

# Boiler Design

## Waste Heat Recovery Boiler (Reference)



Prepared by

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# Contents

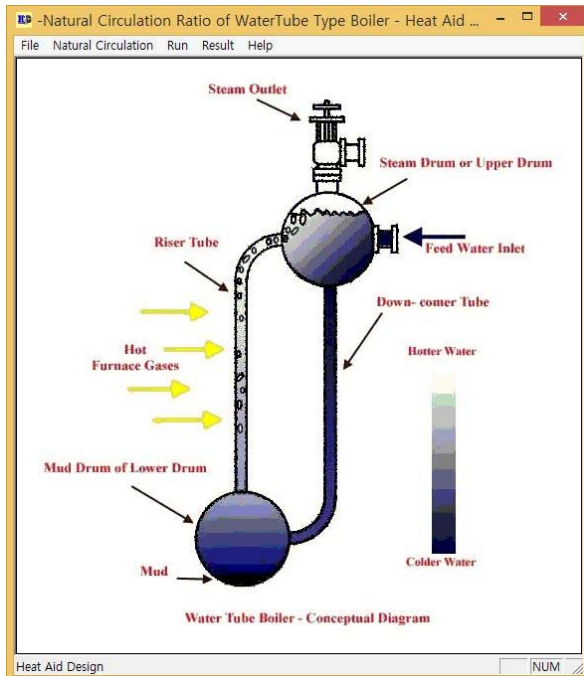
No.	Title	Page
1	2-drum, Waste Heat Recovery Boiler (without Economizer), Waste Gas, <b>60(54) ton/hr x 45 kg/cm<sup>2</sup>-g x 400 degC</b>	

# Boiler Design

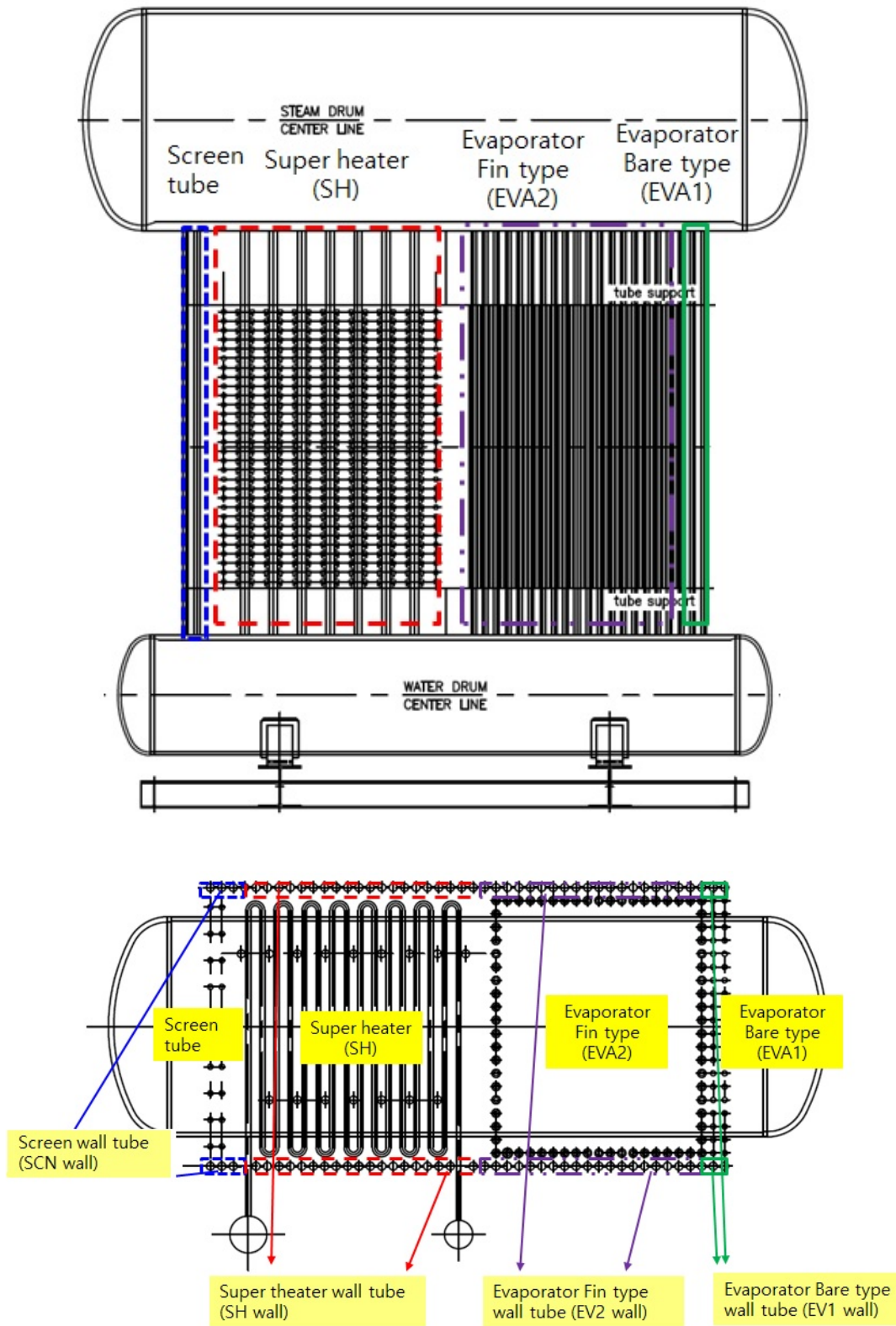


Module ( from No.1 to No.5)

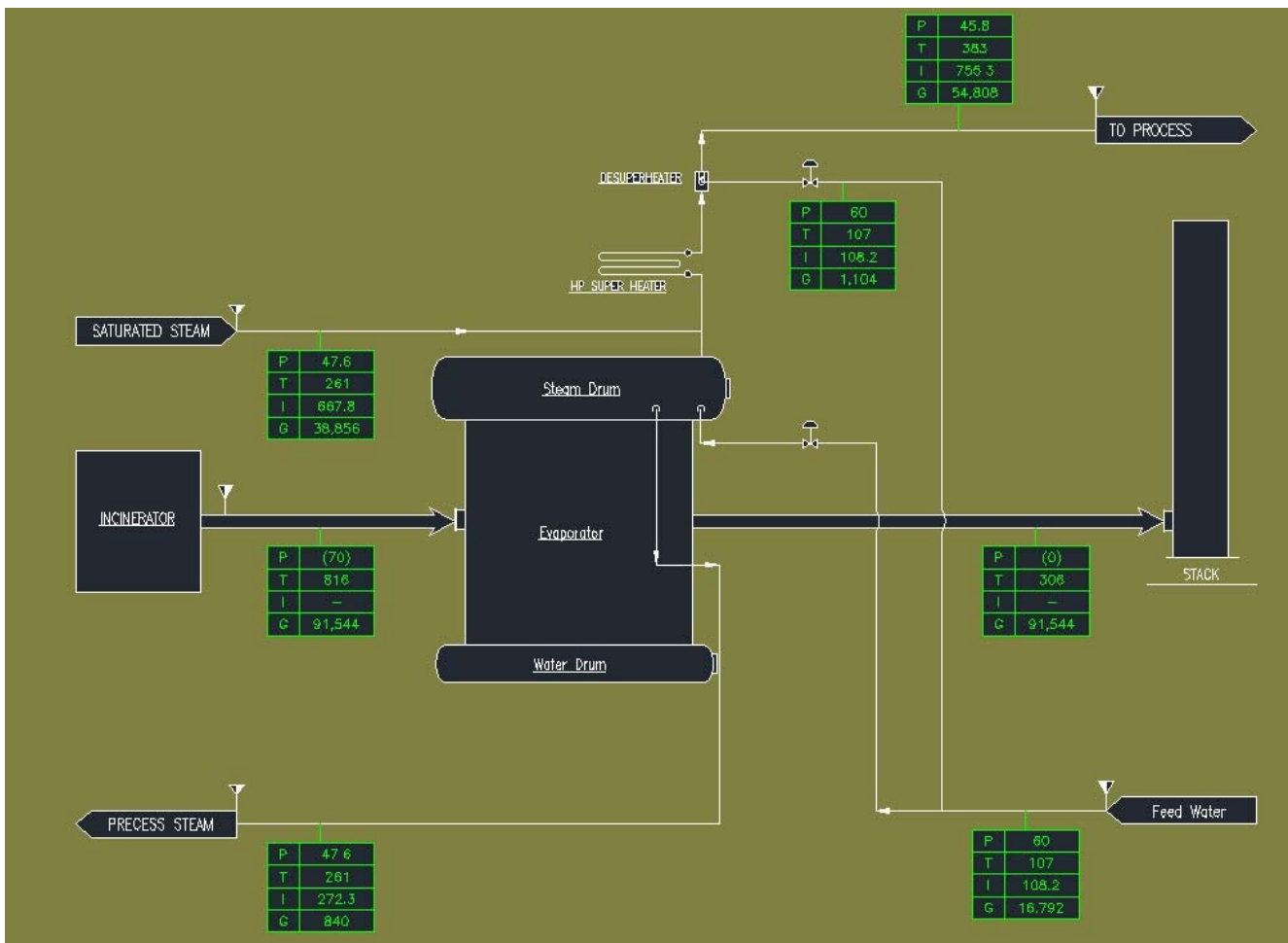
Main Gas Side Type	Use	Use	Use	Use	None	Thermal Cal.
Module(Use/None)*:	Screen	Sup	Evap2	Evap1	----	Thermal Cal.
Gas Side Name*:	90.8	48.0	90.8	90.8	90.8	
Tube Outside Diameter,mm*:	3.2	2.9	2.9	2.9	3.5	
Tube Min Thickness,mm*:	2700.0	2684.0	2700.0	2700.0	10500.0	
Tube Material*:	A178Gr7	A178Gr7	A178Gr7	A178Gr7	A213T22	
No. of Transverse Tubes*:	10	12	20	20	34	
Transverse Spacing,mm*:	256.0	88.0	128.0	128.0	101.00	
No. of tubes on w/steam side*:	2	3	15	2	1	
Number of tube passes*:	1	1	1	1	2	
Longitudinal Spacing,mm*:	110.0	135.0	110.0	110.0	102.00	
Tube Arrang.*:	Inline	Inline	Inline	Inline	Inline	
Finned Type*:	No	No	Serratec	No	Serratec	
Fin Height,mm*:	0.0	12.7	19.0	0.0	12.7	
Fin Thickness,mm*:	0	0	1.0	0	1.2	
Fins per meter, ea/m*:	0.0	0.0	276.0	0.0	0.0	
or Fin per Inch,ea/in*:	0	0.0	0.0	0.0	0.0	
Fin Material*:	C.Steel	C.Steel	C.Steel	SUS409	SUS409	
Fin Segment,mm*:	4.00000	4.00000	4	4	4	
Fin Base Heig(D=6,ESCCO=5.08)*:	6.00000	6.00000	6.0	6.0	6.0	
Width of HRSG(Oil Heater),m*:	2.6834	2.700	2.6834	2.6834	3.4	
Baffle of Inner Casing,mm*:	0.00000	0.0	0.0	0.0	0.0	
Fouling Factor(Gas),m <sup>2</sup> -hr-c/kcal*:	0.00050	0.00050	0.00050	0.00050	0.0002	
Fouling Factor(In),m <sup>2</sup> -hr-c/kcal*:	0.00010	0.00010	0.0001	0.0001	0.0001	
Effectiveness Factor*:	0.9	0.95	0.9	0.9	1.0	
Flow Type*:	Counter	Counter	Counter	Counter	Counter	Thermal Cal.
Tube Pressure Drop(Assume),bar*:	0.0	0.0	0.0	0.0	0.0	Thermal Cal.
Pipe Pressure Drop(Add.),bar*:	00.00	0.0	0.0	0.0	0.0	Thermal Cal.
Module Type*:	Evap.	Super.	Evap.	Evap.	Super.	Thermal Cal.
Heat Loss, %*:	1.5	1.5	1.5	1.5	0.75	Thermal Cal.
Choice of Pressure*:	HP	HP	HP	HP	HP	Thermal Cal.
Blowdown(Only Evap.),%:	0.00	0.0	0.0	0.0	0.0	Thermal Cal.
Extraction Flow(water),kg/hr:	0.	0.0	0.0	0.0	0.0	Thermal Cal.
Extraction Flow(steam),kg/hr:	0.	0.0	0.0	0.0	0.0	Thermal Cal.
Additional Flow(water),kg/hr:	0.	0.0	0.0	0.0	0.0	
Additional Flow(steam),kg/hr:	0.	0.0	0.0	0.0	0.0	
Additional Flow Temp.,degC:	0.	0.0	0.0	0.0	0.0	
No. of Flow Passes(Only Oil),No*:	1	1	1	1	1	



# Boiler Assembly



# Heat & Mass Balance



# Shop Assembly(1/2)



# Shop Assembly(2/2)

