

three inches = one foot
one and one half inches = one foot
one inch = one foot
one half inch = one foot
three quarters inch = one foot
one eighth inch = one foot
one quarter inch = one foot
one eighth inch = one foot

CONTINUOUS BLOWDOWN HEAT EXCHANGER SCHEDULE							
DESIG	PLANT LOAD (LBS/HR)	PLANT PRESSURE (PSIG)	FLASH PRESSURE (PSIG)	BLOWDOWN (%)	MINIMUM BLOWDOWN FLOWRATE (GPM)	MINIMUM MAKE-UP FLOWRATE (GPM)	BASIS OF DESIGN
CBHX-1	60,000	100	5	3	4	26	PENN SEPARATOR , AHRB-6-30

ECONOMIZER SCHEDULE																				
DESIG	DESIGN PRESSURE (PSI)	DESIGN TEMPERATURE (°F)	WATER FLOW CONFIGURATION	GAS FLOW CONFIGURATION	UNIT DUTY (MBTU-HR)	UNIT WET WEIGHT (LBS)	APPROXIMATE OVERALL DIMENSIONS (WxLxH)	WATER SIDE					FLUE GAS SIDE					BASIS OF DESIGN		
								FLUID	FLOW (PPH)	ENTERING TEMP (°F)	LEAVING TEMP (°F)	MAX PRESS DROP (PSI)	FOULING FACTOR	FLUID	FLOW (SCFM)	ENTERING TEMP (°F)	LEAVING TEMP (°F)		MAX PRESS DROP (IN. W.C.)	FOULING FACTOR
EC-1	450	600	COUNTER FLOW	VERTICAL	450	3,067	58"x70"x95"	FEEDWATER	20,700	227	250	1.0	0.0005	FLUE GAS	4,740	369	289	0.16	0.001	CLEAVER BROOKS, CRE-42
EC-2	450	600	COUNTER FLOW	VERTICAL	450	3,067	58"x70"x95"	FEEDWATER	20,700	227	250	1.0	0.0005	FLUE GAS	4,740	369	289	0.16	0.001	CLEAVER BROOKS, CRE-42
EC-3	450	600	COUNTER FLOW	VERTICAL	450	3,067	58"x70"x95"	FEEDWATER	20,700	227	250	1.0	0.0005	FLUE GAS	4,740	369	289	0.16	0.001	CLEAVER BROOKS, CRE-42

- NOTES:
1. ECONOMIZER CASING SHALL BE CONSTRUCTED OF STAINLESS STEEL.
2. ECONOMIZER INTERNALS SHALL BE CONSTRUCTED OF REMOVABLE ONE INCH DIAMETER (1" ID), AL-6XN STAINLESS STEEL TUBES WITH CARBON STEEL FINNS.
3. ECONOMIZER SHALL MEET ALL A.S.M.E. CODE REQUIREMENTS.
4. ECONOMIZER MANUFACTURER SHALL PROVIDE SAFETY RELIEF VALVE.
5. SYSTEM CONNECTIONS SHALL BE A MINIMUM OF CLASS 300 FLANGED CARBON STEEL.

BLOWDOWN SEPARATOR SCHEDULE						
DESIG	TANK HEIGHT (INCHES)	INLET (INCHES)	VENT (INCHES)	DRAIN (INCHES)	COOLING WATER TEMP (°F)	BASIS OF DESIGN
BDS-1	34	2	5	5	70	PENN SEPARATOR , A34

NOTE: PROVIDE FLANGED VENT AND DRAIN CONNECTIONS

CONDENSATE SURGE TANK SCHEDULE								
DESIG	TYPE	DESIGN OPERATING PRESSURE (PSIG)	MIN RETENTION AT FULL LOAD (MINUTES)	MIN RETENTION AT FULL LOAD (GAL)	TANK DIMENSIONS (DIA x OAL)	TANK EMPTY WEIGHT (LBS)	TOTAL APPROXIMATE FLOODED WEIGHT (LBS)	BASIS OF DESIGN
CST-1	HORIZONTAL	VENTED	20	2,400	6' x 14'	12,500	34,500	BFS INDUSTRIES

SCOTCH MARINE FIRETUBE BOILER SCHEDULE															
DESIG	SERVICE	TYPE	CAPACITY			EXHAUST GAS TEMPERATURE (GAS/OIL)(°F)	DESIGN PRESSURE (PSIG)	OPERATING PRESSURE (PSIG)	MIN HEATING SURFACE (SQ.FT.)	MIN BOILER EFFICIENCY (GAS/OIL)(%)	SKID MOUNTED AIR COMPRESSOR (HP)	ELECTRICAL	TOTAL APPROXIMATE OPERATING WEIGHT (LBS)	APPROXIMATE OVERALL DIMENSIONS (LxWxH)	BASIS OF DESIGN
			POUNDS PER HOUR (PPH)	HORSEPOWER (HP)	MBTU's PER HOUR										
B-1	STEAM	4 PASS WET-BACK	20,700	600	20,085	375 / 383	200	100	3000	83 / 86	7½	480 / 3 / 60	65,000	24' x 10.5' x 12'	CLEAVER BROOKS, MODEL 4WI
B-2	STEAM	4 PASS WET-BACK	20,700	600	20,085	375 / 383	200	100	3000	83 / 86	7½	480 / 3 / 60	65,000	24' x 10.5' x 12'	CLEAVER BROOKS, MODEL 4WI
B-3	STEAM	4 PASS WET-BACK	20,700	600	20,085	375 / 383	200	100	3000	83 / 86	7½	480 / 3 / 60	65,000	24' x 10.5' x 12'	CLEAVER BROOKS, MODEL 4WI

- NOTES:
1. SAFETY VALVE SETTINGS: 135 PSIG, 140 PSIG
2. FIRST HIGH PRESSURE CUT-OUT SETTING: 120 PSIG
SECOND HIGH PRESSURE CUT-OUT SETTING: 130 PSIG
3. MINIMUM STEAM QUALITY: 99.0%
4. ALTITUDE: 100 FEET ABOVE SEA LEVEL.
5. REFER TO LOW NOx BURNER SCHEDULE FOR ADDITIONAL INFORMATION.
6. STEAM NOZZLE SHALL BE CONSTRUCTED WITH A REINFORCEMENT PAD.

LOW NOx BURNER SCHEDULE																	
BOILER No	COMBUSTION AIR TEMPERATURE (°F)	HUMIDITY (%)	EXCESS AIR (%) (GAS/OIL)	NATURAL GAS				FUEL OIL No 2				FORCED DRAFT FAN				BASIS OF DESIGN	
				TURNDOWN	TRAIN INLET PRESSURE (PSIG)	NOx (PPM)	CO (PPM)	TURNDOWN	TRAIN INLET PRESSURE (PSIG)	NOx (PPM)	CO (PPM)	HP	RPM	ELECTRICAL	DUTY		VFD
1	80	50	15 / 15	10:1	10	30	50	8:1	120	90	50	40	3,500	480 / 3 / 60	INVERTER	YES	PROVIDED BY BOILER MANUFACTURER
2	80	50	15 / 15	10:1	10	30	50	8:1	120	90	50	40	3,500	480 / 3 / 60	INVERTER	YES	PROVIDED BY BOILER MANUFACTURER
3	80	50	15 / 15	10:1	10	30	50	8:1	120	90	50	40	3,500	480 / 3 / 60	INVERTER	YES	PROVIDED BY BOILER MANUFACTURER

- NOTES:
1. NO COMBUSTION AIR PRE-HEAT.
2. GAS SPUDS SHALL BE STAINLESS STEEL.
3. FORCED DRAFT FAN INLET SHALL BE SCREENED.
4. EMISSIONS PARTS PER MILLION (PPM) ARE BASED ON 3% OXYGEN (O 2).

DEAERATOR SCHEDULE																
DESIG	TYPE	NORMAL CAPACITY (TOTAL MASS FLOW) (PPH)	MAX O ₂ CONTENT (CC/LITER)	MIN TURNDOWN CAPACITY	DESIGN MAKE-UP WATER TEMP (°F)	DESIGN MAKE-UP WATER FLOW (%)	DESIGN OPERATING PRESSURE (PSIG)	DESIGN OPERATING TEMPERATURE (°F)	MAX OPERATING PRESSURE (PSIG)	MIN OPERATING PRESSURE (PSIG)	STORAGE TANK			TOTAL APPROXIMATE EMPTY WEIGHT (LBS)	TOTAL APPROXIMATE FLOODED WEIGHT (LBS)	BASIS OF DESIGN
											MIN RETENTION AT FULL LOAD (MINUTES)	MIN RETENTION AT FULL LOAD (GAL)	APPROX. DIMENSIONS (DIA x LENGTH)			
DA-1	TRAY	60,000	0.005	20:1	70	100	5	400	30	FULL VACUUM	20	2,400	6' x 15'	31,100	53,000	BFS INDUSTRIES

- NOTES:
1. DEAERATOR SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ASME PRESSURE VESSEL CODES WITH 1/8" CORROSION ALLOWANCE.
2. CONSTRUCT PER HEAT EXCHANGER INSTITUTE (HEI) STANDARDS OF CONSTRUCTION.
3. STEAM NOZZLE SHALL BE CONSTRUCTED WITH A REINFORCEMENT PAD.
4. DEAERATOR MANUFACTURER SHALL PROVIDE ACCESS PLATFORM AND LADDER TO DEAERATOR HEAD FOR TRAY REMOVAL.

WATER SOFTENER SCHEDULE																			
DESIGN	SYSTEM	NORMAL OPERATING MODE	WATER HARDNESS INLET (PPM)	WATER HARDNESS OUTLET (PPM)	OPERATING TEMPERATURE (°F)	OPERATING PRESSURE (PSI)	GRAIN CAPACITY PER TANK (GRAINS)	NORMAL FLOW RATE (GPM)	PEAK FLOW RATE (GPM)	MAXIMUM PRESSURE DROP AT NORMAL FLOW RATE (PSI)	VESSEL SIZE (EACH TANK) (DIA x H)	VESSEL PRESSURE RATING (PSI)	MAXIMUM REGENERATION TIME (MINUTES)	MAXIMUM BACKWASH FLOW (GPM)	BRINE TANK		ELECTRICAL	APPROX WEIGHT (LBS)	BASIS OF DESIGN
															CAPACITY (GAL)	DIMENSIONS (DIA x H)			
WSF-1	BOILER MAKE-UP (NP)	TRIPLEX SEQUENTIAL	120	0	70	65	900,000	65	210	15	42" x 60"	100	120	15	500	57" x 63"	120 / 1 / 60	10,000	WATER KING, MF-240S-2

NOTE: TRIPLEX SEQUENTIAL: ONE TANK OPERATIONAL, ONE TANK REGENERATION, ONE TANK STAND-BY.

PUMP SCHEDULE															
DESIG	LOCATION	SERVICE	TYPE	PUMP ROTATION (VERIFY)	FLOW (GPM)	HEAD (FEET H ₂ O)	SUCTION / DISCHARGE	MOTOR					MINIMUM PUMP EFFICIENCY (%)	APPROXIMATE WEIGHT (LBS)	BASIS OF DESIGN
								HP	RPM	ELECTRICAL	DUTY	VFD			
CTP-1	CONDENSATE SURGE TANK	CONDENSATE TRANSFER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	84	135	2½" x 2½"	7.50	3,500	480 / 3 / 60	CONTINUOUS	NO	70.6	230	AURORA PUMPS, PVM SERIES
CTP-2	CONDENSATE SURGE TANK	CONDENSATE TRANSFER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	84	135	2½" x 2½"	7.50	3,500	480 / 3 / 60	CONTINUOUS	NO	70.6	230	AURORA PUMPS, PVM SERIES
CTP-3	CONDENSATE SURGE TANK	CONDENSATE TRANSFER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	42	135	2" x 2"	3.00	3,500	480 / 3 / 60	CONTINUOUS	NO	64.8	131	AURORA PUMPS, PVM SERIES
BFP-1	DEAERATOR	BOILER FEED WATER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	46	370	2" x 2"	7.50	3,500	480 / 3 / 60	INVERTER	YES	66.1	197	AURORA PUMPS, PVM SERIES
BFP-2	DEAERATOR	BOILER FEED WATER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	46	370	2" x 2"	7.50	3,500	480 / 3 / 60	INVERTER	YES	66.1	197	AURORA PUMPS, PVM SERIES
BFP-3	DEAERATOR	BOILER FEED WATER	VERTICAL MULTISTAGE	COUNTER CLOCKWISE	46	370	2" x 2"	7.50	3,500	480 / 3 / 60	INVERTER	YES	66.1	197	AURORA PUMPS, PVM SERIES
FOP-1	FUEL OIL PUMP PIT	No 2 FUEL OIL	ROTARY POSITIVE DISPLACEMENT	COUNTER CLOCKWISE	11	290	1½" x 1½"	2.00	1,725	480 / 3 / 60	CONTINUOUS	NO	-	120	PREFERRED, LO-204
FOP-2	FUEL OIL PUMP PIT	No 2 FUEL OIL	ROTARY POSITIVE DISPLACEMENT	COUNTER CLOCKWISE	11	290	1½" x 1½"	2.00	1,725	480 / 3 / 60	CONTINUOUS	NO	-	120	PHILLIPS FUEL SYSTEMS, D-15

DEAERATOR CONNECTIONS SCHEDULE		
DESCRIPTION	MINIMUM CONNECTION SIZE (DIA)	QUANTITY EACH
PUMPED CONDENSATE INLET :	3"	1
STEAM INLET :	8"	1
RELIEF VALVE OUTLET :	1½"	1
TEMPERATURE INDICATOR / TRANSMITTER :	¾"	3
PRESSURE INDICATOR :	¾"	1
ATMOSPHERIC VENT :	1½"	1
HEATER MANWAY :	18"	1
HIGH PRESSURE RETURN :	2"	1
VACUUM BREAKER :	2½"	1
BOILER FEED WATER PUMP RECIRCULATION :	1½"	1
BOILER FEED WATER PUMP SUCTION :	6"	1
OXYGEN SAMPLE POINT :	¾"	1
STORAGE MANWAY :	12"x16"	2
OVERFLOW :	4"	1
LEVEL CONTROL :	1½"	2
GAUGE GLASS :	1½"	2
CHEMICAL FEED :	1½"	1
MANUAL DRAIN :	1½"	1

STEAM VENT SILENCER SCHEDULE				
DESIG	LOCATION	FLOW (PPH)	OUTLET SIZE (INCH)	BASIS OF DESIGN
SVS-1	100 STEAM HEADER	21,000	16	VANEC MODEL 521-16

- NOTES:
1. 12 dB MINIMUM AT 63 Hz
17 dB MINIMUM AT 125-250 HZ
25 dB MINIMUM AT 250-500 HZ
34 dB MINIMUM AT 500-8000 HZ

STEAM TRAP SCHEDULE																
DESIG	GENERAL LOCATION	TYPE	TRAP SIZE	PRESSURE (PSIG)		DIFF PRESS (PSIG)		FLOW RATE (LB/HR)			STEAM TEMP (°F)		BASIS OF DESIGN			
				OPER	MAX	OPER	MAX	OPER FLOW	SAFETY FACTOR	DESIGN FLOW	OPER	MAX				
T-01	100S STEAM HEADER END DRIP	THERMODYNAMIC	½"	100	140	25	35	110	2	220	338	361	SPIRAX/SARCO TD52			
T-02	100S STEAM HEADER END DRIP	THERMODYNAMIC	½"	100	140	25	35	110	2	220	338	361	SPIRAX/SARCO TD52			
T-03	100S WHISTLE VALVE DRIP	THERMODYNAMIC	½"	100	140	25	35	5	2	10	338	361	SPIRAX/SARCO TD52			
-	-	-	-	-	-	-	-	-	-	-	-	-	-			
T-05	5S AT REDUCING STATION	FLOAT & THERMOSTATIC	¾"	5	15	1/2	1	0	2	0	227	250	SPIRAX/SARCO FT450			
T-06	100S MAIN TO DISTRIBUTION	THERMODYNAMIC	½"	100	140	25	35	41	2	82	338	361	SPIRAX/SARCO TD52			
T-07	100S MAIN TO REDUCING STATION	THERMODYNAMIC	½"	100	140	25	35	0	2	0	338	361	SPIRAX/SARCO TD52			
T-08	100S AT REDUCING STATION	THERMODYNAMIC	½"	100	140	25	35	0	2	0	338	361	SPIRAX/SARCO TD52			
T-09	15S AT REDUCING STATION	THERMODYNAMIC	½"	15	22	2	5	0	2	0	250	262	SPIRAX/SARCO TD52			
T-10	5S MAIN TO DA-1	FLOAT & THERMOSTATIC	1"	5	15	1/2	1	0	2	0	227	250	SPIRAX/SARCO FT450			
T-11	5S MAIN FROM CBHX-1	FLOAT & THERMOSTATIC	¾"	5	15	1/2	1	0	2	0	227	250	SPIRAX/SARCO FT450			
-	-	-	-	-	-	-	-	-	-	-	-	-	-			
T-13	15S MAIN TO HEATING EQUIPMENT	THERMODYNAMIC	½"	15	22	2	5	0	2	0	250	262	SPIRAX/SARCO TD52			
T-14	HV-B-1 EQUIPMENT DRIP	FLOAT & THERMOSTATIC	1½"	5	22	1/2	1	383	3	1,150	227	262	SPIRAX/SARCO FT450			
T-15	HV-B-2 EQUIPMENT DRIP	FLOAT & THERMOSTATIC	1½"	5	22	1/2	1	383	3	1,150	227	262	SPIRAX/SARCO FT450			
T-16	HV-B-3 EQUIPMENT DRIP	FLOAT & THERMOSTATIC	1½"	5	22	1/2	1	383	3	1,150	227	262	SPIRAX/SARCO FT450			
T-17	100S EMERGENCY BOILER	THERMODYNAMIC	½"	100	140	25	35	110	2	220	338	361	SPIRAX/SARCO TD52			