COOLING & TEMPERING COILS

COOLING COILS

COIL No.	CAPACITY BTU/HR	SIZE L	SIZE W	SIZE ROWS	AIR ENT. TEMP DB	AIR ENT. TEMP WB	AIR LVG TEMP. DB	AIR LVG TEMP. WB	AIR FLOW CFM	AIR FACE VEL. FPM	AIR PRESS. DROP IN WG	WATER TEMPERATURE ENT	WATER TEMPERATURE LVG	WATER FLOW GPM	WATER PRESS. FT. WG.
CC1	812,000	AS REQ'D BY AH-1		SIZE AS REQD	83	66.4	57	55.2	22,800	550	MAXIMUM 0.75	44	52	204	MAXIMUM 15'
CC2	550,000	96"	90"		84	65	71	55.6	32,000	560		44	52	138	
CC3	1,080,000	AS REQ'D BY AH-2			82	66.8	57	56	34,300	600		44	62	274	

TEMPERING COILS

COIL No.	CAPACITY BTU/HR	SIZE L	SIZE W	SIZE ROWS	AIR ENT. TEMP DB	AIR ENT. TEMP WB	AIR LVG TEMP. DB	AIR LVG TEMP. WB	AIR FLOW CFM	AIR FACE VEL. FPM	AIR PRESS. DROP IN WG	STEAM PRESSURE	STEAM LB/HR
TC1	246,000	AS REQ'D BY AH-1		SIZE AS REQD	46	-	56	-	22,800	550	MAXIMUM 0.20	5	200
TC2	345,000	96"	90"		55	-	65	-	32,000	550		5	360
TC3	370,000	AS REQ'D BY AH-2			46	-	56	-	34,300	600		5	400

UNIT HEATERS

UNIT No.	SERVICE	CAPACITY BTU/HR	AIR CFM	AIR ENT °F	WATER ENT °F	WATER ΔT	WATER FLOW GPM	FAN SPEED	FAN MOTOR HP	MOUNTING HEIGHT TO BTM (FT)	MANUFACTURER'S MODEL No.
~~UH 1 & 2~~	MECH. RM. LEVEL 4 HTG	120,000	2800	60	220	40	6	1100	1/4	SEE SCHEDULE ON DWG M12	TRANE 18G-S
UH 3	MECH. RM. LEVEL 6 HTG	48,000	1200	60	220	40	2.4	1650	1/12		TRANE 90-S
UH 4	STAGING AREA LEVEL 1	120,000	2800	60	220	40	6	1100	1/4		TRANE 18G-S

AIR HANDLERS & FANS

UNIT NO.	SERVICE	CAPACITY CFM	CAPACITY STATIC IN. W.G.	MAXIMUM FAN SPEED RPM	MAXIMUM TIP SPEED FPM	MAXIMUM OUTLET VELOCITY FPM	MINIMUM MOTOR HP	TYPE	MANUFACTURER'S MODEL NO.
AH-1	LABORATORIES & OFFICES	22,800	2½	1085(1) 660(2)	8500(1) 5800(2)	1900	20	AIR HANDLER DWDI AIR FOIL	TRANE ~~[illegible]~~ (1) CARRIER #13 (2)
SF-1	TUNNEL	32,000	2¼	720	7600	1800	20		TRANE ~~[illegible]~~ DW CARRIER 27CA 9½
AH-2	SYNCHROTRON HALL & LINAC	34,300	2½	940(1) 570(2)	8800(1) 5300(2)	1900	25(1) 30(2)	AIR HANDLER DWDI AIR FOIL	TRANE ~~[illegible]~~ (1) CARRIER ~~[illegible]~~ (2)
RF-1	LABORATORIES & OFFICES	19,400	1½	730	6300	1800	7½		TRANE ~~[illegible]~~ DW CARRIER 27 CA 8½
RF-2	TUNNEL	30,000	2	650	6800	1800	15		TRANE ~~[illegible]~~ DW CARRIER 27CA 9½
RF-2	SYNCHROTRON HALL & LINAC	27,300	1½	580	6100	1900	10		TRANE ~~[illegible]~~ DW CARRIER 27CA 9½
EF-1	MECH. RM. VENT LEVEL 4	5,000	⅜	1080	7800	N/A	¾	PROPELLER BELT & DIRECT DRIVE	TRANE PB 26
EF-2	MECH. RM. VENT LEVEL 6	5,000	⅜	1080	7800	N/A	¾	PROPELLER BELT & DIRECT DRIVE	TRANE PB 26
EF-3	MECH. RM. VENT LEVEL 6	2,000	¼	1150	6800	N/A	¼	PROPELLER DIRECT DRIVE	TRANE PC 20
EF-4	POWER VENT LEVEL 2	810	½	745	2480	N/A	½	ROOF EXHAUST	CARNES DE 9-18 S
EF-6	POWER VENT LEVEL 12 & 3	1100	¾	870	4100	N/A	¾	ROOF EXHAUST	CARNES DE 9-18C
* EF-9	WELDING HOOD LEVEL 1	2700	⅞	760	4750	N/A	1	ROOF EXHAUST	CARNES DE 12 SME
* EF-7	WELDING HOOD LEVEL 2	1100	¾	870	4100	N/A	½	ROOF EXHAUST	CARNES DE 9-18 C
* EF-8	SOLVENT STORAGE	140	⅜	1150	2428	N/A	1/10	ROOF EXHAUST	CARNES DE 12-8 S
** EF-B	TOWER ROAD ACCESS	500	¼	760	2600	N/A	⅛	ROOF EXHAUST	CARNES LS 13A
* EF-10	EAST ADIT EXHAUST	570	1/10	1740	5130	N/A	1/20	PROPELLER DIRECT DRIVE	TRANE PD 11
** EF-11	STATION 5 DRIFT	460	½	859	2000	1000	⅛	UTILITY SET	TRANE BF3

* EF 4 SHALL BE FITTED WITH DISCONNECT SWITCH △A

SF1 & RF3 FANS FITTED W/ INLET VANES AS SPECIFIED

* EXPLOSION-PROOF MOTOR w/ NON-SPARKING WHEELS

FANS EF5 THRU EF9 FITTED WITH DISCONNECT SWITCH

** EF8 SHOWN ON DWG. H42
** EF10 SHOWN ON DWG. C5
** EF11 SHOWN ON DWG. M27

MOTORS
ALL MOTOR ½ HP AND LARGER SHALL BE 440 V., 3 PHASE, 60 CYCLE

COOLING TOWERS

UNIT No.	SERVICE	CAPACITY BTU/HR	WATER FLOW GPM	WATER ENT °F	WATER LVG °F	FAN MOTOR HP	FAN SPEED	FAN MOTOR HP	MANUFACTURER'S MODEL No.
* CT 1 & 2	AIR COND.	3,025,000	726	95	85	22	0.40	2-15 HP	BALTIMORE AIR COIL FBA 208 SC
CT1A & 2A	AIR COND. & ECDN. NKZ	3,625,000	735	92.4	55	22	0.40	2-20HP	BALTIMORE AIR COIL FBA 208 SC

* BID ALTERNATE # 4 INCLUDE REDUCTION IN COST FOR USING CT1 & CT2 IN LIEU OF CT1A & CT2A INCLUDED IN BASE BID.

CONVERTORS

UNIT No.	SERVICE	CAPACITY BTU/HR	WATER FLOW GPM	WATER PRESS. DROP PSI	WATER TEMPS °F ENT.	WATER TEMPS °F LVG	STEAM PRESSURE PSIG	STEAM LB/HR	FOULING FACTOR	TYPE
C1	HEATING	6,000,000	200	2	180	220	5	4200	.001	SHELL & TUBE
C2	* SNOW MELTING	3,000,000	220	3	130	160	5	3120	.001	SHELL & TUBE

* PUMPING ETHYLENE GLYCOL - WATER MIXTURE ETHYLENE GYLCOL 40% BY VOLUME

PUMPS

UNIT NO.	SERVICE	CAPACITY GPM	CAPACITY TDH FT.	SPEED RPM	EFFICIENCY	MOTOR H.P.	TYPE	MANUFACTURER'S MODEL NO.
P1	COOLING TOWER WATER	1450	90	1750	84	50	DOUBLE SUCTION	GOULDS # 3405 6x8x12
P2	CONDENSER WATER	1450	90	1750	84	50	"	GOULDS # 3405 6x8x12
P3	CHILLED WATER	600	180	1750	72	50	"	GOULDS # 3405 4x6x14
* P4	CHILLED WATER STANDBY	600	180	1750	72	50	"	GOULDS # 3405 4x6x14
P5	HOT WATER	200	65	1750	65	7½	CLOSE COUPLED END SUCTION	GOULDS # 3655 2½x3x11
* P6	HOT WATER STANDBY	200	65	1750	65	7½	"	GOULDS # 3655 2½x3x11
P7	SNOW MELT	220	100	1750	67	10	"	GOULDS # 3656 2½x3x11
P8 & P9	CONDENSATE RETURN	40,000 EDR 60	55 PSI	60 GALLON RECEIVER		2-5	"	GOULDS # 6J44
P19	ETHYLENE-GLYCOL TANKERS	5	70	1750	50	1/2	SUMP TYPE	GOULD OR EQUAL

* BID DEDUCT ALTERNATE # 6

CHILLERS

CAPACITIES BASED ON FOULING FACTOR OF 0.0005 FOR CHILLER & CONDENSER

UNIT NO.	CAPACITY TONS	CHILLED WATER FLOW GPM	CHILLED WATER MAX. PRESS DROP FT. WATER	CHILLED WATER TEMP °F ENT.	CHILLED WATER TEMP °F LVG	CONDENSER WATER FLOW GPM	CONDENSER WATER MAXIMUM PRESS DROP FT. WATER	CONDENSER WATER TEMP °F ENT.	CONDENSER WATER TEMP °F LVG	ELECTRICAL VOLTS	ELECTRICAL PHASE	ELECTRICAL CYCLES	ELECTRICAL MAX. KW/TON INPUT	MANUFACTURER'S MODEL NO.
CH1 & CH2	250	600	22	54	44	725	24	85	95	440	3	60	0.84	TRANE RTC 2 CARRIER 19DH 2

ABBREVIATIONS

AHU	AIR HANDLER AND NUMBER
BTU/HR	BRITISH THERMAL UNIT PER HOUR
CH	CHILLER
CC-1	COOLING COIL AND NUMBER
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CT	COOLING TOWER
CTR	COOLING TOWER RETURN WATER
CTS	COOLING TOWER SUPPLY WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
EAR	EXHAUST AIR REGISTER
EF	EXHAUST FAN
ENT	ENTERING
F	FAN
FPM	FEET PER MINUTE
FT.	FEET
GPM	GALLONS PER MINUTE
HC-1	HEATING COIL AND NUMBER
HP	HORSE POWER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX	HEAT EXCHANGER
IN.	INCHES
LVG	LEAVING
OV	OUTLET VELOCITY
P	PUMP
RA	RETURN AIR
RAR	RETURN AIR REGISTER
RF	RETURN FAN
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAR	SUPPLY AIR REGISTER
SF	SUPPLY FAN
SMR	SNOW MELTING RETURN
SMS	SNOW MELTING SUPPLY
ST (HP)	STEAM (HIGH PRESSURE)
ST (LP)	STEAM (LOW PRESSURE)
TDH	TOTAL DYNAMIC HEAD
V	VENT
W.G.	WATER GAGE
°F	DEGREES FAHRENHEIT
D	DRAIN
E	ELECTRIC
MAV	MANUAL AIR VENT
ESP	EXTERNAL STATIC PRESSURE
EDR	EQUIVALENT DIRECT RADIATION
TDH	TOTAL DYNAMIC HEAD
WB	WET BULB
DB	DRY BULB
FD	FIRE DAMPER
KW	KILOWATT
MD	MOTORIZED DAMPER

PIPING SYMBOLS

	HIGH PRESSURE STEAM
	HIGH PRESSURE CONDENSATE RETURN
	PUMP CONDENSATE RETURN
	LOW PRESSURE STEAM
	LOW PRESSURE CONDENSATE RETURN
HWS	HOT WATER SUPPLY } HEATING
HWR	HOT WATER RETURN } HEATING
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CTS	COOLING TOWER SUPPLY
CTR	COOLING TOWER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
SMS	SNOW MELTING SUPPLY } ETHYLENE GLYCOL
SMR	SNOW MELTING RETURN } ETHYLENE GLYCOL
	CAMPUS WATER
A	CONTROL AIR
D	DRAIN
E	CONTROL ELECTRIC WIRING
V	VENT
	CAPILLARY
	FLEXIBLE CONNECTION
	DIRECTION OF FLOW
	GATE VALVE
	GLOBE VALVE
	ANGLE VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVES
	RELIEF VALVE
	CONTROL VALVE - 2 WAY
	CONTROL VALVE - 3 WAY
	PLUG COCK
	GAGE COCK
	STRAINER
T	STEAM TRAP
FS	FLOW SWITCH
P	PRESSURE GAGE
T	THERMOMETER
	THERMOCOUPLE WELL
TN	THERMOSTAT & ZONE No
H	HUMIDISTAT
	VENTURI
VB	VACUUM BREAKER
	DRIP TRAP ASSEMBLY

NPT	NATIONAL PIPE THREAD
DWDI	DOUBLE WIDTH DOUBLE INLET
E.J.	EXPANSION JOINT
G	GUIDE
T.C.	TEMPERING COIL
ECON	ECONOMIZER
CW	COLD WATER
FD	FLOOR DRAIN
RFD	RECESSED FLOOR DRAIN

DUCT SYMBOLS

	DUCTS
	TURNING VANES
	EXTRACTOR
	SPLITTER DAMPER
B.D.	BALANCING DAMPER
HC 7	HEATING COIL AND NUMBER
CC2	COOLING COIL AND NUMBER
	SUPPLY DUCT RISER
	RETURN & EXHAUST DUCT RISER
M.D.	MOTORIZED DAMPER
I	LIGHTING FIXTURE WITH SIDE SUPPLY & RETURN AIR THRU CHAMBER. DUCT ON SUPPLY ONLY.
II	LIGHTING FIXTURE WITH RETURN AIR THRU CHAMBER & SIDES. NO DUCT CONNECTION.
III	LIGHTING FIXTURE WITH RETURN AIR THRU CHAMBER. NO DUCT CONNECTION.

SECTION LETTER OR DETAIL NUMBER

SHEET NUMBER WHERE SECTION IS CUT OR DETAIL REFERENCED

SHEET NUMBER WHERE SECTION OR DETAIL IS DRAWN

ZONE REHEAT COILS

COIL No.	CAPACITY BTU/HR	SIZE L	SIZE W	SIZE ROWS	CONN SIZE NPT	AIR ENT TEMP °F DB	AIR LVG TEMP °F DB	AIR FLOW CFM	AIR FACE VEL FPM	AIR PRESS DROP IN. W.G.	WATER TEMPERATURE ENT	WATER TEMPERATURE LVG	WATER FLOW GPM	WATER PRESS FT. W.G.
HC-1	48,000	18	12	1	¾	58	108	880	600	MAXIMUM 0.20	220	180	2.4	MAXIMUM 5'
HC-2	21,600	12	12	1	¾			400	400				1.08	
HC-3	27,100	12	12	1	¾			530	530				1.05	
HC-4	103,800	12	6	1	½			200	400				0.54	
HC-5	37,000	18	12	1	¾			700	580				1.9	
HC-6	29,700	24	6	1	¾			550	550				1.48	
HC-7	8,100	12	6	1	½			150	300				0.40	
HC-8	29,700	24	6	1	¾			550	550				1.48	
HC-9	28,100	12	12	1	¾			520	520				1.41	
HC-10	29,700	24	6	1	¾			550	550				1.48	
HC-11	28,100	12	12	1	¾			520	520				1.41	
HC-12	29,700	24	6	1	¾			550	550				1.48	
HC-13	28,100	12	12	1	¾			520	520				1.41	
HC-14	40,500	18	12	1	¾			750	500				2.05	
HC-15	49,700	24	12	1	¾			920	460				2.45	
HC-16	19,400	12	12	1	½			360	360				0.97	
HC-17	45,700	24	12	1	¾			920	460				2.45	
HC-18	17,800	12	12	1	½			330	330				0.88	
HC-19	54,000	24	12	1	¾			1000	500				2.7	
HC-20	5,180	12	6	1	½	58	108	170	340		220	180	0.46	

AS REQUIRED

COIL No.	CAPACITY BTU/HR	SIZE L	SIZE W	SIZE ROWS	CONN SIZE NPT	AIR ENT TEMP °F DB	AIR LVG TEMP °F DB	AIR FLOW CFM	AIR FACE VEL FPM	AIR PRESS DROP IN. W.G.	WATER TEMPERATURE ENT	WATER TEMPERATURE LVG	WATER FLOW GPM	WATER PRESS FT. W.G.
HC-21	10,800	12	6	1	½	58	108	200	400	MAXIMUM 0.20	220	180	.54	MAXIMUM 5'
HC-22	12,610	12	6	1	½			230	460				.62	
HC-23	81,800	42	12	1	1			1700	485				4.55	
HC-24	270,540	54	18	1	1¼			5010	480				13.52	
HC-25	23,760	12	12	1	½			440	440				1.19	
HC-26	42,100	18	12	1	3/16			780	520				2.11	
HC-27	81,000	36	12	1	1			1500	500				4.05	
HC-28	32,400	24	12	1	¾			600	300				1.62	
HC-29	35,600	18	12	1	¾			660	440				1.80	
HC-30	21,600	12	12	1	½			400	400				1.08	
HC-31	18,000	12	12	1	½	58	108	350	550				.95	
HC-32	434,000	84	36	2	2	60	85.1	16,000	750				21.7	
HC-33	434,000	84	36	2	2	60	85.1	16,000	750				21.7	
HC-34	762,000	72	36	2	2	58	112.5	15,000	720				38.1	
HC-35	130,000	42	24	1	1		82	5000	720				6.5	
HC-36	182,000	48	30	1¼	1¼		82	7400	740				9.6	
HC-37	120,000	36	30	1	1		82.2	6000	640	0.15			6.0	
HC-38	32,000	24	18	1	¾		83.3	1100	566	0.1			1.6	
HC-39	20,800	24	12	1	1¼		82.1	850	400	0.1			1.04	
HC-40	62,000	42	18	1	¾	58	81.8	2400	400	0.1	220	180	3.1	

AS REQUIRED

LTR	REVISIONS	DATE	CHK'D	APP'D
△3	NOT AS BUILT-SEE SHOP DRAWING SUBMITTALS & OPERATING MANUAL FOR EQUIPMENT	12/16/68	BRM	
△1	SEE ADDENDUM 1	11-5-66	T.CUNE	

10 GEV CORNELL SYNCHROTRON LABORATORY

CORNELL UNIVERSITY
ITHACA NEW YORK

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