

Smoke and Mirrors (and lenses)

In general, the main enemy of any laser optics (lenses and mirrors) is dirt - or dust - from the lasering process. If you are cutting mostly MDF, your lens and mirrors will need much more frequent cleaning than if you cut mostly plastics.

Your main concern is the lens, because it is the most likely to get contaminated because of the open hole at the final mirror.

Although we mention the lens more than mirrors here, keeping your mirrors clean is as important, because a speck of dust in the beam's path can overheat the mirror, causing it to crack.

If the lens is not in optimal condition, the laser cutting machine's performance is not optimal. Cutting speeds slow down, and through-cutting becomes unreliable. Sometimes laser operators slow the machine down to compensate for the seeming lack of power, which directly affects throughput.

To say "check the lens" is a little misleading in the sense that the operator is really checking for damage to the coating. Any perceived contamination of the lens is actually damage to the coating, the protection that helps to extend the lens' lifespan.

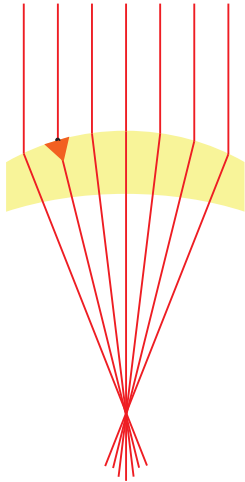
Contamination increases the absorption of the lens and that can lead to "thermal lensing", which will lead to poor quality cutting. You can create a thermal gradient from centre to edge in the lens, which results in thermal stress in the material - in severe cases it could explode.

To avoid having to buy a new lens or mirrors, here's a simple set of "rules" :

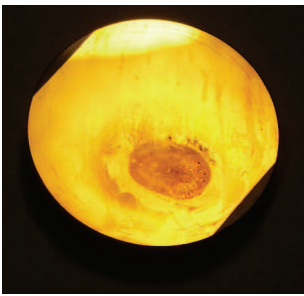
1. Put on rubber gloves before handling the lens or mirrors. Lubricants or skin oils can lead to lens contamination. You should avoid touching the coated surface of the optics.
2. On the underside, look for any material that might have blown back onto the lens. If you are not using the air-assist, more material is blown back onto the lens and could wind up sticking to it. That could lead to a burn spot on the lens, which ruins the optics. On the top of the lens, look for spots. Particles that have become spots at the top of the lens will cause overheating, leading to burning. Remove dust, smudges, or any other contamination as soon as you see it.
3. If cleaning is required, place the lens on a tissue for protection. Use the air-assist pipe to remove loose contaminants, such as dust or lint particles. Avoid using a compressor because oil and water might wind up on the lens, damaging its coating.
4. Lightly dampen a 100 percent cotton swab or a high-quality surgical cotton ball with isopropyl alcohol and gently wipe the lens surface with the damp cotton.
5. For tougher contaminated spots, dampen the cotton swab or ball with white vinegar and gently wipe the lens clean. This needs to be followed up with a gentle wipe of a cotton swab or ball dampened with alcohol, so that the acetic acid from the vinegar is removed.

The Golden rule? Check your mirrors and lens at least once a day. Clean when necessary.

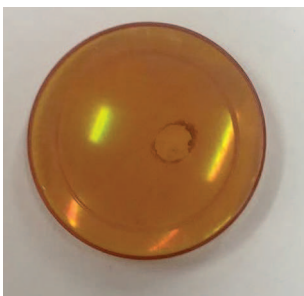
Moral of the story? You can buy the best equipment in the world, but if you don't take the time to clean your equipment, you are just ensuring that you spend more money. When the machine is not running, you are not making money either.



A speck of dirt will cause the lens to overheat and damage the coating on the lens.



A Mirror that had a speck of mdf dust on it. Cleaning in time would have saved it.



A lens that had a speck of mdf dust on it. Cleaning in time would have saved it.

