HOW TO clean a reflector

Ensure your reflecting telescope is delivering the best views with our cleaning tips

Tools and materials

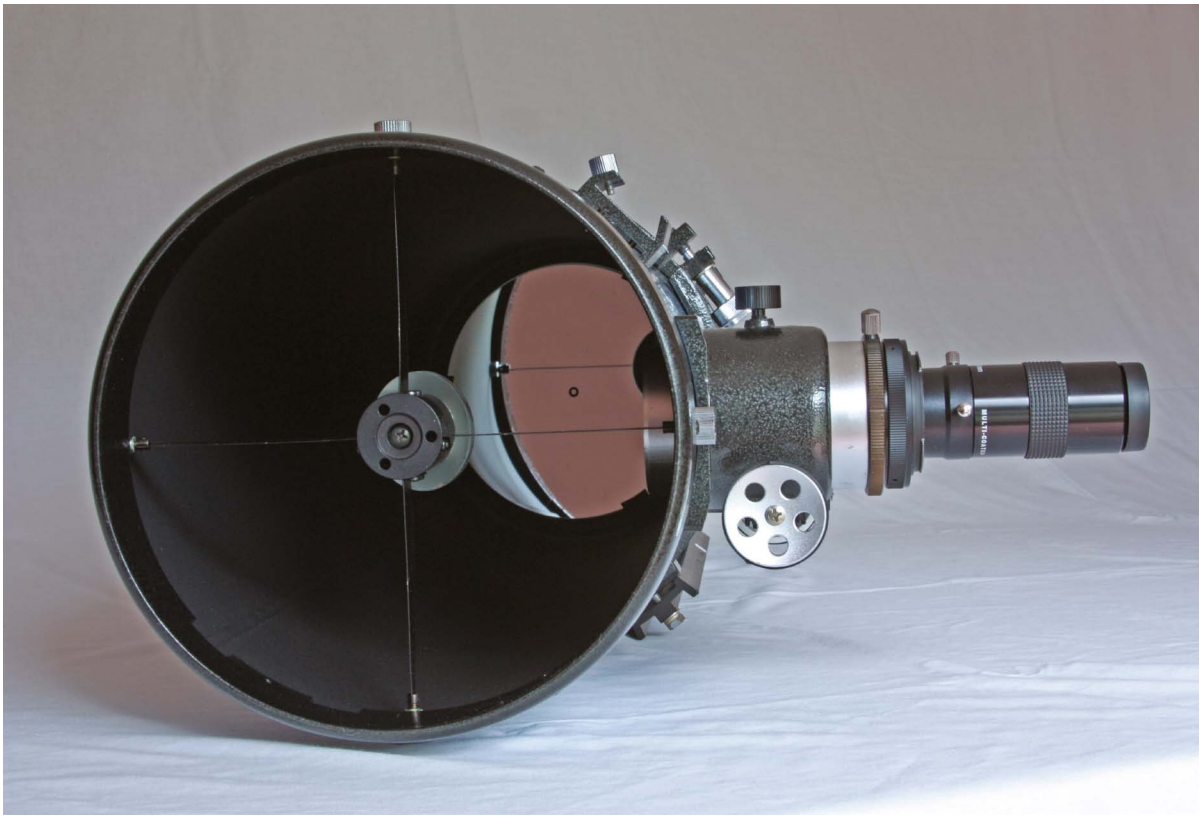
CLEAN TOWELS
Rest the mirrors on these while they dry.

DISTILLED WATER
Distilled water should be used for the final rinse. Although not always readily available locally, it can be bought from good hardware stores.

HIGH-GRADE (BP) COTTON WOOL
Cotton wool is needed to clean the mirror safely.

SCREWDRIVERS, ALLEN KEYS AND PEN
You'll need screwdrivers and Allen keys to disassemble the telescope and an indelible pen and masking tape to ensure accurate alignment during re-assembly.

TEPID WATER
You need warm water and a kitchen sink with a draining rack, a clean plastic washing-up bowl for protecting the mirrors and washing-up liquid.



Keeping your telescope clean can become an obsession, but it pays to take care of these valuable instruments. The open tube design of a Newtonian reflector makes it easy for dust to accumulate on the mirrors, especially the primary. Storing your telescope in a cupboard with the dust caps on the tube end and eyepiece holder can help to prevent it building up.

Even with careful use and storage, your mirrors will still slowly attract a layer of dust over time, but this is rarely enough to have any obvious detrimental effect on the view. The general advice is to leave well alone as a scratched mirror will be far more of a problem than a dusty one! Large dust particles can often be removed using a high-power puffer to direct a strong blast of air at the offending area. However, pollen, small pieces of foliage and even dead insects can add to this dust and when you start to mix in moisture from dew or rain droplets, these foreign bodies can dissolve and attach themselves to your mirror's surface. This is the time to consider taking the plunge and cleaning your mirrors.

It's important to ensure that no damage is done to the coating on the mirror's surface. No chemical or abrasive should be used and you can do an excellent job with just water and a mild detergent.

Remove the mirror

First, remove the primary mirror by undoing the screws around the rim of the telescope base and taking out the primary mirror cell. The mirror is held into the cell with three or more mirror clips, which are usually retained by two small bolts. These can be removed to release the mirror. Before removing the clips, indelibly mark the vertical edge of the mirror and the cell to ensure that you then reassemble in the same position. Start the cleaning process by standing the primary mirror on a towel next to the washing area. With the telescope set horizontally, the secondary mirror can be removed by very carefully holding the edge of the mirror and undoing the centre screw on the spider vane. You can then slowly take out the mirror.

Gently does it

To ensure that there is no danger of chipping the edge of the mirrors, they should be cleaned in a freshly washed plastic bowl as a precaution. The two mirrors should always be cleaned separately. First soak them in tepid water, and a small amount of detergent, for about five minutes to loosen some of the dust and other particles in readiness for the main cleaning.

After each stage of the cleaning process, the mirrors should be carefully rinsed in tepid water and then placed on a soft, clean towel with the mirror surface at an angle. Replenish the contents of the plastic bowl with fresh water after each part of the process has been completed.

The most delicate part involves carefully dragging pieces of well-soaked cotton wool across the mirror surface under their own weight in a series of strokes. You should continue until the whole surface has been treated, but it is important to throw each piece of cotton wool away after every stroke. You can then start the next with a fresh piece. Under no circumstances 'scrub' the surface. Simply let the weight of the cotton wool do the job for you.

Finally, rinse the mirror surface generously with distilled water to ensure that no calcium or other deposits from the tap water can be left to solidify on the mirror's surface. Then rest the mirror, supported at a steep angle, on a fresh towel and leave it to dry.

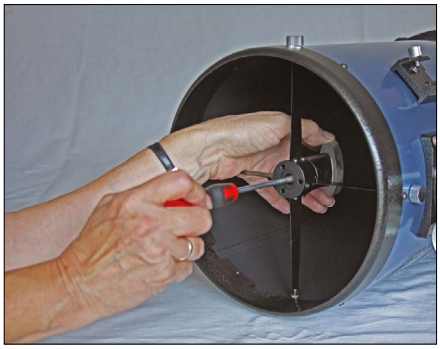
Re-assemble and collimate the telescope.

FIND OUT MORE

Watch the author's video showing mirror cleaning in action using the steps here: **http:/j.mp/cleanmirror**

STEP-BY-STEP GUIDE

STEP 1
Stick a small piece of masking tape on both the telescope base and tube to show the correct alignment. Undo the primary mirror cell retaining bolts around the perimeter of the telescope tube base and carefully lift the complete mirror assembly out of the tube.



STEP 2
Place the tube on a horizontal surface supported by towels. Remove the secondary mirror by holding it by its edges and gently undoing the centre retaining bolt on the spider vane completely. Then withdraw the mirror through the vanes.

STEP 3
Fill the plastic bowl with tepid water and a couple of drops of detergent. Gently place the primary mirror in the soapy water and leave it to soak for five minutes. Rinse using tepid water and place on a towel with the mirror surface at an angle.

STEP 4
Refill the plastic bowl with fresh water and washing-up liquid. Soak pieces of the cotton wool in the solution and drag one gently across the surface of the mirror under its own weight once and throw it away. Repeat across the whole surface.

STEP 5
Empty the bowl and rinse the mirror in copious quantities of running tepid water to ensure that all traces of the washing-up liquid are removed. When you are confident that the mirror is free of detergent, start rinsing with generous amounts of the distilled water.

STEP 6
Place the mirror in the drying rack on a soft towel, propped up at a steep angle to allow the distilled water to drain off. Remove any stubborn drops with the corner of a paper towel. Finally, repeat steps 3 to 6 with the secondary mirror.