



<b>PROJECT :</b>	AAA	<b>CLIENT P. NO.:</b>	DDD
<b>PROJ. NO.:</b>	CCC	<b>REV. No. :</b>	GGG
<b>CLIENT :</b>	BBB	<b>DOC. NO.:</b>	EEE
<b>UNIT :</b>	KKK	<b>BY :</b>	FFF
<b>DATE :</b>	05/01/2010 12:15		

**General Data:**

Pump Tag No.	HHH
Pump Name	III
P & ID No.	JJJ
Pump Type	Centrifugal
Service:	LLL

**Process Data:**

Normal Flow Rate	100.00	m3/hr
Liquid Density	850.0	kg/m3
Liquid Viscosity	1.0000	Cp
Vapour Pressure	4.8000	bara
Overdesign Factor	10.0	%
Turn Down Factor	60.0	%
Shutoff Pressure Factor	25.0	%
Pump Efficiency	70.0	%

**Suction Static Head:**

Source Operating Pressure	5.00	bara
Source Design Pressure	6.80	bara
Static Head	4.00	m
Maximum Static Head	5.20	m

**Suction Head Loss:**

Exchanger Pressure Drop	0.000	bar
Control Valve Pressure Drop	0.000	bar
Strainer Loss	0.070	bar
Other Losses	0.000	bar
Metering Loss	0.000	bar
Acceleration Loss	0.000	bar

**Suction Pipe Specifications:**

Pipe Length	15.0	m
Pipe Internal Diameter	6.065	in
Pipe Roughness	0.0018	in

**Fittings Quantity:**

Tee thru run	0	Check valve - swing	0
Tee thru branch	1	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)	1
Ball valve	0	Pipe Entrance (sharp-edged)	0
Globe valve	2	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		

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<b>Discharge Static Head:</b>	<u>Path 1</u>	<u>Path 2</u>	<u>Common</u>	
Flow Percent	100.00	0.00	100.00	%
Flow Rate	110.00	0.00	110.00	m3/hr
Destination Operating Pressure	10.00	0.00	NA	bara
Destination Static Head	25.00	0.00	NA	m

<b>Discharge Head Loss:</b>				
Exchanger Pressure Drop	0.000	0.000	0.000	bar
Control Valve Pressure Drop	0.000	0.000	0.000	bar
Other Losses	0.000	0.000	0.000	bar
Metering Loss	0.000	0.000	0.000	bar
Acceleration Loss	0.000	0.000	0.000	bar

<b>Discharge Pipe Specification:</b>				
Pipe Length	40.0	0.0	0.0	m
Pipe Internal Diameter	4.026	0	0	in
Pipe Roughness	0.0018	0.0000	0.0000	in

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

**General Notes:**

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**Suction Calculation Results:**

Velocity	1.64	m/sec
Reynolds No.	214650	----
Friction Factor	0.0176	----
Piping Pressure Drop	1.96E-02	bar
Fitting Pressure Drop	1.42E-01	bar

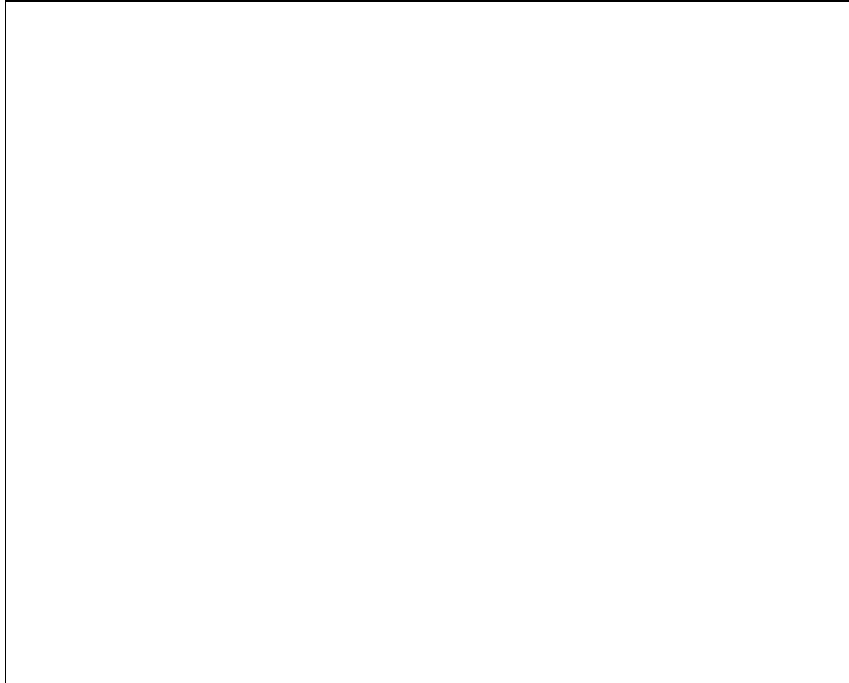
**Discharge Calculation Results:**

	<u>Path 1</u>	<u>Path 2</u>	<u>Common</u>	
Velocity	3.72	0.00	0.00	m/sec
Reynold 's No.	323361	0	0	----
Friction Factor	0.0179	0.0000	0.0000	----
Piping Pressure Drop	4.13E-01	0.00E+00	0.00E+00	bar
Fitting Pressure Drop	1.33E+00	0.00E+00	0.00E+00	bar
Total Pressure in Section	13.83	0.00	0.00	bara

**Calculation Results:**

Pump Suction Head	61.18	m
Pump Suction Pressure	5.10	bara
Pump Discharge Head	165.82	m
Pump Discharge Pressure	13.83	bara
Pump Differential Head	104.64	m
Pump Differential Pressure	8.73	bar
Pump Shutoff Pressure	17.14	barg
Pump Suction Pressure (Max.)	7.23	bara
NPSH <sub>A</sub>	3.62	m
Hydraulic Power	26.66	kW
Breakhorse Power	38.09	kW
Electric Drive Power	43.80	kW

**Sketch:**



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