

# United States Army Air Corps Painting Practices During World War II



The United States Army Air Corps, and later Army Air Force, utilized two different sets of color standards regulating colors at the beginning of WWII. This resulted in two individual numbers for identical colors of paint, and orders being issued that often addressed portions of both standards on the same technical order. Although these numbers were standardized as early as 1939, the elimination of redundant standards did



not officially take place until August of 1942. Both systems were then replaced in June of 1943 by the Joint Aircraft Committee's Subcommittee on Standardization, who adopted the ANA (Army-Navy Aircraft) color standard. It was envisioned that this system would provide a standard for all Army, Navy, and Royal Air Force aircraft produced in the US. We will therefore

refrain from using the earlier (and far more confusing) Corps Spec. 3-1 numbers when referring to U.S. colors, and will use the June 1943 ANA listings, even for those aircraft types mentioned prior to 1943

<b>ANA #</b>	<b>Color Name and Number</b>	<b>FS 595A</b>
601	Insignia White	37875
602	Light Grey	36440
603	Neutral Grey	36118
604	Black	37038
605	Insignia Blue	35044
606	Semi-Gloss Sea Blue	25042
607	Non-Specular Sea Blue	35042
608	Intermediate Blue	35164
609	Azure Blue	35231
610	Sky	34424
611	Interior Green	34151
612	Medium Green	34102
613	Olive Drab	34088
614	Orange Yellow	33538
615	Middlestone	30266 (RAF)
616	Sand (Desert Sand)	30279
617	Dark Earth	30118 (RAF)
618	Dull Red	30109 (RAF)
619	Bright Red	31136
620	Light Gull Grey	36440
621	Dark Gull Grey	36231
622	Jet Black	17038
623	Glossy Sea Blue	15042

There were several color changes that took place during the transition into the ANA system. RAF Extra Dark Sea Gray was originally supposed to supersede both AAF Neutral Gray and USN Blue Gray as Sea Gray 603, the Extra Dark prefix being dropped. However, due to the large stocks of Neutral Gray paint, aircraft were coming off assembly lines as late as 1944 wearing the older Neutral Gray. It is not uncommon to see RAF aircraft operating with Neutral Gray undersurfaces as well. Another color change, although a somewhat moot point, involves "Insignia Red".



US Army Insignia Red was a vivid bright red, and was not suited well for camouflage purposes. RAF Insignia Red was much less intense, and was of a much darker hue. The fact this point is moot stems from the fact that in the same month the RAF color was accepted by the USAAF, all red was eliminated from the insignia of all U.S. aircraft. The final, and probably most significant, change to the system resulted from the Army Corps of Engineers Specification TAC-ES680, requesting the replacement of the original Olive Drab 41 (Spec. 3-1 No.) with the Army Corps of Engineers version. The controversy regarding these colors continues. The two colors are very similar when freshly applied, with the ANA (Army Corps of Engineers) color being slightly darker and greener. One of the major drawbacks encountered with Olive Drab paint was its susceptibility to rapid fading. The effects of fading had more of an impact on the older Spec 3.1 Olive Drab, as it tended to turn more brown than the ANA color, which tended to fade to a light green. The wide variations of faded paint can more readily be attributed to: first, the durability of the paint, second, the large quantities of older-type paint available, and third, the general acceptance of either color by manufacturers and ground crews. It should be noted that the large stockpiles of the early color resulted in the use of that color well into 1944, and it is not uncommon to see wide variations among Olive Drab painted aircraft operating within the same unit.

### **The Most Common Scheme**

The most common scheme was a result of USAAF Spec. 24114, dated September, 1940. This technical order called for Flat Olive Drab 613 upper surfaces with Flat Neutral Grey 603 undersurfaces, the undersurface color climbing to a point where it was not visible

from more than 30° vertical of the fuselage side. Variations of this scheme included the use of Sand 616 in waves or motting over Olive Drab 613 for aircraft operating in desert environments, and Medium Green 612 motting over Olive Drab 613. The use of Medium Green 612 was approved to soften the edges of wings, vertical, and horizontal stabilizers. The nature of Olive Drab 613 to fade rapidly (unknown at that time) actually caused the Medium Green to contrast the Olive Drab rather than soften it. A revision to Spec. 12114, Technical Order T-07-1-1 of June 1942, allowed Medium Green 612 to replace Olive Drab altogether. This was a result of the problems encountered with the rapid fading of the Olive Drab paint, however, did not become standard practice. It is important to note that variations in the basic scheme were uncommon prior to the release of T.O. T-07-1-1.

### Desert Environment Schemes

Dark Earth 617 and Middlestone 615 upper surfaces with Sky 610 or Azure Blue 609 undersurfaces appeared early on aircraft operating in desert environments, specifically North Africa during the "Torch" operations of 1942. Operation "Torch" aircraft received a variety of schemes, most adapted to the aircraft's environment. The following chart was issued to USAAF units operating in desert conditions.

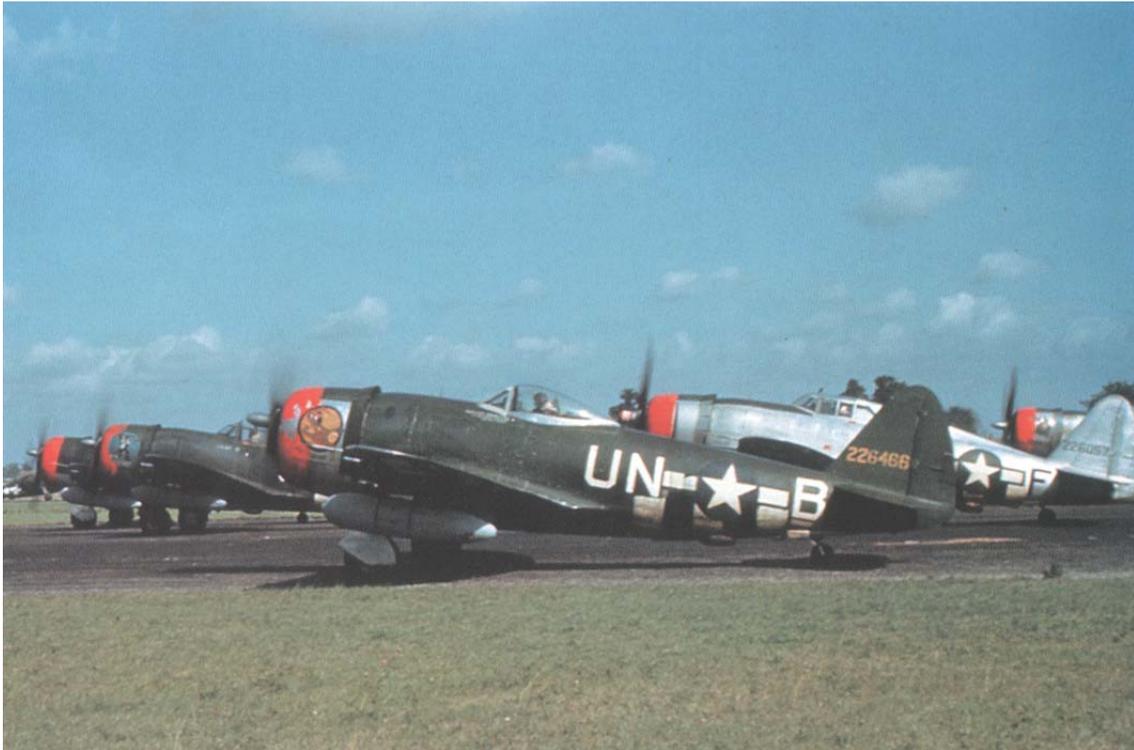
General Scheme	Field Drab (Dark Earth 617)	over	Olive Drab 613
Red Terrain	1:1 Earth Yellow No. 6 and Earth Brown No.5	over	Earth Brown No.5
Yellow Terrain	2:1 Earth Yellow No. 6 and Field Drab (Dark Earth 617)	over	Earth Brown No.5
Green Terrain	Light Green No. 1	over	Olive Drab 613
Light Sand	Sand No.3	over	Sand No.3
Spotted Desert	Sand No.3	over	Field Drab (Dark Earth 617)

These colors are actually Army Corps of Engineers colors, and do not have an ANA designation, with the exception of Olive Drab. Note that although this chart was issued using the Corps Spec. 3-1 system, ANA numbers have been inserted (by the author) where appropriate. For those colors not identified with an ANA number, here are Federal Standard 595a comparisons:

Light Green No.1	34258
Sand No.3	33448
Field Drab No.4	30118
Earth Brown No.5	30099
Earth Yellow No.6	30257
Earth Red No.8	30117
Olive Drab No.39	34087

It is important to note that Army Corps of Engineers Olive Drab is *actually* the later type Olive Drab adopted by the ANA system, and not the earlier, browner shade of Olive Drab. The underside colors of desert environment aircraft are generally Azure Blue 609 or Sky 610.

Although USAAF Spec. 24114 remained the standard practice for aircraft through 1945, in October of 1943 the Army Air Force eliminated requirements for camouflage paint to be applied to aircraft at the factory. The practice of camouflage was not altogether dropped, however, the decision to camouflage aircraft was left up to the commanders in the field. If theater commanders agreed that a specific type of camouflage was needed, then that particular type of paint was applied at the factory. Theater commanders were also allowed to remove camouflage at this time, allowing for improved performance due to the weight and resistance of the paint. It is ironic to note that in January of 1944 the 9th Air Force required all fighter aircraft to wear camouflage. By March, the 9th was accepting and operating *new* natural metal aircraft, but would not allow camouflage on older aircraft to be removed.



The result is often seen on photos: a squadron of fighters in formation, some natural metal, others camouflaged, operating in conjunction with each other. Aircraft of the 8th Air Force responded more quickly to the changes, with natural metal aircraft appearing in mid-October of 1943. This trend continued until May of 1944, when aircraft were again ordered painted in preparation for the D-Day landings. With the large number of aircraft participating in the D-Day operations, the problems with aircraft recognition came into play. In early June of 1944, ETO (European Theater of Operations) combat aircraft were required to operate with 12" alternating recognition stripes, 3 black and 5 white, along the

wings and fuselage. Although the stripes were ordered removed by September 1944, several cases have been noted where aircraft continued to carry "invasion stripes" well into 1945. Most 8th AF aircraft retained D-Day markings and camouflage until August-September 1944.

Contrary to popular belief, most Natural Metal aircraft were waxed or over-sprayed with a clear coat, thus allowing the silver primer and natural metal surfaces to show through. This reduced the weight of the aircraft, allowing for improved range, speed, and performance. Anti-Glare panels were typically Olive Drab or Flat Black, however, there are numerous examples of aircraft utilizing their squadron colors as anti-glare panels.

Pacific Theater aircraft carried the Spec. 24114 scheme much later into the war. Immediately following the Pearl Harbor attack, large quantities of aircraft destined for England were retained and diverted to the Pacific, where many of them retained their Dark Earth 617 with Dark Green (FS 34078) or Olive Drab 613 color schemes. Gradually these aircraft were repainted with standard Olive Drab/Neutral Grey, however, countless variations in paint schemes existed during the first 6 months of the Pacific war. Natural Metal aircraft began to appear in late 1943, and were often seen operating alongside camouflaged aircraft within the same unit, as new aircraft were generally rushed into combat. Older aircraft generally retained camouflage paint until such time as the aircraft required service. Paint was applied to new aircraft in areas where air superiority had not yet been achieved. Aircraft operating over the Japanese homeland generally wore natural metal surfaces, as the distances they flew required careful attention being paid to reducing aircraft weight.

Aircraft operating in the CBI (China-Burma-India) theater were subject to Pacific theater regulations, with one notable exception. Combat aircraft operating in the CBI were required to have 5 white stripes, each 6 inches in width, with a 45° forward rake around the fuselage aft of the trailing edge of the wing. This was to allow for easier recognition in combat situations. In the case of Natural Metal aircraft late in the war, the recognition stripes were eliminated, the Allies having achieved air superiority by this phase of the war.

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