Machine Failure and Damage

SLQ Wiki Fabrication Lab 2026/06/13 12:47

Machine Failure and Damage

All significant Machine Failures or damage inflicted on the machine should be documented on this page of Wiki within 24hrs of the event here. Take a photo of the damage, and note the supervisor at the time.

This is a non-exhaustive list of our fails with the Trotec Rayjet 300. Please edit and expand as you see fit.

Bed Damage Types

The removable cutter bed has been accidently etched a number of times, mostly during the first months of operation. Four incident types have occurred.

Type I : Move Job to Laser

Using the 'move job to laser' option in the rajet minimanager software with laser head positioned over frame means that the cutter can cut into the bed frame.

Solutions:

- supervisor checks initial laser position
- Change training to allow origin (0x, 0Y) cutting only but users - 'move job to laser' is facilitator only.

Type II : Wrong Template or Document type

Cutting from an template or document other than The Edge spec may have the 0,0 point not in the top left position. This will mean that the cutter can move over the bed.

Solutions

- supervisor checks initial document conforms
- Re-enforce in training usage of The Edge template ONLY.

Type III : Bed not positioned properly

If the cutter bed is not correctly aligned and slotted into place, the cutter can move over the edge of the bed. Solutions

- supervisor checks bed is in correct position
- Adherence to procedure and signage - supervision of bed removal and replacement.

Type IV : Laser restarts after lid lifted

If the laser job is interrupted by lifting the lid, then a resume is attempted by shutting the lid and restarting the machine from the control panel, the laser will behave erratically and may cut into bed

- Always power cycle laser after aborting job by lifting the lid

Lense Damage Types

This is our in house catalogue of ways to stuff up the laser lens. In addition to our own experience, asearch of the sawmillcreek forums is recomended.

Lense Scratching

Scratched on Insertion/removal

Lens can be scratched on the edge of the lens mount on insertion and removal.

Solution

- fully loosen collar.
- remove and replace lens horizontally.

Scratched when cleaning

Any grit combined with excessive scrubbing will scratch the lens.

Solutions

- blow dust off lense before wetting with cleanser.
- Wear disposable gloves
- Only clean with a damp wipe or lens.

Lens Cracking

The laser lens is soft, brittle and vulnerable to thermal shock.

Lens overheating

An accumulation of “gunk” from the vaporised material can stick to the lens as a dark spot. If this spot is heated by the laser, the lens can crack.

Solution

- regular (2hr) inspection and clean were needed.

- Make sure only known tested materials are cut.

Lens Thermal Shock

If the lense is touched or wetted while hot it may shatter or crack

Solutions

- Always wear gloves
- Wait for lense to cool before removing and cleaning
- Make sure lense is dry before reinsertion.

Damage Logs

We lost our first lense on 26/06/2016. After heavy use engraving ply the lense chipped in cleaning.

I'm not sure what the cause of this was - but after research [1) 2)] it appears that cleaning before lense was cool is likely.

Z Limit Error

Sometimes all of the lights on the control panel will be flashing and the machine made a continuous beeping sound. It will not commence the boot cycle. On the computer you'll probably see an machine error message on the computer the laser is connected to; LaserError: 163 (Firmware – Error Code).

This might be an X/Y/Z access limit issue caused if the laser arm (or I am assuming bed) is moved manually onto a limit switch when the machine is off or in standby the laser can go into error. To resolve:

* Start by moving the head to the middle of the bed and switch on again.

* If it is on a z axis limit then open a side and wind the z axis belt to lower or raise the table 10mm.

Head Crash

In its working life, we've had two head crashes (that I'm are aware off). I'm not sure what caused the first one, but the second which occurred 01/06/2016 was definitely operator error - auto-focus switched on. As confirmed with Marc from Trotec there is no way to disable auto-focus in software.

As an attempt to technical solve this problem I delved into the nature of printer spooling on windows 7, to see if we can re-write the document post spooling but pre-printing and force auto-focus off. Its possible. You can use something like this

http://splviewer.sourceforge.net/

to poke at the windows spool files, but would require .NET programming to implement.

An open source soultion to use inkscape plug-ins to generate Trotec Spool Files.
https://github.com/bumblebeefr/fablab-inkscape-plugins

Atmos Mono Speedy 500 Filter Level Readings

These are the filter readings on the Atmos Mono Speedy 500 we took on 17/06/2016.

> With a borked filter (reading 100% in use and shutting down) and requiring replacement:
>
> Activated Carbon + (OLD) HEPA only 90 %

Replace Honeycomb Bed

- Replace bed honeycomb - search for 'aluminium composite'. Available as ingot.

> Found a supplier here - http://polycorecomposites.com/Home.php
>
> Quoted $880 for a 2440 x 1200 x 25mm rigid sheet. 1mm cell wall - 8 mm cell

- Test flow through extraction by removing a filter component at a time.
- Carbon can be topped up further - the only change between the current model and the next up is another bag of carbon
- use compressed air to remove large particles from the filter and foam

damaged lens

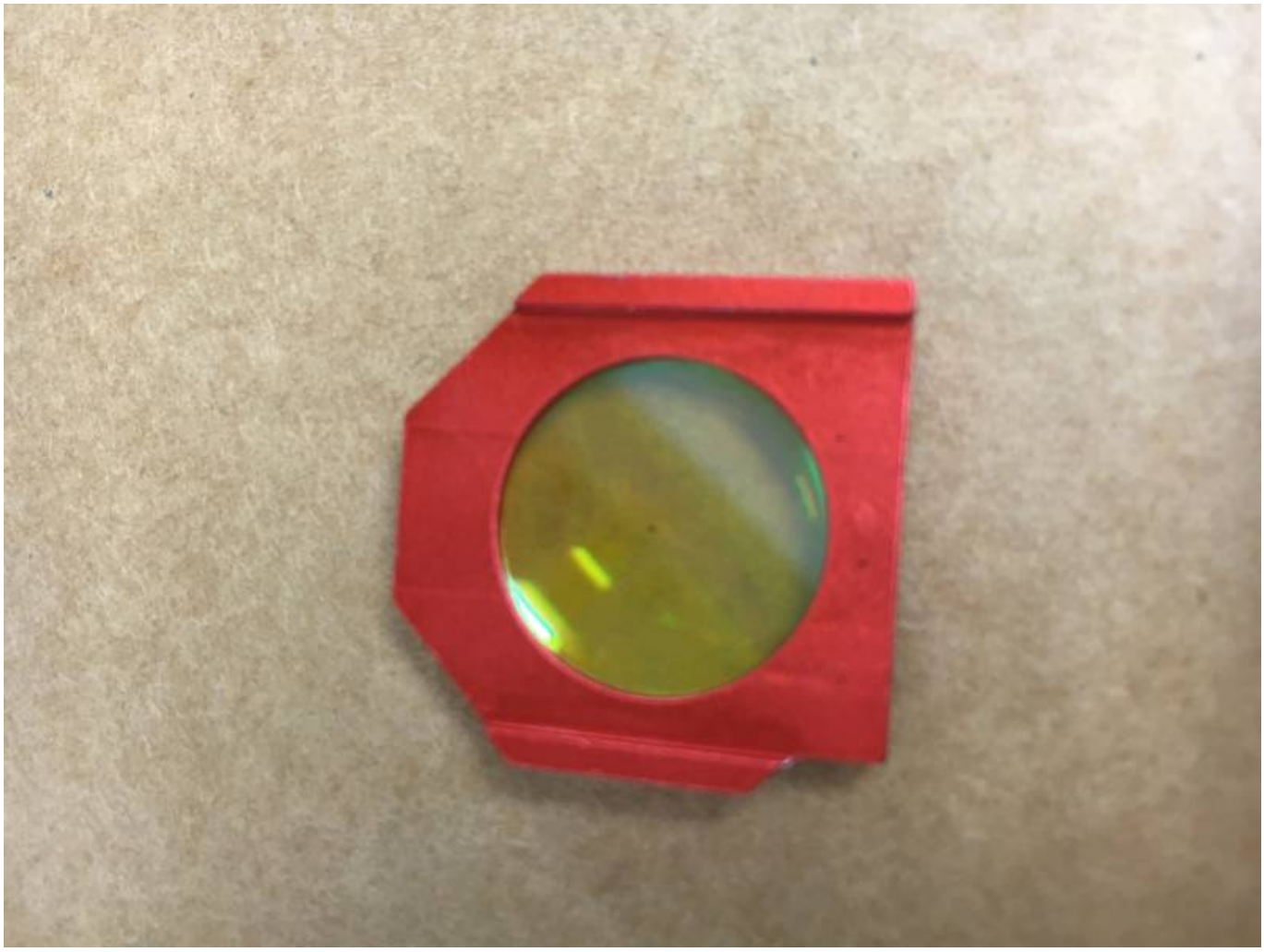
Thursday 25 Aug Brendan reported crack in the lens found after laser was cutting underpowered.
New lens order

Michael from trotec came out with Temporary replacement (different size lens 2“) that did not end up fitting. 2x stock lenses (1.5”) are on order from Sydney. Michael cleaned damaged lens and said it would be right to use but that it was on its way out.

Photos show black dot inside body of lens. this will grow. Questions to be asked about

- is cleaning being done regularly enough.
- is cleaning being done to the Right standard
- lens being mis handled. finger oil damaging

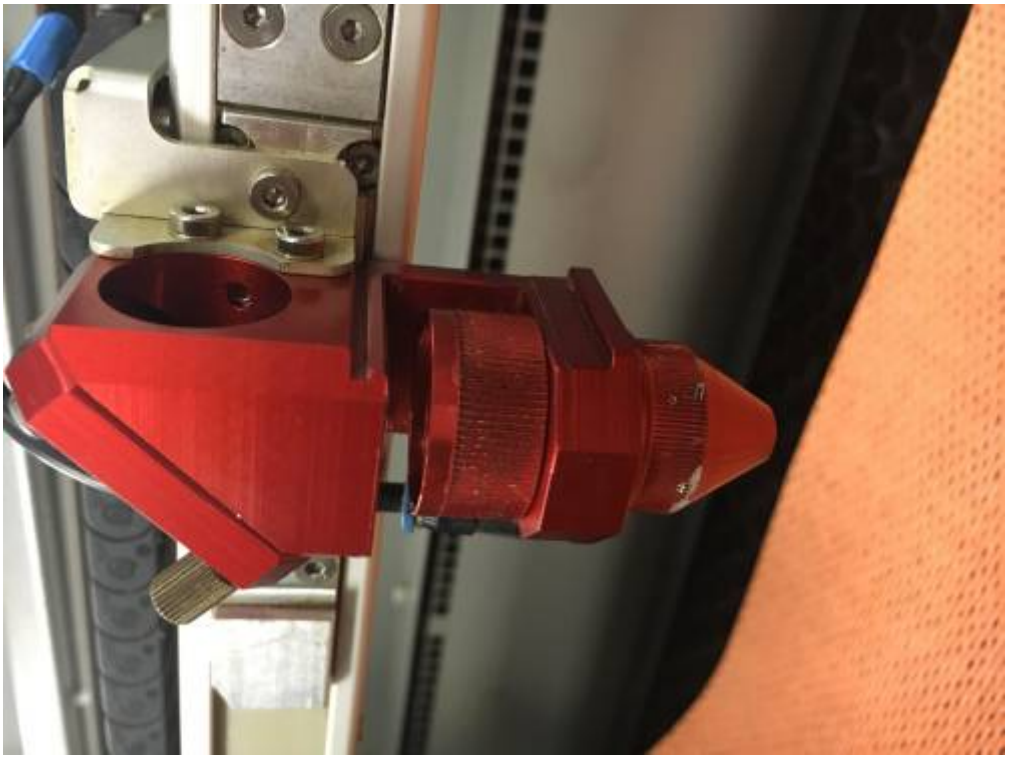

1.5" CO2
TOP



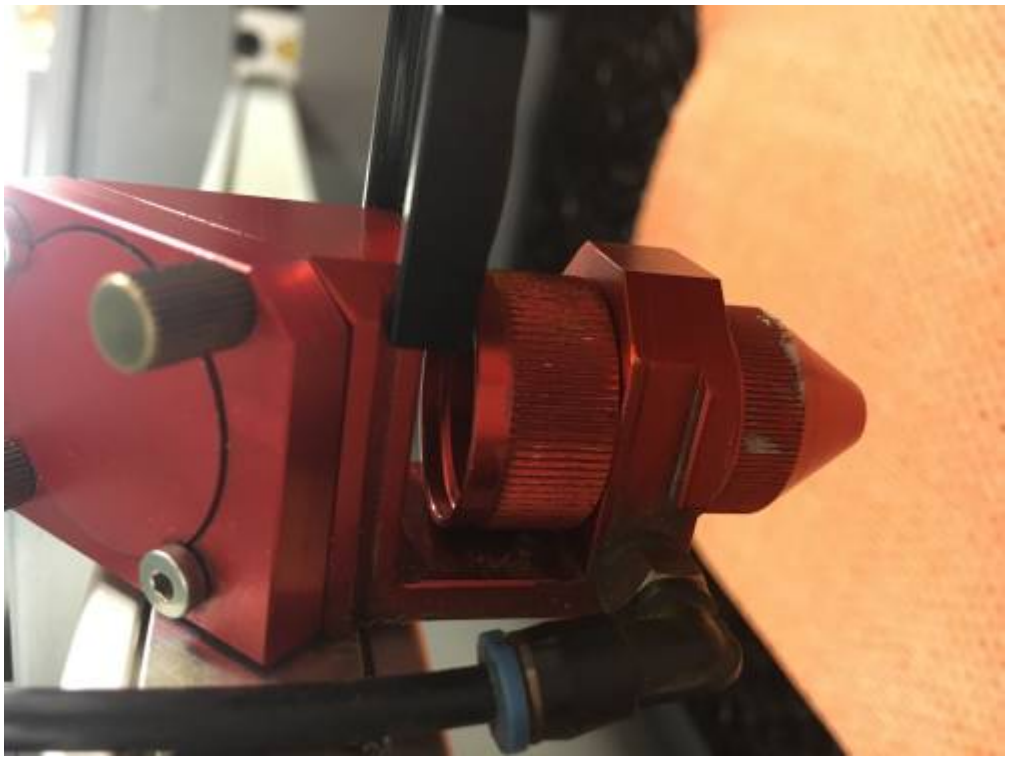
Update 29 Aug 2016

Michael from Trotec returned with the 2“ Lense (black) and showed me how to fit this.

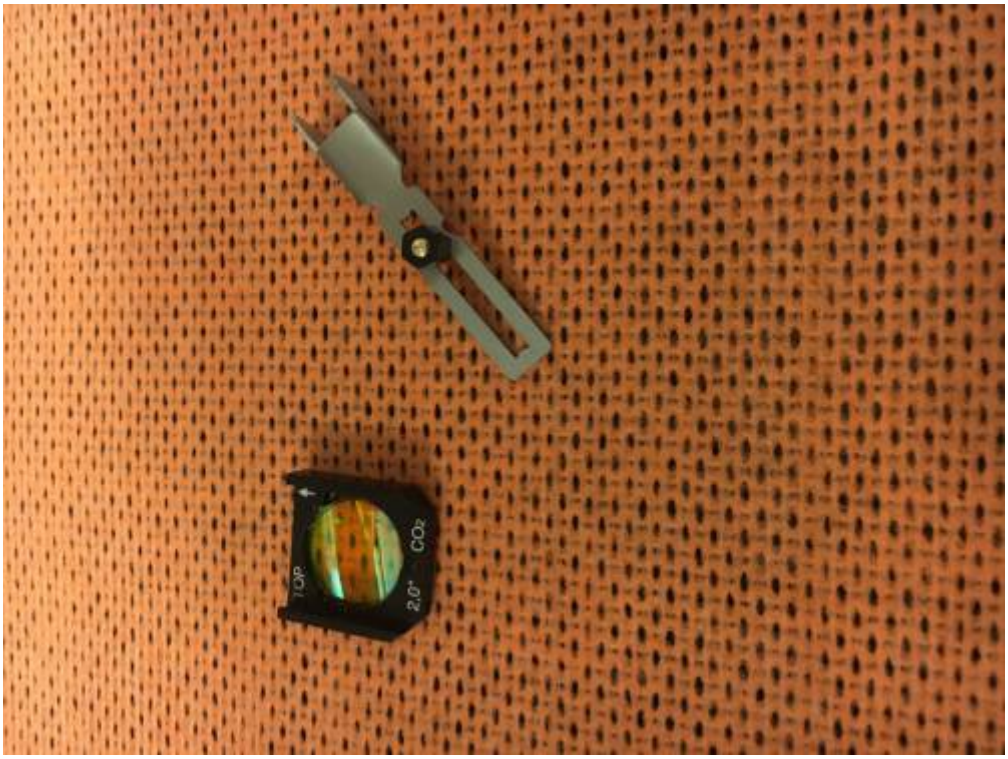
1. unscrew lense retaining collar
2. remove 1.5” lense (Red)
3. continue unscrewing lense retaining collar. Once completely unscrewed remove from lense/ mirror assembly and rotate 180Deg
4. screw rotated collar into threaded receiver. This receiver is directly below face that the 1.5“ Lense rests on.



1. now slide 2” lense (black into space above retaining collar making sure that lense is maintained in a horizontal plane (to stop scratching its pushed in) and that the raised edges on the Lense holder are slotted into the paired slots on the lense/ mirror assembly.



1. Tighten retaining Collar
2. Replace the 1.5“ focal length calibration tool with the 2” focal length calibration tool.



2“ Lense (Black) 2” Lense Focal Length Calibration Tool

FIRE! 08 sept

Phil had to put a fire out today 2ply corrugated cardboard again. The settings appear correct (no second pas which is usually the problem). The Laser was also doing weird stuff after - etching the ruler starting in a weird position. this was rectified by cycling power on Laser and PC.

Phil did raise the concerns about extinguishing the fire. When it came to it he didn't know what to do (he tried to put it out with his hand which sounds silly but the first time i had to put out a cardboard fire in the laser i reached in pulled the cardboard out and stamped it out - not ideal either) my suggestion from the experience is to use the fire blanket. i did this the second time and it worked a treat. MB

Heat Damage to Nozzle 06 Oct

Had an incident this evening where the 1st laser job at the HtE was well and truely under power. When i went to inspect the lense i found that all the parts of the Laser Head (Lense, mirror, retaining collar, and head body)was overheated (approx 60C). We left this to cool before cleaning anything.

The only explanation i can give is that perhaps the trusted participant that cleaned the Laser after their session accidently or unknowingly reassembled the Lense/retaining collar upside down. (Lense on top of collar for 2“; lense Collar on top of Lense for 1.5” lense) This would have put the laser beam badly out of focus and directed energy at the nozzle which is now heat affected.

This is just a theory... i don't know for sure and wouldn't want to blame this participant. However if it is true the incident points possibly to a failure to communicate new procedures to the couple of trusted participants we allow to clean the machine and possibly to other level 3 facilitators we'd trust to operate and supervise the machine.

Heating Lense/ Lense falling out

24 Nov 2016 had another incidence of the Lense falling out/ heating up due to not being aligned. The Theory is that this was caused by the lense collar not being tightend properly (or working undone - probably) the Last person to use and clean the machine was a recently level 3 inducted Edge

employee.

Proposed remedy Actions

1. have a quiet (nonconfrontational) word with the staff member.
2. Add a note to the digital signage or a sign?

MB

Lens Coating Damage?

29 Nov 2016

Its difficult to see, but in the the top right hand quarter of the lens, near the rim it seems like there is a coating on the lens which is lifting off or be abraded.

Proposed Remedy

~~Consult with Mark from Trotec regarding lens coating. Is it coated?~~ Lens is Zinc Selenium good guide to cleaning here.

AM

Filthy Lense - near Miss

13/12/2016

So I've have a near miss with the lense – it was so dirty after cutting a single sheet of masked 6mm ply that it took a good 30 min to clean that I think any further cutting would have resulted in damage for sure.

First I tried the spray and soak then wipe method, but I had a stubborn spot of bunge that persisted despite repeated attempts. I then moved up to acetone on a cotton tip wrapped with lense cleaner. After a couple of applications this did the trick.

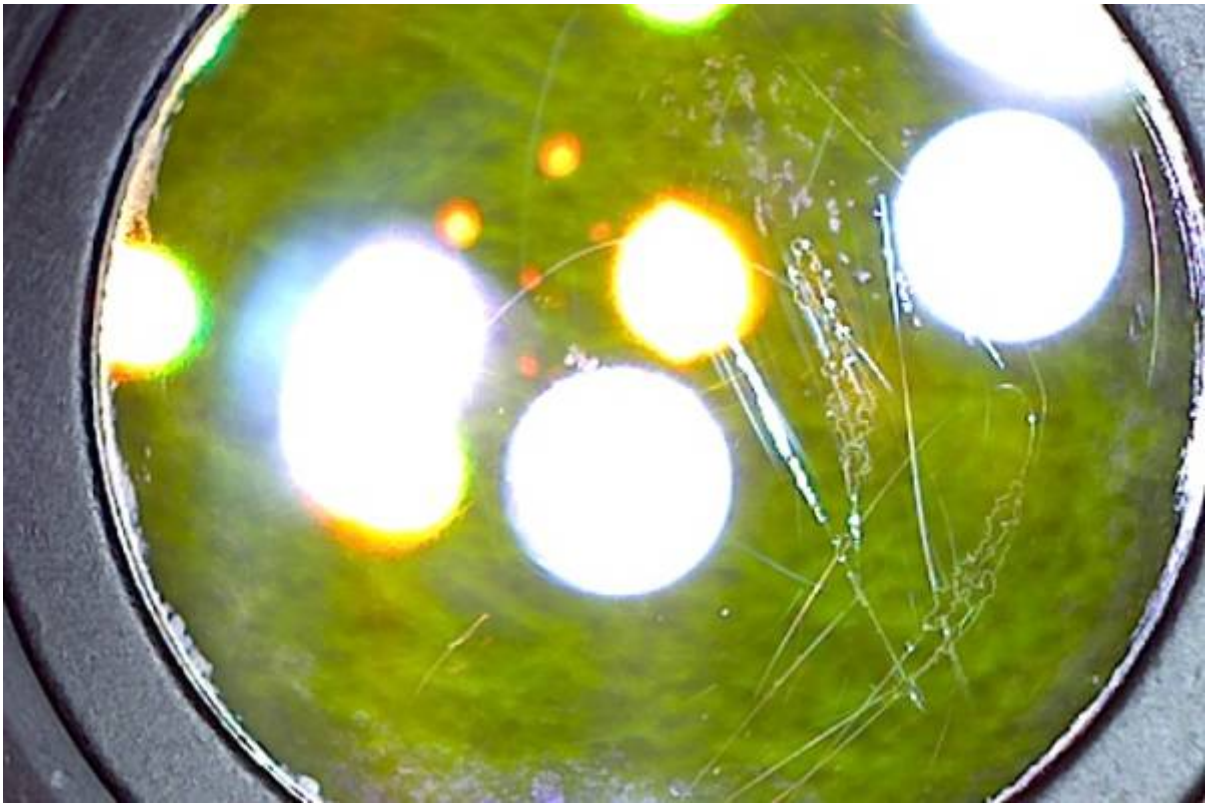
I would suggest we replace the current lense cleaner with the original trotec supplied bottle as this did seem to deal with stubborn gunk better.

Another reason to replace the pump spray bottle is that it cools the lense quickly. While we should never clean the lense warm anyway , this might just eliminate another possible point of failure.

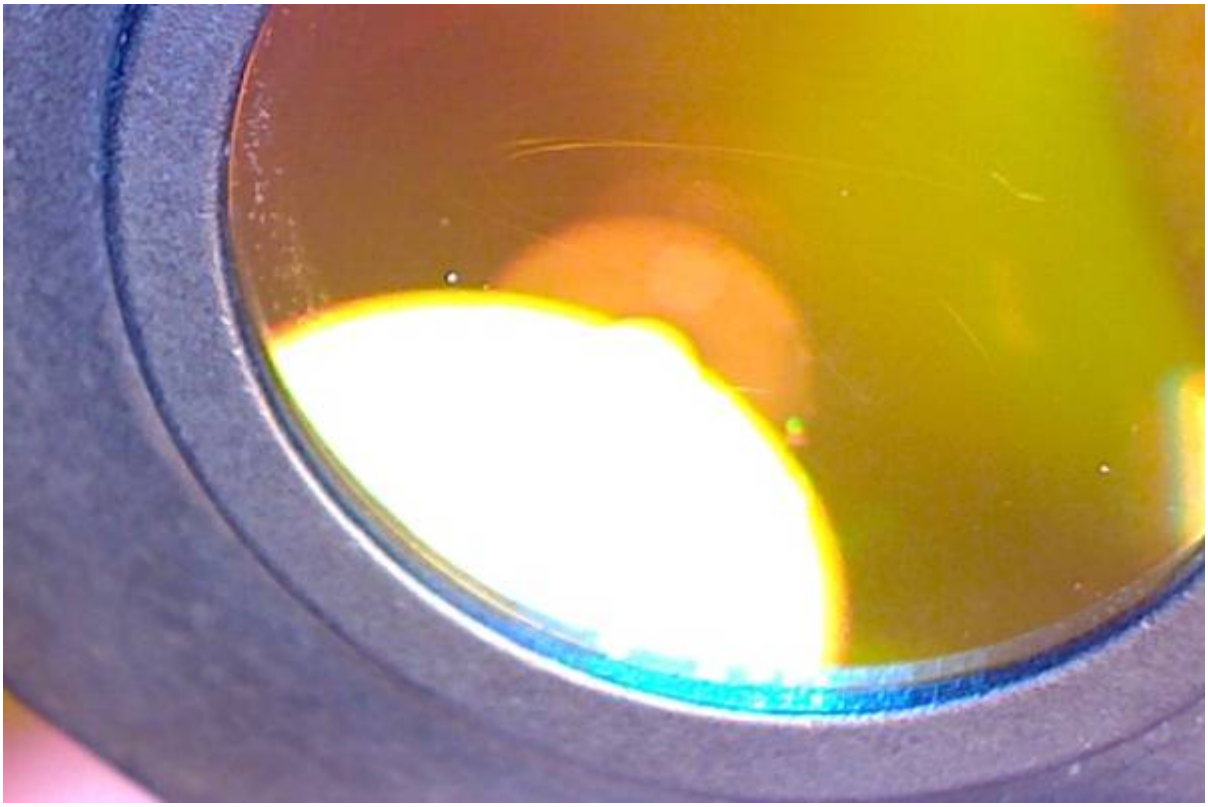
AM

Lens Damage Log

This is a heavily used lens - notice the damage to the lens coating and scratches.



This is the brand new lens - received in the first week on March 2017. Already scratched by 6/03/2017.



Filthy ATOMOS Filter

11/2/2017

The filter had not been cleaned in over two months. The pre-filter was caked solid with materials and the HEPA component of the filter system blew out. Would suggest that this as a direct result of the lack of cleaning and maintenance on the system and that this shortened the life of the filter.

- Suggest that established maintenance schedule be adhered to.
- Suggest that the date on the *last cleaned* acrylic sign be changed to *due to be changed*

Corrosion in Laser cutting enclosure

1)

http://evds.ucalgary.ca/files/evds/evdslasertraining2011.pdf
2)
https://www.youtube.com/watch?v=4jNRoxLWovc