

FACILITY WATER REQUIREMENTS

MECH-46
REV. DATE: 06.SEP.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	17.2F (9.6C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT; 1021 KG/M3 DENSITY; 70 KW HEAT
TEMPERATURE RISE AT MAXIMUM FLOW	15.1F (8.4C) WITH 40% PROPYLENE GLYCOL-WATER; 3730 J/(KG K) SPECIFIC HEAT; 1021 KG/M3 DENSITY; 70 KW HEAT
MAXIMUM INLET PRESSURE AFTER THE FILTER	87 PSI (5.9 TO 6 BAR) MEASURED AT THE INLET TO THE HEC
MAXIMUM HEAT OUTPUT TO WATER	MINIMUM 70 KW
MINIMUM CONTINUOUS HEAT LOAD	7.5 KW
INLET TEMPERATURE	44.6 TO 50F (7 TO 10C) 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
PH LEVEL	6.5 TO 8.2 AT 77F (25C)
HARDNESS	LESS THAN 200 PPM OF CALCIUM CARBONATE
SUSPENDED MATTER	LESS THAN 10 PPM
FACILITY FILTER	100 MICRON OR SMALLER WITH A FIELD-CHANGEABLE FILTER
CONDENSATION PROTECTION	CONDENSATION MUST BE MANAGED TO PREVENT EQUIPMENT DAMAGE OR SAFETY HAZARDS.

CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX

MECH-49
REV. DATE: 13.SEP.12

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

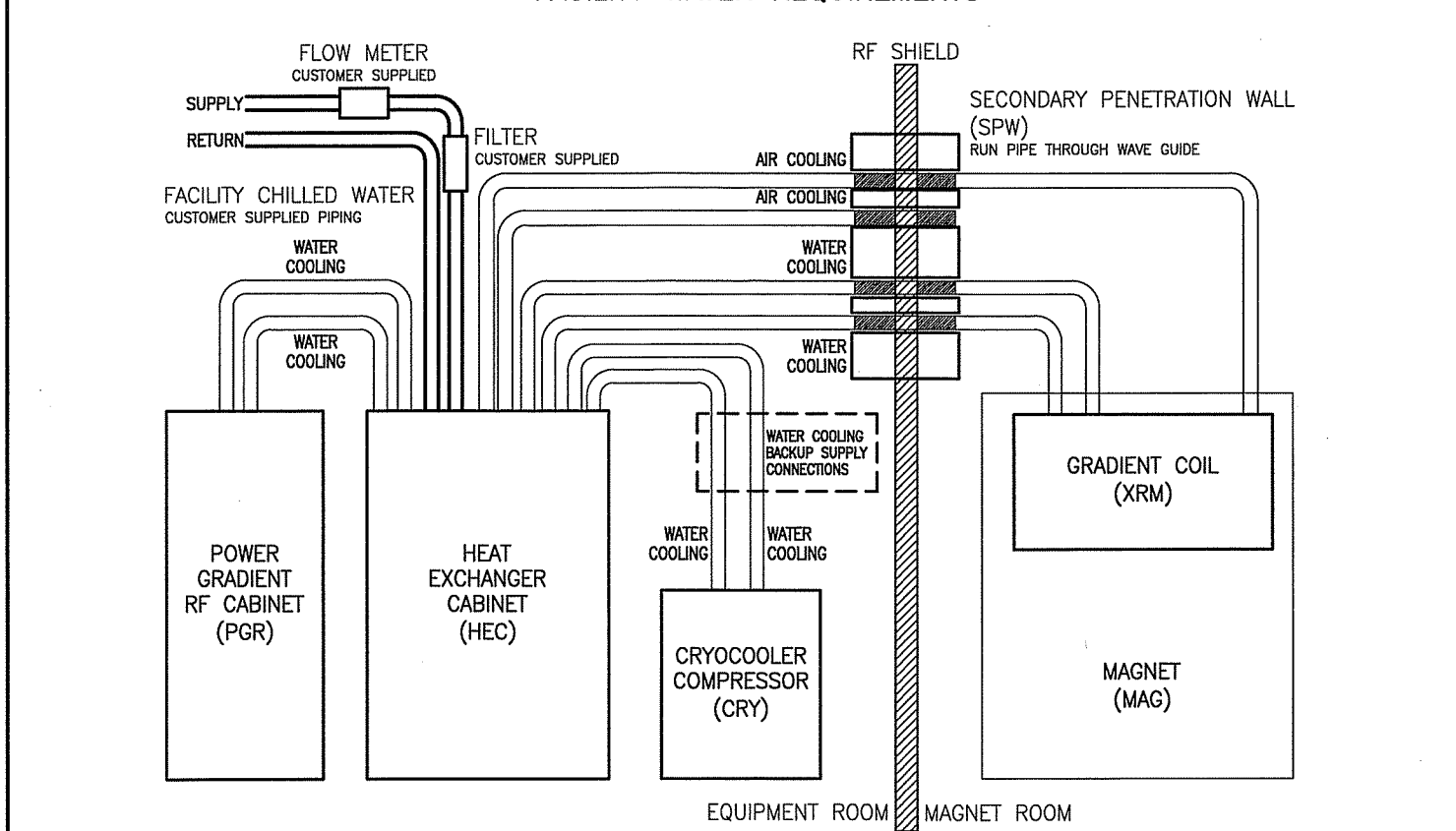
INSIDE DIAMETER OF VENT PIPE	DISTANCE OF VENT SYSTEM COMPONENT FROM MAGNET	CRYOGENIC VENT SYSTEM PRESSURE DROP MATRIX FOR A MAGNET WITH 2" (50.8mm) VENT.		PRESSURE DROP PER ELBOW USED ANYWHERE WITHIN 20 FT. VENT SEGMENT											
		STRAIGHT VENT PIPE WITH SMOOTH INSIDE SURFACE	STANDARD SWEEP 45° ELBOW	LONG SWEEP 90° ELBOW	STANDARD SWEEP 45° ELBOW	LONG SWEEP 90° ELBOW	STANDARD SWEEP 45° ELBOW	LONG SWEEP 90° ELBOW	STANDARD SWEEP 45° ELBOW	LONG SWEEP 90° ELBOW	STANDARD SWEEP 45° ELBOW	LONG SWEEP 90° ELBOW			
in./mm	feet	psi/ft	KPa/m	psi	KPa	psi	KPa	psi	KPa	psi	KPa	psi	KPa	psi	KPa
8 [203]	0-10	0-3.05	0.14	3.22	1.12	7.70	0.74	5.13	2.09	14.43	1.40	9.62	4.19	28.86	
	10-20	3.05-6.10	0.36	12.63	1.22	8.42	3.43	23.87	2.29	15.78	6.87	47.34			
	20-30	6.10-9.15	0.36	8.23	2.49	17.20	1.66	11.45	4.67	32.21	3.11	21.48	9.34	64.43	
	30-40	9.15-12.20	0.47	10.65	3.11	21.42	1.86	14.01	5.82	40.11	3.88	26.74	11.54	80.23	
	40-50	12.20-15.25	0.57	12.80	3.67	25.32	2.45	16.86	6.88	47.42	4.58	31.61	13.79	94.84	
	50-60	15.25-18.30	0.65	14.58	4.20	28.93	2.79	19.26	7.86	54.17	5.24	36.11	15.71	108.33	
10 [254]	0-20	0-6.1	0.08	1.280	0.62	4.29	0.41	1.17	8.04	0.78	5.36	2.33	16.07		
	20-40	6.1-12.2	0.12	2.725	1.05	7.25	0.70	4.83	1.97	13.58	1.31	9.05	3.94	27.16	
	40-60	12.2-18.3	0.17	3.964	1.43	9.86	0.95	6.56	2.67	18.44	1.78	12.29	5.35	38.68	
	60-80	18.3-24.4	0.21	4.859	1.76	12.14	1.17	8.07	3.29	22.70	2.19	15.13	6.58	45.40	
	80-100	24.4-30.5	0.25	5.626	2.05	14.14	1.36	9.40	3.83	26.43	2.56	17.62	7.67	52.86	
12 [305]	0-20	0-6.1	0.090	0.441	0.26	1.78	0.17	0.48	1.34	0.32	2.29	0.97	6.87		
	20-40	6.1-12.2	0.041	0.937	0.43	3.00	0.29	1.99	0.81	5.61	0.54	3.74	1.83	11.22	
	40-60	12.2-18.3	0.069	1.111	0.58	4.08	0.42	2.72	1.11	7.64	0.74	5.09	2.22	15.27	
	60-80	18.3-24.4	0.075	1.702	0.73	5.06	0.49	3.36	1.37	9.45	0.91	6.30	2.74	18.89	
	80-100	24.4-30.5	0.088	1.991	0.86	5.92	0.57	3.83	1.60	11.06	1.07	7.37	3.21	22.12	
14 [356]	0-20	0-6.1	0.008	0.180	0.123	0.85	0.082	0.231	1.59	0.154	1.06	0.462	3.18		
	20-40	6.1-12.2	0.017	0.380	0.206	1.42	0.137	0.95	0.368	2.66	0.257	1.77	0.771	5.32	
	40-60	12.2-18.3	0.024	0.552	0.281	1.94	0.187	1.29	0.522	3.82	0.369	2.42	1.051	7.25	
	60-80	18.3-24.4	0.031	0.699	0.349	2.41	0.232	1.60	0.652	4.50	0.435	3.00	1.304	8.99	
	80-100	24.4-30.5	0.036	0.824	0.411	2.83	0.272	1.88	0.766	5.28	0.511	3.52	1.533	10.57	
14 [356]	0-20	0-6.1	0.008	0.180	0.065	0.45	0.043	0.122	0.84	0.081	0.56	0.244	1.68		
	20-40	6.1-12.2	0.008	0.174	0.108	0.75	0.072	0.50	0.202	1.39	0.135	0.93	0.404	2.79	
	40-60	12.2-18.3	0.011	0.184	0.148	0.96	0.096	0.67	1.49	0.184	1.27	0.251	3.60		
	60-80	18.3-24.4	0.013	0.223	0.194	1.27	0.122	0.84	0.42	2.06	0.286	1.57	0.585	4.22	
	80-100	24.4-30.5	0.017	0.383	0.217	1.49	0.144	0.99	0.404	2.78	0.269	1.86	0.807	5.57	

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. 5M ENERGY (120MJ) IS DUMPED TO THE DURING QUENCH AND RISES THE TEMPERATURE TO 10 KELVIN.
 C. GAS TEMPERATURE STARTS AT 10 KELVIN AND INCREASES WITH LENGTH DETERMINED BY THERMAL ENERGY BALANCE.
 D. 90% He IS ASSUMED TO BE EVACUATED WITHIN 30 SEC. NO He LEFT AFTER QUENCH.
 E. ABSOLUTE PURITY OF He IS ASSUMED TO BE 99.999%.
 NOTE 3: R/D = 1.0 FOR STANDARD SWEEP ELBOWS, R/D = 1.5 FOR LONG SWEEP ELBOWS, WHERE D = INSIDE DIAMETER OF PIPE, R = RADIUS OF BEND.
 NOTE 4: THE TOTAL PRESSURE DROP OF THE ENTIRE CRYOGENIC VENT SYSTEM MUST BE LESS THAN 20 PSI (1.38 KPa).
 NOTE 5: THE CALCULATION STARTS AT THE MAGNET VENT INTERFACE AND ENDS AT THE TERMINATION POINT OUTSIDE THE BUILDING.

SYSTEM CHILLER PIPING

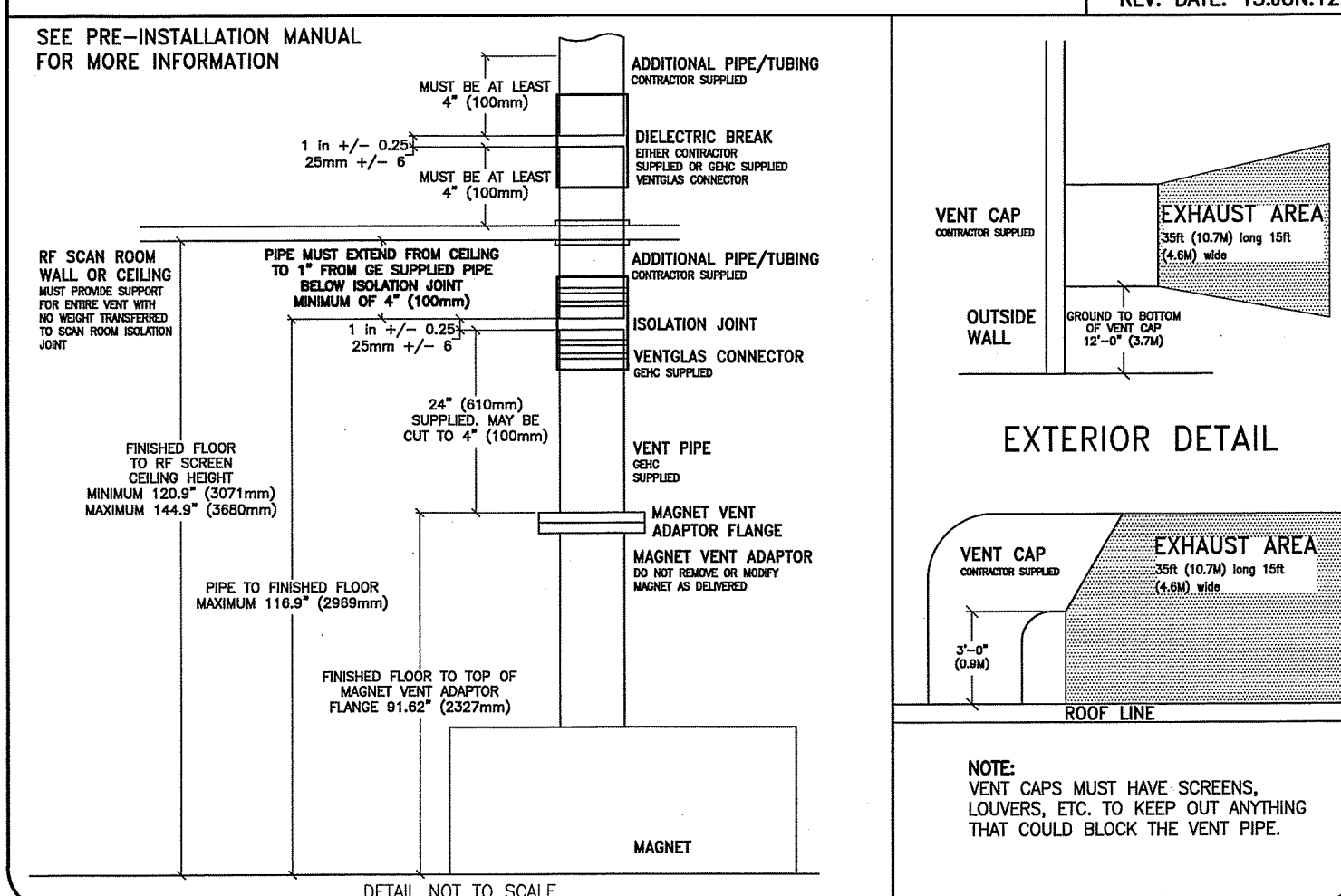
MECH-41
REV. DATE: 06.SEP.12

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



TYPICAL CRYOGEN VENT PIPE DETAIL

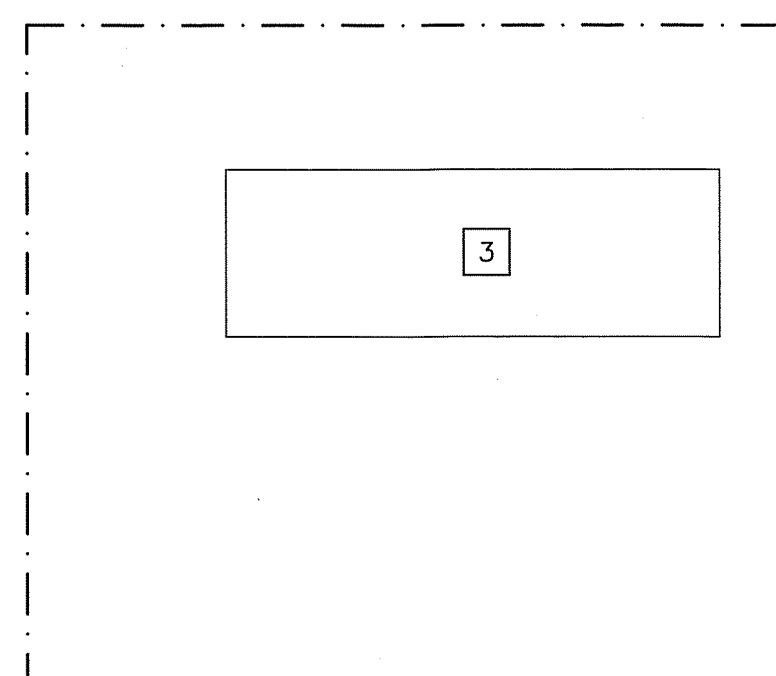
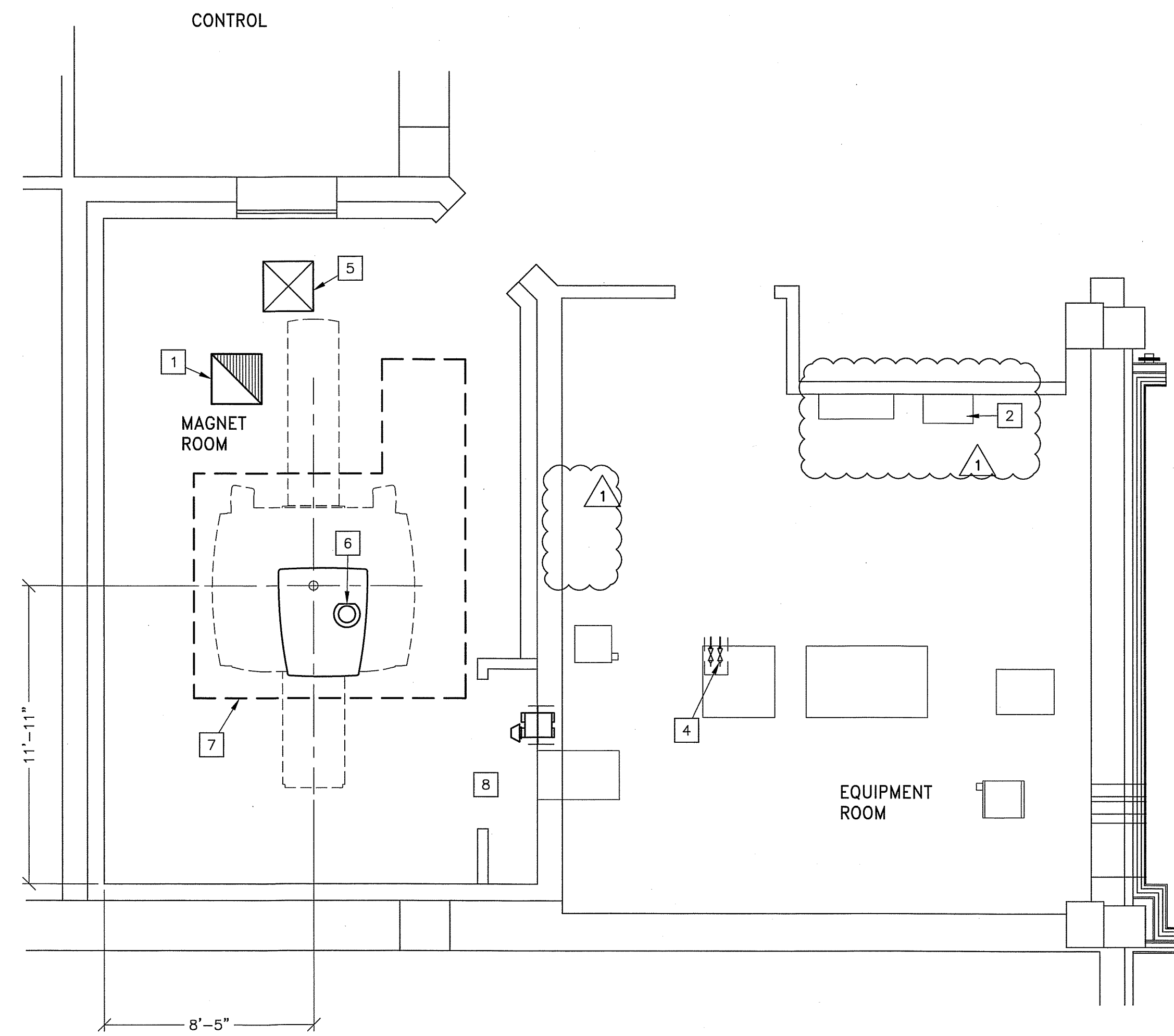
MECH-01
REV. DATE: 13.JUN.12



SCALE: 1/4" = 1'-0"

MECHANICAL/PLUMBING LAYOUT

RECOMMENDED CEILING HEIGHT = 8'-9"



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 Telephone: 603-934-3739
 THE GE HPI TECHNICAL SUPPORT GROUP IS AN ADDITIONAL RESOURCE THAT CAN PROVIDE ANSWERS FOR GENERAL GE PRODUCT STRING QUESTIONS AND CAN BE REACHED AT (877)-305-9877.

MECHANICAL/PLUMBING ITEMS

CUSTOMER/CONTRACTOR SUPPLIED AND INSTALLED ITEMS

ITEM NO.	ITEM DESCRIPTION (* INDICATES EXISTING)
1	EXHAUST FAN AND AIR INLET MUST BE SIZED FOR A MINIMUM OF 1200 CFM (34 M3/MINUTE) AND A MINIMUM OF 18 AIR EXCHANGES PER HOUR. SEE DETAIL ELEC-09 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. REFER TO DIMPLEX FOR MORE INFORMATION.
2	2" I.D. HIGH PRESSURE HOSES AND 2" TO 1 1/2" REDUCERS
3	TWO (2) 1 1/2 IN. (38MM) COPPER LINES (INSULATED) TWO (2) SHUT OFF VALVES. REFER TO DETAIL MECH-41
4	PLEASE REFER TO THE PRE-INSTALLATION MANUAL FOR COMPLETE FACILITY WATER REQUIREMENTS.
5	MINIMUM 2 FT. X 2 FT. (0.61m X 0.61m) PRESSURE EQUALIZING WAVEGUIDE VENT IN THE MAGNET ROOM CEILING.
6	REFER TO PRE-INSTALLATION MANUAL LISTED ON SHEET C1 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). SEE DETAILS MECH-34 AND MECH-01. THE CUSTOMER'S DESIGNER IS RESPONSIBLE FOR SELECTING VENT MATERIALS AND HARDWARE CAPABLE OF SAFELY HANDLING THE PRESSURES AND 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.
7	FOR NON-STANDARD VENT CONFIGURATIONS (I.E. OFFSET CEILING EXITS, WALL EXITS, AND GEODESIC DOME), THE CUSTOMER'S CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND INSTALLATION OF THE CRYOGENIC VENT SYSTEM AND VENT SUPPORTS WITHIN THE MAGNET ROOM.
8	MINIMUM CEILING HEIGHT REQUIREMENT AREA. REFER TO MAGNET EQUIPMENT DETAILS FOR MORE INFORMATION. CLOSEST MUST ALLOW FREE AIR EXCHANGE OF 400 CFM (680 M3/HR) BETWEEN MAGNET ROOM AND CLOSET.

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 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

GE Healthcare
 Healthcare Project Implementation - Design Center
 Milwaukee, Wisconsin

SHEET TITLE: MECHANICAL LAYOUT
 MODALITY TYPE: DISCOVERY MR 750w GEM

PROJECT TITLE:
 MAINE MEDICAL CENTER
 PORTLAND, MAINE

PROJECT	REVISION
132054	01

DATE: 02.Jul.13
 DRAWN BY: MCK
 CHECKED BY: JGA
 CON NO: 4108424
 CON DT: 27.Jun.13

REVISION HISTORY:
 1 KMR - 26.Aug.13
 CHECKED BY: PMM

SHEET
 M1

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