



UV Black Lights: Can They Determine if an Item is Original?

In a world of collecting where counterfeits are constantly being introduced, many people have struggled to find a solid way of identifying fake items from originals. New collectors are haunted by the thought of spending hard earned money on something that later turns out to be a reproduction or forgery. With the escalation in value (and prices) for items categorized as "militaria" (including helmets), it has become important to determine if a given item is truly authentic.

Many sage collectors have come to rely on their many years of collecting experience in order to determine if an item is original or not. Most collectors will tell you that they have learned from direct experience, having found out "the hard way" by purchasing an item or two thought to be original that later turned out to be a fake. Collectors or vendors claiming that they have never made a mistake in this area are probably stretching the truth. In some cases it becomes nearly impossible to tell a high quality forgery from the original article.

While many collectors have their own techniques for determining authenticity, one

method that has been a source of great confusion is one that relies on Ultra Violet (UV) light.

The practice of applying UV light (commonly referred to as black light because of its blue-black color) was introduced into the collecting scene in the 1970's. At the time, the practice of exposing UV light to stamps, paper currency, and photographs had already been established as a



means to identify modern white pigments and to expose marks or details not commonly seen in normal light. Collectors of paper artifacts had learned that items thought to be reproductions often glowed (or illuminated) a bright fluorescent white when compared to items thought or known to be original (the glow itself is referred to as "fluorescing".)

A little investigation into this phenomenon revealed that newer or more modern

pigments used in materials containing white elements often glowed significantly when compared to those produced in earlier times.

By placing two articles in a totally dark room, it was discovered that a person could test each item in question by passing a hand held UV black light over their surface. If one item glowed and the other did not, the one that glowed was dismissed as being a fake or forgery. If an item fluoresced, the conclusion was that the article must contain modern white pigments and therefore it could not have been made in earlier times.

As word spread about this evaluation technique, many people began to buy hand held black lights to assess their own collections and any future purchases suspected as being fake. Before long, UV black lights were being used on everything in the militaria collecting realm. This included uniforms, caps, cloth insignia, and anything that contained a textile thread or natural white fiber.

Naturally the results lead collectors to believe that they could easily identify a fake item using UV light. What resulted later was a growing number of militaria collectors who came to rely just on their UV black lights to determine authenticity. Many collectors



were now able to declare with bold confidence that one item was fake while the other was authentic! An instant “authenticity” tool had been created and many people began to catch on to the new fad.

Today, there exists a large number of WWII relic collectors who still hold fast to their beliefs that their hand held UV black lights are their “proof positive” that one article is fake while another is real. However the question for many still remains:

- *Can militaria collectors rely exclusively on black lights to determine authenticity?*
- *Are UV black lights the “secret trick” that helps one collector over another?*
- *Should every item that fluoresces be considered a fake?*

Let’s take a closer look at the facts. In the beginning, it was thought that any garment or textile produced in the mid to late 1940’s was constructed of material that was bleached white by a natural process compared to modern techniques that use heavy chemical beaches or detergents. The theory was that old garments containing natural or white fibers



Some, but not all, original medal ribbons will fluoresce under the effects of a UV black light.

would not fluoresce under a black light because no artificial bleaching agents were used in their production.

By comparison, modern articles composed of white materials would glow under UV black light because the light would expose the chemical within the fiber itself. The assumption was that the material used in the construction was bleached by artificial (or modern) chemical agents rather than natural means like those found in older garments with similar fibers.

People concluded that modern industrial bleaching agents must have evolved to a point where they replaced the natural bleaching techniques used in pre-WWII textiles. This theory was supported directly by testing various items with UV black light. Testing of various articles did

show that one article might glow while another would not. Based on the majority of tests conducted by collectors in an unscientific setting, it appeared that the older materials would not fluoresce while the modern materials would. The conclusion was quickly drawn that modern materials will always fluoresce as a result of chemical bleaching while older materials would not.

A closer examination of the facts revealed that it was not chemical bleaching agents that caused this effect, but the actual fibers of the material itself. While it is true that chemical whitening agents are used to make modern materials appear “whiter”, what UV black light typically responds to is the material itself. In post WWII materials it is the synthetically produced fiber



that is causing the fluorescing rather than the chemical agent used to whiten the fiber. In some cases it is the combination of the two factors (both material and whitening agents).

Compounding the issue however is the fact that non-synthetic material (such as the cotton or rayon used in wartime Germany) was also shown to fluoresce if washed in a modern bleaching or chemical detergent!

The combined results therefore indicated some interesting findings:

- *Modern synthetic fibers that have a white appearance will fluoresce under UV black light.*
- *Non-synthetic fibers that have a white appearance like those found in wartime German materials (cotton and rayon) will not fluoresce under UV black light.*

Non-synthetic fiber exposed to modern chemical detergents or whitening agents *will* fluoresce under UV black light as a result of a chemical effect on the material itself.

One conclusion leads to the next and one might ask the next logical question; Do materials that are not white or natural in appearance (such as green, black, or blue threads) glow under a

UV black light test? And of course the answer is no. Neither synthetic or non-synthetic fibers dark in color will glow under black light exposure. UV black lights only respond to natural or white materials and not to dark or colored fibers.

Therefore one additional conclusion can be added to those already gathered:

- *Both non-synthetic and synthetic materials that are not made of white or natural fibers will not glow under UV black light unless exposed to modern chemical whitening agents or detergents.*

By the fact that a UV black light can not distinguish between modern synthetic and older non-synthetic materials other than white or natural is

of some concern. If a given article contains only dark threads or materials, a UV black light is of no value in determining whether or not the item is of modern manufacture. Compounding the issue is whether or not an older non-synthetic fiber has been washed in a modern detergent or bleaching agent rendering it with the appearance of being newly made as a result of it fluorescing under UV black light.

For this reason, the UV black light can not be used as a single source of credible evidence in favor of one article being original and another being fake.

As one can clearly see, there is more to consider than just whether or not an item will fluoresce under UV black



Original decals will not glow under UV light.



light when determining authenticity by that method alone!

At this point in time, an astute reader might ask these simple questions:

- *Did wartime Germany ever employ the use of synthetic materials or did they just use wool, rayon and cotton?*
- *Were chemical whitening agents ever used in Germany that give the same effect on white materials like those found in modern fibers?*

And of course the answer is YES! Much to the chagrin of those who rely exclusively on UV black lights to determine authenticity, wartime Germany did in fact use such materials at various points in their manufacturing history. Patent searches reveal that many leading industrial textile firms in Germany had submitted for approval the use of chemical whitening agents as early as 1890! That would mean that by the start of WWII, the German textile industry would have had nearly 50 years of direct experience in advanced textile production using chemical whitening agents.

From this information we can only conclude that UV black lights *are not accu-*

rate enough to determine if a given article is original or not. As a stand alone tool, the test can not do the job by itself. Collectors must take into account other aspects of the item in question (the construction, look, materials, etc.) rather than just relying on a black light test to determine authenticity. Unfortunately, many collectors have come to rely on black lights and will refute these facts just to prove their point.

But what about the use of UV black lights on helmet decals? Can black lights be of any assistance here? Avid believers in UV black light testing have also concluded that the test is good for determining the authenticity of helmet decals (both applied and unapplied). Users of black lights will often support the notion that the test will detect a fake decal from an original. Like cloth items, the belief is centered on the fact that some

reproduction decals will fluoresce under black light while originals will not. Most often cited is the belief that all fake decals will glow white or bright orange if they are fake. Is this true?

Let's take a look at the evidence. Given what we have already discovered we know that UV black light responds not to chemical agents in a given article but rather the material itself. We also know that black lights only fluoresce objects that are synthetic in nature or have been exposed to chemical whitening agents. Given the design colors used in WWII helmet decals we know that only a few patterns actually use white. The majority use dark colors or have metallic properties. So why then do people think that UV black lights can detect fake decals from originals? The answer once again is related to the material the decal is printed on and the ink

The following original items have been shown to glow under UV black light and should be accepted as "originals" based on solid research:

Original Items that will Potentially Fluoresce

- Some but not all white sewing threads.
- Some white fabric including that generally used mid to late-war.
- Some but not all ribbons that possess white elements.*

**It is important to note that most reproduction ribbons fluoresce but the effect is generally brighter than that found in originals.*



used in their manufacture.

Modern reproduction decals are almost always water-based decals. Since modern water-based decals are printed on thin sheets of Mylar, the plastic itself is a synthetic material. When white synthetic plastic is exposed to UV black light it has been shown to fluoresce brightly. The problem however lies in the fact that not all reproduction decals are printed on plastic. Many are printed using dry-transfer inks and also lacquer-based ink with the consistency of thin layers of paint. These substances do not fluoresce under black light. Because original decals (both applied and unapplied) do not glow under black light testing, it can be concluded that they are not synthetically made. However since some reproduction decals mirror the construction materials used in originals, there is no way of telling (by way of the black light) the difference between an original and reproduction decal and a reproduction decal that is not printed on plastic.

To compound this issue, it has been shown that when a clear finish of lacquer is applied over the top of a water-slide decal printed on Mylar (or those printed at home using color printers and modern decal paper) it *will not* glow under UV

black light! The reason being that the lacquer substance painted over the top of the plastic decal does not respond to UV black light. In other words, a lacquer finish applied on top of a plastic decal that would normally glow under black light will not glow at all. The lacquer will in fact mask the fluorescing effect.

Therefore, one can only conclude that a black light is not especially helpful in determining the authenticity of any given decal. Original decals may not glow under black light, but reproductions may not either if treated with lacquer or printed on materials similar or identical to those used during WWII. ***GH***

In addition to this information, helmet collectors should note the following regarding reproduction and original helmet decals:

Black Light Effects on Decals

- Dry transfer reproductions will not fluoresce under UV testing.
- Some, but not all commercially produced reproduction water-slide decals will fluoresce.
- Some, but not all "home produced" decals originating from color printers will fluoresce.
- Reproduction decals coated with clear substances (like lacquer) will not glow under black light. Clear coating will mask the effect and further investigation is always needed.
- Original decals, both applied and unapplied, will never fluoresce under UV light.
- The color of an original decal under UV light, applied or unapplied, is generally dull tan with a hint of "yellow".