

Colloidal Silica

Preparing a Sample Surface Using Colloidal Silica Polishing Medium

Colloidal silica is a commonly used polishing medium that has been around for many years. Its primary use was originally for polishing silicon wafers used in the electronics industry, but now you'll also find it in conventional metallographic laboratories for processing ferrous, nonferrous, and refractory alloys, as well as ceramic materials.

In this article, we'll give you a general overview of what colloidal silica is, our best tips for using this medium in a way that will give you the results you desire, and some recommendations for staying safe while using this product.

What is Colloidal Silica?

Colloidal silica goes by different names: Syton, Ludox, CS, etc., which are actually brand names (kind of like how many people call facial tissues "Kleenex"). It is colorless and odorless. Chemically, it is silicon dioxide (SiO₂) and belongs to the silicate family. It consists of silica particles dispersed in an aqueous alkaline medium, which reacts to the silica surface to produce a negative charge. Because of this negative charge the particles repel each other, resulting in a constant and stable suspension. The size of the silica particles is around 8 nm (8x10⁻⁹ meters).

How to Use

When a fine polish is desired, colloidal silica is an excellent final polishing medium for low, medium, and high carbon steels, alloy steels, cast irons, quench and tempered steels, copper and copper alloys, aluminum and aluminum alloys, titanium and titanium alloys, 300 and 400 series of stainless steel, plasma-sprayed nickel base superalloys, and alumina, zirconia, or magnesia ceramic materials.

Whether manual or automatic procedures are used, colloidal silica is meant to be used on a thoroughly wetted medium nap cloth such as Lecloth or Imperial. The polishing wheel speed is slower than that used with the more traditional polishing media, gamma aluminum oxide, ferric oxide, or magnesium oxides. The speed should be 100 to 200 rpm with light pressure applied; around 25 to 30 psi with the PX system. Time will vary between 30 and 300 seconds, depending upon the material being processed.

Although LECO's Colloidal Silica is non-drying and non-freezing, it is good practice not to let it remain on the polishing cloth for long periods of non-use. The polishing cloth should be rinsed at the end of each day, however, agglomerates will not form if allowed to dry, and the cloth can be reconstituted by rewetting.

Storage

Colloidal silica should be stored at room temperature in tightly capped containers. Unused portions of colloidal silica can be replaced in the original containers.

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