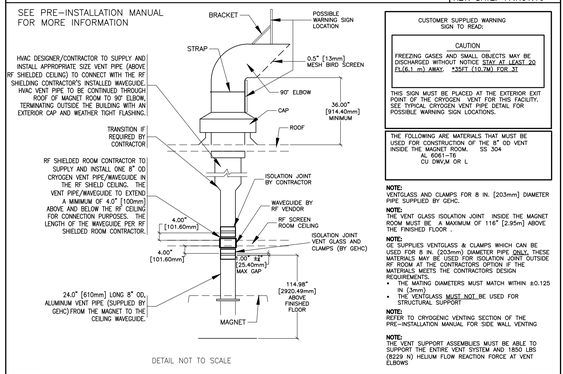
TYPICAL CRYOGEN VENT PIPE DETAIL

MECH-01
REV. DATE: 17.NOV.16



DETAIL NOT TO SCALE

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 8" OD VENT INSIDE THE MAGNET ROOM. SS 304
AL 6061-T6
CU OMCM 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
- THE VENTGLASS MUST NOT BE USED FOR STRUCTURAL SUPPORT

NOTE:
REFER TO CRYOGENIC VENTING SECTION OF THE PRE-INSTALLATION MANUAL FOR SIDE WALL VENTING

NOTE:
THE VENT SUPPORT ASSEMBLIES MUST BE ABLE TO SUPPORT THE ENTIRE VENT SYSTEM AND 1850 LBS (8229 N) HELIUM FLOW REACTION FORCE AT VENT ELBOWS

CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX

MECH-04
REV. DATE: 03.MAY.16

(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	DISTANCE OF VENT SYSTEM COMPONENT FROM MAGNET		PRESSURE DROP STRAIGHT VENT PIPE WITH SMOOTH INSIDE SURFACE		STANDARD SWEEP 45° ELBOW		STANDARD SWEEP 90° ELBOW		LONG SWEEP 45° ELBOW		LONG SWEEP 90° ELBOW	
in.[mm]	feet	meters	psi/ft	KPa/m	psi	KPa	psi	KPa	psi	KPa	psi	KPa
8 [203]	0–20	0–6.1	0.10	2.26	1.10	7.58	2.06	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 [250]	0–20	0–6.1	0.03	0.68	0.55	3.79	0.82	5.65	0.27	1.86	0.41	2.83
	20–40	6.1–12.2	0.07	1.58	0.82	5.65	1.51	10.41	0.41	2.83	0.75	5.17
	40–60	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	18.89	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 [300]	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
	40–60	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	4.76	1.37	9.45	0.34	2.34	0.69	4.76
	80–100	24.4–30.5	0.069	1.56	0.96	6.62	1.51	10.41	0.48	3.31	0.75	5.17
14 [350]	0–20	0–6.1	0.008	0.055	0.20	1.38	0.301	2.08	0.102	0.70	0.15	1.03
	20–40	6.1–12.2	0.017	0.12	0.30	2.07	0.602	4.15	0.154	1.06	0.30	2.07
	40–60	12.2–18.3	0.026	0.18	0.40	2.76	0.808	5.57	0.198	1.37	0.40	2.76
	60–80	18.3–24.4	0.034	0.23	0.51	3.52	1.01	6.96	0.250	1.72	0.51	3.52
	80–100	24.4–30.5	0.043	0.30	0.71	4.90	1.11	7.65	0.353	2.43	0.55	3.79
16 [400]	0–20	0–6.1	0.0053	0.037	0.153	1.05	0.230	1.59	0.078	0.54	0.115	0.79
	20–40	6.1–12.2	0.013	0.09	0.229	1.58	0.460	3.17	0.118	0.81	0.229	1.58
	40–60	12.2–18.3	0.020	0.14	0.306	2.11	0.618	4.26	0.152	1.05	0.306	2.11
	60–80	18.3–24.4	0.026	0.18	0.390	2.96	0.773	5.33	0.191	1.32	0.390	2.69
	80–100	24.4–30.5	0.033	0.23	0.543	3.74	0.850	5.86	0.270	1.86	0.421	2.90

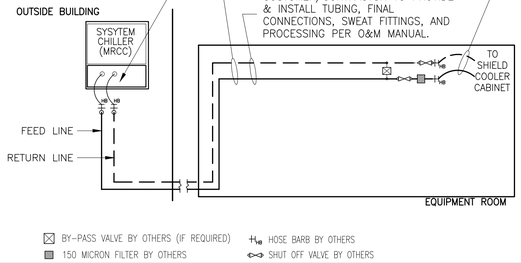
NOTE 1: ELBOWS WITH ANGLES GREATER THAN 90° MUST NOT BE USED.
NOTE 2: THE TABLE DATA IS BASED ON THE FOLLOWING:
A. INITIAL FLOW CONDITIONS AT MAGNET INTERFACE.
B. GAS TEMPERATURE STARTING AT 4.5 KELVIN (–452° F OR –268° C).
C. HELIUM GAS FLOW RATE OF 2,737 CUBIC FEET (77.5 CUBIC METERS) PER MINUTE
D. 45° STANDARD SWEEP ELBOW K = 15 Ft
E. 90° STANDARD SWEEP ELBOW K = 30 Ft
F. 45° LONG SWEEP ELBOW K = 7.5 Ft
G. 90° LONG SWEEP ELBOW K = 15 Ft
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.

SYSTEM CHILLER PIPING

MECH-39
REV. DATE: 05/07/09

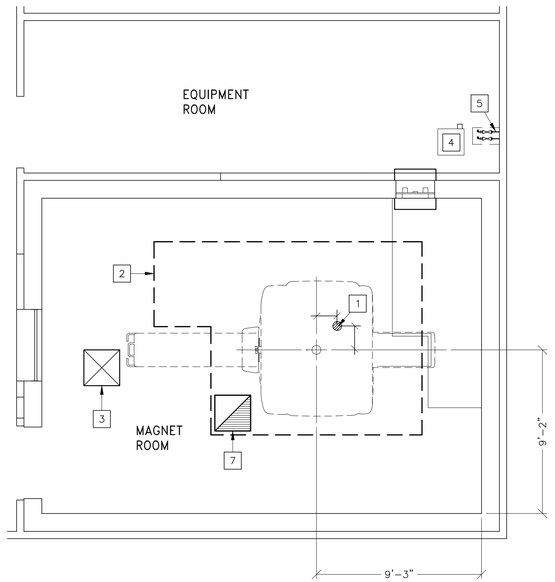
COPPER LINES, SWEAT FITTINGS AND FINAL CONNECTIONS PROVIDED BY CUSTOMER/CONTRACTOR.

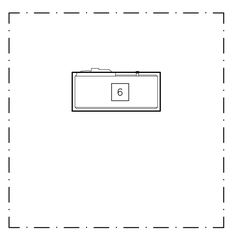
REFER TO AIRSYS O&M MANUAL FOR DETAILED INFORMATION.



BY-PASS VALVE BY OTHERS (IF REQUIRED)
150 MICRON FILTER BY OTHERS
HB HOSE BARB BY OTHERS
SHUT OFF VALVE BY OTHERS

SCALE: 1/4" = 1'–0" MECHANICAL/PLUMBING LAYOUT CEILING HEIGHT = 9'–0"





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MECHANICAL/PLUMBING ITEMS

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS

ITEM NO.	ITEM DESCRIPTION (* INDICATES EXISTING)
1	REFER TO PRE-INSTALLATION MANUAL FOR CRYOGEN VENT REQUIREMENTS SEE SHEET S-2 FOR CRYOGEN VENT LOCATION. 8" [203 mm] CRYOGEN VENT – TOLERANCE FOR VENT LOCATION +/-0.25" [6 mm]. REFER TO CRYOGEN VENT DETAILS. 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 GEODESIC DOMES) THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE CRYOGENIC VENT SYSTEM AND VENT SUPPORTS WITHIN THE MAGNET ROOM.
2	MINIMUM CEILING HEIGHT REQUIREMENT AREA. REFER TO MAGNET EQUIPMENT DETAILS FOR MORE INFORMATION
3	MINIMUM 2 FT. x 2 FT. (610mm x 610mm) PRESSURE EQUALIZING WAVEGUIDE VENT IN THE MAGNET ROOM CEILING.
4	SEE PRE-INSTALLATION MANUAL FOR RECOMMENDED BACK-UP WATER SPECIFICATIONS.
5	TWO (2) 3/4 IN. (19MM) COPPER LINES (INSULATED). FOUR (4) 3/4 IN. (19MM) HOSE BARBS. TWO (2) 1/2 IN. (13MM) HOSE BARBS. FOUR (4) 3/4 IN. (19MM) BALL VALVES. TWO (2) 3/4 IN. (19MM) TO 1/2 IN. (13MM) REDUCERS ONE (1) 150 MICRON FILTER TWO (2) SHUT OFF VALVES ONE (1) BY-PASS VALVE REFER TO SYSTEM CHILLER PIPING DETAIL. PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS.
6	CUSTOMER/CONTRACTOR RESPONSIBLE FOR RIGGING AND INSTALLATION OF SYSTEM COOLING CABINET. THERE IS A MAXIMUM OF 100 FEET (30.5 M) VERTICAL DIFFERENCE ABOVE OR 10 FEET (3.9M) BELOW BETWEEN THE OUTDOOR CHILLER CABINET (MRCC) AND THE CRYO COMPRESSOR. A TOTAL MAXIMUM DISTANCE OF 200 FEET (61 M) EXISTS BETWEEN THE OUTDOOR CHILLER CABINET (MRCC) AND CRYO COMPRESSOR OR THE MAGNET. PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE SITE PREPARATION REQUIREMENTS.
7	EXHAUST FAN AND AIR INLET MUST BE SIZED FOR A MINIMUM OF 1200 CFM (34 M3/MINUTE) AND A MINIMUM OF 12 AIR EXCHANGES PER HOUR. SEE DETAIL ELEC-S5 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, VENTLATION SYSTEMS, ETC. ARE TO BE SUPPLIED AND INSTALLED BY THE CUSTOMER OR HIS CONTRACTORS.
- FOR COMPLETE DESIGN AND REQUIREMENTS, SPECIFICATIONS AND GUIDELINES REFER TO THE PRE-INSTALLATION MANUAL:

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

  CYCLOTRON SYSTEMS – CHEMISTRY LINES, GAS LINES, AND SYSTEM COOLING.
- AN EMERGENCY WATER COOLING BACK-UP SUPPLY IS RECOMMENDED FOR CONTINUOUS CRYOGEN COMPRESSOR OPERATION.
  IF USING AN OPEN LOOP BACK-UP DESIGN, ENSURE A DRAIN IS PROVIDED.
  PLEASE REFER TO THE PRE-INSTALL MANUAL FOR OPTIONAL BACK-UP COOLANT SUPPLY REQUIREMENTS

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

GE Healthcare
Healthcare Project Implementation – Design Center
Wisconsin
Healthcare Project Implementation, Milwaukee,

SHEET TITLE: MECHANICAL LAYOUT
MODALITY TYPE: SIGNA 1.5T HDx

PROJECT TITLE:
IMPERIAL SURGERY CENTER LLC
HOUSTON, TEXAS

RQ – DC-46059 PIM R8 This drawing is based on Sketch No.: MRI-M088751-00A & 18ISCSSHDxtv3

PROJECT	REVISION
M088751	00B

DATE: 23.Feb.18
DRAWN BY: KRB
CHECKED BY: KRB
GON NO: 4605496
GON DT: 23.Feb.18

REVISION HISTORY:

SHEET
M1