

Cleaning Optics *by Thomas Baader*



All the good advice given below has been derived from observing "old hand" opticians at Carl Zeiss Jena, who had cleaned optical surfaces for more than a lifetime (and like always in life; one must "steal with the eyes – not with the fingers").

Our heart stood still when we saw the "Final Touch" procedure (see below) first time, performed on a priceless giant APQ triplet lens at Zeiss, but the workers there were really kind to explain all the "to do's and not to do's", so that we can pass them along to you here.

Preliminaries:

Don't let any "cleaning devil" ("Putzteufel".....) Ever come near to your optical surfaces! As long as you do not want to observe the ever so faint solar corona itself (which is almost impossible through modern, polluted air anyway), there is absolutely no reason at all to meticulously remove any dust grain on the lens as soon as it touches it.

Give your lenses a rub only once a year and in the rest of the time try to save them from receiving fingerprints and other forms of fat mixed with weak acids.

Fingerprints and pollen are about the only contaminants which would have to be removed quickly to not alter the coating. Both contain weak acids ("urine acid" in the case of the fingerprint).

Normal dust would have to accumulate into a real thick layer until it gets noticeable during nightly observations to reduce contrast. A little more care is to be given during solar observation with narrow-band-filters. That is about the only occasion when a lens should be kept free of **heavy** dust build up.

Again - don't overkill your lenses with aggressive cleaning! We have run tests on this for 25 years.

The myriad of scratches due to wrong cleaning methods causes thousand times more damage to the contrast than a heavy layer of dust! Series of parallel scratches on your objective can work like a grating and even cause color error (!), while dust can only take some transmission away.

We have tested it on the sun during using a new, totally clean piece of BAADER AstroSolar Safety Film against three years old AstroSolar filters, which had been left unprotected on purpose all the time.

There was absolutely no visible difference on image contrast or resolution, not even with the highest of magnifications; between using a new or old and totally dust covered AstroSolar filter. At any magnification, even when observing solar granulation image detail and contrast was exactly the same.

Cleaning Eyepieces:

The only exemption might be the lenses of your eyepieces.

The eye-lens is the one and only optical element which has to withstand the most abuse of any part of the telescope's optical system (closely followed by the stardiagonal).

The eyepiece eye-lens must be cleaned more frequently to remove fat from eyelashes inevitably touching the glass. Fortunately the small lenses of an eyepiece can more easily be heated up for receiving a real hard coating - at least much easier than larger objective lenses. There the technicians often are much more reluctant to use very hard coating processes to not end up with a broken lens due to excessive heat stress.

Usually - if the eyepiece quality is any good at all - the eye-lens can be cleaned quite frequently without getting harmed (very similar to modern acrylic lenses with hard coated surfaces, these also are being cleaned almost daily).

Use our Optical Wonder Fluid™ without fear and apply some pressure on the glass during wiping it with Optical Wonder Cloth™, indeed, use your fingernail to press the cloth into the area between the rim of the lens and the lens cell in order to remove any residue there.

The only absolute "not to do" on an eyepiece is to soak it with cleaner until it fills all the lens spacings - inside the eyepiece! It is the very "exitus" for many a (very expensive) eyepiece, to suffer a



"sudden death", when the everloving owner fills it up with Isopropyl Alcohol or Acetone - and them desperately tries to unmount the eyepiece to get the inner lenses clean again.

Most of the time, the "cleaned" eyepiece looks like Jim Chroche's "Jigsaw puzzled Leroy Brown". After assembly, such an "assortment of lenses" will never ever perform as before and between the lenses you will see dust and dirt in any stage of magnification, more than you ever thought possible.

So - when cleaning an eyepiece, always make sure to apply the cleaning fluid onto the cloth – or purified cotton wool – being used for the procedure – never onto the eyepiece itself !!

Cleaning Objectives:

This is an entirely different story.

Cleaning an objective requires peace of mind, time – and a cloudy day, where you can't observe anyway, with all your kids and spouses being off to other grounds.

The Final Touch:

On elder camera objectives you certainly have seen optical surfaces with ragged coatings, were obviously fungi and bacteriae have literally eaten up the coating down into the very glass itself.

Our Optical Wonder™ Cleaning Fluid does address this problem. Not only does it clean most thoroughly like heavy armature as - for instance - "Acetone". But since it is not an aggressive fluid, unlike Acetone, it dries off without leaving any residue, striae or color hue on the coating!

The formula contains ingrediences to actively kill myceliae, fungi and bacteriae, analyzed to foster on optical coatings.

Use Optical Wonder Fluid™ for cleaning your lens surfaces and protect them from all known organic malevolent enemies, from "pollen" – containing very aggressive aetherical oils (which can indeed penetrate into the coating layers), from dust loaden moisture, and any other "impurities" like finger-prints, waterstains and the like.

Carefully use your breath for "The Final Touch", it is the finest source for totally clean (body-) **distilled** water.

After having thoroughly cleaned the optical surface twice with OW-Fluid as detailed above, put an ever so gentle "hue" of your own breath across the area on the lens which you want to have completely cleaned. Don't "spit" on the glass though! – this would have an entirely adverse effect.... . Too much haste during exhaling would put a spray of "sputum" across the glass - and that of course definitely is not distilled water. Just slowly breathe the air from the depth of your lung, with your mouth wide open. This will absolutely evenly fog a small area of the glass which you would wipe clean quickly and decidedly (not too "hesitant"). After applying the "destilled water", You will rightaway look into the atomic layers of the fogged coating and for a moment you will clearly see all the changes / perturbations which environmental forces already have done to the coating layers. Fortunately modern coatings can withstand a lot of mistreatment. When the surface has been wiped dry, the coating will look completely smooth again.

Quickly wipe the hue with your Super Microfiber Cloth until you have a cleaned area, totally free of striae and any other residues. Proceed with this until all the surface looks entirely clean.

Due to the pretreatment with the antibacterial "OWF", you can be restassured to protect your lens for a long time!

Do not clean too much !!!



For all cleaning operations – really : less is more !



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