OPTICS CLEANING KIT

The TJS 604-0100K Optics Cleaning kit contains all items necessary to safely clean all of your laser optics.

Contents:

Optical Grade Methanol (Liter)

Applicator Bottle

Compressed Air

Lint Free Lens Tissue (4 x 6” Sheets)

Cotton Tip Applicators

Latex Fingercots

Worldwide Coverage: Optics, Lasers, Imaging, Fiber Optics, Electro-Optics, Photonic Component Manufacturing
PHOTONICS SPECTRA

Scratches can result from improper cleaning methods.

The Dirt on Cleaning Optics

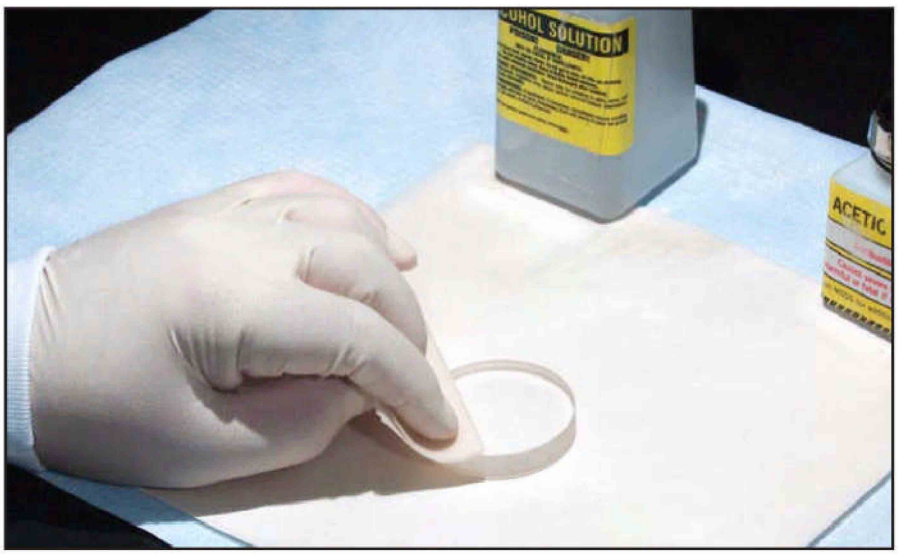
The reason for cleaning an optical element is to improve performance. Proper materials, techniques and handling procedures should be used to minimize the risk of damage.

Anyone who has worn glasses or driven a car knows the detrimental effects of dirt on the performance of a lens or window. The effects can be more serious in optics setups that involve laser radiation.

Contaminants, whether on a coating or on the substrate surface, can absorb laser energy, leading to damage to the coating or its interface with the substrate. Studies have shown that the cleaning process alone can cause variations in the laser damage threshold of a coated part by 25 to 75 percent. It is easy to see why cleaning, coating and packaging in a cleanroom environment are so important to both the lifetime and performance of optics.

Unfortunately, the photonics industry does not have established standards either for cleaning methods or even for the definition of what a "clean" optical element is. The only widely accepted principles are that all cleaning methods incur some handling risks and that excessive or unnecessary cleaning should be avoided to prevent limiting the lifetime of an optical component — in particular, coated optics.

Historically, optical components such as mirrors and beamsplitters



The wipe technique should involve smooth and continuous motions of the lens tissue across the optic.

Precision optics should be handled properly in cleaning. Here, the prism is held on the frosted surfaces.

have been cleaned by hand, using lint-free optical wipes and reagent-grade acetone or another liquid solvent such as methanol, ethanol, 97 percent pure isopropyl alcohol, methyl ethyl ketone (MEK) or methylene chloride (MEC). Some inorganic acids such as trichloroethylene (TCE), hydrofluoric acid (HF) and hydrochloric acid (HCL) may be used on uncoated silicon wafers, and nitric acid may be used on germanium substrates. Acidic solutions, however, should never be used on coated or uncoated zinc sulfide (ZnS) or zinc selenide (ZnSe) components.

Acetone is very good at dissolving grease, but it dries very quickly and always should be handled with acetone-impenetrable gloves. In general, isopropyl alcohol is a safe and effective cleaner — except for cleaning aluminum coatings. Because alcohol reacts with aluminum, it should never be used on protected or bare aluminum-coated mirrors. Methanol and most acidic solutions can be toxic or damaging to optics or coatings if misused, so care should be taken to follow the instructions provided by the manufacturer.

Combinations to Avoid

Alcohol	Aluminum coating or substrates
Acids (e.g., HF, HCL)	Coated optics Zinc sulfide (ZnS) Zinc selenide (ZnSe) VIS and UV optical glasses (e.g., BK 7, fused silica, CaF_2, MgF_2)
MEC, MEK, TCE	Coated optics
All	Bare metal coatings (e.g., gold, copper, aluminum)
Ultrasonic cleaning	Metal coatings Soft optical glass (e.g., CaF_2, MgF_2, SF11)

Before cleaning, it generally is recommended that one first remove dust and other large particles of debris using a bulb blower, a camel hair brush or dry-nitrogen-propelled compressed air. Other pressurized gas products are not recommended because the propellant could be released onto the optical surface in the form of liquid droplets.

Three hand-cleaning techniques typically are used, depending on the type of optic and the level of cleaning required: the drop-and-drag method, the wipe method and immersion. For each, it is important to handle the optics with care. Using latex gloves or powder-free finger cots and always holding the component by the outer edges will help to prevent additional scratches, chips or fingerprints.

The drop-and-drag method, the most commonly used, is intended for light cleaning. A drop of methanol or reagent-grade acetone is placed in the center of a clean lens tissue, precision quality optical wipe or microfiber cloth; it should not be applied directly to the lens surface. The wet portion of the wipe is placed on the optic and slowly dragged across the surface, exerting no pressure. The surfaces of both the wipe and the optic should be nearly dry at the completion of the drag. If done properly, the residual solvent will have evaporated from the optical surface without leaving spots or wipe marks. In many cases, it is beneficial to clean the edges of the optic first to prevent dirt or excess polishing compound from being drawn onto the polished surface.

The wipe method is recommended to remove fingerprints and other embedded residues on uncoated surfaces or durable coatings. This technique uses a clean lens tissue or wipe folded into a brush and grasped near the fold with a hemostat, fingers or tweezers. Several drops of solvent are placed on the fold, and the excess is shaken off. With gentle, uniform pressure, the brush is wiped slowly from one edge of the optic to the other and then discarded, even if a second wipe is required.