THE STEEL SUPPLY COMPANY

Hard Chrome Plating

The Steel Supply Company, and Precision Chrome Inc., have been pioneers in the process of hard chrome plating, also known as industrial type plating, for more than half a century. This plating process should not be confused with decorative chrome plating which is actually a corrosion protective plating of other metals and an extremely thin plate of hard chrome over this material.

Of the numerous surface treatments available, hard chrome yields a combination of properties that are very unique and not readily provided by other plating processes. This would account for the widespread acceptance of hard chrome plating by numerous industrial applications. Hard chrome plating provides an extremely hard, long wearing surface coupled with a low coefficient of friction. Typical hardness values measure in a range of 800 to 1200 Knoop, and coefficients of friction are typically 25% of the value for steel. These properties make hard chrome plating useful for many applications ranging from hard surface cutting tools, engine cylinders, ways on machines tools, guides and pins, repair of worn parts, ring gauges, elements for computers, and, of course, hydraulic cylinder components.

Years ago it was a common procedure to machine piston rods, grind the surface, and then piece-part chrome plate as a final operation. This entails many parts made at risk of handling damage and poor surface preparation. Currently, it is much more economical to use pre-plated stock and machine parts as a final operation. Parts are now immediately available for assembly and handling is minimized.

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The actual mechanisms of hard chrome plating are difficult. Chrome is present in the bath solution in the form of chromic acid. However, for it to plate, a catalyst must be added. There are several ions that will serve this purpose. Two of the most common in regular use are sulfate and fluoride. Plating temperatures are approximately 120 degrees F., and 2 to 3 amps of power per square inch required. Solutions are continuously monitored, measured and documented for compliance.

As chrome is deposited, stresses build up in the plate until a crack develops when those stresses exceed the strength of the deposited chrome. This process continues throughout the plating process. For this reason, and the thousands of tiny cracks continuing to the base metal, hard chrome will not provide protection against corrosion. In actual cylinder use, this is not a problem as a continual film of hydraulic oil is present and provides protection against rusting. Any items not in use, or in extended storage, need to be inspected and oiled on a regular basis.

In machining hard chrome plated rods or tubes that have been plated as much as .002" thickness, the best rule is to use standard machining practices. Although the chrome is extremely hard, it is not actually cut but lifted off with the steel chip. It is possible to "chase" threads directly over a chrome surface and carbide or ceramic tooling is often the best choice when selecting a proper insert.