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## SMD Operations Procedures Manual

### 8.1.3.3 OPERATION OF DUNHAM-BUSH COMPRESSOR FOR "PAT" REFRIGERATOR

Text Pages 1 through 3

#### Hand Processed Changes

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Division Head

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Date

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Category A

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### **8.1.3.3 Operation of DUNHAM-BUSH Compressor for "PAT" Refrigerator**

#### **1.0 Purpose**

This procedure provides instructions for start-up, operation and shutdown of the two stage DUNHAM-BUSH screw compressor which supplies 125 gram/second of helium flow at 205 psia to "PAT" helium refrigerator for testing superconducting magnets in vertical dewar and liquid helium used on-site.

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

- 2.1 The operator is responsible for start-up, operation and shutdown of the compressor.

#### **3.0 Prerequisites**

- 3.1 Operator must be trained by the supervisor or an authorized operator.
- 3.2 Training shall include operation of the "PAT" helium refrigerator and the MAGCOOL system.

#### **4.0 Precautions**

- 4.1 Hearing protection shall be worn in the compressor room.
- 4.2 Ensure that no personnel are near unit to be started unless they are issued hearing protection and aware of compressor room environment.

#### **5.0 Procedure**

- 5.1 Ensure that water supply and return valves to oil cooler and aftercooler are open.
- 5.2 Check that the oil level in the sight glass of the oil tank is correct.
- 5.3 Ensure that compressor suction and the discharge valves are open.
- 5.4 Push the "SYSTEM RESET" button and then the "START" button. The compressor drive motors will start and the system begin to operate.

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- 5.5 Load C1 and C2 half way during cooldown of the helium refrigerator.
- 5.6 When the pressure bypass valve is almost closed, fully load the compressors.
- 5.7 Check pressure, temperature and oil level to make sure the compressor is operating in its design range two times per shift. Document step 5.7 in the Compressor Operator's Logbook.
- 5.8 Any sign of oil loss shall be logged and reported to the supervisor or engineer for investigation.
- 5.9 Automatic shutdown of the system occurs if any of the following system switches are activated:
  - Low oil differential pressure in first stage C1 or second stage C2, trip value is set at 20 psid
  - Oil failure timer is set at 20 seconds
  - High discharge temperature in C2, trip value is set at 200 F
  - High discharge temperature in C1, trip value is set at 200 F
  - High oil temperature, trip value is set at 130 F
  - High discharge pressure in C1 or C2, trip value are set at 100 psig for C1 and 250 psig for C2
  - Low suction pressure, trip value is set at 0 psig
  - High process gas temperature, trip value is set at 130 F
- 5.10 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.
- 5.11 Normal shutdown or manual emergency shutdown of the system is accomplished by depressing the local "STOP" push-button.

## **6.0 Documentation**

- 6.1 Documentation shall be kept in Compressor Operator's Logbook in 902.

## **7.0 References**

- 7.1 Installation, Operation, Maintenance and Trouble Shooting Manual for PCS-H Hermetic Units and PCX-O Open Units Rotary Screw Compressor Package Chillers by DUNHAM-BUSH.

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7.2 Two Stage Helium Package, Sequence of Operation.

7.3 Items 7.1 and 7.2 are part of the Operation & Maintenance Manual for "PAT" Helium Refrigerator - Liquefier provided by CVI corporation. A copy of this manual is kept in MAGCOOL area in building 902.

## **8.0 Attachments**

None