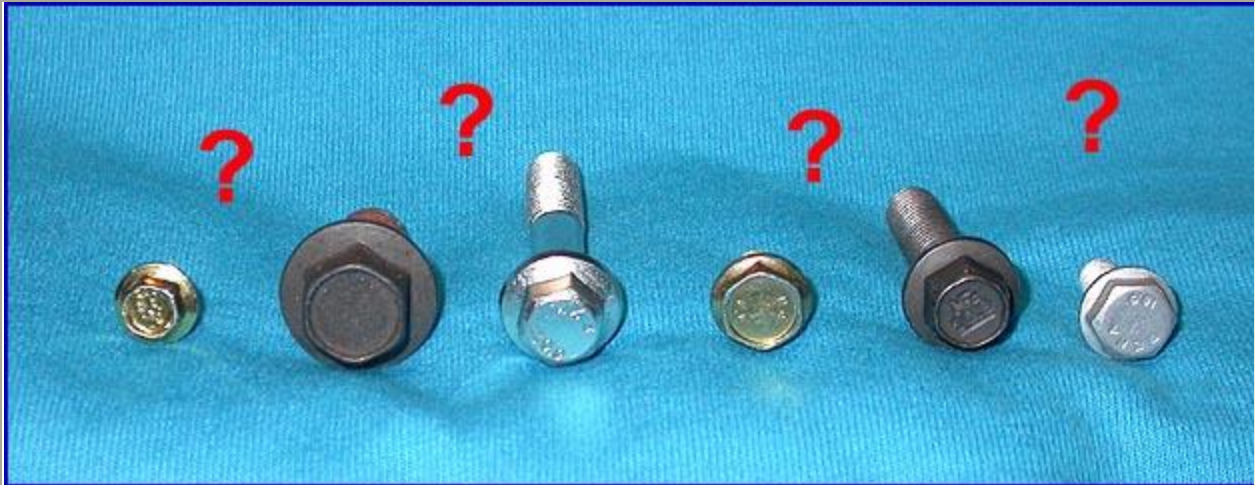




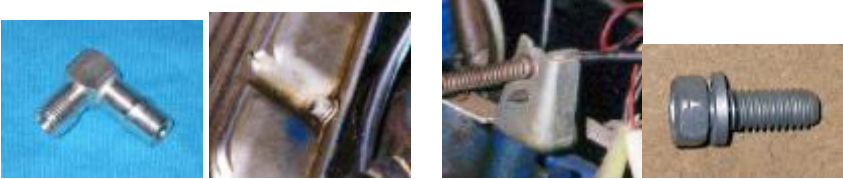
How to Identify Coatings and Platings on Underhood Parts










Identifying the different types of coatings used on components can be a tricky job, especially since both Zinc and Cadmium plating were used in 1971. An engineer from the Ford Fastener Engineering Laboratory has provided some "Rules of Thumb" to use in identifying coatings and platings. These have been captured in the table below along with some photos of these different coatings.

(Note: Click on thumbnail photos to enlarge)

| Coating | Also Known As; | How it Looks; |
|---------------|---------------------------------------|--|
| Zinc Chromate | Zinc Silver Zinc Clear Chromate | <p>Shiny Silver Plating</p> <p>This shiny silver plating is commonly used on the new silver nuts and bolts you buy at the hardware store and can sometimes have a slight bluish tint. Zinc plating is the most common and economical type of plating and is a sacrificial coating designed to corrode so the part does not. The limitations of zinc are that when the plating begins to corrode the zinc rust is plentiful and unsightly. Zinc Chromate plated bolts were used to attach the fuel pump to the engine.</p> |

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| Zinc Dichromate | Yellow Zinc Gold Zinc Yellow Dichromate | <p>Yellow/Gold Shiny Plating This is a yellow/gold plating often seen with a pink and green rainbow effect visible on the plating surface. Items with this coating are first plated with zinc, then treated with a dichromate coating which gives it the yellow/gold appearance. It provides moderate corrosion protection and was used on the 71 Alternator Pulley and Fan.</p>  |
| Cadmium | Silver Cadmium Silver Cad Clean Cadmium | <p>Dull to somewhat shiny Silver Plating Cadmium, a whitish, silvery plating is superior to zinc for corrosion protection and is used in harsh environments such as areas prone to salt corrosion, offering twice the corrosion resistance of zinc. Although commonly used on fasteners and other parts by Ford back in the 60s and early 70s, it is rarely used in the auto industry today because of its toxicity. A good example on our engines is the Accelerator Bracket and Valve Cover bolts.</p>  |
| Gold Cadmium | Yellow Cadmium Gold Cad Yellow Cad | <p>Yellow/Gold Shiny Plating Like zinc dichromate, this yellow/gold plating often has rainbow effect of pink and green visible in the plating. Items with this coating are first plated with Cadmium, then treated with the dichromate coating giving it the yellow/gold appearance. Like Silver Cadmium, it was often used in areas subject to corrosion from road salt since it has a much higher resistance to corrosion than Zinc Dichromate. Cad is no</p> |

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| | | <p>longer used on fasteners and underhood components by the automotive industry due to toxicity.</p>  |
| <p>Zinc Phosphate</p> | <p>Phosphate and Oil over Zinc</p> | <p>Gray to Black Coating This smooth, even, Gray to Black coating results from phosphate and oil applied over a zinc base plating. Unlike the Phosphate & Oil coating described next in this table, Zinc Phosphate does not have the heavy phosphate crystallization present all over the fastener surface. In addition, Zinc Phosphate maintains its original appearance well and has much better corrosion resistance than "Phosphate & Oil". This coating is frequently used for coil brackets, bolts, and miscellaneous pieces where a nicer, dark appearance needs to be maintained.</p>    |
| <p>Phosphate & Oil</p> | <p>Phosphate and Oil over Manganese</p> | <p>Gray Coating with Crystals Evident This consistently Gray, dull coating is applied over a manganese base plating and is characterized by a moderate to heavy phosphate crystallization over the surface of the part. It is commonly used on fasteners and some underhood components where appearance is not important (like accessory drive brackets) since this coating deteriorates soon after its exposed to the weather.</p>    |

How To Tell One Plating From Another

Okay, so now you know a bit more about the platings and coatings used on the parts of your engine. But if you noticed in the chart above, there are two silver coatings, two gold/yellow coatings and two phosphate & oil coatings. How do you tell which is which? We asked a plating company and the Ford Fastener Lab for some guidelines to help with this.



How To Tell Silver Cadmium From Zinc Chromate

Silver Cadmium plating tends to have a whiter appearance and a duller luster than Zinc Chromate, which is more silvery and shiny. In the photo above: Silver Cadmium on left, Zinc Chromate on right.



How To Tell Zinc Dichromate From Gold Cadmium

This is an easy one - you can't! That is, unless you take your part to a metallurgical lab and have it tested on a special piece of equipment. These two coatings will appear identical to the naked eye because although they have different base platings (Cadmium -vs- Zinc), the final coating is the same type - Dichromate. So, if you're going to re-plate an item you believe was originally Gold Cad, why not go for the more easily available and less toxic Zinc Dichromate? Oh yeah, I almost forgot - in the photo above, that's Zinc Dichromate on the left and Gold Cadmium on the right ;-)



How To Tell Phosphate & Oil from Zinc Phosphate

These are both classified as "Phosphate and Oil" type coatings. The difference lies in the

coating applied before the phosphate & oil overcoat. As the name implies, Zinc Phosphate is Zinc with a Phos/oil coating applied while the "Phosphate and Oil" is actually Manganese with a Phos/oil coating. Now, how to tell them apart. The Zinc Phosphate coating (right, in photo above) will appear smooth and not have any obvious crystallization in the coating and can vary from gray to black. The Phosphate & Oil manganese based coating (left in photo above) will be consistently gray, dull and will have significant crystallization apparent in the coating. In the photo above, note how the Phosphate & Oil manganese based coating at left has a very heavy phosphate coating nearly obscuring the markings on the bolt head while the Zinc Phosphate at right has a very smooth and even coating showing the head markings clearly.

Hint About Uncovering Your Original Coating

Many of the original coatings can be found on parts in their "protected areas", where they are fastened together to another part, underside of bolt heads, etc. These areas have not been exposed to the elements and can usually provide a good indicator of the part's original finish.

A Special Warning About Cadmium Toxicity

All potential Cadmium platings should **ONLY** be removed by a professional who knows about the material. Cadmium dust immediately leads to respiratory infection, and even trace amounts can be extremely dangerous and potentially fatal.