



<b>PROJECT :</b>	AAA	<b>CLIENT P. NO.:</b>	DDD
<b>PROJ. NO.:</b>	CCC	<b>DOC. REV. :</b>	GGG
<b>CLIENT :</b>	BBB	<b>DOC. NO.:</b>	EEE
<b>UNIT :</b>	JJJ	<b>BY :</b>	FFF
<b>DATE :</b>	15-Sept. -06		

**General Data:**

Tag No.	<b>HHH</b>
P&ID No.	III
Service	Liquid
Location	Pump Discharge
Fluid	KKK

**Process Data:**

Normal Flow Rate	100.00	m3/hr
Mass Density	850.00	kg/m3
Viscosity	1.0000	Cp
Shut off Factor	25.00	%
Overdesign Factor	10.00	%
Turndown Ratio	60.00	%

**Suction Static Head:**

Pump Discharge Pressure	13.000	bara
Static Head	-3.500	m

**Suction Head Loss:**

Exchanger Pressure Drop	0.000	bar
Control Valve Pressure Drop	0.000	bar
Other Losses	0.000	bar
Metering Loss	0.000	bar
Acceleration Loss	0.000	bar

**Suction Pipe Specifications:**

Pipe Length	15	m
Pipe Internal Diameter	4.026	in
Pipe Roughness	0.00180	in

**Fittings Quantity:**

Tee thru run	0	Check valve - swing	0
Tee thru branch	0	Check valve - lift	0
Elbow - 90 deg LR	2	Check valve - stop	0
Elbow - 90 deg Std	0	Check valve - tilting disk	0
Elbow - 45 deg LR	0	Foot valve - hinged disc	0
Elbow - 45 deg Std	0	Foot valve - poppet disc	0
Close pattern return bend	0	Reducer / Expander	0
Gate valve	0	Pipe Entrance (projecting)	0
Ball valve	1	Pipe Entrance (sharp-edged)	0
Globe valve	0	Pipe Entrance (flush)	0
Angle valve	0	Pipe Exit (projecting)	0
Butterfly valve (2" - 8")	0	Pipe Exit (sharp-edged)	0
Butterfly valve (10" - 14")	0	Pipe Exit (rounded)	0
Butterfly valve (16" - 24")	0		



**Discharge Static Head:**

Destination Operating Pressure	9.000	bara
Static Head	4.000	m

**Discharge Head Loss:**

Exchanger Pressure Drop	0.000	bar
Control Valve Pressure Drop	0.000	bar
Other Losses	0.000	bar
Metering Loss	0.000	bar
Acceleration Loss	0.000	bar

**Discharge Pipe Specifications :**

Pipe Length	50	m
Pipe Internal Diameter	4.026	in
Pipe Roughness	0.00180	in

**Fittings Quantity:**

Tee thru run	0
Tee thru branch	0
Elbow - 90 deg LR	2
Elbow - 90 deg Std	0
Elbow - 45 deg LR	0
Elbow - 45 deg Std	0
Close pattern return bend	0
Gate valve	0
Ball valve	3
Globe valve	0
Angle valve	0
Butterfly valve (2" - 8")	0
Butterfly valve (10" - 14")	0
Butterfly valve (16" - 24")	0
Check valve - swing	1
Check valve - lift	0
Check valve - stop	0
Check valve - tilting disk	0
Foot valve - hinged disc	0
Foot valve - poppet disc	0
Reducer / Expander	0
Pipe Entrance (projecting)	0
Pipe Entrance (sharp-edged)	0
Pipe Entrance (flush)	0
Pipe Exit (projecting)	0
Pipe Exit (sharp-edged)	0
Pipe Exit (rounded)	0

**Notes:**



---

<b>Suction Calculation Results:</b>	<u>Maximum</u>	<u>Normal</u>	<u>Minimum</u>	
Flow rate	110.00	100.00	60.00	m <sup>3</sup> /hr
Velocity	3.72	3.38	2.03	m/sec
Reynolds No.	323361	293965	176379	----
Friction Factor	0.0179	0.0180	0.0189	----
Pump differential Pressure	5.00	5.11	5.57	bara
Piping Pressure Drop	1.55E-01	1.29E-01	4.85E-02	bar
Fitting Pressure Drop	3.64E-01	3.01E-01	1.08E-01	bar

<b>Suction Calculation Results:</b>				
Velocity	3.72	3.38	2.03	m/sec
Reynold 's No.	323361	293965	176379	----
Friction Factor	0.0179	0.0180	0.0189	----
Piping Pressure Drop	5.16E-01	4.29E-01	1.62E-01	bar
Fitting Pressure Drop	1.61E+00	1.33E+00	4.79E-01	bar

<b>Calculation Results</b>				
Control Valve Suction Pressure	12.19	12.39	13.12	bara
Control Valve Discharge Pressure	11.46	11.09	9.97	bara
Control Valve Pressure Drop	0.73	1.30	3.15	bar

**Sketch:**

