sources concur that six submerged 53 @. @ 3 cm torpedo tubes were included in each design .

= = Designs = =