

The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website.

## **SMD Operations Procedures Manual**

### **8.1.3.1 OPERATION OF THE MYCOM COMPRESSOR FOR MAGCOOL REFRIGERATOR**

Text Pages 1 through 4

#### **Hand Processed Changes**

<b>HPC No.</b>	<b>Date</b>	<b>Page Nos.</b>	<b>Initials</b>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>

Revision No. 05

Approved:

[Signature on File](#)

[7/23/18](#)

Division Head

Date

The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website.

### **8.1.3.1 Operation of the MYCOM Compressor for MAGCOOL Refrigerator**

#### **1.0 Purpose**

This procedure provides instruction for startup, operation and shutdown of the two stage MYCOM screw compressor which supplies 160 gram/second of helium flow at 265 psia to MAGCOOL helium refrigerator for testing superconducting magnets or liquefying helium.

#### **2.0 Responsibilities and Scope**

- 2.1 The operator is responsible for startup, operation and shutdown of the compressor.
- 2.2 The operator is responsible for the control of environmental aspects as defined in course number AM-ENV-F56.

#### **3.0 Prerequisites**

- 3.1 Operator must be instructed by the supervisor or designee.
- 3.2 Instruction shall include operation of the helium refrigerators, MAGCOOL Test and Measure System, Wet Expander, Liquid Storages and Gas Management in B902.

#### **4.0 PPE Requirements**

##### **4.1 Normal Operating Conditions:**

Safety Glasses, Hearing Protection, Long Pants, Safety Shoes.

##### **Maintenance of pressurized components, Inspections during Operation, Emergency Shutdown Conditions:**

Safety Glasses, Face Shield, Long Sleeve Shirt, Long Pants, Double Hearing Protection, Gloves.

- 4.2 Ensure that no personnel are near unit to be started unless they meet PPE requirements and are aware of compressor room environment.

The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website.

## 5.0 Procedure

### NOTE:

Lines and supports will be inspected once a year or after 1000 hours of service, whichever comes first.

MYCOM compressor is controlled locally using manual START, STOP and LOAD/ UNLOAD switches. A remote monitoring program written in LABVIEW is installed in Cryo-control room computer. This program displays the compressor faults and important process variables like temperature, pressure and motor currents for the operator in the control room. It also forwards compressor faults to the operator's cell phone and email.

- 5.1 Check AUTO BY-PASS VALVE AV- 182 for setting.
- 5.2 Ensure that water supply and return **VALVES** to oil cooler and after cooler are **OPEN**. Check the water pressure on PI-10. **NOMINAL PRESSURE** for water to heat exchangers is **65 psig**.
- 5.3 Check that the **oil level** in the sight glass of the oil tank is **correct**.

**NOTE: Any additions of oil must be noted in a detailed daily log. Should any unaccountable loss of oil be realized, an investigation shall be conducted to determine the source of the oil loss. If the oil loss cannot be reconciled, the cooling tower must be shut down, sampled and analyzed prior to discharge.**

- 5.4 Ensure that compressor suction and discharge **VALVES** are **OPEN** and the manual by-pass **valve V-100** and coalesor valve C-1A is **closed**.
- 5.5 Turn on lube oil pump switch.
- 5.6 Unload both C1 and C2 manually until the "**SYSTEM READY**" light is on.
- 5.7 Push the "**SYSTEM RESET**" button and then the "**START**" button. The compressor drive motors will start and the system will begin to operate. When compressor discharge pressure matches the pressure at Auto By-Pass Valve, AV-182, open VALVE C1A, at the coalesors. Enter that compressor is started in the Cryogenic Operator's Logbook.

**The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website.**

- 5.8 Depending on the operation, MYCOM may not need to be fully loaded. For example: during cooling down of the helium refrigerator, C1 and C2 can be partially loaded.
- 5.9 When the pressure bypass valve is almost closed, fully load C2 switch PIC-2 from manual to **AUTO** and set pointer on **PIC-2 to 50% MAX**.
- 5.10 Check pressure, temperature and oil level to make sure the **compressor** is operating in its design range.
- 5.11 Any sign of oil loss in addition to being logged shall be reported to the supervisor or engineer for investigation.
- 5.12 **Automatic shutdown** of the system occurs if any of the following system switches are activated:
  - A. Low oil differential pressure in first stage C1 or second stage C2, trip value is set at 45 psid.
  - B. High discharge temperature in C2, trip value is set at 250 F
  - C. High oil temperature, trip value is set at 120 F.
  - D. High discharge pressure in C1 or C2, trip value are set at 100 psig and 275 psig for C1 and C2.
  - E. Low suction pressure, trip value is set at 0.1 psig.
  - F. Low oil temperature, trip value is set at 70F.
  - G. High oil level in second stage reservoir.
  - H. High process gas temperature, trip value is set at F.
  - I. Oil failure timer is set at 20 seconds.
- 5.13 The compressor can be shutdown manually in case the controller fails to shutdown the unit during any of the above events, or in case of emergency situations due to loss of helium, oil or water.
- 5.14 Normal shutdown or manual emergency shutdown of the system is accomplished by depressing the local "STOP" push-button. Enter that compressor is stopped in Cryogenic Operator's Logbook.

**The only official copy of this file is the one on-line on the Superconducting Magnet Division website. Before using a printed copy, verify that this is the most current version by checking the document issue date on the website.**

## **6.0    Documentation**

Documentation shall be kept in Cryogenic Operator's Logbook in 902.

## **7.0    References**

Installation, Operation, and Maintenance manual - Helium Compressor System for Brookhaven National Lab. PG639 by Mycom. A copy of this manual is kept in CRYOGENIC area located in Bldg. 902.

## **8.0    Attachments**

None