TYPICAL CRYOGEN VENT PIPE DETAIL — MECH-01

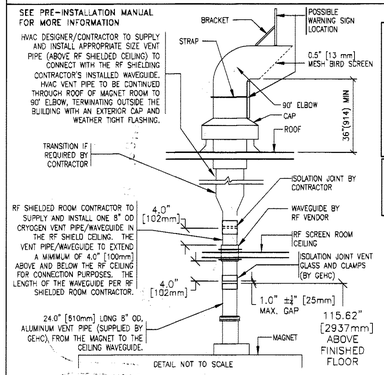
REV. DATE: 05/04/10

SEE PRE-INSTALLATION MANUAL FOR MORE INFORMATION

HVAC DESIGNER/CONTRACTOR TO SUPPLY AND INSTALL APPROPRIATE SIZE VENT PIPE (ABOVE RF SHIELDED CEILING) TO CONNECT WITH THE RF SHIELDING CONTRACTOR'S INSTALLED WAVEGUIDE. HVAC VENT PIPE TO BE CONTINUED THROUGH ROOF OF MAGNET ROOM TO 90° ELBOW, TERMINATING OUTSIDE THE BUILDING WITH AN EXTERIOR CAP AND WEATHER TIGHT FLASHING.

RF SHIELDED ROOM CONTRACTOR TO SUPPLY AND INSTALL ONE 8" OD CRYOGEN VENT PIPE/WAVEGUIDE IN THE RF SHIELD CEILING. THE VENT PIPE/WAVEGUIDE TO EXTEND A MIMMUM OF 4.0" [100mm] ABOVE AND BELOW THE RF CEILING FOR CONNECTION PURPOSES. THE LENGTH OF THE WAVEGUIDE PER RF SHIELDED ROOM CONTRACTOR.

24.0" [610mm] LONG 8" OD, ALUMINUM VENT PIPE (SUPPLIED BY GEHC), FROM THE MAGNET TO THE CEILING WAVEGUIDE.



CUSTOMER SUPPLIED WARNING SIGN TO READ:

CAUTION

FREEZING GASES AND SMALL OBJECTS MAY BE DISCHARGED WITHOUT NOTICE
STAY AT LEAST 20 FT.(6.1 m) AWAY.
+35FT (10.7M) FOR 3T

THIS SIGN MUST BE PLACED AT THE EXTERIOR EXIT POINT OF THE CRYOGEN VENT FOR THIS FACILITY. SEE TYPICAL CRYOGEN VENT PIPE DETAIL FOR POSSIBLE WARNING SIGN LOCATIONS.

THE FOLLOWING ARE MATERIALS THAT MUST BE USED FOR CONSTRUCTION OF THE VENT INSIDE THE MAGNET ROOM.
SS 304
AL 6061-T6
CU DWV,M OR L

NOTE:
VENTGLASS AND CLAMPS FOR 8 IN. [203mm] DIAMETER PIPE SUPPLIED BY GEHC.

NOTE:
THE VENT GLASS ISOLATION JOINT INSIDE THE MAGNET ROOM MUST BE A MAXIMUM OF 116" [2.95m] ABOVE THE FINISHED FLOOR.

NOTE:
GE SUPPLIES VENTGLASS & CLAMPS WHICH CAN BE USED FOR 8 IN. (203mm) DIAMETER PIPE ONLY. THESE MATERIALS MAY BE USED FOR ISOLATION JOINT OUTSIDE RF ROOM AT THE CONTRACTORS OPTION IF THE MATERIALS MEETS THE CONTRACTORS DESIGN REQUIREMENTS.

- THE MATING DIAMETERS MUST MATCH WITHIN ±0.125 IN (3mm)
- THE VENTGLASS MUST NOT BE USED FOR STRUCTURAL SUPPORT

CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX (A) — MECH-04

REV. DATE: 02.MAY.12

(THIS TABLE MUST BE USED FOR CRYOGENIC VENT SYSTEM DESIGN)

CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX FOR A MAGNET WITH 8" [203mm] VENT. — PRESSURE DROP PER ELBOW USED ANYWHERE WITHIN 20 ft. VENT SEGMENT

INSIDE DIAMETER OF VENT PIPE in.(mm)	DISTANCE OF VENT SYSTEM COMPONENT FROM MAGNET ft.(m)	PRESSURE DROP STRAIGHT VENT PIPE WITH SMOOTH INSIDE SURFACE psi/ft (KPa/m)	STANDARD SWEEP 45° ELBOW psi (KPa)	STANDARD SWEEP 90° ELBOW psi (KPa)	LONG SWEEP 45° ELBOW psi (KPa)	LONG SWEEP 90° ELBOW psi (KPa)
8(203)	0-20 (0-6.1)	0.10 (2.26)	1.10 (7.58)	2.05 (14.20)	0.55 (3.79)	1.03 (7.10)
	20-40 (6.1-12.2)	0.21 (4.75)	2.10 (14.48)	3.70 (25.51)	1.03 (7.10)	1.85 (12.76)
	40-60 (12.2-18.3)	0.30 (6.79)	2.88 (19.86)	5.21 (35.92)	1.44 (9.93)	2.60 (17.92)
	60-80 (18.3-24.4)	0.38 (8.60)	3.70 (25.51)	6.71 (46.27)	1.85 (12.76)	3.36 (23.17)
	80-100 (24.4-30.5)	0.47 (10.63)	4.52 (31.17)	8.22 (56.68)	2.26 (15.58)	4.11 (28.34)
10(254)	0-20 (0-6.1)	0.03 (0.68)	0.55 (3.79)	0.82 (5.66)	0.27 (1.86)	0.41 (2.83)
	20-40 (6.1-12.2)	0.07 (1.58)	0.83 (5.73)	1.51 (10.41)	0.41 (2.83)	0.75 (5.17)
	40-80 (12.2-18.3)	0.10 (2.26)	1.23 (8.48)	2.19 (15.10)	0.62 (4.27)	1.10 (7.58)
	60-80 (18.3-24.4)	0.12 (2.71)	1.51 (10.41)	2.74 (18.88)	0.75 (5.17)	1.37 (9.45)
	80-100 (24.4-30.5)	0.16 (3.62)	1.92 (13.24)	3.43 (23.65)	0.96 (6.62)	1.71 (11.79)
12(305)	0-20 (0-6.1)	0.013 (0.29)	0.27 (1.86)	0.41 (2.83)	0.14 (0.97)	0.21 (1.45)
	20-40 (6.1-12.2)	0.027 (0.61)	0.41 (2.83)	0.82 (5.65)	0.21 (1.45)	0.41 (2.83)
	40-80 (12.2-18.3)	0.041 (0.93)	0.55 (3.79)	1.10 (7.58)	0.27 (1.86)	0.55 (3.79)
	60-80 (18.3-24.4)	0.054 (1.22)	0.69 (4.75)	1.37 (9.45)	0.34 (2.34)	0.69 (4.75)
	80-100 (24.4-30.5)	0.069 (1.56)	0.96 (5.62)	1.51 (10.41)	0.48 (3.31)	0.75 (5.17)
	100-120 (30.5-36.6)	0.08 (1.81)	1.09 (7.52)	1.77 (12.20)	0.55 (3.79)	0.88 (6.07)
	120-140 (36.6-42.7)	0.10 (2.26)	1.27 (8.75)	2.07 (14.27)	0.63 (4.34)	1.04 (7.17)
	140-160 (42.7-48.8)	0.11 (2.49)	1.43 (9.85)	2.36 (16.27)	0.72 (4.96)	1.19 (8.20)
	160-180 (48.8-54.9)	0.12 (2.71)	1.60 (11.03)	2.53 (17.44)	0.80 (5.52)	1.27 (8.76)
	180-200 (54.9-61.0)	0.17 (3.85)	1.75 (12.07)	2.93 (20.20)	0.88 (6.07)	1.47 (10.14)

NOTE 1: ELBOWS WITH ANGLES GREATER THAN 90° MUST NOT BE USED.

NOTE 2: THE TABLE DATA IS BASED ON THE FOLLOWING:
- A. INITIAL FLOW CONDITIONS AT MAGNET INTERFACE.
- B. GAS TEMPERATURE STARTING AT 4.5 KELVIN (-452° F OR -268° C).
- C. HELIUM GAS FLOW RATE OF 2.737 CUBIC FEET (77.5 CUBIC METERS) PER MINUTE
- D. 45° STANDARD SWEEP ELBOW K = 15 F_t
- E. 90° STANDARD SWEEP ELBOW K = 30 F_t
- F. 45° LONG SWEEP ELBOW K = 7.5 F_t
- G. 90° LONG SWEEP ELBOW K = 15 F_t

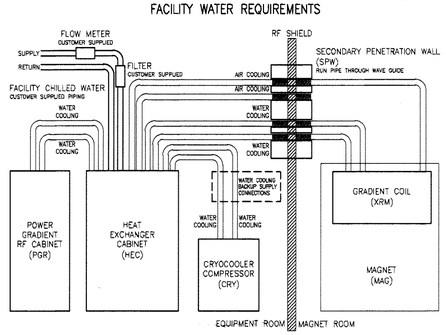
NOTE 3: THE TOTAL PRESSURE DROP OF THE ENTIRE CRYOGENIC VENT SYSTEM MUST BE LESS THAN 17 PSI (117.2 KPa). THE CALCULATION STARTS AT THE MAGNET VENT INTERFACE AND ENDS AT THE TERMINATION POINT OUTSIDE THE BUILDING.

NOTE 4: FOR 14 IN. [356mm] AND 15 IN. [406mm] VENT PIPE DIAMETERS REFER TO PRE-INSTALLATION MANUAL REFERENCED ON SHEET C1.

SYSTEM CHILLER PIPING — MECH-41

REV. DATE: 06.SEP.12

PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS



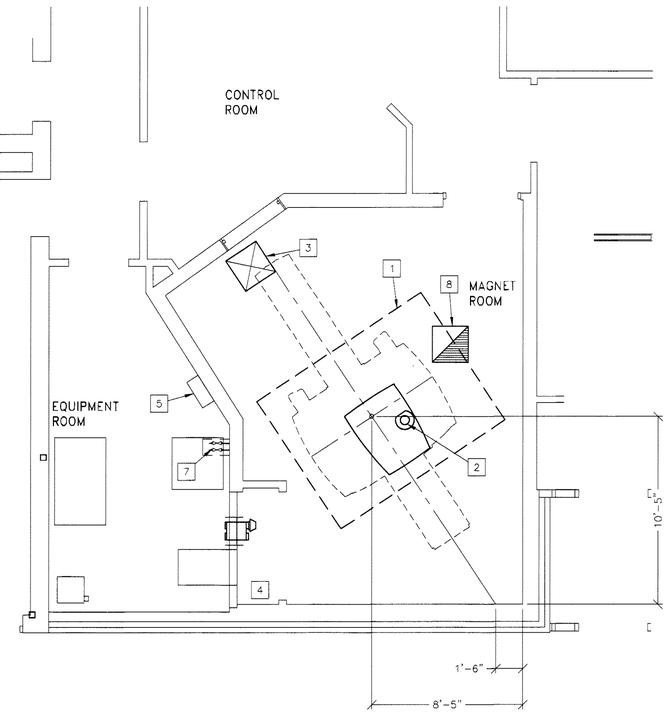
FACILITY WATER REQUIREMENTS — MECH-47

REV. DATE: 06.JUN.12

PARAMETER	REQUIREMENTS
AVAILABILITY	CONTINUOUS
ANTIFREEZE	0-40% PROPYLENE GLYCOL
MINIMUM FLOW	30 GPM (114 L/MIN)
MAXIMUM FLOW	35 GPM (132 L/MIN)
MAXIMUM PRESSURE DROP IN HEC AT MINIMUM FLOW	34.8 PSI (2.4 BAR) WITH 40% PROPYLENE GLYCOL-WATER; 1021 KG/M3 DENSITY
MAXIMUM PRESSURE DROP IN HEC AT MAXIMUM FLOW	47.8 PSI (3.3 BAR) WITH 40% PROPYLENE GLYCOL-WATER; 1021 KG/M3 DENSITY
TEMPERATURE RISE AT MINIMUM FLOW	12.2°F (6.8°C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT;1021 KG/M3 DENSITY; 49 KW HEAT
TEMPERATURE RISE AT MAXIMUM FLOW	10.4°F (5.8°C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT; 1021 KG/M3 DENSITY; 49 KW HEAT
MAXIMUM INLET PRESSURE TO HEC	87 PSI (6 BAR)
CHILLER SIZE	MINIMUM 49 KW
CONDENSATION PROTECTION	FACILITY PLUMBING TO THE HEC MUST BE PROPERLY ROUTED AND INSULATED TO PREVENT EQUIPMENT DAMAGE OR SAFETY HAZARDS
MINIMUM CONTINUOUS HEAT LOAD	7.5 KW
INLET TEMPERATURE	44.6 TO 50°F (7 TO 10°C) MEASURED AT THE INLET TO THE HEC
CUSTOMER SUPPLIED FEEDER HOSE (FROM MAIN WATER SUPPLY TO HEC)	1.5 INCH (38.1 MM) MINIMUM HOSE INSIDE DIAMETER
HOSE CONNECTIONS TO THE HEC	1.5 INCH (38.1 MM) MALE NPT

MECHANICAL/PLUMBING LAYOUT

SCALE: 1/4" = 1'-0" — RECOMMENDED CEILING HEIGHT = 8'-9"



GE Project Manager: JIM DOMBROSKI
Telephone: 803-934-3739

THE GE HPI TECHNICAL SUPPORT GROUP IS AN ADDITIONAL RESOURCE THAT CAN PROVIDE ANSWERS FOR GENERAL GE PRODUCT SITING QUESTIONS AND CAN BE REACHED AT (877)-305-9677

MECHANICAL/PLUMBING ITEMS

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS

ITEM NO.	ITEM DESCRIPTION (* INDICATES EXISTING)
1	MINIMUM CEILING HEIGHT REQUIREMENT AREA. REFER TO MAGNET EQUIPMENT DETAILS FOR MORE INFORMATION
2	SEE SHEET S-2 FOR CRYOGEN VENT LOCATION. THE TOTAL PRESSURE DROP OF THE ENTIRE CRYOGENIC VENT SYSTEM MUST BE LESS THAN 20 PSI (138 KPa). THE CALCULATION STARTS AT THE MAGNET VENT INTERFACE AND ENDS AT THE TERMINATION POINT OUTSIDE THE BUILDING. 8" [203 mm] CRYOGEN VENT - TOLERANCE FOR VENT LOCATION +/-0.25" [6 mm]. SEE DETAILS MECH-04 AND MECH-01. THE CUSTOMER'S DESIGNER IS RESPONSIBLE FOR SELECTING VENT MATERIALS AND HARDWARE CAPABLE OF SAFELY HANDLING THE PRESSURES AND COLD TEMPERATURE GENERATED WITHIN THE VENT AT EACH MRI SITE. THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND INSTALLING THE CRYOGEN VENT FROM THE MAGNET VENT ADAPTER TO THE BUILDING'S EXTERIOR. FOR NON-STANDARD VENT CONFIGURATIONS (I.E. OFFSET CEILING EXITS, WALL EXITS, AND GEOMETRIES) THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE CRYOGENIC VENT SYSTEM AND VENT SUPPORTS WITHIN THE MAGNET ROOM.
3	MINIMUM 2 FT. X 2 FT. (0.61m X 0.61m) PRESSURE EQUALIZING WAVEGUIDE VENT IN THE MAGNET ROOM CEILING.
4	CLOSET MUST ALLOW FREE AIR EXCHANGE OF 400 CFM (680 M3/HR) BETWEEN MAGNET ROOM AND CLOSET
5	REFER TO EQUIPMENT DETAIL B05-7; FOR MORE INFORMATION
6	(2) 2" I.D. HIGH PRESSURE HOSES AND (2) 2" TO 1 1/2" REDUCERS
7	TWO (2) 1 1/2 IN. (38MM) COPPER LINES,(INSULATED) TWO (2) SHUT OFF VALVES. REFER TO DETAIL MECH-41 PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS.
8	EXHAUST FAN AND AIR INLET MUST BE SIZED FOR A MINIMUM OF 1800 CFM (34 M3/MINUTE) AND A MINIMUM OF 15 AIR EXCHANGES PER HOUR. SEE DETAIL ELEC-55 ON THE ELECTRICAL DETAIL SHEET(S). MAGNET ROOM EXHAUST FAN INTAKE VENT MUST BE LOCATED AT THE HIGHEST CEILING PLANE NEAR THE MAGNET CRYOGEN VENT.

MECHANICAL/PLUMBING NOTES

- ALL PIPING, FITTINGS, SUPPORTS, HOSES, CLAMPS, VENTILATION SYSTEMS, ETC. ARE TO BE SUPPLIED AND INSTALLED BY THE CUSTOMER OR HIS CONTRACTORS.
- FOR COMPLETE DESIGN AND IS REQUIREMENTS, SPECIFICATIONS AND GUIDELINES REFER TO THE PRE-IS MANUAL REFERENCED ON SHEET C1 FOR:

  MR SYSTEMS - SYSTEM COOLING, CRYOGEN VENTING, WAVEGUIDES AND EXHAUST VENTING.

  CYCLOTRON SYSTEMS - CHEMISTRY LINES, GAS LINES, AND SYSTEM COOLING.

THIS SHEET IS PART OF THE DOCUMENT SET LISTED ON SHEET C1 AND SHOULD NOT BE SEPARATED

This drawing is based on Sketch No.: 1.3nef006

PIM R6

RQ - 132725

Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 05/16/13
Planner: Benjamin Wallace

GE Healthcare
Healthcare Project Implementation - Design
Milwaukee, Wisconsin

SHEET TITLE: MECHANICAL LAYOUT

MODALITY TYPE: OPTIMA MR450w

THIS PLAN IS SUBMITTED TO SUGGEST LOCATION OF GE HEALTHCARE EQUIPMENT AND ASSOCIATED APPARATUS. ELECTRICAL WIRING DETAILS AND ROOM ARRANGEMENTS. IN PREPARING THIS PLAN, EVERY EFFORT HAS BEEN MADE TO CONFORM DETAILS TO ACTUAL EQUIPMENT EXPECTED TO BE INSTALLED. HOWEVER, THE ARCHITECT OR ENGINEER OF RECORD FOR THE HOSPITAL EQUIPMENT CANNOT ACCEPT RESPONSIBILITY FOR ANY DAMAGES RESULTING THEREFROM.

PROJECT TITLE: ORTHOPAEDIC ASSOCIATES OF PORTLAND
PORTLAND, MAINE

PROJECT	REVISION
130261	00

DATE: 22.Jan.13
DRAWN BY: TMS
CHECKED BY: PMM
GON NO: 4057873
GON DT: 16.Jan.13

REVISION HISTORY:

SHEET
M1