

**2. Steam Condition in Pressure Loss Calculation**  
(Amb. Temp. 32°C, Gas Firing, GT-100% Load)

Line Name	Ambient Temperature		°C		Pipe Condition	
	Load		%		Material	Size
HP	HP SH Outlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	129 540 0.02637 273700 7216.4	SA335GrP22	350A
	HP S/T Inlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	125 538 0.02719 547400 14884.8	A335GrP22	500A
LP	LP SH Outlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	6.5 257 0.31886 40400 12882.0	SA515Gr60	450A
	LP S/T Inlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	5.5 255 0.36785 80800 29722.3	A515Gr60	550A
CRP	HP S/T Outlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	38.7 367.8 0.06957 52900 3680.0	A387Gr12	600A
	IP Confluence Point	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	37.9 366.8 0.07096 264500 18769.9	A515Gr60	450A
	RH Inlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	37.9 352.8 0.06894 303400 20916.3	A515Gr60	550A
HTR	RH Outlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	35.9 568 0.10303 303400 31260.7	A387Gr22	650A
	IP S/T Inlet	Press. Temp. Spec. Vol. Mass Flow Vol. Flow	bara °C m3/kg kg/h m3/kg	35 566 0.10539 606800 63953.4	A387Gr22	700A

# HP STEAM PIPE

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		Common	Unit
MCR Steam Flow[t/h]		547.400	273.700
Press. Mpa	:Up Stream	12.90	
Temp. °C	:Up Stream	540	
Spec. Vol. m3/kg	:Up Stream	0.0266	
Press. Mpa	:Down Stream	12.50	
Temp. °C	:Down Stream	538	
Spec. Vol. m3/kg	:Down Stream	0.0274	
Spec. Vol. m3/kg	:Average	0.0270	

		Common Pipe				Unit Pipe			
Line Number		1	2	1	1	1	1	1	1
Outside Diameter	mm	508.00	323.80				355.60		
Thickness	mm	66.00	42.00				46.00		
Inner Diameter	m	0.376	0.240				0.264		
Sectional Area	m <sup>2</sup>	0.111	0.045				0.055		
Mass Flow	T/H	547.400	273.700				273.700		
Vol. Flow	m <sup>3</sup> /s	4.110	2.050				2.050		
Velocity	m/s	37.000	45.400				37.600		
Pipe Length	m	12.5	2.0				102.5		
Bend	90°						5		
	60°								
	45°								
	30°								
Elbow	90°	1					2		
	60°								
	45°								
	30°								
Lateral	60° (Main)								
	45° (Main)								
	60° (Branch)								
	45° (Branch)								
T-Piece	Main	1					2		
	Branch	2							
Reducer									
Non-Return Valve							1		
Sluice Wedge Valve							1		
Flow Nozzle	kg/cm <sup>2</sup>						0.240		
Flow Nozzle	MPa						0.024		

Press. Loss Lim	MPa	0.400
	kg/cm <sup>2</sup>	4.080
	bar	4.000

DARCY's Formula

$$(P=63.8 \cdot f \cdot L \cdot v \cdot G^2/di^5, P=k \cdot W^2/(2 \cdot g \cdot v))$$

Piping Loss	kg/cm <sup>2</sup>	0.103	0.039				1.248		
Fitting Loss	kg/cm <sup>2</sup>	0.704					1.237		
Bend	90°						0.134		
	60°								
	45°								
	30°								
Elbow	90°	0.047					0.032		
	60°						0.096		
	45°								
	30°								
Lateral	60° (Main)								
	45° (Main)								
	60° (Branch)								
	45° (Branch)								
T-Piece	Main	0.026					0.053		
	Branch	0.631							
Reducer									
Non-Return Valve							0.668		
Sluice Wedge Valve							0.014		
Flow Nozzle							0.240		
Sub Total Loss	kg/cm <sup>2</sup>	0.807	0.039				2.485		
Total Press. Los	kg/cm <sup>2</sup>	3.331							
	MPa	0.327							
	bar	3.267							

&lt; 4.000 (Press. Loss Limit)