



**NuMI Target Hall Air Cooling System
Chiller Specification
#MD-ENG-034**

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1.0 Scope

- 1.1 The purpose of this chiller is to supply the refrigeration for a closed loop, constant flow rate, chilled fluid system.
- 1.2 Vendor shall quote a standard chiller with standard options. Vendor shall note all specification requirements that are not included in the quotation.
- 1.3 The chiller shall be a complete, packaged unit. Components shall be mounted on one or two bases. Field assembly shall be kept to a minimum.
- 1.4 Fermilab will set the unit, and connect it to the cooling water system, the process piping and the electrical system.
- 1.5 Vendor technical and cost-saving suggestions are welcome.

2.0 Details

- 2.1 The chiller shall be water-cooled and designed to operate with the low conductivity cooling water specified in Section 5.0.
- 2.2 The refrigeration compressor shall be driven by 460 VAC, 3 phase, 60 hertz, TEFC, electric motor.
- 2.3 The chiller shall be designed to operate continuously at all heat loads from no load up to the full load operating conditions specified in section 4.0.
- 2.4 Chiller capacity control shall be automatic and designed to hold the chilled fluid supply temperature specified in Section 4.0 at all heat loads.
 - 2.4.1 Speed control or hot gas bypass can be used to help modulate chiller capacity.
 - 2.4.2 If hot bypass gas is cooled by injecting a fine spray of liquid refrigerant then a suction trap shall be provided to remove unvaporized refrigerant.
 - 2.4.3 Part of the chilled fluid returning to the chiller can bypass the evaporator and be mixed with fluid cooled in the evaporator to control chilled fluid supply temperature. The mixing valve and piping to do this shall be part of the chiller package.



- 2.5 Vendor shall provide their recommended amount (at least four hours) of field startup, commissioning and training support.
- 2.6 The chiller will be installed 160 feet underground. It will be lowered by crane down an access shaft. Loading zone dimensions in the access shaft are 66 inches by 20 feet. The chiller shall be provided with lifting lugs and other braces to permit this lift. It will be placed on rollers at the bottom of the access shaft and pushed into position. The chiller must pass through a door. Vertical height limitation for the chiller to fit through the door is 80 inches. Floor space for the installed chiller is 66 inches by 20 feet.
- 2.7 A replaceable-core, filter drier shall be provided as an integral part of the chiller package. A moisture indicator shall be provided. An indicator of filter loading shall be provided.
- 2.8 Vendor shall provide recommended spare parts list in the quotation.

3.0 General Operating Conditions

- 3.1 Altitude 600 feet above mean sea level
- 3.2 Barometric pressure 14.4 psia
- 3.3 Refrigerant Vendor recommendation
- 3.4 Chilled fluid (the process coolant) 80% water, 20% propylene glycol by volume with industrial corrosion inhibitors
- 3.5 Chilled fluid operating pressure 200 psi maximum
- 3.6 The unit will be installed indoors. The indoor temperature range is 50 to 80 °F and the relative humidity is 50 to 90%.

4.0 Full Load Operating Conditions

- 4.1 Process heat load 232.7 kW
- 4.2 Chilled fluid flow rate 100 US gpm
- 4.3 Chilled fluid supply temp from chiller 30 °F +/- 2 F°
- 4.4 Chilled fluid return temperature to chiller 46.5 °F



5.0 Cooling Water for Chiller Heat Rejection

5.1	Maximum cooling water temp	<u>95 °F</u>
5.2	Minimum cooling water temp	<u>90 °F</u>
5.3	Supply pressure	<u>220 psig</u>
5.4	Return pressure	<u>125 psig</u>
5.5	Type	<u>LCW (Low Conductivity Water)</u>
5.6	Acceptable materials for LCW service	<u>A312 TP304/304L, copper</u>