

Job Hazard Analysis Form

Job Title: ArgoNeuT Filter Replacement

Date of Analysis: April 16, 2009

Reviewed By (optional):

Approved By (Supervisor/Task Manager):

Job Location: MINOS Assembly Hall

Job Description:

The ArgoNeuT system contains two TRIGON argon filters, which will periodically need to be replaced when saturated. The filters are positioned in parallel, with only one in use at a time, allowing for replacement to occur without affecting operation of the system.

Personal Protective Equipment:

- Face shield
- Cryogenic Apron
- Cryogenic Gloves
- Protective Shoes

Equipment Required for Job:

Work Plan History Information: (List any lessons learned from this job, tips from previous jobs.)

The operators performing the filter swap should be aware of the hazards listed in the following table, and the necessary procedures to mitigate these hazards.

Hazard Analysis		
STEP	HAZARD	PRECAUTIONS/SAFETY/PROCEDURE
Attach/Disconnect Piping	Burns	Wear Cryo gloves/apron/mask Required training for operators: General Cryogenic Safety FN000115/CR/00
	Contamination	Check valves before/after procedure. Pump out lines according to procedure.
	ODH	The ArgoNeuT system is hooked into a vent line that runs outside of the MINOS hall. The system is also equipped with 2 ODH monitors.
	Overpressure	Monitor pressure gauges during procedure.
Remove Filter	Falling	Use lift. Operator must have training. Minimum of two operators required Follow JHA for access to top of cryostat
	Drop Filter	Wear protective shoes. Clear area below work site. one operator must be trained to use MINOS crane.

My supervisor has reviewed this hazard analysis with me and I understand the hazards and required precautionary actions. I will follow the requirements of this hazard analysis or notify my supervisor if I am unable to do so. I understand that there are Environmental, Safety and Health Professionals on staff if I need further assistance or clarification.

Name and ID (please print)	Signature	Date

Filter Replacement Procedure

The system will be arranged as depicted in Figure 1. The following steps should be taken to change either filter #1 or #2:

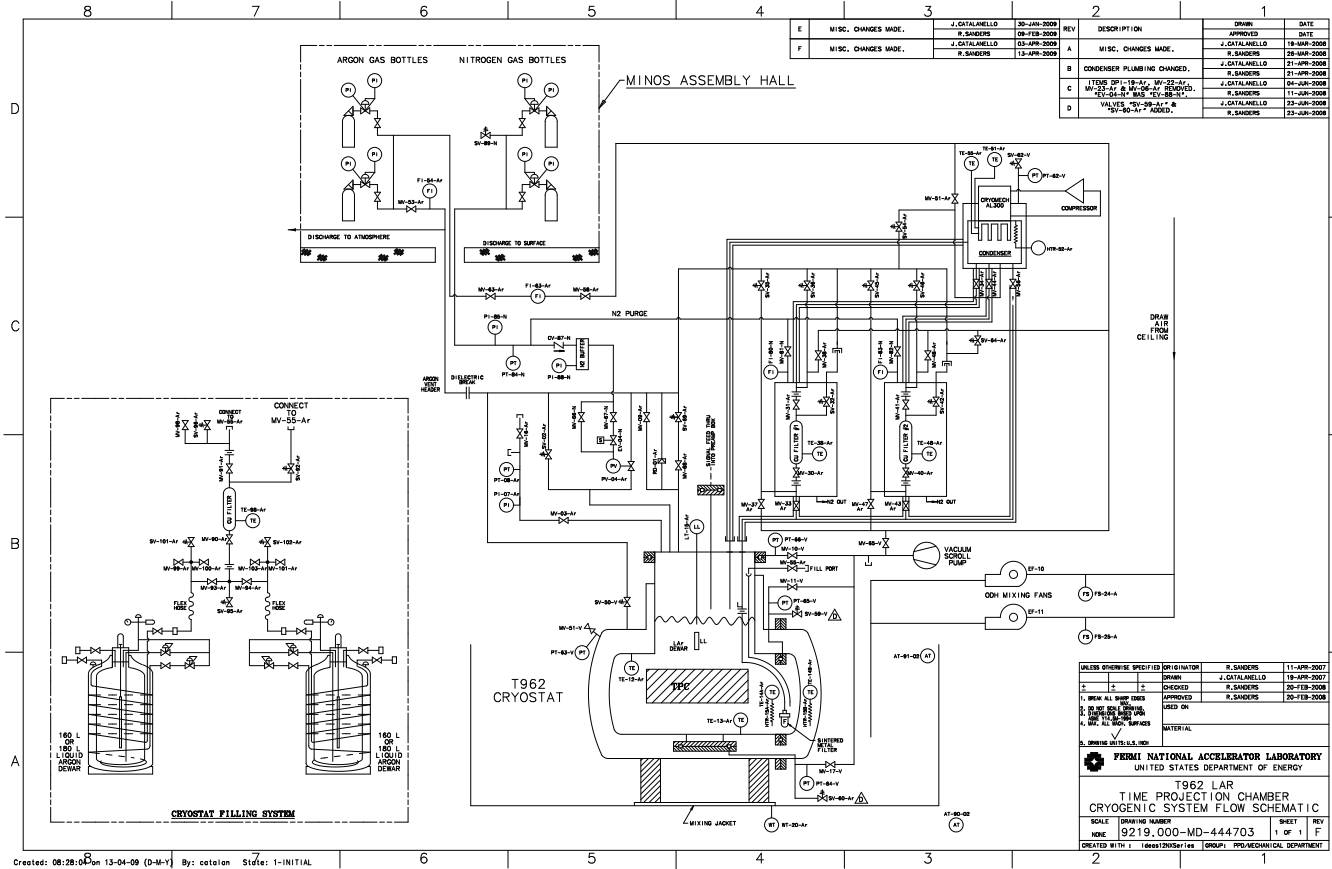


Figure 1: ArgoNeuT Recirculation System

Cu Filter #1 Changing Procedure

1. Shutoff cryocooler and heaters HTR-15-Ar and HTR-52-Ar.
2. Open MV-43-Ar and MV-44-Ar.
3. Make sure MV-33-Ar is open. Close MV-34-Ar. Wait 1 minute for liquid to drain from filter.
4. Loosen clamps on insulation. Remove insulation around top and bottom isolation valves of filter. Close nitrogen purge MV-81-N.

5. Close MV-33-Ar.
6. Disconnect exhaust of trapped volume relief on filter. Depending on which filter is installed, the valve tag could be SV-32-Ar or SV-42-Ar or SV-92-Ar. Leave the exhaust of the relief valve open. But cap the O_2 vent line it was connected to. Disconnect cable to thermalcouple on filter.
7. Close the top isolation valve on the filter. Depending on which filter is installed, the valve tag could be MV-31-Ar or MV-41-Ar or MV-91-Ar.
8. Close the bottom isolation valve on the filter. Depending on which filter is installed, the valve tag could be MV-30-Ar or MV-40-Ar or MV-90-Ar.
9. Open MV-37-Ar and MV-38-Ar to release pressure.
10. Carefully disconnect VCR fittings on top and bottom of filter.
11. Remove filter. This and the next step requires at least two people and crane use. One person must be on top of the cryostat on one side of the filter. Follow JHA for access to top of cryostat. Another person must be on the lift on the other side of the cryostat.
12. Install replacement filter and connect VCR fittings on top and bottom of the filter.
13. Connect exhaust of trapped volume relief on filter. Depending on which filter is installed, the valve tag could be SV-32-Ar or SV-42-Ar or SV-92-Ar. Connect cable to thermalcouple on filter.
14. Purify the filter inlet and outlet connections by vacuum pumping and back filling with clean argon gas through valves MV-37-Ar and MV-38-Ar.
15. Open the top isolation valve on the filter. Depending on which filter is being installed, the valve tag could be MV-31-Ar or MV-41-Ar or MV-91-Ar.
16. Open the bottom isolation valve on the filter. Depending on which filter is being installed, the valve tag could be MV-30-Ar or MV-40-Ar or MV-90-Ar.
17. Replace insulation around top and bottom isolation valves of filter. Install clamps on insulation. Open nitrogen purge valve MV-81-N.
18. Turn on the cryocooler and put PID loop for heaters HTR-15-Ar in Automatic. and HTR-52-Ar
19. Open the bottom isolation valve MV-33-Ar. If this filter is to be brought into use then open its top isolation valve MV-34-Ar and close the top isolation valve MV-44-Ar of the other filter

Cu Filter #2 Changing Procedure

1. Shutoff cryocooler and heaters HTR-15-Ar and HTR-52-Ar.
2. Open MV-33-Ar and MV-34-Ar.
3. Make sure MV-43-Ar is open. Close MV-44-Ar. Wait 1 minute for liquid to drain from filter.
4. Loosen clamps on insulation. Remove insulation around top and bottom isolation valves of filter. Close nitrogen purge MV-82-N.
5. Close MV-43-Ar.
6. Disconnect exhaust of trapped volume relief on filter. Depending on which filter is installed, the valve tag could be SV-32-Ar or SV-42-Ar or SV-92-Ar. Leave the exhaust of the relief valve open. But cap the O_2 vent line it was connected to. Disconnect cable to thermacouple on filter.
7. Close the top isolation valve on the filter. Depending on which filter is installed, the valve tag could be MV-31-Ar or MV-41-Ar or MV-91-Ar.
8. Close the bottom isolation valve on the filter. Depending on which filter is installed, the valve tag could be MV-30-Ar or MV-40-Ar or MV-90-Ar.
9. Open MV-47-Ar and MV-48-Ar to release pressure.
10. Carefully disconnect VCR fittings on top and bottom of filter.
11. Remove filter. This and the next step requires at least two people and crane use. One person must be on top of the cryostat on one side of the filter. Follow JHA for access to top of cryostat. Another person must be on the lift on the other side of the cryostat.
12. Install replacement filter and connect VCR fittings on top and bottom of the filter.
13. Connect exhaust of trapped volume relief on filter. Depending on which filter is installed, the valve tag could be SV-32-Ar or SV-42-Ar or SV-92-Ar. Connect cable to thermacouple on filter.
14. Purify the filter inlet and outlet connections by vacuum pumping and back filling with clean argon gas through valves MV-47-Ar and MV-48-Ar.
15. Open the top isolation valve on the filter. Depending on which filter is being installed, the valve tag could be MV-31-Ar or MV-41-Ar or MV-91-Ar.

16. Open the bottom isolation valve on the filter. Depending on which filter is being installed, the valve tag could be MV-30-Ar or MV-40-Ar or MV-90-Ar.
17. Replace insulation around top and bottom isolation valves of filter. Install clamps on insulation. Open nitrogen purge valve MV-82-N.
18. Turn on the cryocooler and put PID loop for heaters HTR-15-Ar in Automatic. and HTR-52-Ar
19. Open the bottom isolation valve MV-43-Ar. If this filter is to be brought into use then open its top isolation valve MV-44-Ar and close the top isolation valve MV-34-Ar of the other filter