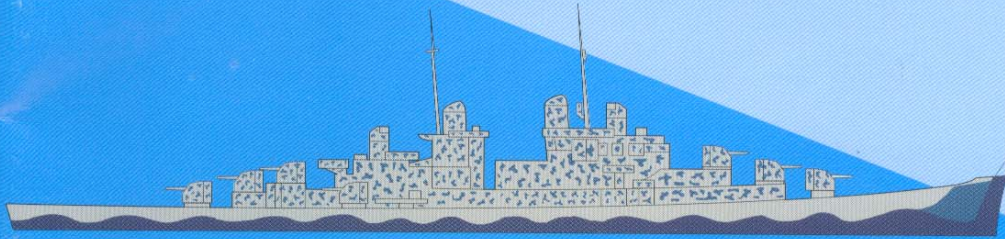
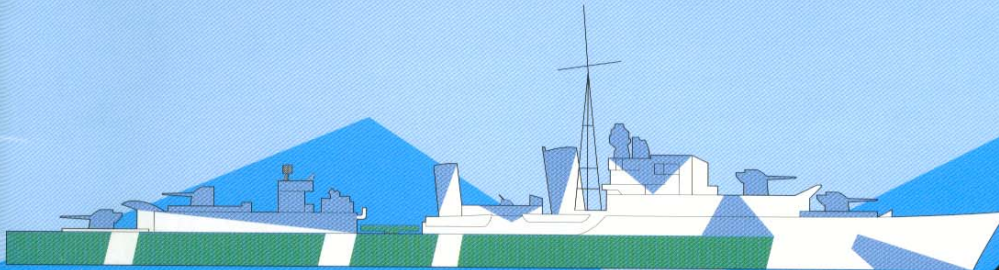
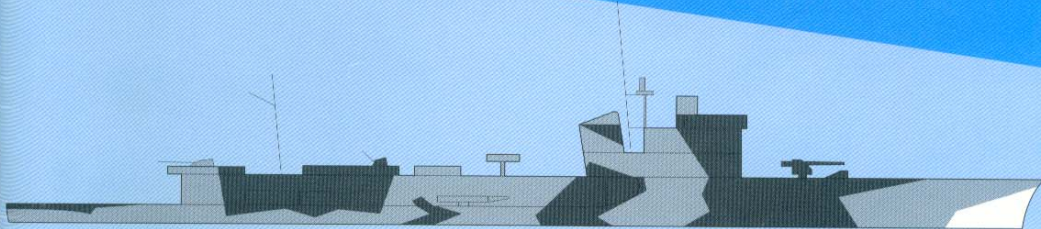


THE PAINTER'S GUIDE TO WORLD WAR TWO NAVAL CAMOUFLAGE



Written by PATRICK HREACHMACK



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**The Painter's Guide to WW II
Naval Camouflage**

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The author of this book is prepared to answer questions about the material. He may be contacted at Clash of Arms Games; Byrne Building #205; Lincoln & Morgan Streets; Phoenixville, PA 19460

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CHAPTER 1 - INTRODUCTION

The *Painter's Guide to World War Two Naval Camouflage* is not intended to be a complete or all-encompassing authority on naval camouflage. It is intended to describe a number of the more common painting schemes used on naval vessels. The *Painter's Guide* attempts to answer the question, "What paint colors should I use and how should they be applied?" The measures and schemes described in this volume may be applied successfully to models in the 1:2400, 1:1200, and 1:700 scale ranges, but may also be successfully used for other larger scales.

The *Painter's Guide* attempts to identify what I believe is the probable actual color and the closest match commercially available without the need to mix paints. In fact, in many cases, the actual shades and colors are somewhat in doubt due to the age of remaining samples, loss of paint samples, over 50 years of time passing, lack of color consistency in photographic printing, and many other causes. No attempt is made to describe the complications of camouflage colors such as level of reflectance, light absorbance, or scale color effects.

By the same token, some of the more complex patterns are recreated here in a slightly simplified manner so as to be easier to reproduce on your models. The effect and impact of the camouflage pattern remains the same.

Upon reviewing some of the drawings and the information available, editor Larry Bond commented that he didn't realize how "Prussian" the American Navy was in documenting its measures and paint colors. No other navy approached the detail and regimentation of the USN in its development and application of camouflage and dazzle schemes.

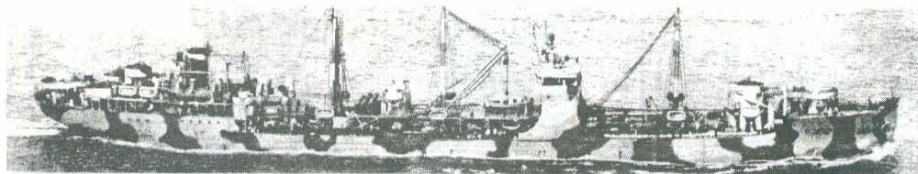
Properly executed, the camouflage schemes in this book will look good on models of any scale, although the larger the scale, the easier (and more necessary) it is to add additional detail. Anyone doubting the ability to camouflage 1:2400 models is invited to view my ten 1:2400 scale "Tribal" class destroyer miniatures, all ten in different Royal Navy destroyer schemes.

Please keep in mind that there may have existed several, if not many, variations of each scheme, partially due to the number of vessels in the class. You only have to refer to photos of various sister ships to see differences from ship to ship. Different yards maintained slightly different interpretations of each scheme. This is especially noticeable with the Imperial Japanese Navy where the shipyard last visited for major overhaul can often be identified by the color of the ship's paint. Often, in cases where a Royal Navy ship was painted by the crew, the scheme differed dramatically from that specified by the British Admiralty. In the USN, "measures" had suffix numbers designating design variations within the measure, but could still substantially differ from ship to ship. The Italian Regia Marina had a different paint scheme for each ship and often changed schemes due to the captain's decision. Other navies were probably no different in practice.

By the 1940's, radar was available on ships of many nationalities. The very nature of ship camouflage and dazzle schemes changed, not so much to hide the vessel from detection, but to disguise the type of vessel and its speed or direction. This was especially important in confusing gunners and sub skippers, who often had to estimate a target's speed and angle on the bow based on what they could see. Camouflage can also hide the vessel from aircraft, although no camouflage system could hide a ship at high speed with its wake creaming behind.

For the sake of simplicity, the drawings in this book do not reflect minor construction differences between sister ships, and many details are omitted, so the camouflage patterns can be clearly seen. Cross hatching used in the drawings does not indicate the same color throughout the book. It is used to illustrate the colors of a specific pattern.

I encourage those with information, corrections, or comments to contact me c/o Clash of Arms, Byrne Building #205, Lincoln & Morgan Streets, Phoenixville, PA 19460. I am also researching additional Dutch, French, and Russian naval camouflage of WW II for a follow-up to this volume. Anyone having published or documented camouflage information for these navies is invited to share their sources with me by writing to me. Thank you.



USS *Maumee* (AO-2), July 1942

US Navy

CHAPTER 2 - TOOLS, PAINTS, & TECHNIQUES

The choice of whether to use water-based acrylics or oil-based enamels is strictly up to each painter. In fact, some companies, most notably Floquil Polly-S, manufacture colors in both mediums. In the case of Floquil Polly-S, these paints may be applied over each other, providing you allow at least 24 hours between layers. Paints of both mediums will be referred to in this guide.

Your investment in quality brushes will pay off in the long run. Brushes should be properly cleaned between colors and after use. Carefully stored after cleaning, good brushes will have a long life. The size of the brush is a matter of personal choice and the scale of the model. On 1:2400 scale models, the use of "000" size brushes is not at all unusual.

The tools you select and use will vary to some degree dependent on the scale of your models. Local hobby shops have a variety of tools and magnifiers, and will be able to supply most, if not all of the paints referred to in this guide. Hobby shops also may carry Squadron "Green Putty" and other such materials. I have found flea markets to be a good and inexpensive place to purchase dental tools and magnifiers. These are excellent for many modeling activities.

For detail painting, I highly recommend purchasing or making a pair of pancake-shaped bean bags of about 5 inches in diameter and an inch thick. By steadying your wrists on the bean bags, you will more easily be able to add more detail painting to your ship model. (My young daughter made me a set of bean bags many years ago. Now, I would be lost without the bean bags to steady my hands when painting my 1:2400 models.) A magnifier mounted on a headband or clipped onto your glasses will also strongly enhance your ability to paint detail onto the ship model.

When painting fine camouflage or other detail, one very helpful tool is a painting platform to hold ship models steady. An easy way to make a model holding platform is to tack or glue two triangular strips of wood to another flat piece of wood. These should be of a length longer than the average ship model in your collection. A 45° angle is highly recommended. The two triangle strips should be placed so that they form a "V" with the interior edges touching. A ship model placed into the "V" will automatically present one side at a 45 degree angle up towards the painter, allowing easy access to the hull and superstructure sides.



Throughout this painting guide, hobby paint manufacturers' names are abbreviated by use of their initials. The number following the manufacturers' code is the manufacturer's item number for the specific paint.

Armory = A
Model Master = MM

Floquil = F
Polly-S = PS

Humbrol = H
Testors = T

In many of the camouflage or dazzle schemes cited, the deck color may have also been applied to the majority of horizontal surfaces including the turret and gun shield tops, deck houses, and other superstructure. Guns were generally painted in the color of the mount, although some painted deck schemes also involved the gun barrels. Lighter rifle caliber weapons, e.g. machine guns, were gunmetal.

Metal models such as most 1:2400 or 1:1200 scale miniatures should first be cleaned of any excess flashing or metal sprues. Gun barrels, masts, and other small features should be carefully straightened. Any modifications or repairs to the model should be finished. (Larger scale plastic models may be detail painted prior to assembly.) Many model builders will complete some of the subassemblies, then fill in any cracks or joints with Squadron "Green Putty" or other similar materials. After the "Green Putty" is dry, a careful light sanding with Testors wet or dry fine grit sanding film eliminates any sign of the seam.

Small scale metal models should be lightly spray painted with a base coat primer before painting the camouflage coat. The Armory manufactures two excellent base primers, grey primer (GG-001), and white primer, (GG-002). Floquil Polly-S also makes excellent base primers in white (#330021), black (#330010), and grey (#330009). All of these base coats are formulated to not obscure detail. I do not recommend the use of any other spray paints not designed to be primers for models, as they will obscure detail. While the choice of primer color is up to the individual, grey generally works better under darker schemes and white is better under lighter schemes. Black primer has the effect of darkening any colors painted over it, and can significantly alter the final effect of any paint job.

When painting and detailing a ship model, it is best to remember the old model railroad guide, "inside to outside, lighter to darker". Applying paint first to items which are "inside" or harder to reach, will enable you to add detail without having to reach around or through areas already finished. Darker colors are harder to cover with light paint than lighter areas are to cover with dark paint.

Models which are all metal, such as most of those in the popular 1:2400 or 1:1200 scales, may be baked to bind the paint to the miniature. After painting the model, set it aside for at least 24 hours. Be sure there is no plastic anywhere on the model. Place the ship model or models on a thin piece of hobby plywood, no closer than an inch apart. Heat a conventional oven to 200° F. When the oven has stabilized, bake the miniatures on the middle rack for 20 minutes. Remove and cool for several hours.

DO NOT ATTEMPT TO MICROWAVE! Do not use a small toaster style oven as the temperature does not stabilize. Metal ship models will melt if the temperature is too high above the recommended 200° F.

Finally, at least 24 hours or longer after the last paint is applied, lightly spray the model with one or two light applications of a color flattening agent such as Testors "Dullcote" or Floquil Figure Flat (#330022). This will reduce any gloss and allow the model to be handled while preserving the finish. (Warning: Dullcoat, a lacquer, may attack decals. Clear acrylic matte sealer, available in craft stores, is decal-safe.)

Many modelers like to place name labels on the bottom of their models. Some add the dates the ship was in service, or other details. An easy way to create permanent labels is do the labels on a computer using a font size consistent with the size of the model. The labels are then cut out to be smaller than the bottom of the model. A thin layer of Elmer's white glue is carefully spread across the bottom of the ship model where the label is to be applied. Place the label over the glue and roll a toothpick from one end of the label to the other to remove any air bubbles. Carefully spread another thin layer of Elmer's white glue over the label. Allow to dry. This technique is known as decoupage, and seals the label onto the model.

Floquil Polly-S Paint Corporation has gone to great lengths to accurately duplicate actual WW II paints. To my knowledge, they are the only company to list their colors according to the designations used by the navies, and are also the only company to have the elusive "Thayer Blue" used by the U. S. and Royal navies. Floquil Polly-S is developing other colors used by the Royal Navy and the Italian Navy. These should be available soon. All of the following are available in the Floquil enamel, and many in the Polly-S acrylic series. The corresponding Armory color is also cited where available. Many of the Armory paints are close matches to naval colors, although Armory's name for a particular paint may fool you.

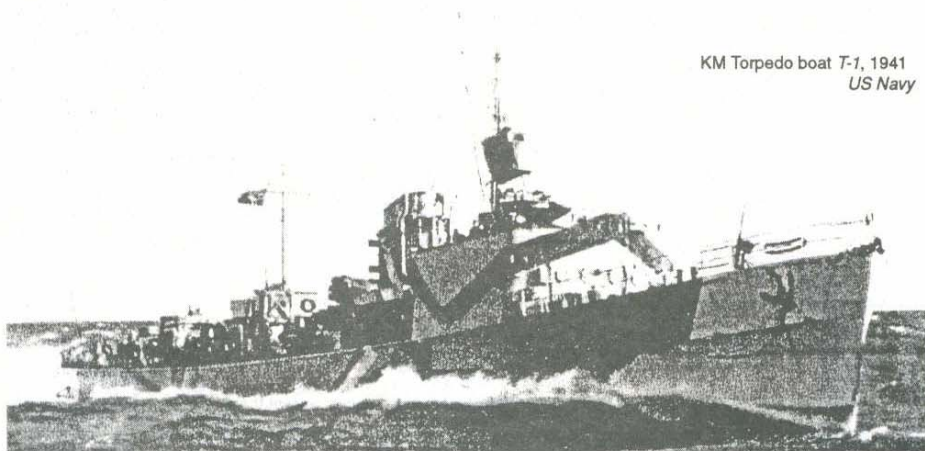
| Color Name | Floquil | Polly-S | Armory |
|-------------------------------|---------|---------|--------|
| Pale Gray (5-P) ✓ | #818590 | #505326 | GG-020 |
| Light Gray (5-L) ✓ | #818592 | #505328 | GS-291 |
| Haze Gray (5-H) ✓ | #818594 | #505330 | GG-068 |
| Ocean Gray (5-O) ✓ | #818596 | #505332 | GS-292 |
| Navy Blue (5-N) ✓ | #818598 | #505334 | GG-017 |
| Deck Tan ✓ | #818618 | #505336 | |
| Weathered Deck Blue (20-B) ✓ | #818600 | #505338 | GG-019 |
| Dull Black (13) | #818602 | | GG-004 |
| Haze Green (5-HG) | #818605 | | GF-010 |
| Ocean Green (5-OG) | #818606 | | GF-018 |
| Navy Green (5-NG) | #818608 | | GG-013 |
| Sea Blue (5-S) | #818638 | | GG-019 |
| Deck Gray (very close to 5-D) | #818700 | | GS-290 |
| Thayer Blue | #818704 | | |

Note: Deck Gray may also be used for Dark Gray (5-D) in the early war measures.

Testors manufactures colors specifically matched to Federal Standards, citing the FS number on the bottle. Humbrol (now Monogram-Humbrol) manufactures colors to match many of the paints commonly used by various navies, but does not indicate the FS number or Royal Navy reference number. (Within the last several years, some Humbrol colors for ships seem to have become more difficult to find.) Neither of these companies apparently has gone to the lengths of Floquil Polly-S in providing the full range of naval paints.

Many of the British, French, and particularly German grays and blue grays were close to some of the USN paints. As a result, some of the American paint identification numbers are referenced in other chapters of this book.

(As a late note, Floquil Polly-S was purchased by Testors in late 1997 or early 1998. it is not known at this time if we will see any changes in the availability or variety of colors.)



KM Torpedo boat T-1, 1941
US Navy

CHAPTER 3 - AMERICAN CAMOUFLAGE SCHEMES

Like many navies during the 1920s and the early 1930s, the US Navy maintained one standard paint scheme for its vessels. All vertical surfaces were painted with standard Navy Gray. All metal horizontal surfaces were #20 Outside Deck Gray. Wood decks of cruisers and battleships were of unpainted bleached teak. Carrier flight decks were fir, stained with mahogany (dark red-brown). Flight deck markings and striping were chrome yellow. Hull numbers were white with black shading.

During 1935, and later in 1939, several experiments were run attempting to design and evaluate dazzle schemes. However, these experiments only demonstrated that the paints and schemes available at that time were prone to severe weathering and rapid degradation. The Atlantic and Pacific fleets each were performing their own independent research under the vastly different "normal" or "regular" weather conditions specific to the North Atlantic and the central Pacific. The Department of the Navy (Bureau of Ships) did not become involved in any central coordination of the experiments.

From 1938 up to 1941, major painting differences were noticeable between the U. S. Atlantic and Pacific fleets. Atlantic vessels used subdued and graded tones while Pacific vessels generally used dark solid colors. Some Atlantic vessels transferred to the Pacific during the early part of 1942 were used so extensively that they never had time to change their camouflage from their original Atlantic schemes. *USS Wasp* was one of these, sunk in her Atlantic measure. During this period the standard colors were: Light Gray (5-L), Ocean Gray (5-O), Dark Gray (5-D), and black. Prior to 1941, wood decks of battleships and cruisers theoretically were to be painted or stained a dark gray. In practice these decks were usually left in bare wood. This practice continued until the winter of 1941-42.

As a note of interest regarding experimental patterns, during the summer of 1941 *USS Enterprise* briefly wore a black silhouette of a destroyer painted on her sides.

In late 1941, with the realization that war was imminent, the Bureau of Ships issued a new set of instructions and colors. These were Haze Gray (5-H), Ocean Gray (5-O), and Sea Blue (5-S). At the same time, the Commander in Chief of the Atlantic Fleet "unofficially" ordered the use of Navy Blue (5-N). This last color was not to be sanctioned by the Bureau of Ships until June of 1942.

All horizontal metal surfaces were to be painted in Deck Blue (20-B). Wood decks were not colored until early 1942 when Deck Blue (20-B) was applied. Note that gun vessel decks were painted while carrier flight decks were stained. The rationale was that stains could provide the appropriate coloring to wooden flight decks while retaining the non-skid feature of fir decks. The striping on carrier decks was changed to a stain which matched Ocean Gray (5-O).

The US Asiatic Fleet was somewhat left out in the cold during this period. In fact, in December of 1941 just prior to Pearl Harbor, Asiatic Fleet Commander Admiral Hart complained that there were no official camouflage paints or scheme diagrams available to his forces in the Philippines. He said that his vessels had to use "home brewed" schemes and locally produced paints.

Experiments by both the USN and the Royal Navy determined that in foggy North Atlantic waters, light gray paint was much more effective. In June 1942, a new measure was issued which included white and light blue paints in alternating bands. This measure, based on the Thayer System, was for the foggy areas of the North Atlantic and North Pacific Arctic waters. The Royal Navy adopted the similar Peter Scott scheme earlier, and no later than 1941 used it throughout the rest of the war for North Atlantic escorts. The British Western Approaches scheme may be a variation of the Thayer System.

In general, larger vessels such as battleships and heavy cruisers tended to use simpler lines and designs. Destroyers and other smaller combatants tended to use more complex designs.

Modelers working with USN colors should be aware of one additional important item. Some USN "warship" colors are completely different from USN "aircraft" colors of the same name. Most notable are the warship and aircraft colors for "Sea Blue" and "Light Grey".

Fortunately for the ship model painter, Floquil Polly-S has done an excellent job of determining the exact color matches for USN camouflage paints. The USN camouflage paints are already listed in Chapter 2. Modelers finding references to USN paint numbers in any later chapter of this book may refer to the list of Floquil Polly-S paints for the accurate and "proper" paint color.

The following descriptions are the official USN Camouflage Measures. Application by different yards of in the fleet led to many variations of the basic schemes. Decks should be dark gray approaching black for Measures 1 through 8. The first eight Measures were officially discontinued after September 1941, although some vessels may have continued to wear a specific measure until their next dockyard overhaul. Note that there were no Measures 18, 19, or 20. Apparently, Measures 15 and 17 existed only for experimental purposes and were not adopted. There also were no Measures 24 through 30 during World War Two.

A chart on page nine shows when each Measure was in use. (Additional research is currently in process so that I may be able to include a list of specific USN vessels and the Measures they wore in a future volume of the *Painter's Guide*.)

The following Measures were introduced in January, 1941.

Measure 1: Dark Gray:

Dark Gray (5-D) was applied overall to both vertical and horizontal surfaces, except that Light Gray (5-L) was applied above the level of the stacks.

Measure 2: Graded System:

Dark Gray (5-D), Ocean Gray (5-O), and Light Gray (5-L) were applied in color bands from darkest at the low band to Light Gray at the top band. The low band was from the waterline to a horizontal line intersecting the lowest point of the main deck. The middle band was to the top of the superstructure. The top band covered the upper masts and platforms.

Measure 3: Light Gray System:

Light Gray (5-L) applied overall on all vertical surfaces. Dark Gray (5-D) was applied on all horizontal surfaces until after September of 1941 when Deck Blue (20-B) was authorized.

Measure 4: Black System:

This measure was specific to destroyers only. Black was applied overall. Once it was determined that this measure actually highlighted destroyers at night, this unsuccessful measure was discontinued in mid-1942.

Measure 5: Painted False Bow Wave:

In this measure, a bow wave was outlined in white or Light Gray (5-L), and applied with Measures 1, 2, or 3. When used with Measures 2 and 3, the center of the wave was painted in Dark Gray (5-D), authorized in September, 1941 or Dark Blue (5-N), authorized in June, 1942.

Measure 6: Light Cruiser Painted to Simulate a Heavy Cruiser:

Dark gray (5-D) and Light Gray (5-L) were applied to modify the visual image of a cruiser from a distance. This measure was designed for *Brooklyn* class cruisers. A false catapult was simulated amidships. Generally, the aft section was in the lighter color.

Measure 7: Four-Funneled Light Cruiser Painted to Simulate a Four-Funneled Destroyer:

Dark Gray (5-D) and Light Gray (5-L). This measure was specific to the *Omaha*-class light cruisers.

Measure 8: Light Cruiser Painted to Simulate a Two-Funneled Destroyer:

Dark Gray (5-D) and Light Gray (5-L). This measure was intended to be applied to *Brooklyn*-class cruisers in an attempt to deceive the enemy into underestimating the engaging American forces. Its only established application, however, was to the *New Orleans*-class cruiser *Minneapolis* and/or *San Francisco*.

The following measures were introduced in September, 1941.

Measure 9: Black System:

Specific for submarines, the entire vessel above the waterline was painted black.

Measure 10: Gray System:

Also specific for submarines, Ocean Gray (5-O) was applied to the entire vessel above the waterline. This Measure provided a low visibility for surfaced subs sighted from a low level. It was a poor scheme for hiding the sub from an aircraft, even when the sub was submerged at shallow depths or in clear waters.

Measure 11: Sea Blue System:

Sea Blue (5-S) was applied overall. This Measure was exclusive to vessels in the Pacific and the Mediterranean. It had the advantage of protecting the vessel from aerial observers in all weather conditions, but was highly visible to surface observers.

Measure 12: Graded System:

Sea Blue (5-S), Ocean Gray (5-O), and Haze Gray (5-H). Sea Blue was used for the lower hull up to a horizontal line which touched the lowest portion of the main deck, and on all horizontal surfaces.

| Measure | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|-------------|------|------|------|------|------|------|
| Ms1 | | — | — | | | |
| Ms2 | | — | — | | | |
| Ms3 | — | | | | | |
| Ms4 | | — | — | | | |
| Ms5 | | — | — | | | |
| Ms6 | | — | — | | | |
| Ms7 | | — | — | | | |
| Ms8 | | | | — | | |
| Ms9 | | — | — | | | |
| Ms10 | | | — | — | — | |
| Ms11 | | | — | — | — | |
| Ms12 | | — | — | | | |
| Ms12/12A | | | | | | — |
| Ms13 | | — | | | | — |
| Ms14 | | | | — | — | — |
| Ms15 | | | — | | | — |
| Ms16 | | | — | — | — | — |
| Ms17 | | | — | | | — |
| Ms21 | | | | — | — | — |
| Ms22 | | | | — | — | — |
| Ms31 | | | | | — | — |
| Ms32 | | | | — | — | — |
| Ms32/3 (SS) | | | | | — | — |
| Ms32/9 (SS) | | | | | | — |
| Ms33 | | | | — | — | — |

The band of Ocean Gray (5-O) was from the main deck to the highest superstructure. Haze Gray (5-H) was on all masts and minor structures above the main superstructure. This Measure was in use in both the Atlantic and Pacific.

Measure 13: Haze Gray:

Haze Gray (5-H) was applied to all vertical surfaces. Deck Blue (20-B) was used on all horizontal surfaces.

In June of 1942, Measures 10, 14, 16, 21, and 22 were introduced. Carrier decks were also changed. All other measures were introduced later at various times. Measures 9 and 13 were unchanged at this time.

Measure 14: Ocean Gray System:

All vertical surfaces to the top of all superstructure masses were in Ocean Gray (5-O). Pole masts and small structures above the main superstructure (gun directors, etc.) were in Haze Gray (5-H). All horizontal surfaces were painted in Deck Blue (20-B).

Measure 16: Thayer System:

Thayer Blue and white were alternatingly applied in chevrons with the point forward, or in other patterns of alternating color. Horizontal surfaces were in Deck Blue (20-B). This measure was used in the North Atlantic and North Pacific during 1943 and 1944.

Measure 21: Navy Blue System:

Navy Blue (5-N) was applied to all vertical surfaces. Deck Blue (20-B) was on all horizontal surfaces. This measure was in use in the Southwest Pacific from mid-1942 to 1945.

Measure 22: Graded System:

Navy Blue (5-N) was applied up to a horizontal line touching the main deck at its lowest point. All remaining vertical surfaces were in Haze Gray (5-H). Deck Blue (20-B) was applied to all horizontal surfaces. Shadows caused by overhanging horizontal surfaces were lightened by painting their undersides white. Measure 22 was used in Atlantic and European waters from 1942 to 1945. It was also used in the Pacific from late 1944 to 1945. Measure 22 has been noted as the most common system for American vessels.

In March 1943, the following Measures were introduced:

Measure 23: Light Gray System:

Light gray (5-L) was applied on all vertical surfaces. White was applied to all undersurfaces and overhangs. All horizontal surfaces were Deck Blue (20-B). Note that this system is highly visible to aircraft observation. It was intended to make recognition difficult from surface observation.

Measures 31, 32, & 33 were considered to be "false perspective patterns" and were used in a bewildering array of design variations. Variations were indicated by suffix numbers, for example, Measure 33-10A applied to some carriers, or Measure 31-15T applied to APDs operating in the inter-island areas of the Pacific.

Measures 31 (overall dark appearance), 32 (overall medium appearance) and 33 (overall light appearance) initially involved three colors chosen from Pale Gray (5-P), Light Gray (5-L), Haze Gray (5-H), Ocean Gray (5-O), Navy Blue (5-N), and black. Contradictory, derivative source descriptions have been published. However, logically, the darkest colors for Measures 31, 32, and 33 should have been black, Navy Blue, and Ocean Gray, respectively. The lightest colors should have been Haze Gray, Light Gray, and Pale Gray respectively. Hence the mid colors will have been Haze Gray or Ocean Gray. So, the mid color for Measure 31 should have been Ocean Gray; the mid color for Measure 32 also Ocean Gray, the mid color for Measure 33 was probably omitted.

Some simplified schemes used only two colors.

A new gray-green series of paints was introduced for landing ships and craft, PT boats, and auxiliaries intended to operate near shore. These included Pale Green (5-PG), Light Green (5-LG), haze Green (5-HG), Ocean Green (5-OG), Navy Green (5-NG), black, and Deck Green (20-G). Some of these were known as variations of Measures 31, 32, or 33. A range of Browns was subsequently introduced.

Measure 31: Dark Pattern System:

This measure was used in 1944 and 1945 and was the best pattern for anti-aircraft use. Measure 31 was also for amphibious forces, using at least three colors from the green series (5-PG through 5-NG), plus Browns, Navy Blue, and black. In application this may have been used primarily by amphibious forces. Decks were Deck Blue or Deck Green as appropriate, with possible overlap of side colors onto the deck.

The pattern was continued across all horizontal surfaces. Even landing craft on board their parent ships were painted in this measure.

Measure 32: Medium Pattern System:

Usually three colors chosen from the blue-gray series were applied in diagonal bold splinter patterns, resulting in an overall medium tone akin to Measure 22. This measure was used in the Pacific during 1944 and 1945. The pattern may overlap some sections of the decks. Otherwise, decks are Deck Blue (20-B) or Deck Green (20-G) as appropriate.

Measure 33: Light Pattern System:

Usually three colors chosen from the blue-gray series were applied in a random pattern, resulting in an overall light tone akin to Measure 23. This Measure may also use Navy Green (5-NG), Haze Green (5-HG), and Ocean Green (5-OG) for amphibious forces. Decks as for Measure 32.

Measure 32/3SS-B: Light Gray:

Specific for submarines only, this measure used Light Gray (5-L), medium grays, and flat black. Forward hull and superstructure were Light Gray on the vertical surfaces. Just aft of the conning tower, the Light Gray vertical surfaces blend into a medium gray. The sternmost fifth of the vessel was flat black. All deck guns were also flat black. Guns above the main deck were the same color as the superstructure. Decks were gloss black. The undersides of all overhangs were painted white. This was a very effective measure for subs.

Measure 32/9SS: Dark Gray:

Specific for subs only. Medium gray and dark grays, with flat black. Paint in the same pattern as Measure 32/3SS-B.

NAVAL AIRCRAFT

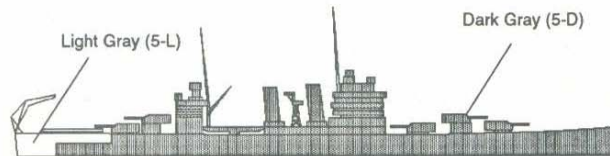
Naval aircraft generally were light gray under, with blue gray upper surfaces. By late in the war, naval aircraft were painted overall dark blue. Army aircraft supporting naval forces in the Pacific were usually olive drab upper surfaces and Neutral Gray under. Late in the war, the Army Air Force maintained aircraft in their original aluminum finish overall. This expedient actually saved a substantial amount of weight and allowed waxing of wings which enhanced aircraft performance.

THE SHIP DRAWINGS

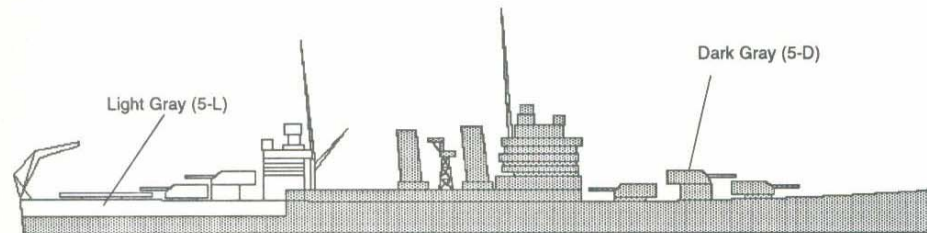
For the measures described below, please refer to Chapter 2 for a listing of Floquil, Polly-S, and Armory paints to match the colors cited.

A-1: Brooklyn Class in Measure 6

This measure was an attempt to make a 6" gun cruiser appear to be an 8" gun cruiser. The pattern was designed to be either light gray on a dark gray or black hull, or the reverse of dark gray on a light gray hull. Although an interesting measure, there does not seem to be any record of a *Brooklyn*-class vessel ever wearing this measure. Colors should be Dark Gray (5-D) and Light Gray (5-L).

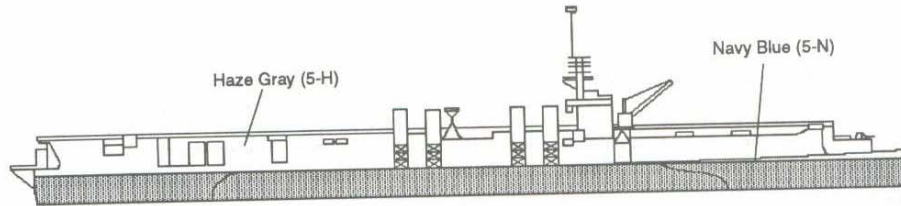
**A-2: Brooklyn Class in Measure 8**

Measure 8 was designed to make a 6" gun cruiser resemble a two stack destroyer at a distance. Heavy cruiser *San Francisco* is pictured in Silverstone in Measure 8 on Page 74. A different view of the same ship appears in U.S. Naval Institute *Proceedings* February 1973, page 72. This Measure used the same colors as Measure 6.

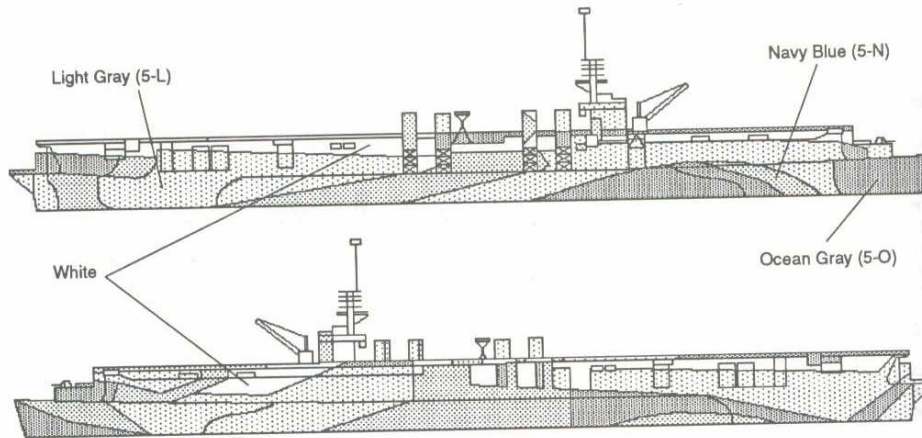


A-3: Independence class CVL in Measure 22

Measure 22 used Navy Blue (5-N) on the lower portion of the hull below a line which was drawn level to the lowest point of the main deck. The upper portion of the vessel was Haze Gray (5-H). Flight decks were stained a dark blue (Deck Blue 20-B). Flight deck markings should be painted in Ocean Gray (5-O). Several *Independence*-class light carriers wore this measure at various times.

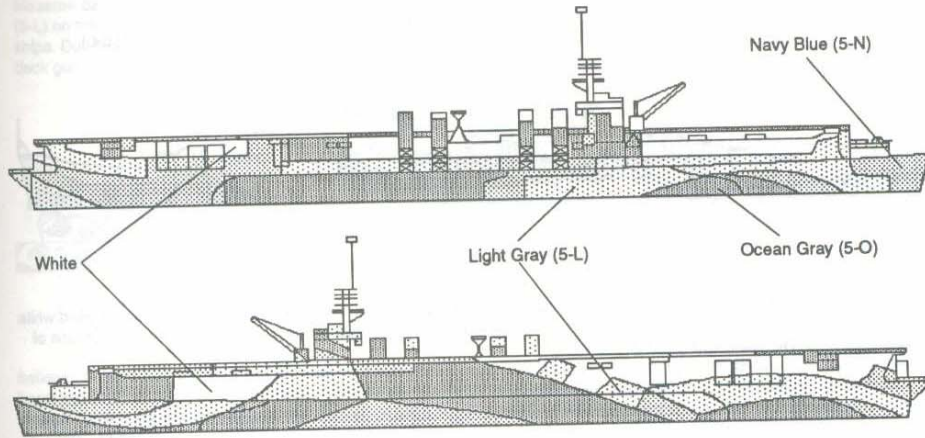
**A-4: USS *Bataan* (CVL-22) in a Measure 32 Variation**

Measure 32 had an exceptionally large number of variations, making it difficult to identify a specific pattern as belonging to a certain measure. Photos of both sides of USS *Bataan* taken on the same day in 1944 show the differences between the two sides. All decks and horizontal surfaces are painted in Deck Blue (20-B). The sides of the vessel are in Navy Blue (5-N), Light Gray (5-L), and Ocean Gray (5-O). Note the use of white along the underhang of the flight deck and in blocks on the port side. The white countershading was to eliminate any shadows.



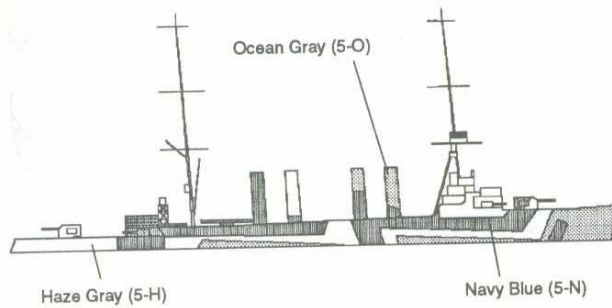
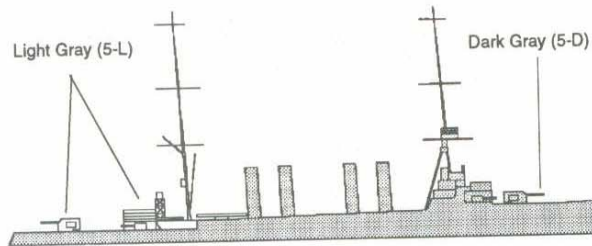
A-5: Independence Class CVL in a Measure 33 Variation

In another variation of either Measure 32 or Measure 33, ships were painted with a darker Haze Gray (5-H) in place of the Light Gray formerly used. Again, white was used in large areas immediately below the flight deck so as to disguise the telltale shadows of the overhang. This measure was spotted on carriers right up to the end of the war.



A-7: Omaha Class in Measure 7

During late 1941 and the early part of 1942, *USS Marblehead* and other *Omaha*-class cruisers may have been painted to resemble "4-Piper" destroyers at a distance. (It is not clear if this measure was ever actually worn by an *Omaha* class vessel.) The Measure 7 deception was specific to the *Omaha* class and apparently was used only on vessels assigned to the Pacific. The colors used are Light Gray (5-L) and Dark Gray (5-D). The decks were probably the same Dark Gray.

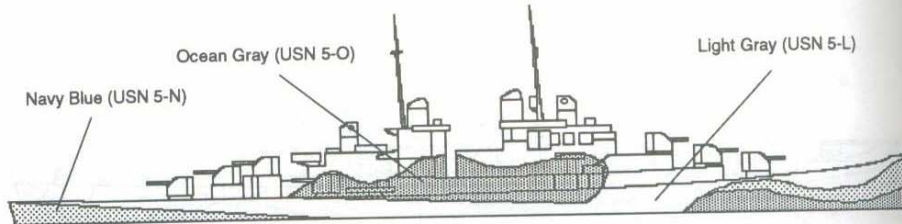


A-8: USS Detroit, 1944, Measure 32

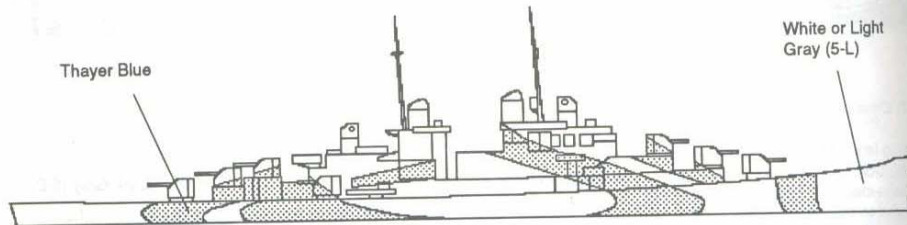
A photo of this vessel appears in Silverstone's *US Warships of World War 2* wearing Measure 32. The colors for *Detroit's* scheme appear to have been Haze Gray (5-H), Ocean Gray (5-O), and Navy Blue (5-N). The deck color is not available but probably was Deck Blue (20-B).

A-9: USS *San Juan* (CL-54) in Measure 33

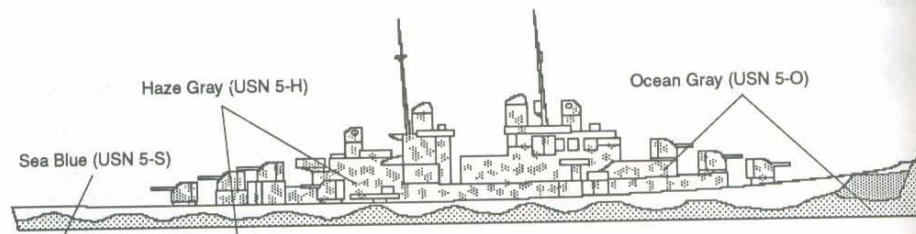
Similar to Measure 32, Measure 33 was a disruptive scheme. *San Juan's* colors appear to be Light Gray (5-L), Ocean Gray (5-O), and Navy Blue (5-N).

**A-10: USS *Oakland* in Measure 16**

Used on vessels in the North Atlantic and the North Pacific from 1943 through 1945, *Oakland's* Thayer scheme used white or Light Gray (5-L) combined with Thayer Blue. This Measure was very effective in the foggy and winter ice conditions of the northern seas. The decks were Deck Blue (20-B).

**A-11: USS *Juneau*, 1942, in Measure 12**

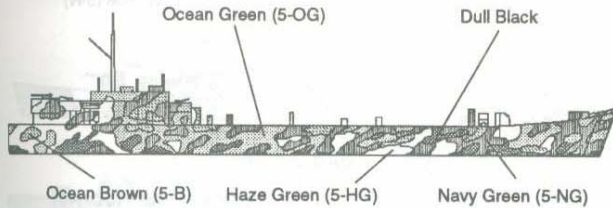
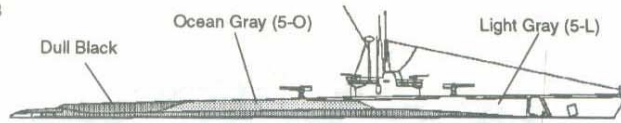
The Measure 12 scheme depicted here may have been what *Juneau* was wearing when she was sunk at Guadalcanal in November of 1942. There is also evidence that *Juneau* may have been painted in a variation of this scheme by having the mottled appearance continued over the hull instead of Measure 12 as depicted here. The colors used were Haze Gray (5-



H), Ocean Gray (5-O), and Sea Blue (5-S). This Measure is unusual for its mottled application of the Ocean Gray on the superstructure. Decks were probably Deck Blue (20-B). (A full color illustration of this measure is featured on the front cover.)

A-12: Gato class in Measure 32/3SS-B

As American subs prowled the often foggy or hazy waters near Japan, a scheme was devised to hide the approaching sub from its prey. Measure 32/3SS used Light Gray (5-L) on the forward portions of the vessel and the superstructure. The Light Gray gave way to Ocean Gray (5-O) amidships. Dull black was used for the aft portion of the vessel and the area just above the surfaced waterline from the forward deck gun on aft. The undersides of all overhangs were painted white to hide the shadows. Decks were dull black.



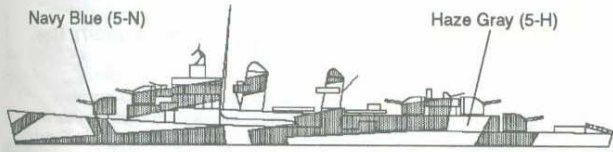
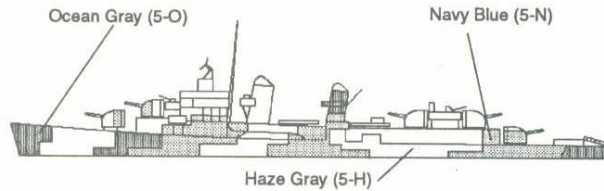
A-13: LST in Measure 31/LC

Measure 31 was very effective for landing craft and other vessels whose service required a close proximity to the jungle shore lines and intercoastal waters of the South Pacific. Note that Measure 31 was continued across all horizontal surfaces of landing craft and most amphibious vessels. The colors used were Haze Green (5-HG), Ocean Green (5-OG), Navy Green (5-NG), and Dull Black. "Ocean Brown,"

believed to have been a medium tan, also may have been used on some vessels. Measure 31 does not appear to have been used in European or Mediterranean waters as references to amphibious vessels mention repainting when these vessels were transferred from or to the Pacific. (A full color illustration of this Measure is featured on the cover.)

A-14: USS Killen (DD-593), June, 1944

Several variations of Measure 32 were created in a block format. USS *Killen* (Fletcher class DD) is shown in such a variation, wearing Navy Blue (5-N), Ocean Gray (5-O), and Haze Gray (5-H). While using the same colors, the following drawings (A-14 through A-18) will serve to illustrate significant differences in appearance created by the use of many variations of Measure 32. Decks are believed to have been Deck Blue (20-B), or a pattern of Deck Blue and Ocean Gray (5-O).

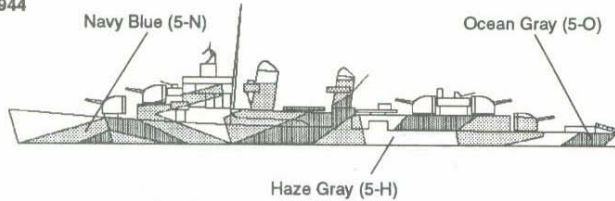


A-15: USS Heerman (DD-532), October, 1944

This variation of a false prospective seems to have used only two shades of paint which are probably Navy Blue (5-N) over a base of Haze Gray (5-H). *Heerman* is a Fletcher-class destroyer.

A-16: USS Stoddard (DD-566), April, 1944

USS *Stoddard* (Fletcher class) was photographed in what appears to be Navy Blue (5-N) in combination with Ocean Gray (5-O), and Haze Gray (5-H).



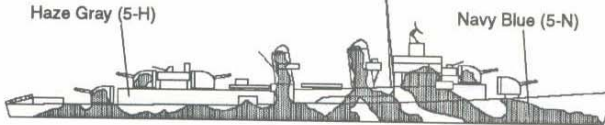
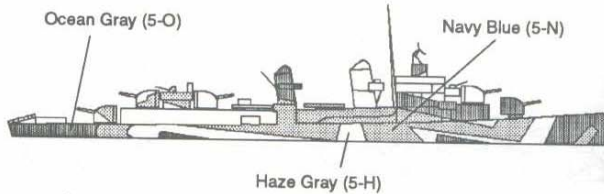


A-17: USS Cassin Young (DD-793), January, 1944

Cassin Young's (Fletcher class) Measure 32 makes more use of flowing lines than many other variations of this measure. Again, the colors appear to be Navy Blue (5-N) and Haze Gray (5-H).

A-18: USS Radford (DD-446), January 1944

During her time in the Pacific, USS *Radford* (Fletcher class) was photographed in Measure 32 in January of 1944. This variation is probably Navy Blue (5-N) with Ocean Gray (5-O) and Light Gray (5-L).



A-19: USS La Vallette (DD-448)

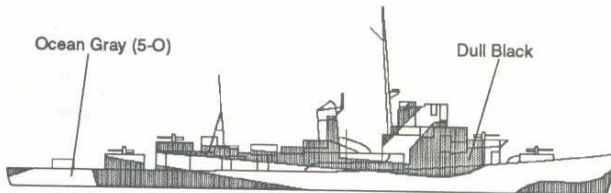
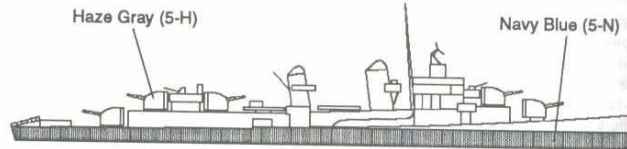
For several months in 1942, camouflage instructions referred to "spotch patterns" as the way for warships in the south Pacific to apply their patterns, but without any illustrations of what was meant. Each ship

therefore designed and applied their own pattern or concept of "spotches". USS *La Vallette* (Fletcher class) is shown as she was in August of 1942. Colors used appear to be Navy Blue (5-N) and Haze Gray (5-H).

A-20: Fletcher Class Destroyers

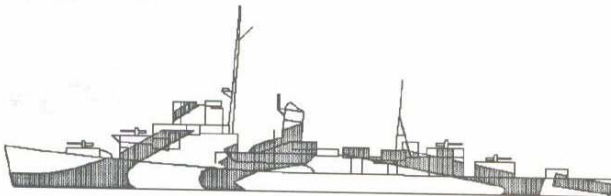
Measure 22 is again illustrated to show the effect on a destroyer's appearance. Using Navy Blue (5-N) and Haze Gray (5-H), Measure 22 attempts to fool the observer into believing that the vessel is further away than it really is. This

was perhaps the most common of all measures worn by USN vessels, and was the easiest to maintain. Note that the color band is parallel to the water line, not the deck line.



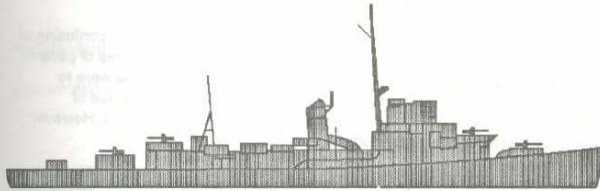
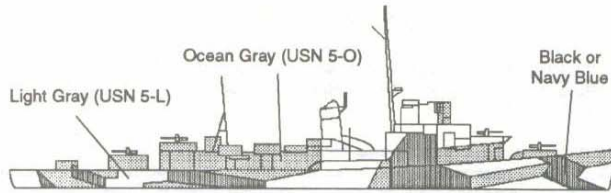
A-21: USS Griswold (DE-7), May, 1944

Measures 31 and 32 were also applied to destroyer escorts as well as many other vessels. This *Everts* (GMT) class escort demonstrates the closeness of Measure 31 and 32 in that the patterns were identical. The prime and perhaps only difference is in the tone of the paint. Measure 31 uses Ocean Gray (5-O) with a flat or dull black. Measure 32 substitutes Light Gray (5-L) for the Ocean Gray, while using the same pattern. The hobbyist is invited to paint the same pattern with different colors on two identical models. The effect is often very surprising.



A-22: USS *Mason* (DE-529) in a Measure 31 Variation

In August of 1944, *USS Mason* was photographed in this measure. While the dark color may actually be Navy Blue, the caption of the photo identifies it as flat black. In this case, the final effect on the observer is the same. All decks and horizontal surfaces are Deck Blue (20-B).



A-23: *Evarts* (GMT) class in Measure 21

Measure 21 covered the entire vessel in Navy Blue (5-N). This Measure had the visual effect of obscuring all detail from the observer. Worn by many vessels in 1944 through 1945, photo captions often cite the vessels as being in "black". In fact, these vessels were probably in Navy Blue as black tends to show up at night as "a dark

hole in the gloom of the night".

USS *Trippe* (*Craven* class) in July 1944

US Navy



USS *Reuben James* (*Buckley* class) in April 1944 in Measure 22. Note how the border between the Navy Blue and Haze Grey is parallel to the water, not to the deck.

US Navy

CHAPTER 4 - BRITISH & COMMONWEALTH NAVIES

This chapter includes paint schemes used for all British and Commonwealth navies including the Royal Navy (RN), the Royal Australian Navy (RAN), the Royal Canadian Navy (RCN), the Royal Indian Navy (RIN), and the Royal New Zealand Navy (RNZN).

Until 1904, Royal Navy vessels were painted as if constantly on parade or inspection. In 1904, nine years after the French and the Germans, the Royal Navy adopted grey for battleships and cruisers, but maintained black for destroyers. Around 1915, American maritime artist and naturalist Abbott H. Thayer postulated a number of conclusions drawn from his observations of wild life. Thayer concluded that a white ship would be less visible against a sky background in average lighting conditions than ships of other colors. While Thayer's concepts were not generally accepted in England at that time, British artist and naturalist Peter Scott did accept Thayer's concepts. Scott later refined Thayer's concepts and, early in World War II, developed the Western Approaches pattern so successfully applied to escort vessels.

Contrary to Thayer and Scott, marine artist Norman Wilkinson did not believe in concealing ships, but in confusing or dazzling the observer into incorrectly assessing the ship type, range, and course. Wilkinson designed a series of patterns consisting of sharply contrasting panels with the tone boundaries set at various angles. Wilkinson's designs were to confuse range finders on enemy ships. Although there are photos and documentation demonstrating some use of camouflage on naval vessels, World War I ended before much of Thayer's or Wilkinson's ideas were applied. However, Wilkinson's work was to have a strong impact on future Royal Navy camouflage.

Between the wars, the Royal Navy used a dark grey on their ships based in home waters. Ships in the Med were painted in light grey to reflect the heat and cool the hulls. On the China station, ships had white hulls and light grey upperworks. Other geographic regions including the East Indies used white for all outside hull and superstructure surfaces, often with buff colored stacks, masts, and yards.

Decks of cruisers and larger vessels were covered in teak. Destroyers had their forward steel decks painted in dark grey. The rest of the decks were covered in corticene, a milk chocolate-brown linoleum-like finish. (Corticene may be painted using Floquil #303145, British Dark Earth.) Small decks were painted in dark grey except for those areas covered by wooden gratings, such as the bridge, gun platforms, lookout stations and other similar areas.

During the first few months of World War II, the Admiralty issued several Fleet Orders concerning the painting of warships. In 1942, a detailed set of orders was issued listing the types of paints to be used for camouflage. At this stage, many ships were still designing their own patterns. It was during this same period that the famous "Mountbatten Pink" was developed by Mountbatten for his destroyer squadron. His own creation, it was an unusual shade of dark grey-purple. Later research showed it to be an exceptionally poor choice for a camouflage color. Many schemes were also produced by the Directorate of Camouflage for individual ships. By 1943, the Directorate of Camouflage issued a handbook as well as provided a large number of Admiralty designs for all classes of ships.

While smaller vessels were guided by the handbook, some specific capital ships, aircraft carriers, and other special vessels received individualized designs. Some of the smaller vessels faithfully copied the designs from the handbook, with the same pattern on both sides. However, others took it upon themselves to modify the patterns from side to side. Generally, but not always, there was some variety and minor differences in the patterns between ships of a squadron.

Many of the patterns for the North Atlantic made extensive use of white. While white is not usually thought of as a good camouflage color for the mid ocean, it can be the best color to blend a ship into fog or misty/rainy weather. During the infamous episode of convoy PQ-17, the commanding officer of *HMS Ayrshire* ordered the fleeing vessels under his protection to paint their sides white as they hid against the edge of pack ice. Several major historians credit this action with saving these ships from the German onslaught.

In general, countershading was applied to most undersurfaces, to "wash out" shadows. With the lighter patterns, white should be used. With the darker patterns, the lightest color of the pattern should be used. Examples of countershading locations include the undersides of torpedo tubes, decks and platforms, boats, and the lower third of curved surfaces such as gun barrels and searchlights. By 1944 "reverse" countershading was implemented. Paint one shade darker than that of the connecting vertical surface was applied to reduce highlights.

The Admiralty's initial system of nomenclature for paints was based on a code number which gave an indication of the tone of the paint. Initially, colors were designated by a letter combination such as MS for "Mixed Shade," (i.e., resulting in gray greens or gray tans). The number 1 after the letters indicated the darkest shade, nearly black in the case of MS1. MS4A was at the other end of the scale and was a very light gray. With the issuance of the 1943 handbook, gray was designated by "G". The color tone was now designated by the reflection factor. Paint "G5" for example was dark gray with a 5% reflective factor, thus appearing near black. "G45" was a very light gray.

Admiralty Standard Camouflage Colors, World War II

| Standard | Color | Designation | Commercial Paint |
|--------------------------------|----------------------|--|--|
| Admiralty Colors | dark grey | Home Fleet Grey 507A | F #303157 British Extra Dark Sea Gray |
| | light grey | Mediterranean Grey 507C | USN 5-L Light Gray |
| Admiralty Camouflage Colors | black | MS1 (later G-5) | F #818596 (Similar to USN 5-O) |
| | dark grey | MS2 (later G-10) | |
| | mid-grey-green | MS3 (later G-20) | |
| | light mid-grey | MS4 (later approx. G-45) | A GG-039 F #303155 British Azure Blue |
| | light grey | MS4A (later approx. B-55) | |
| | dark blue | B5 (later B-15) | |
| | mid-grey/blue | B6 (later (B-30) | |
| med/light blue | B30 | | |
| Non-standard | grey/pink | Mountbatten Pink | |
| Western Approaches | light blue | Peter Scott Blue (very close to Thayer Blue) | |
| | white | | |
| | light green | | F#303147 British Sky Type S |
| Admiralty Merchant Ship Colors | black/grey | MSD | |
| | mid-grey | MSS | |
| | dark grey | G5 | USN Dark Grey (5-D) |
| | dark mid-grey | USN Ocean Grey (5-O) | |
| | very dark blue/black | USN Deck Blue (20-B) | |
| dark grey/blue | USN Sea Blue (5-S) | | |

Humbrol had many of the appropriate shades in the past, but it has become increasingly difficult to locate the proper shades. A color mix chart for RN shades is included as Appendix A on the inside rear cover.

Admiralty Patterns and Schemes**1. Western Approaches**

In accordance with the designs of Thayer and other early designers, white, light blue and/or light green were used to disrupt the observer's view of the vessel. Ships were base painted in white with blue/green panels in splinter and angle patterns on the hull. For destroyers and smaller vessels, the pattern is usually identical for both sides. Color tone B30 (a medium to light blue) was used for decks. All masts and above were to be in white as was the aft side of the bridge superstructure.

2. Admiralty Light, Intermediate, and Dark Disruptive Patterns

In these patterns blues, grays, and greens were used in combinations of bold irregular patterns. They were used from 1942 through 1944. The three Admiralty patterns were nearly identical except for the color tone. Color tones used were G20 for the light, G10 for the intermediate, and G5 for the dark patterns. These colors were medium to dark grays. Both the light and intermediate schemes required masts to be white above the superstructure tops and camouflaged below. The dark scheme carried a medium gray on the masts above the tops with camouflage below. On all three of these patterns, the aft side of the bridge superstructure was to be in the lightest color of the pattern. Decks should be dark gray similar to USN 5-D.

3. Home Fleet Destroyer

Specifically designed for destroyers and later applied to other similar escort vessels, this pattern made use of light blues and light grays forward in irregular patterns. Dark blues and grays were used for the aft portions of the vessel.

4. Admiralty Standard

In this scheme, the ship had a light gray hull and superstructure. A sea blue panel was painted on approximately the middle 2/3 of the hull. This scheme was in use during 1944 and 1945 in the Atlantic, the Mediterranean, and the Pacific.

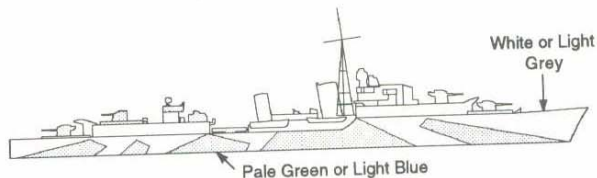
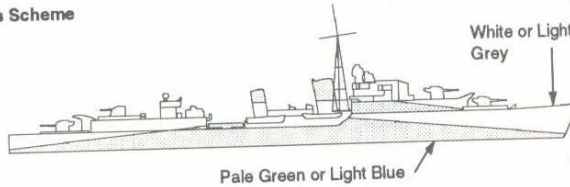
5. Admiralty Alternative

The Admiralty Alternative pattern was much like the USN Measure 22, in that dark grey was used for the hull and decks with light grey superstructure. This scheme was also used during 1944 & 1945 in both the Atlantic and the Med.

THE SHIP DRAWINGS

B-1: Tribal class in Western Approaches Scheme

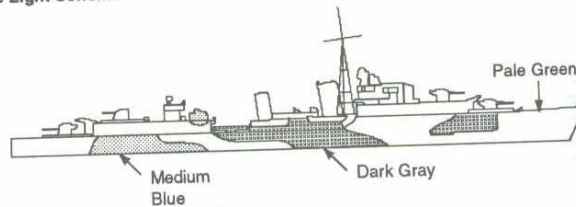
Two variations of this scheme are presented. This scheme was in use from 1939 throughout the war. Western approaches destroyers were often painted the same color for both deck and hull prior to application of the camouflage pattern. In earlier editions of this scheme, the hull should be white with a light grey deck,



except where linoleum was applied. After 1941, light grey may be used for both hull and deck. The easiest method to duplicate this scheme is to use Armory or Floquil base white over the whole ship, then detail the camouflage with the appropriate color. Apply the camouflage measure using F #303147 Br. Sky Type "S". During and after 1941, pale blue (Floquil #303155, Br. Azure Blue or H MC-9, Sky Blue) may be used.

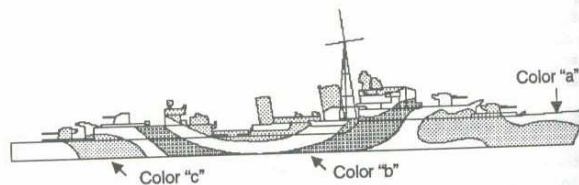
B-2: Tribal class in Admiralty Disruptive Light Scheme

In use from 1940 onwards, this scheme used dark grey for decks and part of the vertical camouflage.



B-3: Tribal class in Admiralty Disruptive Medium and Dark Schemes

The "disruptive" schemes were applied in two versions, a medium and a dark. The pattern seems to have been the same regardless of version. The colors were never mixed between the two or the effect would have been lost.



| | <u>Medium</u> | <u>Dark</u> |
|-----------|--|--|
| Deck | dark grey (MM, FS-36118, Gunship Grey) | flat black |
| Color "a" | light blue (H, MC-9, Sky Blue) | medium blue (F, 303155, Br. Azure Blue) |
| Color "b" | medium blue (F, 303155, Br. Azure Blue) | medium grey (MM, FS-36231, Dark Gull Grey) |
| Color "c" | medium grey (MM, FS-36231, Dark Gull Grey) | flat black |

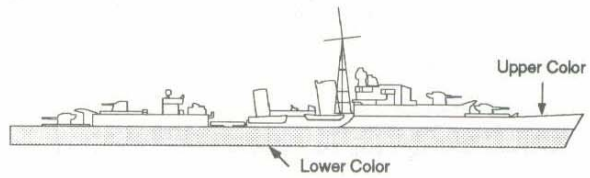
B-4: Tribal class in Special Home Fleet Destroyers Scheme

This scheme was used in 1943 and 1944. It was adopted by the RCN Tribals and some surviving RN Tribals. The base color for this scheme should again be flat white. The decks should be in a light grey. The lower hull will have sections of a medium blue-green. Other portions of the hull and the upper works will have sections of light blue. A color illustration of this scheme is shown on the cover.



B-5: Tribal class in Simplified Scheme, Three Versions

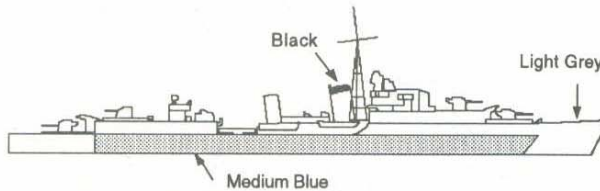
The simplified scheme actually existed in at least three variations. In each case the ship's vertical surfaces were in two colors with the darker color on the lower hull or on the full hull. When painting the lower hull version, the color should be painted up to a line even with the level of the main deck. The alternative version will carry the lower color over the full hull, aft up to the main deck and forward up to the foredeck. In the first two variations, the deck should be medium grey. The final variation should have decks of flat black.



| | <u>Lower Color</u> | <u>Upper Color</u> |
|--------------|--------------------|--------------------|
| Variation a) | light mid-gray | white |
| Variation b) | mid gray-green | light mid-gray |
| Variation c) | gray | mid gray-green |

B-6: Tribal class, Standard Pattern

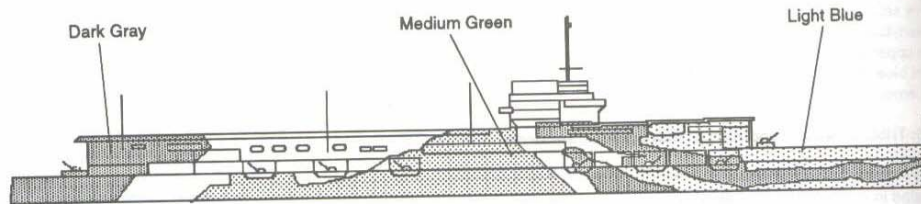
This scheme was placed in use after the disruptive patterns were discontinued in 1944. Note that this pattern includes black "boot topping" along the waterline and at the top of the forward stack. The decks were medium grey. The superstructure was light grey. The hull had a bold stripe of medium blue.



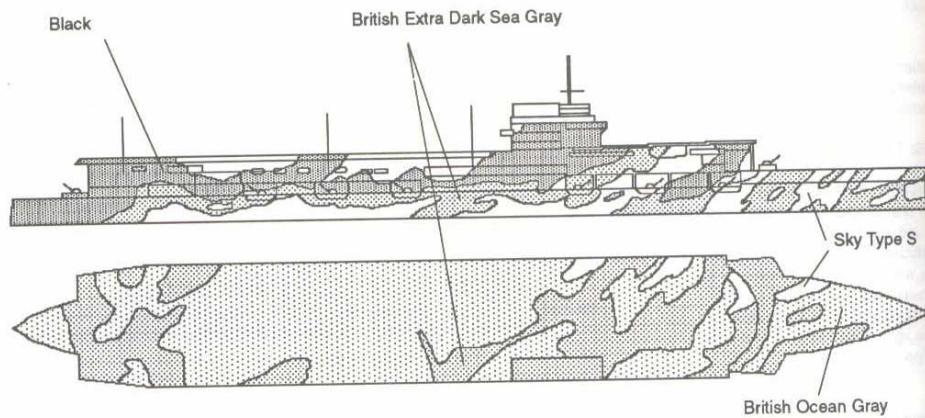
There was at least one additional scheme applied to Tribal class vessels, and possibly other destroyers. This scheme was very basic in that the full vessel was dark grey overall, Home Fleet Grey 507A, including decks. Such a scheme was often seen on Home Fleet vessels.

B-7: HMS *Furious*, 1939

This scheme was an early war "one-off" designed for HMS *Furious* during her operations in northern waters. She appears to wear a very dark gray with light gray. The flight deck should be a dark gray, but not as dark as the hull. Deck markings were medium yellow.

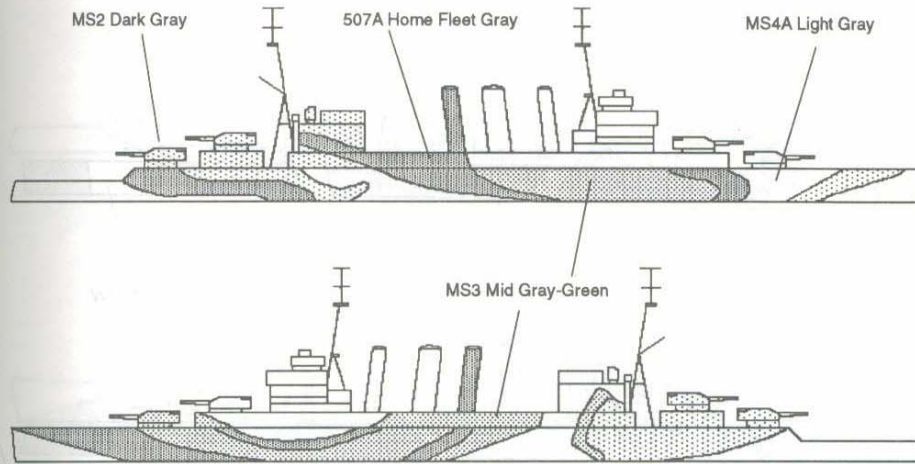
**B-8: HMS *Furious*, 1941**

By 1941, *Furious* had already received additional antiaircraft armament but still carried Swordfish torpedo bombers as her prime antiship weapon. Her colors were now dull black, a very deep gray, and a blue/green. This pattern seems to have been continued over her flight deck. The primary deck color is British ocean gray.



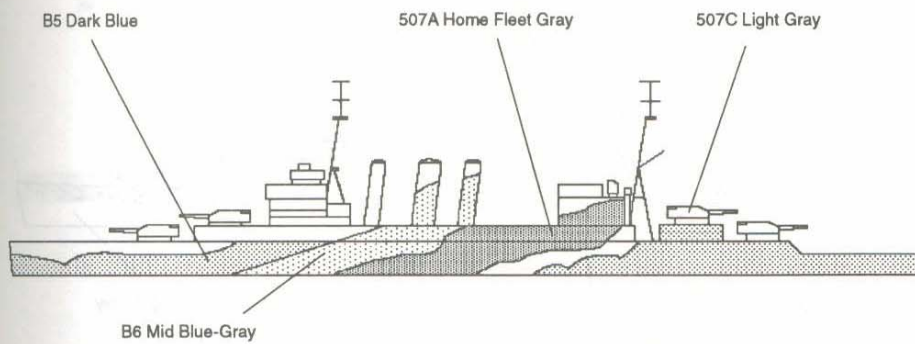
B-9: HMS Suffolk

By May of 1943, HMS *Suffolk* was repainted with the pattern she would keep until the end of the war. This strikingly deceptive pattern used MS2 dark gray, MS3 mid gray-green, MS4A light gray, & 507A Home Fleet Gray.



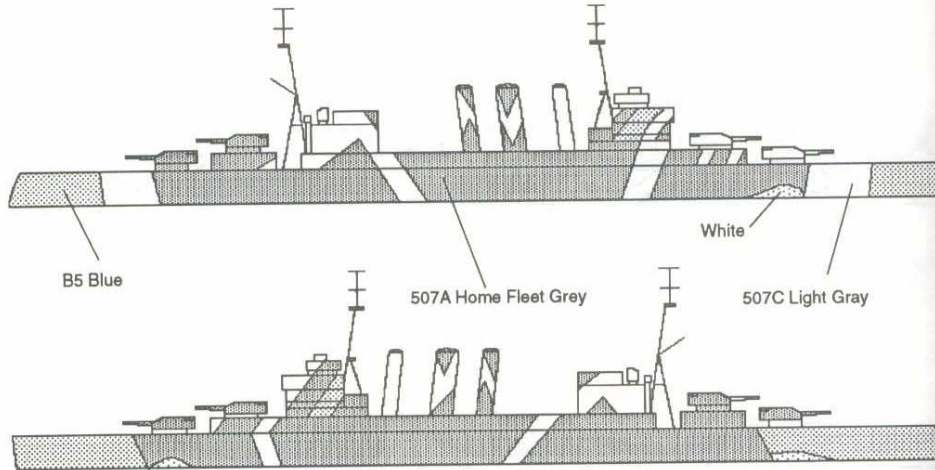
B-10: HMS Cumberland

The port side of HMS *Cumberland* is illustrated, wearing 507A Home Fleet Gray, B5 dark blue, 507C light gray, and B6 mid blue-gray. The starboard side was not identical, but was probably similar.

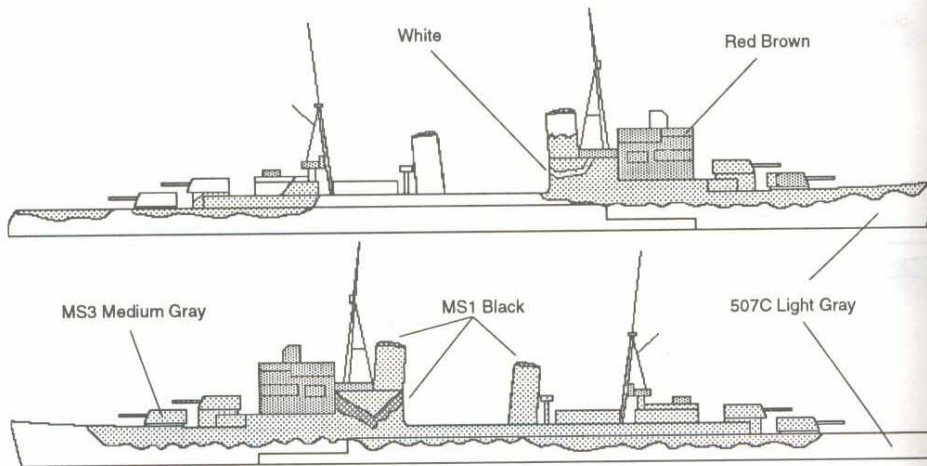


B-11: HMS *Berwick*

HMS *Berwick* was photographed with this pattern during late 1941 and mid 1942. Unfortunately, since the port side photo was in late 1941 and the starboard photo in mid-1942, I am not sure that this is both sides of the same scheme. In both cases, the light and dark grays are identified as 507A and 507C, making them the standard light and dark grays of the time. The third color has been identified as Mountbatten Pink or B5 Blue, depending on the source.

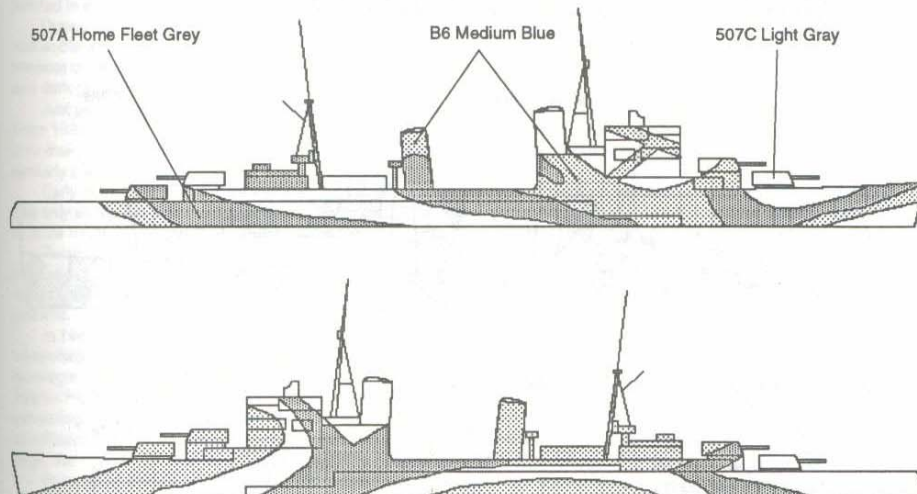
**B-12: HMS *Southampton*, June, 1940**

This scheme made use of brown more than most RN schemes. Armory GG-024 Red Brown is a close match. MS1 is dull black and appears on the funnel caps and on the port side main superstructure. MS3 is a medium gray. White is used only on the starboard superstructure below the forward funnel. The rest of the ship is standard 507C Light Gray.



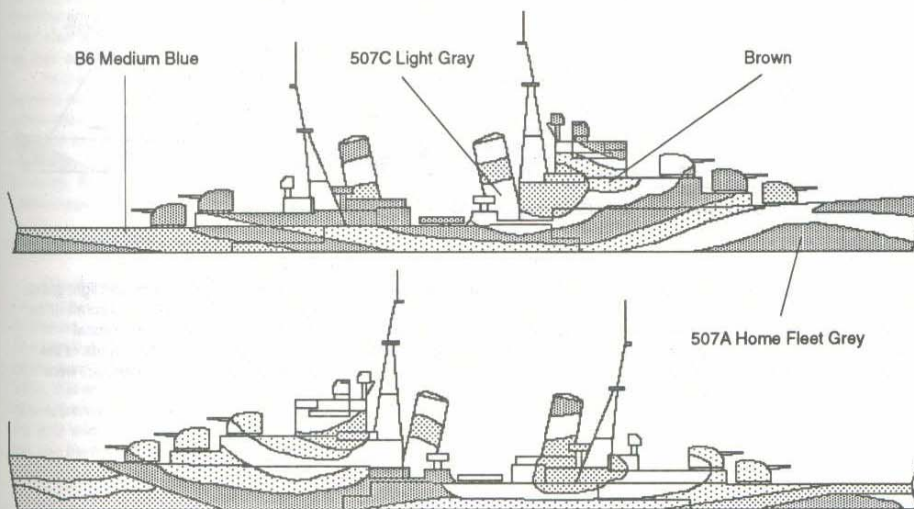
B-13: HMS Sheffield, late 1942

This is a straightforward scheme using the standard colors 507A Dark Gray, 507C Light Gray, and B6 Medium Blue. It is very similar to several schemes designed for destroyers.



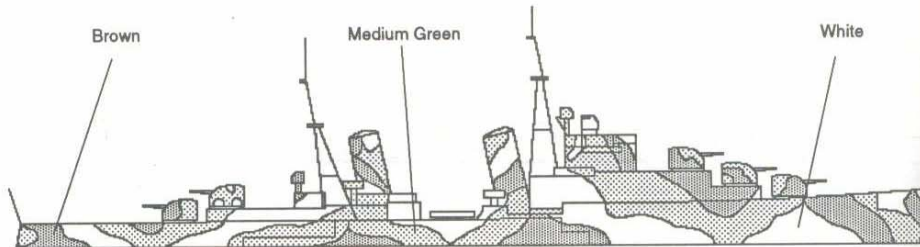
B-14: HMS Sirius, June, 1942

HMS *Sirius* wore this scheme throughout the early years of the war, until repainted in 1944. She seems to be wearing a scheme using B6 Medium Blue, 507C Light Gray, brown, and 507A Home Fleet Grey. The brown looks close to F #303153, British Middlestone.

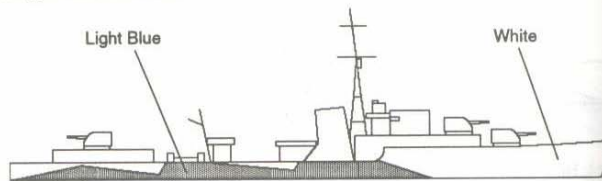


B-15: HMS *Naiad*, mid-1940

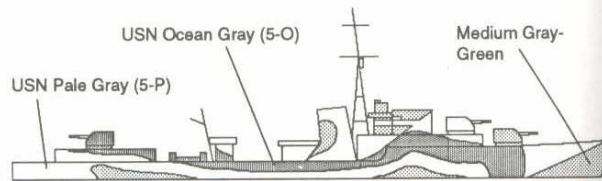
This is an unusual scheme combining brown, medium green and white. The pattern is identical on both sides. *Naiad* wore this pattern from her completion until repainted in early 1941. While somewhat tricky to paint, it is stunning when completed. From then until sunk, she wore dark gray on her hull and had a light gray superstructure and turrets. For the brown and green, I used F #303139, French Earth Brown, and F #303033 Medium Green.

**B-16: L & M class Destroyer in Western Approaches Pattern**

The most common "Western Approaches" scheme was white with light blue. While we don't usually think of warships in white, this scheme did an excellent job of hiding the ship during the foggy and hazy conditions of the North Atlantic. F #818704 Deckhouse Blue is also Thayer Blue and therefore the color of choice for this pattern. Decks and horizontal surfaces should be a medium blue such as Floquil #303155 British Azure Blue or Armory GG-019 Medium Blue.

**B-17: L & M class destroyer in Admiralty Intermediate scheme**

Compare this and illustration B-16 to see how the same vessel can look totally different depending on the camouflage scheme used. The Admiralty Intermediate scheme used light, medium, and dark grays to obtain the best effect in general conditions of the Atlantic or the Med. Use USN Dark Gray (5-D) for the decks and all horizontal surfaces. USN Pale Gray (5-P) and USN Ocean Gray (5-O) may be used for the light and dark grays.

**AIRCRAFT**

On board the carriers, aircraft were usually a medium gray and medium green camouflage pattern on top and light green (sky) on the bottom. Late in the War they were overall dark blue. Catapult-based seaplane reconnaissance aircraft often were light green on the undersides and camouflaged shades of gray and green on upper surfaces. Some Coastal Command long range patrol aircraft such as Catalinas and Sunderlands later were white for the lower two-thirds of the aircraft and dark gray on top of the wings and fuselage. British camouflage experts discovered that white aircraft were very difficult to see during daylight in mid-ocean from a moving deck.

CHAPTER 5 - KRIEGSMARINE (FORMERLY REICHSMARINE)

After World War 1, Germany was forced to rebuild her naval forces. The first of these were the Type 1923 and Type 1924 classes of torpedo boats, commonly known as the *Möwe* and the *Wolf* classes. These same craft carried the Reichsmarine's first attempts at camouflage during the 1929 fleet maneuvers, when some of them were temporarily painted in a medium gray and black splinter pattern. However, by 1930 the torpedo boats had returned to solid black.

During 1934 the Reichsmarine was changed to become the Kriegsmarine as the Nazis came to power. The most noticeable effect on the warships, in addition to the new flag, was the application of the swastika and eagle on the transom of larger vessels. With the launching of the new destroyers beginning in 1935, warship colors returned to light and dark gray combinations.

Just prior to World War 2, ships of several nationalities took part in the Neutrality Patrol during the Spanish Civil War. From 1936 to 1938, those German warships engaged in the patrol maintained black, white, and red bands crosswise on their main turrets or gun shields. Other nationalities such as England and France applied their respective national colors in similarly placed bands.

Early in the war, wood main and secondary decks were left bare of paint on all vessels up to and including *Tirpitz*. The only exception was the cruiser *Königsberg* which had steel decks with knobs or small ridges for traction. Wood suitable for decks became less available as the war progressed. Decks of all vessels built later in the war were steel.

Painting instructions for all vessel types were issued by the main navy yard in Wilhelmshaven during 1941. These instructions included lists of approved colors and how to mix them. Also included were instructions regarding how each color should be applied. However, the Wilhelmshaven documents apparently did not describe particular camouflage patterns.

In 1942, Korvetten Captain Walter Dechend undertook the writing of a memo documenting his experience with camouflage during the first two years of the war. Dechend, as an officer on *Admiral Hipper*, had participated in the Norwegian and early North Atlantic operations. In November, 1940, Captain Dechend designed the camouflage of *Admiral Hipper*. His intense interest in naval camouflage led to his appointment, in March of 1943, as special advisor for naval camouflage to the OKM. Dechend's memos addressed issues of the application of camouflage schemes in addition to the identification and mixing of appropriate colors. Dechend recognized the impact of different weather conditions on camouflage, the need to conceal the ship type, and the need to conceal the speed and direction of the ship's course.

Prior to Dechend's appointment, ship camouflage directions were occasionally issued by the OKM, but left somewhat to the discretion of the ship's captain. One example is the gray, white, dark and light green camouflage of *Graf Spee* during her last cruise and to her end in the River Plate off Montevideo. *Graf Spee's* camouflage had been designed by her Captain, Hans Langsdorff. Notably, *Graf Spee's* camouflage included a false "B" turret with two guns and a false second funnel. Langsdorff's design was intended to disguise *Graf Spee* as a British cruiser at a distance.

Many of the patterns worn by German warships were designed by their crews. One of the more notable design exceptions was the white and dark gray bands and false bow waves worn by *Bismarck*, *Gneisenau*, *Nürnberg*, *Emden*, and *Prinz Eugen* in the Baltic in 1941. The vessels so painted also carried reddish-brown main turret tops.

The submarine force seems to have been more consistent in their painting. Many boats started the war in a dark gray. Boats later cruising the North Atlantic were painted in lighter grays to blend into the haze and foggy conditions while stalking convoys. Some of the Atlantic-based boats were decorated in four or five alternating bands of light and dark gray. Mediterranean-based subs often used a light gray base with light or medium green in splotches. The Italian boats in the Med also wore the same camouflage at this time. By mid-war, Atlantic U-boats began using patterns of light and dark gray as their surface operations became strictly nocturnal.

As the war progressed and the need to hide vessels from marauding Allied aircraft grew in importance, auxiliary vessels were often seen with intricate patterns of light, medium, and dark blues, white, greens and grays. In some cases silhouettes of other smaller vessels were painted on the side of German auxiliaries. Warships went to great lengths to disguise themselves while undergoing repairs. While alongside a pier for her repairs, *Gneisenau* was painted and otherwise disguised to resemble a series of buildings along the pier, complete with windows, staircases, roofs, and pier landings. By the end of the war, Allied air supremacy kept most German vessels in constant hiding under extensive camouflage.

Aircraft Recognition Schemes

The German command recognized the need for aircraft recognition features when a German destroyer (*Z-1, Leberecht Maass*) was bombed and sunk on February 22, 1940, by a He 111 flown by an inexperienced pilot. In the confusion, a second destroyer (*Z-3, Max Schultz*) was also sunk, possibly by the same aircraft on its second bomb run. The fact that the British had a small mine field in the immediate area may possibly have contributed to the loss of the destroyers. Whatever the case, Hitler ordered that a black swastika be displayed on a white circular field. Up to June, 1941, this emblem was on a broad red transverse band on the forecastle. After June, 1941, the same recognition scheme also appeared on the afterdeck. (As a historical note, this emblem was still easily recognizable on *Bismarck's* deck when the ship was located and filmed by deep sea explorer Robert Ballard in the late 1980s.) This feature was used throughout the war from 1939 to 1945.

A second recognition feature was tried during 1940 and 1941 when the Kriegsmarine realized that anti-shipping aircraft often came in at a low level, precluding observation of deck markings. For this feature, diagonal red bands were painted on the turrets and gun shields of some vessels.

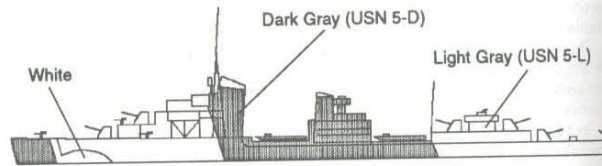
From April, 1940 through June of 1941, *Bismarck*, *Gneisenau*, *Hipper*, and other vessels were spotted with light yellow on their forecastle, turret tops, and other gun shields. I believe this was discontinued at the start of Operation Barbarossa.

Ship Diagrams

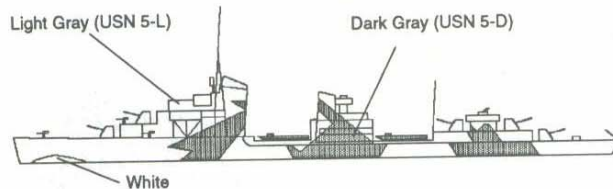
Because of the apparent closeness of many German naval paint colors to those of the USN, US Navy colors are used as described in Chapter 2. The result should accurately depict the color schemes and effects of the German paints. Decks of all German vessels should be in Dark Gray (USN 5-D) unless otherwise stated.

G-1: Type 34 destroyer Z-7 (*Hermann Schoemann*), 1942

Applied to destroyer Z-7 in 1942, this scheme has also been reported to have been used by several of the T-7 class torpedo boats. A light gray hull (USN 5-L) is distorted by two prominent sections of dark gray (USN 5-D). Immediately aft of the dark bow, white has been applied in an effort to create the impression of a bow wave. Z-7 was wearing this scheme at the time of her sinking by HMS *Edinburgh* in the Barents Sea in May of 1942.



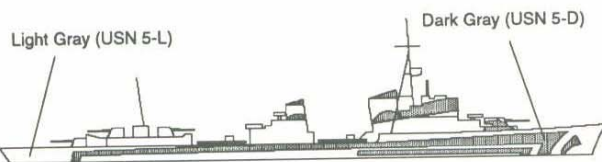
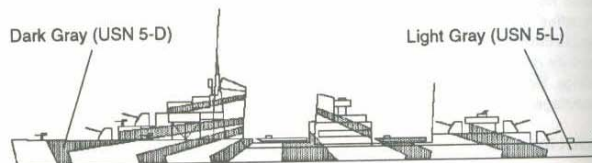
G-2: Type 34 destroyer Z-8 (*Bruno Heinemann*), 1941



A light gray hull (USN 5-L) was disguised by three prominent splinter shapes at the three superstructure areas of the vessel. A false bow wave is created in white. Note that both sets of torpedo tubes are also painted in the dark color in an attempt to hide the fact that this vessel is a destroyer and not another lighter escort.

G-3: Type 34 destroyers Z-6 (*Theodore Riedel*), Z-15 (*Erich Steinbrinck*), & Z-20 (*Karl Galster*), 1943

This scheme makes use of false perspective to draw the viewer's eye to another distant point. Dark gray (USN 5-D) converging bands were applied over a light gray (USN 5-L) hull. At least three destroyers wore this scheme for North Atlantic operations. A color illustration of this pattern is on the back cover.



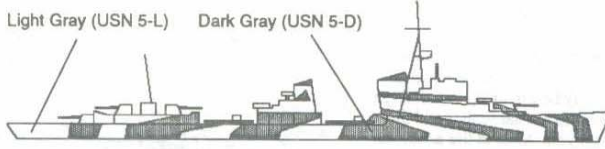
G-4: Type 36A destroyer Z-39, 1943

During the middle part of 1943, destroyer Z-39 wore an experimental scheme using horizontal strips of dark gray (USN 5-D) over a light gray (USN 5-L) hull. Z-39 operated in the Skaggerak area with this scheme.

G-5 & G-6: Type 36A destroyers Z-32, 1943 & Z-33, 1943

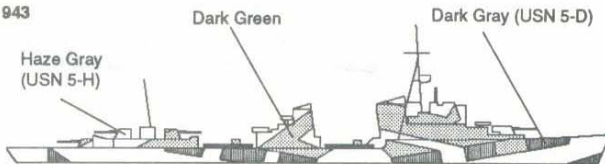
These two schemes were very similar, but not identical. Both made use of an infinite point above the vessel to move the spotter's eye from the ship's identification.

Where destroyer Z-32 used dark gray (USN 5-D) over the light gray (USN 5-L) hull, destroyer Z-33 used a medium gray similar to USN 5-O. The single significant difference was that Z-33's forward most chevron was not medium gray, but the same dark gray (USN 5-D) as on her sister ship. Z-32 was wearing this scheme when driven ashore by two British destroyers during operations in the Normandy invasion area.



G-7: Type 36A destroyer Z-37, Baltic, 1943

This scheme was worn by Z-37 during late 1942 and through the summer of 1943 in the Baltic. A haze gray hull (USN 5-H) had shapes of dark gray (USN 5-D) and a dark green resembling a drab green. For the green, MM #1787, FS-34036 Green Drab is suggested.

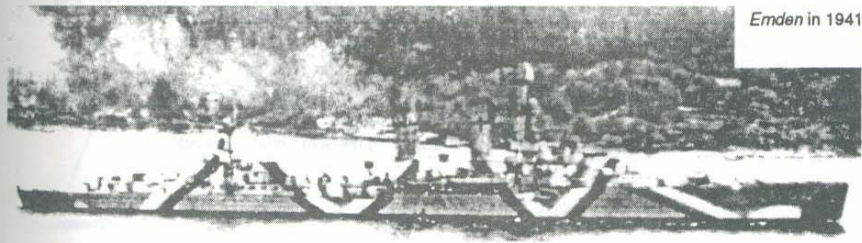


G-8: Type 36A destroyer Z-31, 1944

Again making use of the same dark gray and light gray colors, Z-31 displays a much different version of a false perspective. This scheme was worn while on operations in Norwegian waters.

G-9: Type 34 destroyer Z-1 (Leberecht Maass), 1939

Immediately before and for the first few months of the war, many German vessels wore a scheme of a medium gray hull and haze gray superstructure. The destroyer *Leberecht Maass* is shown in haze gray (USN 5-H) and medium gray (USN Ocean Gray 5-O). The ship's pendant number should appear in white with black shadowing on the hull below the bridge. During wartime, identification numbers were not displayed.



Emden in 1941
RAF

G-10: Torpedo boat T-7, 1941

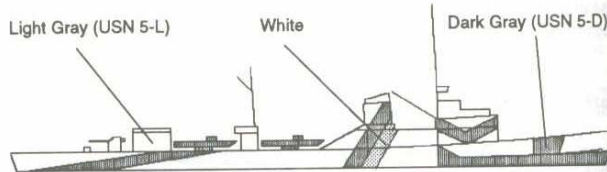
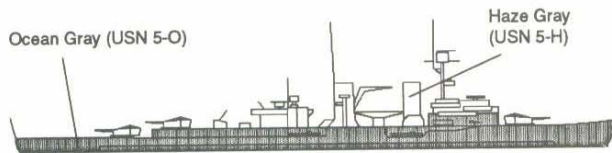
During 1941, torpedo boats working the North Sea and the coast of Norway began using camouflage schemes similar to those of the destroyers. Most of the schemes, such as the one worn by T-7, were two-color patterns. On a base of a light gray (very close to USN 5-L) a dark gray such as USN 5-D was applied in splinter and other diagonal patterns. The intent was to disrupt the eye into not recognizing the shape of the ship and thus not seeing the ship.

**G-11: Torpedo boat T-2, 1942**

T-2 was one of a very few vessels to continue to use her ship's emblem on her stack after the start of the war. The design was of a dark gray spade in a circle of white. T-2 also used a white diagonal section at the bow to give a false image of her distance from the viewer. Colors for this vessel are dark gray (USN 5-D), light gray (USN 5-L), and flat white.

**G-12: Torpedo boat T-8, 1942**

This scheme was a variation of the above schemes, using the same colors in a different pattern. Note the white diagonal band at the funnel to break up the image of the vessel.

**G-13: Köln, summer of 1943, Baltic**

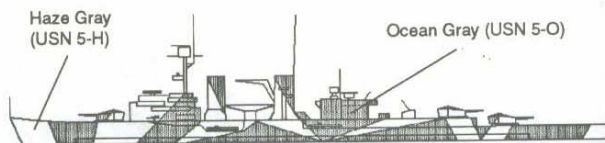
appears to cover the balance of the ship's vertical surfaces. It is most likely that these two colors were very close to the USN Ocean Gray (5-O) and the USN Haze Gray (5-H).

G-13: Köln, summer of 1943, Baltic

There do not seem to be many photos of any of the "K" class light cruisers available showing these ships in camouflage patterns. During the summer of 1943, Köln was photographed in a pattern which appears to be a dark gray on the hull and part of the bridge superstructure. Light gray

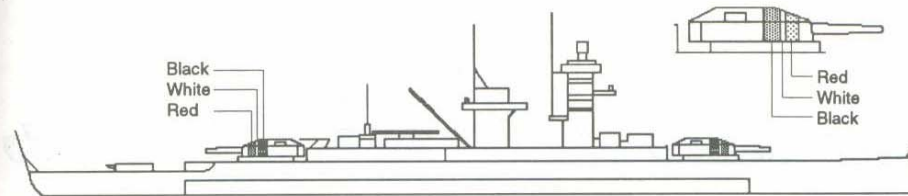
G-14: Köln, fall of 1943, Baltic

Only a few months after the pattern documented in G-13, Köln was again photographed in the Baltic. This time, her pattern had been changed to a false prospective pattern of very dark gray and a lighter haze gray. As above, the two USN colors seem to be appropriate. Note how this pattern does a more effective job of disguising the ship's characteristics.

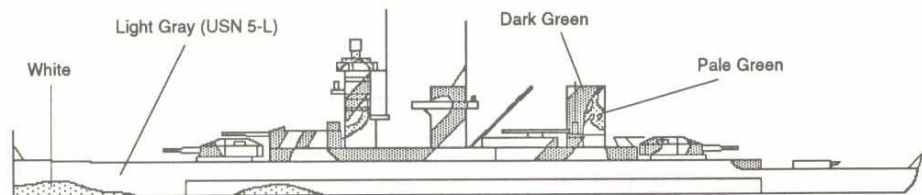


G-15: The Neutrality Patrol

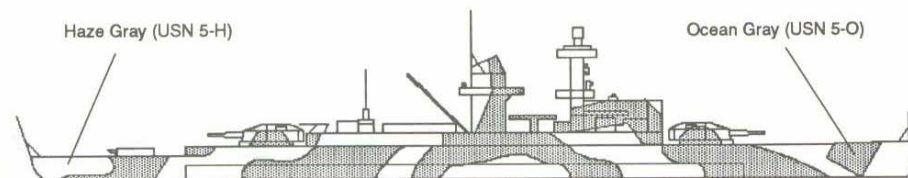
During the Spanish Civil War of 1937 and 1938, four countries undertook a naval patrol off the Spanish coasts, allegedly to protect neutral vessels from attacks by Spanish warships. Each country of the patrol agreed to wear their national colors in bands across the top and vertically down the sides of their primary turrets or gun shields. The armored ships *Admiral Scheer* and *Deutschland*, plus other German vessels wore bands of black, white, and red over their haze gray primary color. This illustration demonstrates the proper application of the color bands.

**G-16: Admiral Graf Spee in November of 1939**

The armored ship *Admiral Graf Spee* is shown here in the scheme designed by Captain Langsdorff and which she wore prior to her famous fight against three British cruisers. Part of Captain Langsdorff's deception included a false "B" turret and a false after funnel, in the hopes of deceiving distant observers into believing the raider to be a British heavy cruiser. However, photographic evidence indicates that the false turret and funnel were not in use on the day of the battle. False bow waves of white were painted at the bow and just aft of the forward turret. While the regular German light gray was maintained on the hull, Captain Langsdorff applied a medium dark gray and a pale green to the upperworks and false features. MM #1716 Pale Green FS-34227 appears to be near the correct shade. For the dark gray Armory's GS-207 Panzer Gray should be used. When modeling this vessel, it will be necessary to create the false structures. Note that *Graf Spee* never wore the lengthened and raked bow nor the funnel cap later given to her sister ships.

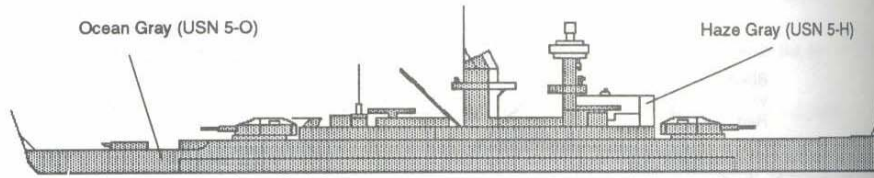
**G-17: Lützow during summer of 1942**

By the summer of 1942, *Lützow*, (formerly *Deutschland*) and *Admiral Scheer* had been modernized and improved with the extended bow, funnel cap, and rebuilt bridge/tower superstructure. While operating on the Norwegian coast, *Lützow* was painted with a prospective altering pattern of dark and light gray. Two USN colors, Haze Gray (5-H) and Ocean Gray (5-O) seem to be appropriate for this scheme.



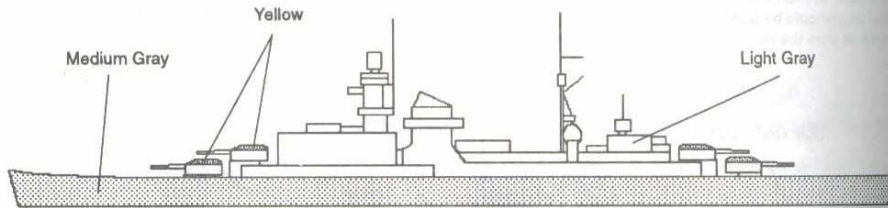
G-18: Admiral Scheer in the Baltic

By March of 1945, Admiral Scheer was again repainted with a dark gray over most of her hull and structure. While Ocean Gray may be used for the dark color; turret tops, the forward edge of the funnel, the tower top and the bridge structure should be in a lighter gray, such as haze gray. This is probably the scheme the Admiral Scheer was wearing when bombed at Kiel.



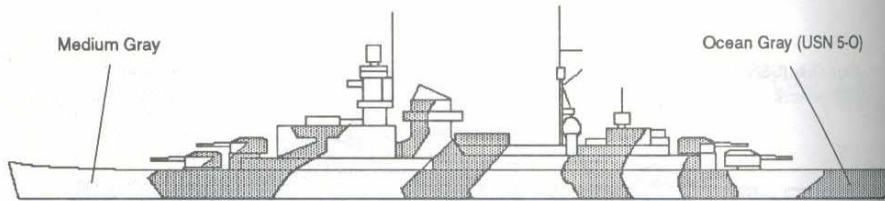
G-19: Admiral Hipper during April of 1940

A few German patterns were applied to several ships on the same operation at the same time. While the illustration is of the cruiser Admiral Hipper, this pattern of yellow markings was worn by both Gneisenau and Bismarck during 1941. Medium Gray (MM #1721, FS-35237 or Floquil #303151, Brit. Sea Gray Medium) covers the complete hull. The superstructure is finished in light gray such as Floquil's USN 5-L or MM #1728, FS-36275. The roof and top angled portions of the main and twin gun secondary turrets are painted with Floquil #303269, German Yellow. Note that single gun secondary turrets were not painted.



G-20: Admiral Hipper, December, 1940

This is the pattern designed specifically for the Admiral Hipper by Captain Dechend in November of 1940. Captain Dechend designed the pattern with Admiral Hipper's upcoming Atlantic operations in mind. He also intended to imitate the scheme carried by HMS Revenge during the same period. By December, the painting was completed and Admiral Hipper departed on a 21-day raiding cruise in the North Atlantic. She completed her cruise by returning to a French port, the first major German warship to do so during the war. This pattern is completed using the standard USN 5-O, Ocean Gray for the dark gray. MM #1721, FS-35237 works well for the medium gray.



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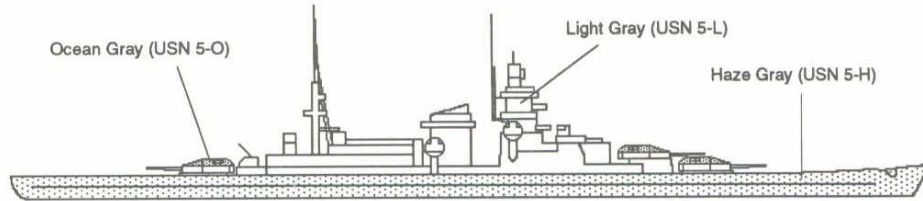
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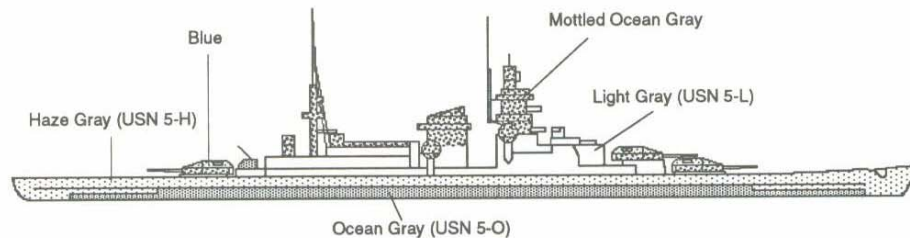
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G-21: *Scharnhorst*, June, 1940

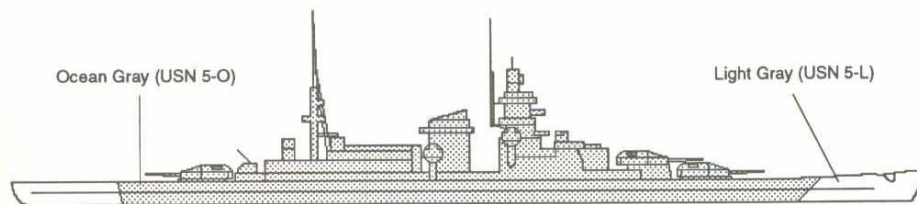
This pattern was worn by *Scharnhorst* and probably *Gneisenau* during the 1940 Norwegian campaign. A haze gray (USN 5-H) hull is matched to a light gray superstructure (USN 5-L). Only the main turret tops received the dark gray treatment. Dark Gray (USN 5-O) should be applied on the turret tops and the top angled portion of the turrets.

**G-22: *Scharnhorst*, February, 1942**

Scharnhorst was wearing this pattern during the famous "Channel Dash" when she, *Gneisenau*, and *Prinz Eugen* raced from Brest through the English Channel on their way to several German ports. *Scharnhorst* went to Wilhelmshaven, *Gneisenau* to Kiel, and *Prinz Eugen* to Brunsbuttel. The dark gray lower section of the hull camouflage may be painted in USN 5-O, Ocean Gray. Haze Gray (USN 5-H) may be used for the upper and lighter portion of the hull. The superstructure should be painted first in light gray such as USN 5-L. A mottling effect is then applied using the same dark gray on the upper superstructure and the sides of the main turrets. Finish this scheme with a bright light blue such as F #303090 or MM #1722, Duck Egg Blue applied to the upper angled portion and top of the turrets.

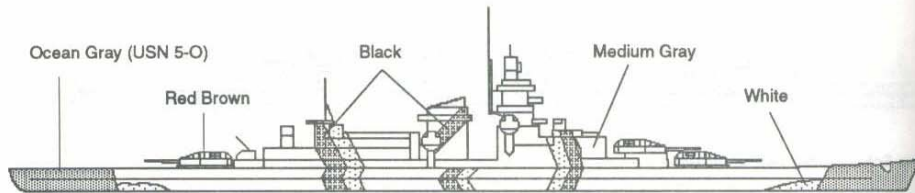
**G-23: *Scharnhorst*, 1943**

This is the scheme which *Scharnhorst* was probably wearing during her final engagement with HMS *Duke of York* and her accompanying cruisers and destroyers. In this scheme, *Scharnhorst* was dark gray overall with the exception of portions of the bow and the stern. The standard USN 5-O Ocean Gray and USN 5-L Light Gray may be used.



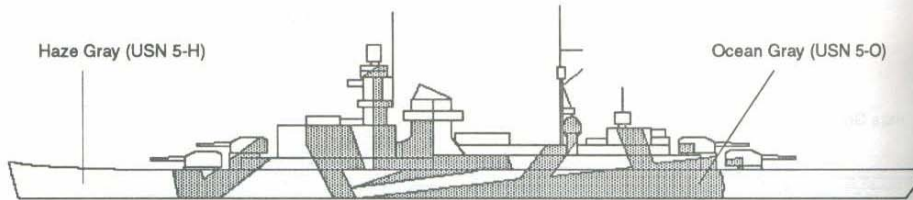
G-24: *Gneisenau*, November, 1940

Many readers will recognize this scheme as made famous by *Bismarck*. However, *Gneisenau* may have been the first German vessel to use the "Baltic" scheme. Certainly, *Gneisenau* was in this pattern as early as November of 1940. *Bismarck* wore the same pattern during her 1941 Baltic operations. Both *Numberg* and *Emden* wore a very similar but not identical pattern during the same period in the Baltic (see photo p.29). A dark gray such as USN 5-O Ocean Gray is used at both bow and stern. The rest of the ship is in a medium gray such as MM #1721, FS-35237. Over this are laid three zig-zag vertical stripes of black and white. White is also used to create false bow and stern waves on the medium gray portion of the hull. Use Floquil's #303126 Panzer Red Brown for the angled top portion and roofs of the main turrets.



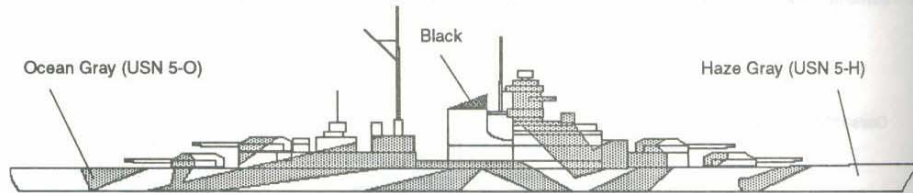
G-25: *Admiral Hipper*, July, 1942

The cruiser *Admiral Hipper* was repainted in a false perspective pattern for her Norwegian operations in 1942. This pattern may be another of Captain Dechend's designs, but has not been confirmed as such. The colors are again matched by USN 5-O, Ocean Gray, and USN 5-H, Haze Gray. This pattern is probably specific to *Admiral Hipper*, since it was not photographed on other vessels.



G-26: *Tirpitz*, early 1944

In November, 1944, RAF heavy bombers finally caught *Tirpitz* in a heavy bomb attack in a Norwegian fjord. Although she was heavily camouflaged at the time and smoke generators were operational, it wasn't enough. *Tirpitz* capsized and was lost. The pattern depicted here is thought to be the scheme in which *Tirpitz* was sunk. Except for the black funnel cap, USN 5-O, Ocean Gray, and USN 5-H, Haze Gray may be used to model this pattern.



Aircraft Colors

Ship-based seaplane reconnaissance aircraft were generally light or medium gray all over. Alternatively, some seaplanes carried light gray under-surfaces and dark green upper-surfaces.

CHAPTER 6 - REGIA MARINA

During the early part of the war, up to mid-1942, most Italian vessels were painted light grey overall, comparable to USN Haze Grey. The light grey, or "grigio cinerino chiaro" was the standard for all Regia Marina vessels. Steel decks and horizontal surfaces were painted dark gray. Wood decks were left in their natural color.

During the early months of 1941, tests were carried out using full dazzle patterns on several ships, including *Fiume* and two destroyers. The purpose of these schemes was to shorten the ships' apparent length to confuse enemy rangefinders. By the middle of 1942, the Supermarina issued a new set of camouflage regulations. Any camouflage or dazzle schemes appearing on Italian warships up to then were strictly experimental, often drawn by the ship's crew. Noted Italian naval artist Rudolf Claudus was commissioned to design several schemes which were to break up a ship's silhouette. One of these appeared on *Trento* between February and March of 1942. While paint colors were standardized, there apparently was no standardization of camouflage/dazzle schemes within classes of vessels or types. Each ship had its own unique pattern. Perhaps in part because of the individuality of Italian schemes, their vessels tended to be more unusual with a far greater variety of color and patterns than even the Royal Navy.

Many of the Italian camouflage schemes used low bands of white at the bow and/or stern to simulate bow waves or wake. However, by the end of 1942, the use of white in these areas was discontinued as too conspicuous in the Mediterranean, especially during the spring and summer. Areas of white were painted over with light gray while the rest of the scheme was maintained. Several vessels, including *Duilio*, *Trieste*, *Attilio Regolo*, *Da Recco* and others, used light green or light blue to obtain the same results.

For a certain time, many Italian ships were seen with bright red and white diagonal stripes across the fore and sometimes the stern section of the main deck. These deck patterns were used as an air identification marking for Regia Aeronautica (Italian Air Force) flight crews who were poorly trained in ship recognition. The use of the identification markings was developed as a result of an incident during the Battle of Calabria (July 9, 1940, known to the Italians as the Battle of Punta Stilo) with the Royal Navy. Italian air crews bombed Italian vessels by mistake, fortunately without obtaining any hits. The air identification markings were applied from then until the Italian armistice in September of 1943.

British ships attempted to use Italian recognition markings on at least one occasion. In *The Tribals*, by Martin H. Brice, the author describes *Sikh* and *Zulu* being "painted in Italian gray with red and white Italian recognition stripes on their forecastles" for a raid on Tobruk in September 1942. It was a disaster. The Italians knew they were coming. *Sikh* was sunk by shore batteries, and *Zulu* by aircraft.

Funnel caps, originally painted black at the start of the war, were in most cases overpainted light gray to make ships less conspicuous. By mid-1942, practically all Italian warships were camouflaged in dazzle patterns that, in most cases, required only light and dark gray. (Floquil Polly-S has developed an excellent set of Regia Marina paints, matched to actual WW II Regia Marina color chips. This series will be released in the near future as soon as testing is complete.)

Regardless of camouflage scheme, destroyers, destroyer-escorts, and gunboats had two red letters painted in large size on the bows. The same two red letters were repeated in a smaller size on both sides of the stern. The letters were generally the first and one additional letter of the vessel's name. In cases where the same letters appeared on two different vessels, the difference is found in the number of funnels carried by each vessel. Battleships, cruisers, and other large vessels had no distinctive letters or numbers at all. While the use of red as lettering may seem at odds with the camouflage, experts point out that at any distance, the red fades and blends with dark grays and other dark hues. (Note the use of red markings on night fighters and other nocturnal prowling aircraft.)

Throughout the war, life rafts were painted in alternating bands of red and yellow, to be highly visible when deployed.

At the beginning of the war, Italian submarines were usually black or blue/black overall. By the end of 1940, submarine upperworks were a very light blue-gray, with irregular splotches of greenish dark brown. This scheme was also used by some German subs operating in the Med. Subs later operating with Allied forces reverted to black or were painted in USN submarine schemes.

After the Italian armistice, most vessels fighting on the Allied side were repainted in accordance with Allied patterns. Vessels captured and operated by the Kriegsmarine usually maintained their Italian schemes or occasionally were repainted in German patterns.

Color Matches for the Regia Marina, 1940-1943

The Armory and Model Master paints cited below are close to the Regia Marina color chips, but are not accurate color matches. If you can wait for the Floquil Polly-S paints, you'll have exact color matches for your ships.

Ship Colors

light gray (grigio cinerino chiaro)
dark gray
light blue
dark blue
yellow-green
light green

Armory

GF-016, Mortuary Gray
GS-212, Charcoal Grey
GG-020, light blue
SS-016, midnight blue
no close match
SS-010, melon

Model Master

#1728, FS-36375, light ghost gray
#1723, FS-36118, gunship gray
#1722, FS-35622, duck egg blue
#1718, FS-35042, flat Sea Blue
#1716, FS-34227, pale green
#1793, FS-34159, bomber green

Submarine Colors

light blue gray
dark brown

GF-020, illusion blue
GE-013, liver chestnut

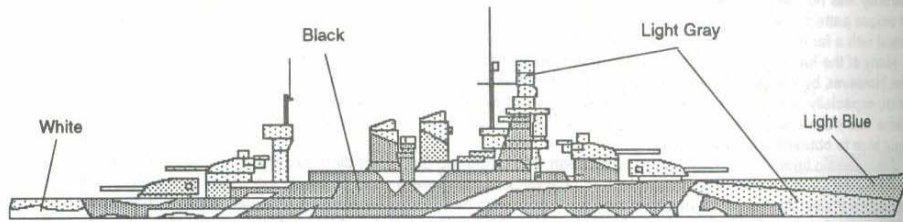
no close match
no close match

Ship Drawings

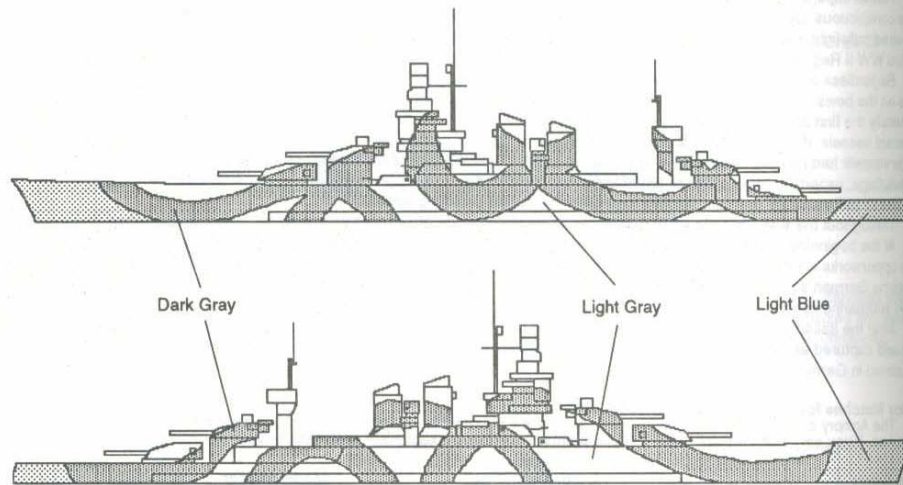
Names of colors referenced in the following drawings are listed in the table above.

I-1: *Andrea Doria*, Fall, 1941

During the fall of 1941, *Andrea Doria* was painted in a scheme designed by Claudus. This scheme made use of white, black, light blue, and light gray to break up the ship's lines. This was one of the few examples of an Italian vessel carrying the identical scheme on both sides of the ship. Red and white air identification markings were carried on the forward deck.

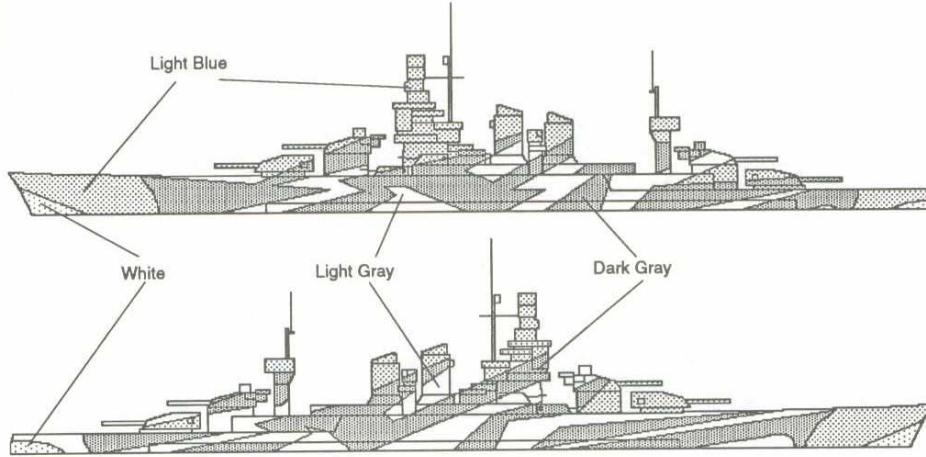
**I-2: *Andrea Doria*, Summer, 1942**

Andrea Doria appears here in her new "official" scheme from the Supermarina. Note the use of light blue at the bow and stern to shorten the vessel's appearance. The other colors were dark grey and light gray.



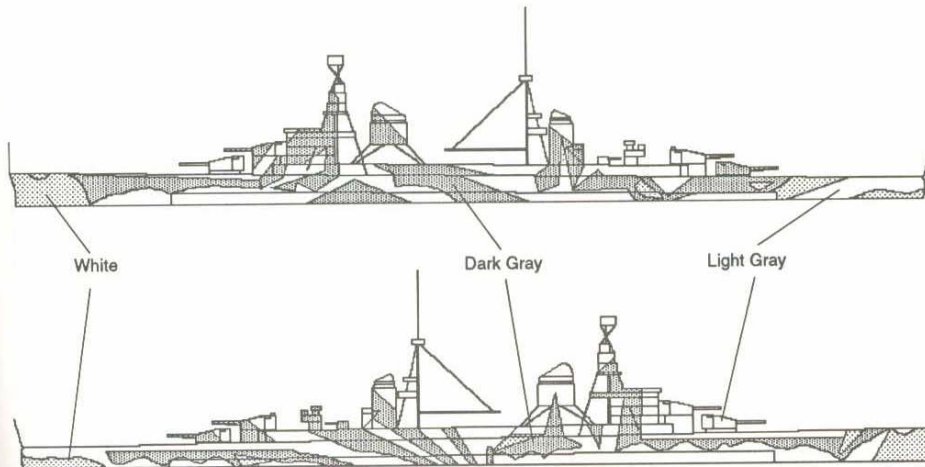
I-3: *Caio Duilio*, Summer, 1942

During the summer of 1942, *Caio Duilio* was repainted in her official scheme, making use of white and light blue in several areas, contrasting with the light gray and dark gray of other areas. Splinter schemes of this type later became more common on Italian vessels as the war progressed.



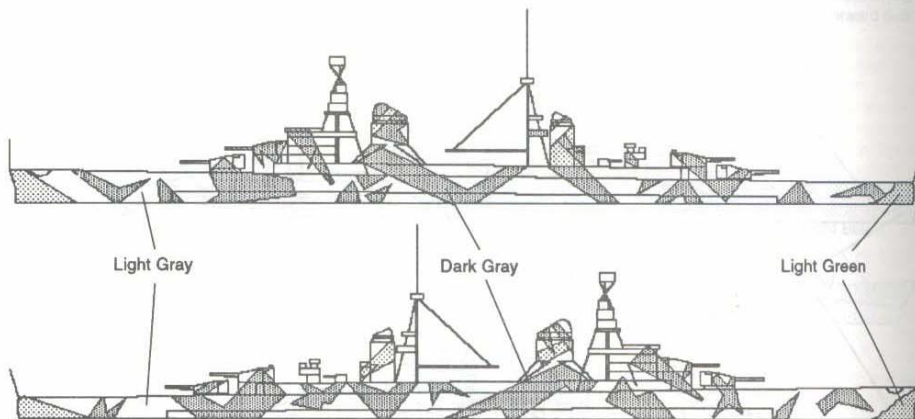
I-4: *Trento*, 1942

Trento's scheme made use of light gray, white, and dark gray on all vertical surfaces. Her horizontal surfaces were of a dark gray slightly lighter than the dark gray on the vertical surfaces. On the forecastle were the air recognition stripes of alternating red and white, from bow to forward edge of No. 1 turret. White was used on the hull low at the bow to make ship appear shorter and mislead range finders. White was also used at the stern to simulate foaming water from a high speed wake. *Trento* was sunk in June of 1942 while wearing this scheme.

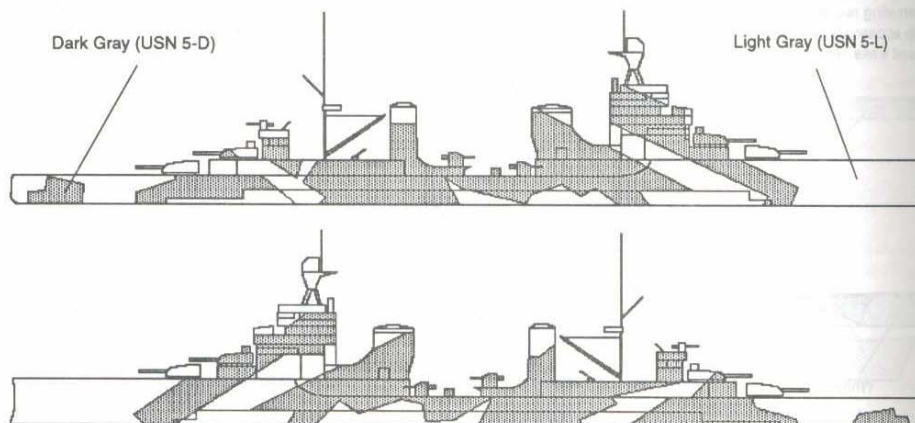


I-5: Trieste, early 1942

During January of 1942, *Trieste* was painted in this scheme, which made use of light and dark gray with light green at both bow and stern. Later during the year, white was substituted for the light green. However, during the summer, all white or light green was covered with light gray.

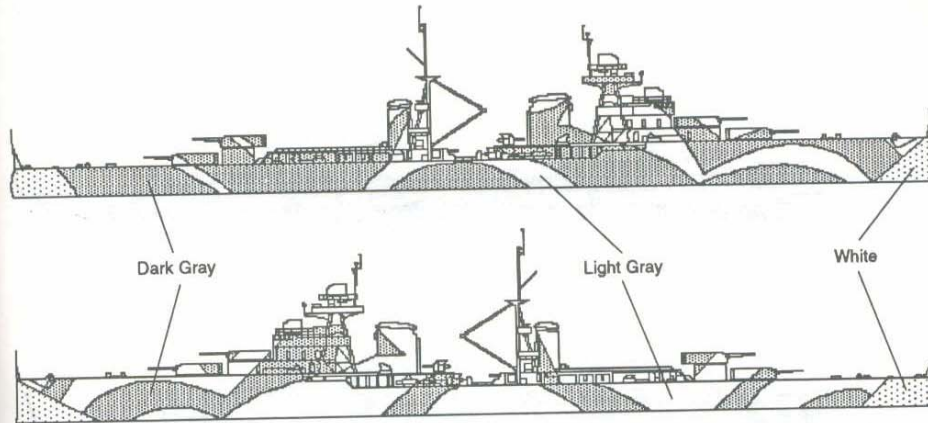
**I-6: Bande Nere, December, 1941, as sunk**

This is one of the earlier examples of an "official" pattern using only light and dark gray. *Bande Nere* was wearing this pattern when sunk. USN 5-L and USN 5-D colors may be used to achieve the correct effect.



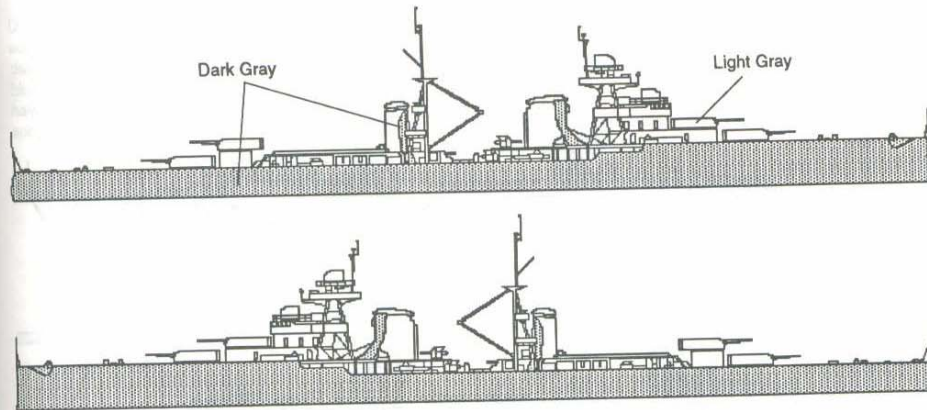
I-7: *Luigi Cadorna*, March, 1942

A typical Italian pattern often used curved sweeping lines of light and dark gray to break up the ship's outline. In this example, cruiser *Luigi Cadorna* adds white to both bow and stern to enhance the illusion.



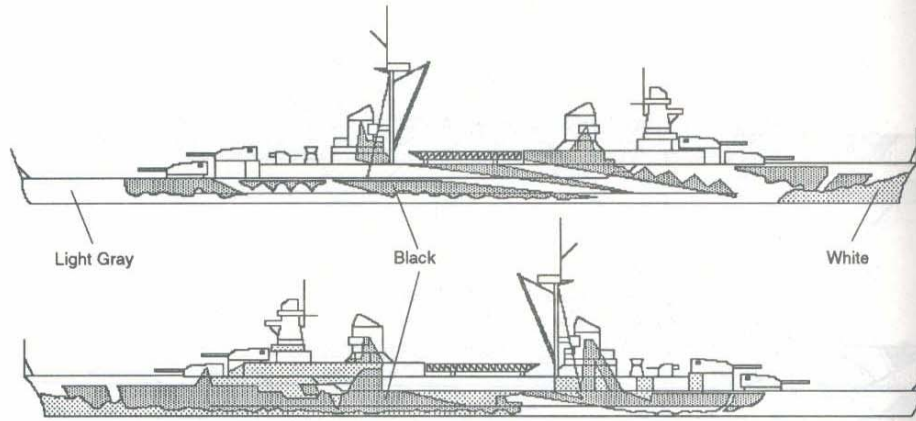
I-8: *Luigi Cadorna*, 1944

After the Italian armistice, many Italian vessels were repainted in Allied patterns. Here *Luigi Cadorna* carries a scheme closely resembling USN Measure 22. This measure was a dark gray up to the deck line with a light gray superstructure. Decks and horizontal surfaces were dark gray. *Luigi Cadorna* carried this scheme through the end of the war.

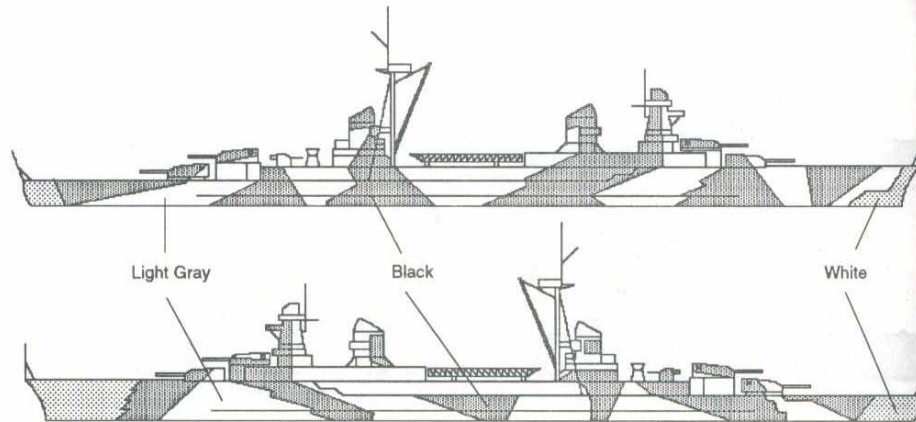


I-9: *Muzio Attendolo*, July 1941

This scheme with its unusual lines, curves, and sawtooth pattern was a typical Claudus design rendered in white, light gray and black. The intent of this pattern was to drastically alter the vessel's appearance. *Muzio Attendolo* wore this pattern for a year, until she was repainted in the scheme shown in I-10.

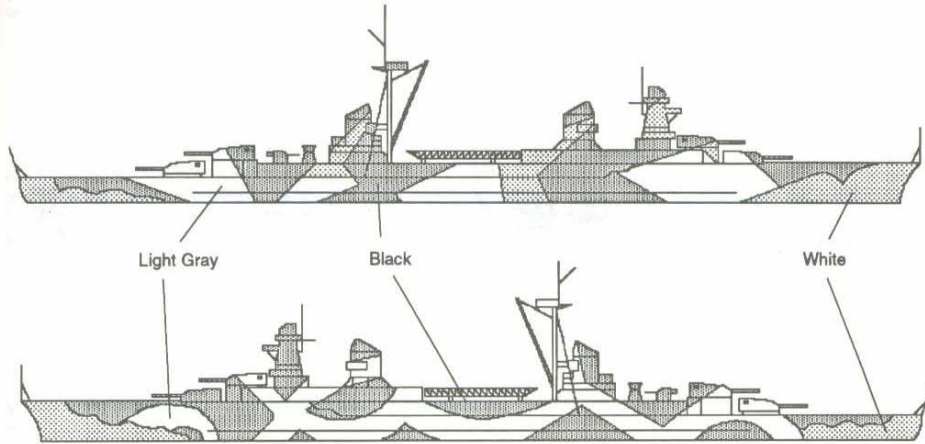
I-10: *Muzio Attendolo*, July, 1942

During July of 1942, *Muzio Attendolo* was repainted in her "official" white, black, and light gray scheme as designed by the Regia Marina Technical Department. By this time, the Regia Marina was beginning to move to combinations of light and dark grays, with less emphasis on white, greens, and blues.



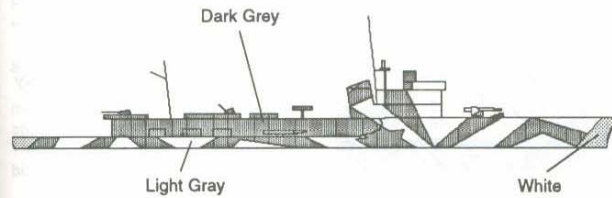
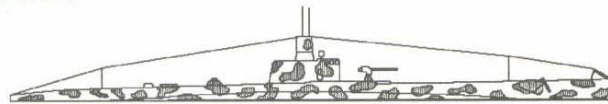
I-11: R. Montecuccoli, May, 1942

While most Italian patterns differed on each side of the vessel, the patterns usually made use of the same proportions of colors on both sides. This pattern is unusual in that the starboard side has much more white than the port side. The other colors are the usual black and light gray.



I-12: Typical scheme for submarines, 1941-42

During 1941 and 1942, many Italian submarines wore patterns of greenish dark brown splotches over their light blue-gray finish. Often, those subs having higher bows also had areas of dark gray at bow in an attempt to render the bow less conspicuous. Later, those subs operating under Allied command were repainted in black or in accordance with USN submarine measures.

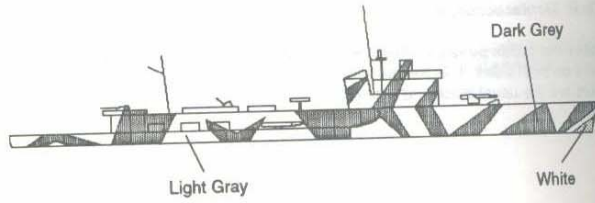


I-13: Climene 1943

This and the next two patterns are examples of schemes specific to smaller escort vessels. By making use of light gray, dark gray, and sometimes white splinter patterns to create a false perspective, these schemes were designed to draw the observer's eye from the vessel.

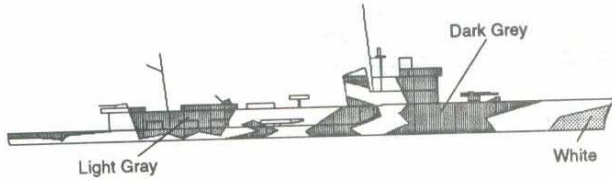
I-14: *Ardito*, 1943

Many versions of these patterns were used by escort vessels operating along the coast line and in inter-island waters of the Med.

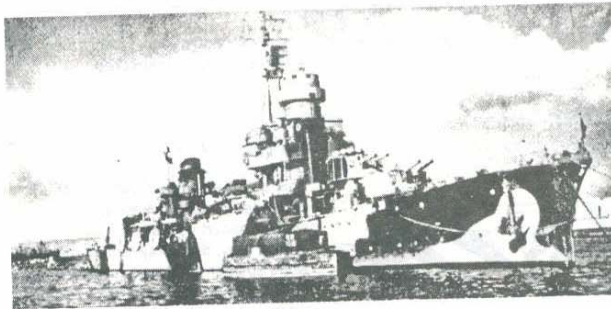


I-15: *Tifone*, 1943

Note the continued use of white at the bow and often the stern, even after larger vessels were overpainting their white to light gray. Apparently, white was continued on the escorts due in part to their nocturnal operations when white at the bow would have a more definite deceptive impact.



Bombardiere (*Soldati* class) in 1942.
Italian Navy

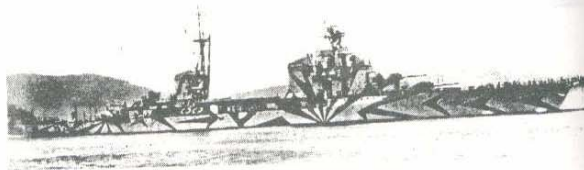


Scipione Africano (*Capitani Romani* class), some time after the September 1943 surrender.

US Navy

Bolzano (*Bolzano* class), some time in 1941 or 1942.

Italian Navy



CHAPTER 7 - THE IMPERIAL JAPANESE NAVY

At the beginning of World War II, Japanese naval vessels were painted overall very dark grey with a hint of blue. As the war progressed, colors changed to a silvery grey when the paint formulas changed due to scarcity of tints. Some sources suggest a dark blue grey may have been available from some shipyards. Research indicates that four shades of grey were predominant. The particular shade of gray applied depended on which shipyard the vessel was either built or last visited for a major overhaul. The four main naval shipyards and the approximate colors are:

| | |
|--------------------|-----------------------------------|
| Kure Navy Yard | MM #1721, FS-35237 medium gray |
| Maizuru Navy Yard | MM #1726, FS-36307 light sea gray |
| Sasebo Navy Yard | H Matte 32 Dark Grey |
| Yokosuka Navy Yard | H Matte 106 Ocean Grey |

Decks on capital ships were left in bare wood. Reports of decks later appearing to be in a light grey may have been due to weathering after a few months at sea. Steel decks were the same color as the hull. With the exception of *Yamato* and *Musashi*, the wood main deck planking on battleships extended from bow to stern. Superstructure decks were steel. Several sources have reported that all battleships were planked with teak except the two *Yamatos* and *Nagato*. These three had Japanese cypress (*hinoki*) planking.

Most Japanese combatant vessels started the war with white canvas on their gun mounts. By 1939 light grey canvas began to be used. By 1941, virtually all canvas was grey with the actual color varying from ship to ship, but generally in the light to medium grey range. Some destroyers in the Solomons Islands are reported to have had white canvas patterns between their funnels or between the funnels and the bridge. These panels may have served as a recognition feature.

During the early part of the war, ships assigned to the combined Fleet had their main rangefinders and bases painted white to distinguish them from ships of other commands. This practice appears to have been discontinued during 1942. Throughout the war, turrets, gun shields, and gun barrels were the same color as the hull with the exception of machine guns. These were gunmetal (a silvery grey-black produced by several manufacturers). Ship's boats generally were the same color as the ship's side.

Beginning in 1942, some warships assigned to the Northern Fleet used white, gray, and black schemes on all vertical surfaces. A poor photo of cruiser *Tama* taken from the port bow, shows her in a typical Northern Fleet scheme. This photo appeared in the Number 1, 1982 issue of *Warship International*, but does not show enough of the full side of the vessel.

Submarines began the war painted overall dark grey. On some boats, the decks and other horizontal surfaces were black. As the war continued, the black was extended to the sides as well, so that vessels appeared to be black overall.

Linoleum decks were not painted on light cruisers, destroyers, and lighter units. Weatherdeck linoleum has been described as a yellowish-brown or ochre. Linoleum coverings were generally applied only to the weather and forecastle decks. The forecastle decks often extended a considerable distance aft in smaller vessels. Cement coatings were sometimes used as a nonskid surface over metal decks in the vicinity of catapults.

Several references to late-war camouflage state that the Japanese were behind the US and UK in "passive defense" (camouflage). By late 1942, the IJN decided to copy US/UK designs as an emergency model. Some IJN vessels may have started using camouflage sometime during 1943.

Flight decks on carriers and other vessels were initially left in their natural wood tan. After several months of use and weathering, wood flight decks generally faded to a light grey. During 1942, wood flight deck planking was replaced on all new construction and converted carriers by a reddish-brown compound material. This was found on all ships after the conversion of seaplane tenders *Chiyoda* and *Chitose* to carriers in 1943 and 1944. Floquil #303367, U. S. Earth Red and Floquil #303126, Panzer Red Brown may be close matches to the red/brown of these decks. Several readers have indicated the brown linoleum to be close to FS-20117.

While other classes and types of vessels were in dark grey, by late war many of the Japanese carriers had hulls and superstructures of dark green. This color appears to be closely matched by Model Master #1714, FS-34127 Forest Green.

Deck markings on carriers varied. Elevators were often painted grey and sometimes were outlined in yellow. Striped markings on the aft ramp were often alternating red and white running across ship. Many carriers had a circle painted aft about a quarter of the flight deck length forward of the ramp. This apparently provided a landing aim point target for pilots. The fan shapes on many Japanese carriers were centered on holes in the flight deck through which colored smoke was blown. This was a simple and practical way of giving pilots a visual reference to the relative wind direction and intensity.

Near the end of the war, the IJN went to great lengths to camouflage their remaining carriers. Several of these vessels were drawn close to shore. Netting was then suspended between the ship and the shoreline. The decks and seaward sides were extensively camouflaged with trees, fields, roads, buildings, and even small villages.

It appears that with only a few exceptions, the IJN bureaucracy and command designed camouflage schemes only for carriers, auxiliary naval vessels, and merchant vessels. Photos of armed merchant cruisers *Aikoku Maru* and *Hokoku Maru* in camouflage appear in *Liners In Battledress*, although these two ships were probably painted at the request of their captains. Some Japanese naval auxiliary vessels seem to have used splinter or pseudo-dazzle patterns. There is also an example of a naval tanker with a light gray hull having dark blue drawings of two smaller vessels on her sides. The actual use of this design cannot be confirmed without photographic documentation.

The Japanese Imperial Crest of the Chrysanthemum (*Gomonsho*) appeared on the bow of capital ships, carriers, cruisers, gunboats and minelayers, but not on destroyers. The Crest was carved in teak and covered with gold leaf.

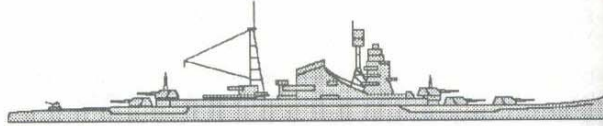
Aircraft Colors

By the time of Pearl Harbor, most carrier aircraft and floatplanes were a light sky grey with flat black engine cowlings. Land-based aircraft were in the process of changing to dark green and tan on upper surfaces with a light grey undersides. Later, naval aircraft, including seaplanes, generally were dark green on fuselage and all upper surfaces with light grey on the under wings and fuselage. The famous red sun national insignia (*hinomaru*) appeared on both upper and lower wings and the sides of the fuselage. On dark green aircraft the red sun was often surrounded by a thin white circle.

Ship Diagrams

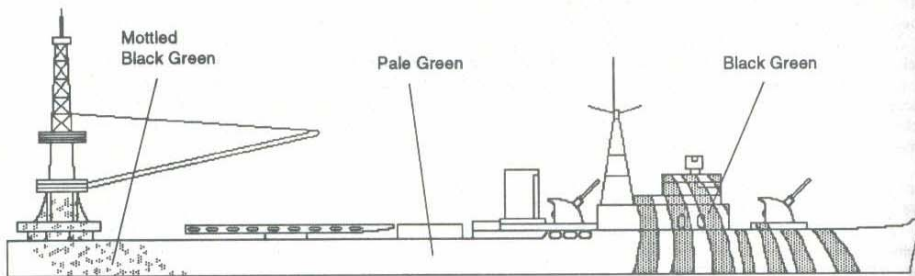
J-1: *Mogami*, 1939 to 1942

This illustration demonstrates the typical overall paint scheme of Japanese warships. Since *Mogami* was built at Kure and returned there for most of her maintenance, she should be painted in Model Master #1721, FS-35237 Medium Gray. By 1942, the canvas gun sleeves would have been in a light gray.



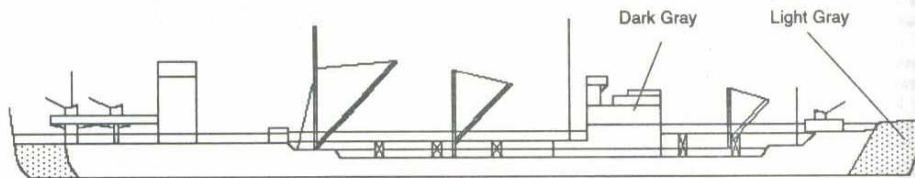
J-2: Seaplane Tender *Akitsushima*

Akitsushima was one of the very few Japanese warships which received a camouflage pattern. According to the U. S. Technical Mission to Japan's *Camouflage of Japanese Ships and Naval Installations*, "The forward third of the ship was painted with dazzle stripes in light green and black (or very blackish green)." The same dark color was used for the spotted effect at the stern. Overall the vessel was a light green. Model Master #1716, FS-34227 Pale Green would probably be the approximate shade. Polly-S #500086, Black Green should be used for the dark color.



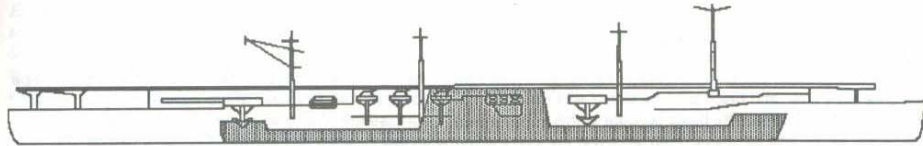
J-3: Typical Tanker

One of the few camouflage schemes used was on slower and older tankers. On a dark gray hull, the bow and stern were painted in a lighter gray to make the vessel appear to be a faster, more modern vessel. The intent was to make the attacking sub overestimate the tanker's speed and thus miss when they fired torpedoes.



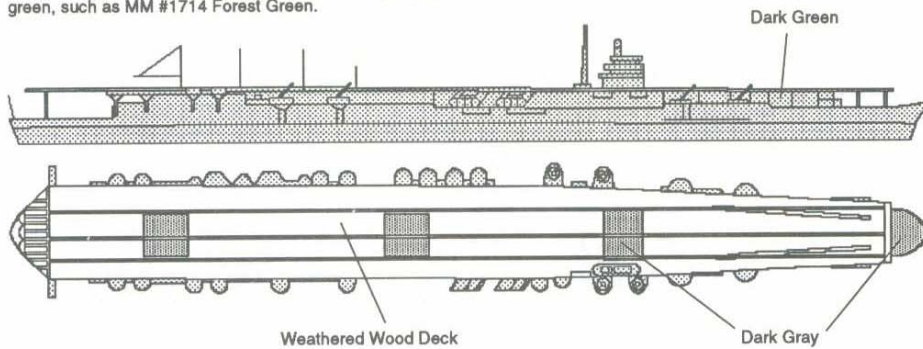
J-4: Late War Carrier Pattern

During 1944 and 1945, some carriers were painted a light green (exact color unknown). They then had a rough dark gray silhouette of a merchant painted onto the hull, hoping to deceive attacking subs. Right.



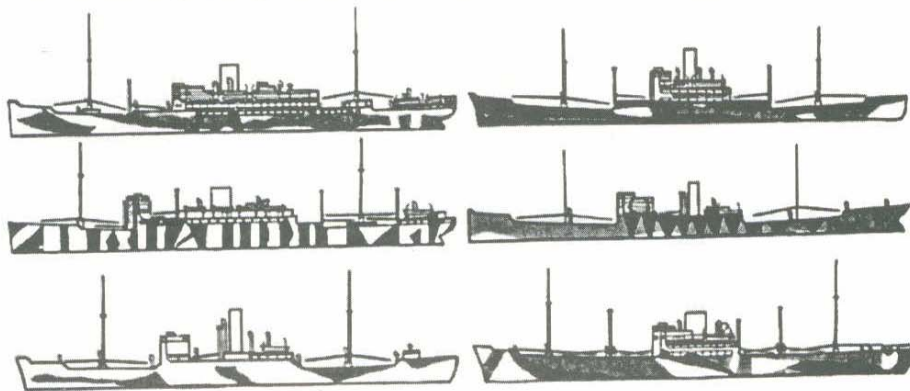
J-5: Zuikaku

This illustration shows *Zuikaku's* deck markings and hull coloration as typical of carriers during the earlier part of the war. Although the IJN later experimented with carrier deck camouflage, none were put into use for any significant periods on active carriers. Deck markings were in white and usually consisted of three solid lines fore to aft. Outboard of the three solid lines were two additional dotted lines, one to each side. The bow and stern were usually marked with across ship white lines. Often the approach apron was marked in several white lines as a warning for approaching pilots. The flight decks were usually tan until the wood aged to a light gray. Elevators were generally in dark gray. The hull was a dark green, such as MM #1714 Forest Green.



In the *Kiso* and *Tama* kits produced by Tamiya, the instructions show a white and gray "Northern Fleet Scheme." Two poor photos have also been found.

Sample Japanese merchant ship camouflage patterns, from ONI-20&J, *Japanese Merchant Ships Recognition Manual*. These were supplied as typical camouflage schemes, but were not linked to any ship or class.



CHAPTER 8 - OTHER NAVIES

THE FRENCH NAVY: THE MARINE MILITAIRE

Many French combatant vessels began the war with dark gray hulls and light gray upperworks. Their funnels had a black top. Decks seem to have been a dark gray, although this has not been confirmed. As with other navies, those French vessels which later worked with the Allies adopted US or British schemes, depending on where the vessel was overhauled. Allied-built vessels transferred to French control maintained their Allied schemes. Because of this, French vessels often appeared identical to other vessels of the same class operating under different flags.

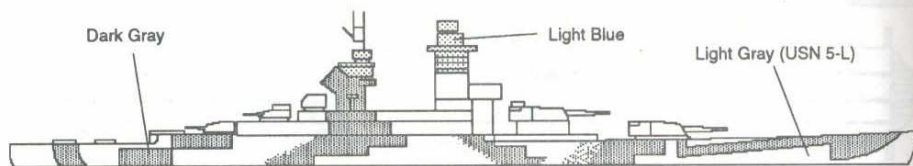
One notable exception should be recognized. The light cruiser *Gloire* is famous for her unusual zebra or pinstripe light gray, dark gray, and black scheme which was nearly unique among the Allied navies. *Gloire* wore this experimental camouflage during 1944. The basic concept of this scheme was to confuse the enemy as to the type of vessel, its direction of travel, and its speed. With distance, the zebra scheme loses its distortion effectiveness as it blends to a medium gray. (There are photos of USN Elco built torpedo boats in a similar zebra pin-stripe scheme. The zebra-striped PT-boats were active in both the Mediterranean and the Pacific.) Difficulty in maintaining the zebra scheme led to its rapid abandonment.

During her tour of the far east with Royal Navy forces, *Richelieu* wore a scheme similar to those worn by some Royal Navy battleships. This scheme was composed of dark, medium, and light grays in rectangles and other shapes.

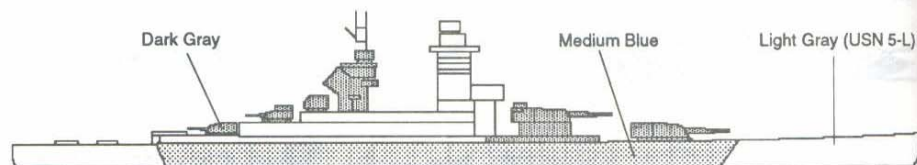
Paint colors used for French vessels should be the same as used for American and some British vessels. For this reason, colors for French vessels are referenced by USN paint numbers.

F-1: *Richelieu* in 1943

This scheme is unusual for its feathering effect on the midships section. Colors used may have been a dark gray such as the USN 5-O, light gray similar to USN 5-L, and a light blue. Armory GG-020 light blue or a similar color would seem to be appropriate. Note the application of colors, forming a sharp line at the forward edge of the block to a feathered blend as the color moves aft.

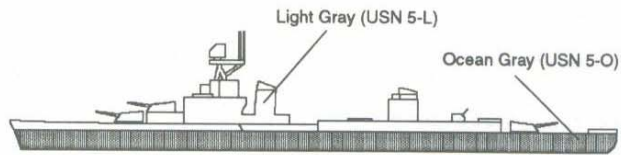
F-2: *Richelieu* with the British forces in the Pacific in 1944

In 1944, *Richelieu* was assigned to accompany Royal Naval forces forming the Pacific Squadron. For this operation, *Richelieu* was painted similar to British vessels with a scheme having a false hull prospective. A light Gray hull (USN 5-L) was overpainted with a false hull of medium blue. Floquil #303153, British Azure Blue, or Armory SS-021 Tibetan Blue appear to be close matches. Dark gray similar to USN 5-O was applied to the turrets and aft superstructure. A photo of *Richelieu* appears in Couhat's *French Warships of World War II*. A dark gray is suggested for the decks.



F-3: *Emile Bertin*, 1944

In 1944, this vessel was refitted in the United States before joining the Allied fleets. This is probably the reason that *Emile Bertin* appears to be in a scheme similar to USN Measure 22. She probably wore Ocean Gray (5-O) and Light Gray (5-L) during the invasion of the south of France. The deck was probably a dark gray such as 5-D.

**THE ROYAL NETHERLANDS NAVY**

Dutch vessels started the war in plain light or medium gray schemes. Decks were dark grey. Most of the vessels in the Far East seem to have worn light gray throughout their brief wartime career. After the fall of the Netherlands and the escape of many vessels to England, Royal Netherlands Naval vessels adopted the British and American schemes as they were refitted in Allied shipyards. The vessels lost in the early Pacific battles may not have worn any camouflage other than their basic gray colors. American and British-built vessels turned over to the Netherlands usually retained their original paint schemes.

THE POLISH NAVY

Both the 1937 and 1942 editions of *Jane's Fighting Ships* indicate Polish Navy vessels were painted in "grey-green" during the early part of the war. However, I have not been able to locate samples of this color. It is known that, as was the case with Netherlands Naval vessels, the Polish Navy adopted the same colors and schemes already in use by the Royal Navy. One has only to review the Royal Navy destroyer and escort listings to find that many RN-built vessels were operated as part of RN squadrons by the Polish Navy. The largest vessel was the British cruiser *Danae*, renamed *Conrad*. These vessels were loaned to the exiled Polish Navy for the duration of the war. Their training, maintenance, supply, and other services were as part of the Royal Navy. The result is that Polish vessels were nearly impossible to tell from their British counterparts except for the flag. Colors and paint schemes were mostly British in design and application, but could be American on occasion if the vessel was overhauled in an American shipyard.

THE SOVIET NAVY

Little is known or written regarding Russian Naval paint schemes during WW II. The Soviet penchant for secrecy usually kept Russian vessels out of close sight of other Allied vessels. The few photos available seem to indicate that a dark gray may have been used overall for many vessels. Przemyslaw Budzbon's *Soviet Navy At War, 1941 - 1945* features a colorized photo of a Type 7U destroyer on the front cover. This photo is tinted in dark grey, light grey and a light blue. Close examination of the black and white reproduction of the same photo in the book shows a noticeable difference in the lighter colors, and would appear to show one color which may be other than a shade of grey. Photos in other sources, showing only small portions of Soviet vessels, indicate that camouflage schemes were used by destroyers and lesser combatants, but rarely by larger combat vessels.

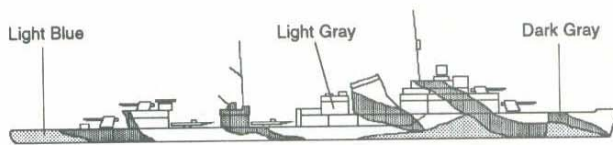
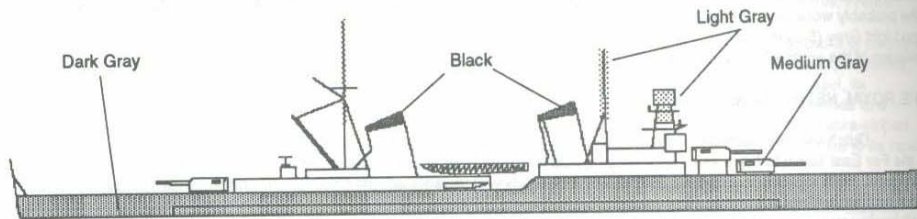
Several sources indicate that the Russian destroyer *Tashkent* was nicknamed "Blue Beauty" or "The Blue Cruiser" due to his "unusual sky blue scheme" (Russians refer to their ships in the masculine gender). Budzbon's book contains photos of several other vessels, notably coastal forces and guard ships in various schemes. However, these are black and white photos and no attempt has been made to describe the schemes.

Russian submarines apparently wore a flat black or a dark grey overall scheme. Vessels operating on inland waterways, such as armored gunboats, may have worn dark green or green/brown schemes similar to those worn by Russian armour.

As a more relaxed atmosphere of friendship (and less secrecy) is developed with the Western nations, more historical information is becoming available. Recently, I have established contact with the Russian Imperial Naval Museum in St. Petersburg. They have promised to send additional information and photos of Soviet vessels in camouflage for inclusion in Volume II of this book.

R-1: Cruiser *Kirov*

A photo of *Kirov* in 1943 shows him in a dark gray hull, medium gray superstructure, and light gray upperworks and masts. His stack caps appear to be black. For the dark gray, use Model Master #1723 FS-36118, Gunship Gray. Model Master #1725, FS-36270 Neutral Gray is suggested for the medium gray. Model Master #1728, FS-36375, Light Ghost Gray is appropriate for the top works.

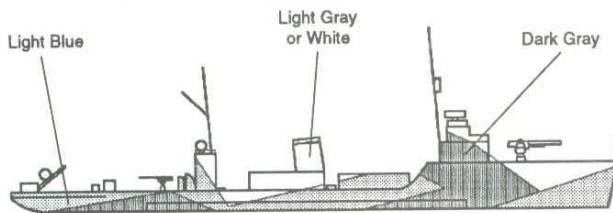
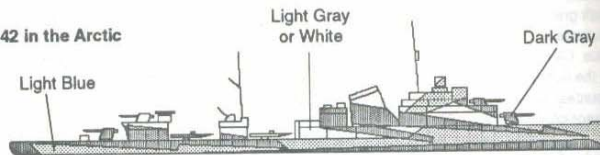
**R-2: Type 7 destroyer *Gremyashchiy*, 1944**

This vessel may have spent a substantial amount of time in northern waters. Russian camouflage schemes for Arctic conditions often had an element of light blue, and this scheme is no exception. The same Model Master dark and light grays as used in R-1 may be applied for this scheme. The light blue recommended is Model

Master #1722, FS-35622 duck egg blue. Note how the application of the light blue low on the hull tends to disrupt the flow of the ship's lines and disguise his appearance.

R-3: Type 7 destroyer *Razyaryonni*, 1942 in the Arctic

Disruptive splinter schemes, such as this example, were favored by Soviet naval forces for the far northern conditions in which pack ice was expected. This scheme would help to hide the ship regardless of lighting conditions. The same light gray, dark gray, and duck egg blue as in R-2 are suggested to duplicate this scheme.

**R-4: *Tral* class minesweeper in the Arctic**

Several Royal Navy historians have credited the Soviet minesweeper forces as perhaps the hardest-working and most diligent of the Soviet deep-water navy next to the submarine service. This example of a *Tral*-class vessel shows one Arctic scheme apparently used by mine warfare

vessels. It is not known if whole classes of vessels were routinely painted in the same scheme, but one photo of several *Trals* operating together seems to show the same scheme on three vessels. This scheme uses the same colors as the previous R-3, but applied in a totally different pattern.

CHAPTER 9 - MOUNTING AIRCRAFT & SMALL CRAFT

Please refer to the appropriate national chapter for details of aircraft and small craft colors.

Mounting Aircraft "in flight" (1:700, 1:1200 & 1:2400 scales)

Several model companies produce aircraft in very small scales to accompany and dress up other models in their production lines. Small aircraft models, particularly those of 1:700, 1:1200, 1:2400 or other similar scales, may be mounted on clear lucite rod, or stiff brass wire for the 1:2400 scales, to simulate flight and protect the model. Before mounting, the model should be painted and sprayed with the protective coating. (Lucite will become fogged when sprayed with protective coatings.)

Very thin lucite rod may be purchased at a plastics supply company. Lucite can be cut, polished, or handled just like any other plastic, except care should be taken to preserve its transparent quality. These same companies often have bins of lucite precut into small squares and/or circles with polished edges. The lucite squares or circles become the bases for your aircraft. Other larger squares or rectangles may be used for mounting formations of aircraft.

Brass wire can be found at many hobby shops. Use wire cutters to trim it to appropriate lengths.

A small hobby drill with a drill bit of the same size as the rod may be used to drill a hole into, but not through, the lucite base. Make very sure your drill is correctly aligned or the rod will be canted! Any clear cyanoacrylate adhesive can be used to cement the rod vertically into the base.

To allow the model to sit on the top of the rod, a small "V" notch can be filed into the top of the rod to fit the bottom of the aircraft model. Alternatively, if the model is large enough, a hole may be drilled into the model's bottom. In either case, the model is then cemented to the rod. One suggestion: The longer the rod (and higher the model), the more fragile and unstable the mounting becomes. In other words, spare the rod and don't spoil the model!

This technique is very successful with the beautiful 1:2400 series of aircraft models now produced and offered by GHQ.

Mounting Small Craft (1:1200 & smaller scales)

Often modelers have very small vessels in 1:2400, 1:1200, or other small scales. Small fast attack boat models in 1:3000 scale often are formed with a base. These naval units, such as GHQ's beautiful WW II PT boats, are small enough to be easily overlooked and lost, especially when camouflaged. Mounting each vessel on its own base, singly or in pairs, can add considerable security and beauty to your models. You will also have a base under which you can apply your unit's name.

Some stationery stores carry plastic insert dividers for three-ring binders which can be used as a water surface. One type is about 1/32 inch thick and comes in a smooth finish on one side and rough on the other. These can be cut with heavy scissors. If the rough plastic is not available, obtain thin plastic from your hobby shop. Another alternative is thin, but stiff, card stock from a local art supply store. Your base material must be thin enough to give the illusion of water while supporting the model when you pick it up.

For each model, cut a piece of thin plastic large enough to allow a half-inch margin to the front and sides the model and one inch at the stern. Cement the unpainted model lengthwise on the rough side of the plastic, with the bow of the vessel approximately 1/2 inch from one end. The idea is to leave enough room aft of the vessel to provide a nice wake. Paint the water surface light grey using Model Master FS-36231 Light Grey.

Using a dry brush technique, go back over the water with a dark sea blue or dark sea green. Directly astern of the vessel, create a wake by brushing on Polly-S Dragon White. Be careful not to overdo the wake effect. At this point use your regular style to paint your small model, unless you prefer to paint the model before attaching the base. When done, spray the model with Testors "Dullcoat" or Floquil "Figure Flat" (#330022).

Obtain a bottle of clear nail polish for your paint supply inventory. While you may prefer using the bottle brush, a number 1 model paint brush is recommended. Quickly dab clear nail polish onto the water surface. The nail polish will tend to run and streak the underlying paints, which is the effect the modeler wants. Working the nail polish slightly will create some interesting water effects including waves. Don't overdo the effect. Note: DO NOT apply this technique to the wake! Water surface is glossy except where there is a white foamy wake. Also, do not spray your completed model and water surface with any dulling agent or protective coating. Spray the ship but shield the water.

After letting the model and its water base dry overnight, go back and touch up the wake with a little dry brushed white. Also add a moustache of white around the bow of the vessel, on top of the clear nail polish. The effect is of foam on top of the water as the bow cuts through. You can obtain a similar effect using thick card stock for the base and a two part epoxy to create the wave action. After the epoxy dries for at least a day, use the same paint and nail polish technique.

[Ed Note: I like Pat's technique, and it looks great, but I mount my small stuff on clear, thin acetate bases. Use the dimensions Pat's described above, but paint and spray-coat the model before mounting on the base, to prevent crazing the clear plastic. Then paint the wake as he describes. This way, you don't have to worry about the painted base not matching your playing surface.]

BIBLIOGRAPHY

- Bagnasco & Grossman Regia Marina: Italian Battleships of World War Two, Pictorial Histories Publishing Company, Missoula, MT, 1986
- Brescia, Maurizio Cacciatorpediniere classe "Navigatori", Ermanno Albertelli Editore, Parma, Italy, 1995
Question 37/90 response, Warship International, No. 3, 1991
U. S. Navy Camouflage, Storia Militare, No. 15, December, 1994
- Brice, Martin The Tribals: Biography of a Destroyer Class, Naval Institute Press, Annapolis
- Brown, David 1971 HMS Illustrious Operational History, Warship Profile 11, Profile Publications, Ltd., Windsor,
- Budzon, Przemyslaw Soviet Navy At War. 1941-1945, Warships Fotofax, Arms and Armour Press, London, 1989
- Burt, R. A. British Destroyers in World War Two, Warships Illustrated No. 4, Arms and Armour Press, London, 1985
- Chesneau, Roger Aircraft Carriers of the World, 1914 to the Present, Naval Institute Press, Annapolis, 1984
- Chesneau, Roger, (Edit) Conway's All The World's Fighting Ships, 1922-1946, Mayflower Books, New York, 1980
- Connelly, T. Garth PT Boats In Action, Warships Number 7, Squadron/Signal Publications, Carrollton, TX, 1994
- Couhat, J. L. French Warships of World War II, Ian Allan, London, 1971
- Crawford, M. L. C. HM S/M Upholder, Warship Profile 16, Profile Publications Ltd., Windsor, 1972
- Dickens, Peter HMS Hesperus, Warship Profile 20, Profile Publications Ltd., Windsor, 1972
- Dickson, David Fighting Flattops: The Shokaku, Warship International, No 1, 1977
- Egan & Sumrall USS Texas. (BB-35), Ship's Data 6, Leeward Publications, Annapolis, MD, 1976
- Ellis, Chris Famous Ships of World War II, Arco, London, 1977
- Ewing, Steve American Cruisers of World War II, Pictorial Histories Publishing, Missoula, Montana, 1984
- Fraccaroli, Aldo Italian Warships of World War II, Ian Allan, London, 1971
RN Zara, Warship Profile 17, Profile Publications Ltd., Windsor, 1972
- Gibbons, Tony The Complete Encyclopedia of Battleships, Crescent Books, NY, 1983
- Gould, Mike Royal Navy Colours, (photocopy) Scale Models, November, 1981
- Grimes, C. G., Captain, USN Miscellaneous Targets: Camouflage of Japanese Ships and Naval Installations, U. S. Naval Technical Mission to Japan, 1945
- Gröner, Erich German Warships: 1815 - 1945, Revised and Expanded by Dieter Jung and Martin Maass, English version, Conway Maritime Press, London, 1990
- Hague, Arnold Destroyers For Great Britain, Naval Institute Press, Annapolis, 1988
Sloops, 1926-1946, World Ship Society, Kendal, England, 1993
- Hartcup, Guy Camouflage - A History of Concealment and Deception In War, David & Charles Publishers, London, 1979
- Hodges, Peter Royal Navy Warship Camouflage, 1939-1945, Almark Publications, Surrey, England, 1973
Tribal Class Destroyers, Almark Publishing Co., Ltd., London, 1971
- Hummelchen, G. German Schnellboote (E-Boats), Warship Profile 31, Profile Publications Ltd., Windsor, 1973

- Jones, Daniel Expanding Your 1/700 Scale Fleet, Model Ship Builder #36, July/August, 1985
- Jung, Abendroth, Kelling Anstriche und Tarnanstriche der Deutschen Kriegsmarine, Bernard & Graefe Verlag Munchen, 1977
- Kershaw, A., (Edit) Battle of the Atlantic, History of the World Wars Special No. 2, Phoebus Publishing Co., London, 1975
- Lambert & Ross Allied Coastal Forces of World War II, Volumes I & II, Conway Maritime Press, London, 1990
- Le Masson, H. The French Navy, Volumes 1 & 2, Navies of the Second World War, Doubleday & Company, Garden City, NY, 1969
- Lenton, H. T. German Surface Vessels, Volume 2, Navies of the Second World War, Doubleday & Company, Garden City, NY, 1966
- Lott & Sumrall USS Alabama (BB-60), Ship's Data 2, Leeward Publications, Annapolis, MD, 1978
USS North Carolina (BB-55), Ship's Data 1, Leeward Publications, Annapolis, MD, 1975
USS Ward - The First Shot, Ship's Data Special, Leeward Publications, Annapolis, MD, 1977
- Lyon, David HMS Cossack, Warship Profile 2, Profile Publications Ltd., Windsor, 1970
HMS Illustrious, Technical History, Warship Profile 10, Profile Publications, Ltd., Windsor, 1971
- Macintyre, Donald, Capt., RN(Ret), DSO, DSC Sea Warfare, 1939-1945, Illustrated War Library Issue No. 5, Salamander Books, London, 1975
- Macpherson, Ken Corvettes of the Royal Canadian Navy: 1939-1945, Vanwell Publishing Limited, St. Catharines, Ontario, 1993
- Meister, J. The Soviet Navy, Volume 1, Navies of the Second World War, Doubleday & Company, Garden City, NY, 1972
- Palmieri, Del USN Camouflage of World War 2, 18 parts, published in Scale Models beginning April, 1979.
- Preston & Raven Flower Class Corvettes, Man O' War 7, Arms and Armour Press, London, 1973
- Raven & Roberts Battleships Nelson and Rodney, Man O' War 3, Arms and Armour Press, London, 1979
County Class Cruisers, Man O' War 1, Arms and Armour Press, London, 1978
Dido Class Cruisers, Ensign 2, Bivouac Books, Ltd., London, 1973
Hunt Class Escort Destroyers, Man O' War 4, Arms and Armour Press, London, 1980
Town Class Cruisers, Ensign 5, Plaistow Press, London, 1975
"V" and "W" Class Destroyers, Man O' War 2, Arms and Armour Press, London, 1979
- Ross, Al The Destroyer Sullivans, Anatomy of the Ship, Conway Maritime Press, London, 1988
- Rousselot, H. L. G. Rubis: Free French Submarine, Warship Profile 26, Profile Publications, Ltd., Windsor, 1972
- Scutts, Jerry Fletcher DDs In Action, Warship Number 8, Squadron/Signal Publications, Carrollton, TX, 1995
- Silverstone, Paul U.S Warships of World War II, Ian Allan Ltd., Surrey, UK 1965
- Smith, Myron Free State Battlewagon, USS Maryland (BB-46), Pictorial Histories Publishing, Missoula, MT, 1986
Golden State Battlewagon, USS California (BB-44), Pictorial Histories Publishing, Missoula, MT, 1983
Mountaineer State Battlewagon, USS West Virginia (BB-48), Pictorial Histories Publishing, Missoula, MT, 1986
- Sowinski & Walkowiak United States Navy Camouflage of the WW2 Era, The Floating Drydock, Philadelphia, 1976

- United States Navy Camouflage 2 of the WW2 Era, The Floating Drydock, Philadelphia, 1977
- Stern, Robert Kriegsmarine, Squadron/Signal Publications, Carrollton, TX, 1979
U. S. Aircraft Carriers In Action, Part 1, Warships Number 5, Squadron/Signal Publications, Carrollton, TX, 1991
U. S. Battleships In Action, Part 1, Warships Number 4, Squadron/Signal Publications, Carrollton, TX, 1980
U. S. Battleships In Action, Part 2, Warships Number 4, Squadron/Signal Publications, Carrollton, TX, 1984
U. S. Subs In Action, Warships Number 2, Squadron/Signal Publications, Carrollton, TX, 1983
- Terzibaschitsch, Stefan Cruisers of the US Navy, 1922-1962, Naval Institute Press, Annapolis, 1984
- Tonks, Randall HMS Exeter, Warship Profile 13, Profile Publications, Ltd., Windsor, 1971
- Walkowiak, Thomas Destroyer Escorts of World War Two, The Floating Drydock, Pictorial Histories Publishing Company, Missoula, Montana, 1987
- Watton, Ross The Cruiser Belfast, Anatomy of the Ship Series, Conway Maritime Press, London, 1985
- Watts, A. J. Japanese Warships of World War II, Ian Allan, London, 1966 & 1978
- Wells, Linton III Painting Systems of the Imperial Japanese Navy, 1904-1945, Warship International, No. 1, 1982
- Whitley, M. J. Destroyer! German Destroyers in World War II, Naval Institute Press, 1983
German Cruisers of World War Two, Arms and Armour Press, London, 1985
- Williams, David Liners In Battledress, Conway Maritime Press, London, 1989
- Wingate, John HMS Belfast, Warship Profile Special 29, Profile Publications Ltd., Windsor, 1971
HMS Campbeltown (USS Buchanan), Warship Profile 5, Profile Publications, Windsor, 1971

The following documents are not credited to a specific author:

- 1/700 Water Line Series Guide Book of Imperial Japanese Navy Ships, Tamiya Plastic Model Company, Inc., Shizuoka, Japan
- USN Publication Handbook of Ship Camouflage, C&R-4 ATR A-332, Bureau of Construction and Repair, 1937
- USN Publication Ships-2, C&R-4 Revisions, Bureau of Construction and Repair, January 1941.
- USN Publication Ships-2, Second Edition, September, 1941
- USN Publication Ships-2, Second Edition Revisions, June, 1942
- USN Publication Ships-2 Supplement, March, 1943

Additional technical assistance was provided by the following:

- Imperial War Museum, London
- National Maritime Museum, Greenwich
- Smithsonian Museum, Washington, DC
- U. S. Naval Academy Museum, Annapolis, MD
- US Navy Historical Department, Washington, DC

Appendix A - RN Color Mixes

by Jon Warneke

These mixes utilize Humbrol Paints, which are available through mail-order and hobby shops. These are given for large quantities of paint. You may need to acquire some larger bottles for storage if you mix batches of this size. I recommend using some of the larger "Badger" paint bottles. These are the larger bottles for use with the Badger airbrush. You could even use old baby food jars, if necessary.

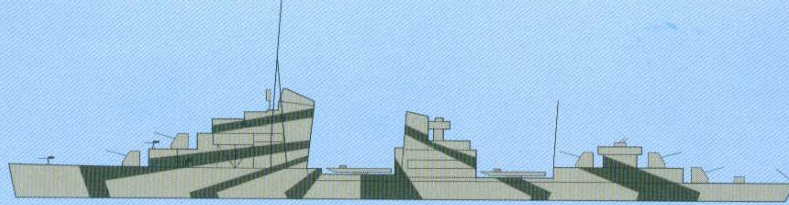
| | RN Number | Drops of Paint to (1) Tin of White | Humbrol Color Name |
|------------------------------------|---------------|---------------------------------------|-------------------------------------|
| Grey-Black | MS1/G5 | N/A | #77 Navy Blue |
| Very Dark Grey | 507A/MS2/G10 | N/A | #27 Sea Gray |
| Dark Grey | 507B | N/A | 1 pt #27 Sea Gray + 1 pt # 33 Black |
| Mid Grey-Green | MS3/G20 | 110 drops of #30 | #30 Dark Green |
| Mid Blue | B20 | 130 drops of #25 | #25 Blue |
| Mid Grey | MS4 | 50 drops of #33 | #33 Black |
| Mid Blue Grey | B6/B30 | 30 drops of #25 | #25 Blue |
| Light Grey | 507C/MS4a/G45 | 10 drops of #33 | #33 Black |
| Pale (Western Approaches) Blue | B55 | 15 drops of #25 | #25 Blue |
| Bale Blue | N/A | 43 drops of #25 | #25 Blue |
| Pale (Western Approaches) Green | N/A | N/A | #90 Beige Green |
| Semtex (Deck Overlay) | N/A | 50 drops of #33 | #33 Black |
| Dark Green | N/A | N/A | #88 Deck Green |

Times of Usage

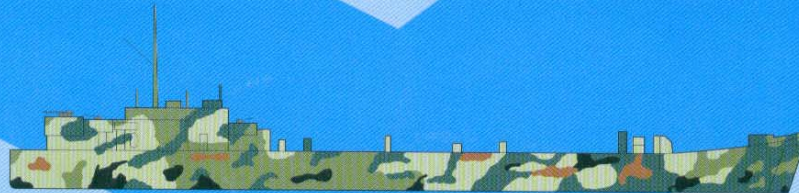
| | Pre-War | 1940-41 | 1941-42 | 1943-44 | 1945-46 |
|----------------|---------|---------|-----------|---------|---------|
| Grey-Black | N/A | N/A | MS1 | G5 | N/A |
| Very Dark Grey | 507A | 507A | 507A/MS2 | G10 | N/A |
| Dark Grey | 507B | 507B | 507B | N/A | N/A |
| Dark Blue Grey | N/A | N/A | B5 | B15 | B15 |
| Mid Grey-Green | N/A | N/A | MS3 | G20 | N/A |
| Mid Blue | N/A | N/A | N/A | B20 | B20 |
| Mid Grey | N/A | N/A | MS4 | N/A | N/A |
| Light Grey | 507C | 507C | 507C/MS4a | G45 | G45 |
| Pale Blue | N/A | WA Blue | WA Blue | B55 | B55 |
| WA Green | N/A | N/A | N/A | N/A | N/A |

This table refers to RCN corvettes, but could apply to all RN ships.

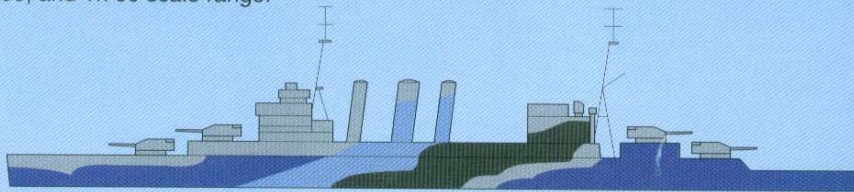
Included with the kind permission of Mr. Warneke



Trying to paint accurate WWII naval camouflage schemes can be very frustrating. A book might devote a few of its hundreds of pages to talking about one class' camouflage schemes, but it has a \$50 price tag, and won't tell you which paints to buy to get the best color match. While the US system is orderly and well-documented, the best books for the British and German systems are long out of print. The Japanese didn't care much about camouflage, and didn't take notes. Although bits and pieces of naval camouflage information have been available to those with the money and time to spend, no publication has ever documented all the national systems in one inexpensive book, in modeler's terms.



The *Painter's Guide to World War Two Naval Camouflage* combines descriptions of the most important schemes and techniques of the American, British, French, German, Italian, Japanese, Russian, and other navies into one neat document. Written for model ship builders, *The Painter's Guide* provides the answers to "What paint colors should I use and in what patterns should they be applied?" The measures and schemes described in this volume may be applied successfully to ship models of all scales, but particularly to models in the 1:2400, 1:1200, and 1:700 scale range.



The *Painter's Guide to World War Two Naval Camouflage* has been prepared by Patrick Hreachmack, a noted ship miniature modeler. Pat has extensively researched color matches with the manufacturers and camouflage authorities and has produced over one hundred and twenty drawings to illustrate the many schemes he describes.

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