

Photonic

Cleaning Technologies

MIRRORS, METALS AND FIRST CONTACT™

FIRST CONTACT™ Polymer Solution is the first strip coat cleaner in the world that safely cleans first surface mirrors, protected or unprotected, highly polished metal surfaces, diamond-turned surfaces. FIRST CONTACT™ solution follows surface contours, dissolves organic contaminants and encapsulates particulates as it dries to a robust film. Peeling the polymer film renders the surface pristinely clean! The polymers in FIRST CONTACT™ have been tested and evaluated by independent laboratories using many techniques.



The Cleaning & Protection System

FIRST CONTACT™ POLYMERS:

- ◆ Clean off contaminants and nano-particulates.
- ◆ Remove fingerprints (skin oils).
- ◆ Leave no residue.
- ◆ Remove residue from treatments using other products or chemicals.
- ◆ Leave optical thin films intact on optics, mirrors, and gratings.
- ◆ Physically protect optics from airborne contaminants and accidental contact.

PRODUCT

FIRST CONTACT™ was developed over several years; now it is available as a one-part solution that is ready to use right from the bottle.

The product consists of designer polymers in a complex solvent system. FIRST CONTACT™ adheres strongly to itself and particulate contaminants, but has minimal adhesion to the mirror's surface. The solution dries to a flexible film and peels off easily, leaving an amazingly clean surface.

The solvent system has been carefully developed to work with mirrors, highly polished surfaces, and coatings. The solvents have been selected to dry at a controlled rate to avoid thermally shocking the surface. The system is quite safe, utilizing common solvents like ethanol and acetone.

In addition to cleaning mirrors and metals, FIRST CONTACT™ cleans optical glass, Si, Ge, ZnSe, NaCl, KBr, KRS-5, thin films including AR and reflective coatings, crystals, and non-linear crystals like coated BBO – even diffraction gratings! Smooth or rough surfaces, flat or curved surfaces, continuous or non-continuous surfaces can all be cleaned safely, easily, and completely with FIRST CONTACT™ because the fluid solution conforms to any surface but the polymer film releases easily; removing all particulate and organic contaminants.



CLEANING

The polymers have been tested over and over again to show they remove contaminants but not optical thin films or metal substrates. In fact, studies by different researchers attest to the FIRST CONTACT™ polymer's ability to restore first surface mirrors to pristine, nearly-new reflectivity.



NO SCRATCHES

In addition to leaving surfaces optically clean, FIRST CONTACT™ Polymer Solution cannot scratch. The liquid solution can be sprayed on, poured on, dropped on, or brushed on the optic; nothing ever touches the surface except liquid FIRST CONTACT™ Polymer Solution. There is no way to scratch the substrate! Completely safe when properly applied regardless of the contaminants.

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FIRST SURFACE MIRROR CLEANING DATA

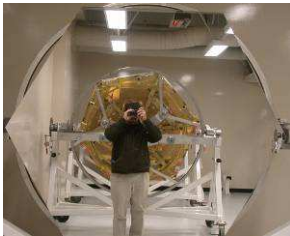
P. Giordano working at an European Southern Observatory site in Chile characterized fresh aluminum mirrors and then let them sit for several months. Cleaning with CO₂ snow restored about one-half the lost efficiency however cleaning with **FIRST CONTACT™ Polymer solution restored the mirrors to pristine condition.**

EFFECTIVE SURFACE CLEANING TOOL

JPL in Pasadena, California evaluated **FIRST CONTACT™ Polymer Solution** following Mil-STD-1246C Notice 3. JPL found that First Contact cleans comfortably into the A10 level with only one-tenth the residue as the A10 definition allows. Comparing the results to other JPL reports, First Contact treatment alone is nearly sufficient to meet Level 2 requirements for space exploration sample handling. Simply apply the polymer, let it dry, and remove it. Cleaning can be done on your schedule because the polymer film protects surfaces while keeping them pristinely clean until it is peeled off. Your optics have never been cleaner!

SURFACE COVERAGE

Coverage depends on optic size, shape, and roughness. One (1) milliliter of **FIRST CONTACT™ Polymer Solution** can clean about 6 smooth, flat, 1" (2.5 cm) optics. Larger optics require a thicker coating to provide enough film strength for easy, complete peeling. Rough optics, e.g. diffraction gratings, and certain optic thin films also require thicker, stronger film layers to peel off completely in a single piece.



OPTIC SIZE LIMITATION

There is none! **FIRST CONTACT™** has cleaned surfaces as small as fiber optics to as large as 6 foot hexagonal first surface mirrors. If you can apply the solution and remove the film, there is no optic too small or too large for cleaning with **FIRST CONTACT™ Polymer Solution**. First Contact cleans micro- and nano-structures, too!

PROTECTION

FIRST CONTACT™'s polymer film provides excellent protection to the coated surface! The inert polymers form a strong, flexible covering that adheres intimately to the surface. The polymer film prevents airborne contaminants and accidental contact to eliminate fingerprints, particulate contamination, and abrasion damage.

FIRST CONTACT™ polymer film is also an excellent barrier to oxygen, water, water vapor, and sulfur compounds. This level of protection helps prevent oxidation and chemical attack that could damage the optic during storage or shipping.



APPLICATION MODES

FIRST CONTACT™ is a versatile cleaning tool. Its versatility extends to application techniques. **FIRST CONTACT™** may be applied with a brush, from a pipette, by dipping, pouring, or spraying. Please go visit our website, www.PhotonicCleaning.com, or contact us for more information about spray application.



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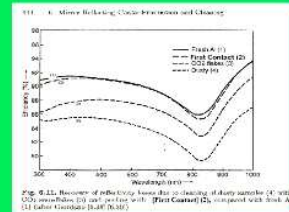
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"Various cleaning techniques were applied to the 'dusty' primary... In practice, [First Contact] was considered the optimum solution..."

"Further experiments have confirmed the superiority of the [First Contact] peeling technique..."

"In summary, techniques for... cleaning have clearly entered a period of active development... certainly one of the most important trends in modern telescope optics." -- R. N. Wilson



Wilson, R.N., Chapter 6 in *Reflecting Telescope Optics II*, Springer-Verlag, 1999, pp 442-8