Helix Technologies Pty Ltd

Project	Helix QA	Client	Helix QA
Project No.	4567	Design Date	15/03/2017
Category	Demo Liquid QA	Atmos. Press	100.19 kPa
Network Type	Liquid	Calc. Method	Darcy
Description	Water Crane 410M ex 4-6 pg 4-3		

Water Flow ref. 'Flow of Fuids Through Valves, Fittings and Pipe', Crane Technical Paper 410 M Example 4-6 pg 4-3
Water flows through a pipe 3" Sch 40, 60m long with several fittings with a differentail head of 7m.
Determine the flow rate in l/min.

Fitting Description	Kft	K	Qty
Bend - 90 degree elbow r/d = 8	30	0.54	6
Entrance - flush 1/2	0	0.5	1
Exit - Sharp edged	0	1	1
Ball Valve, full bore	3	0.58	1

Calculation Results	Crane 410	Helix
Flow Rate	763 l/min	762.71 l/min

Good correlation.

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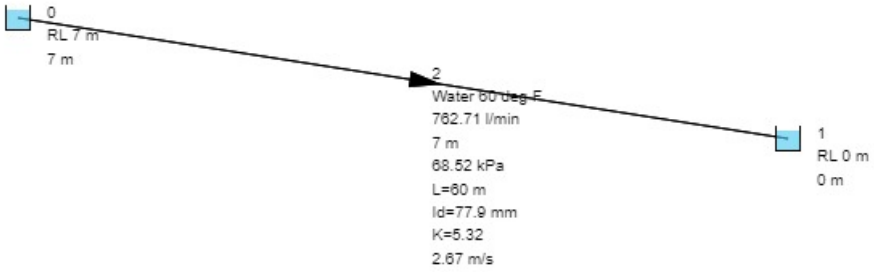

Water Crane 410M ex 4-6 pg 4-3

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Description	Water Crane 410M ex 4-6 pg 4-3		

Pipe No	2	From node to node	0 - 1
Description		Equipment No	
Liquid	Water 60 deg F	Viscosity	1.002 cp
Temperature	20 C	Density	998.2 kg/m3
Vapour Pressure	2.34 kPa		
Pipe Description	Steel Pipes 3" AS1836 (ANSI B36.10)	Pipe Class	Sch 40
Nominal Diameter	80 mm	Inside Diameter	77.9 mm
Outside Diameter	88.9 mm	Pipe Length	60 m
Pipe Roughness	0.03 mm	Allowable Press.	12100 kPa
Orifice Plate Dia	-	Non Return Valve	No

Pipe Fitting Description	Qty	K value	Kft value
Bend - 90 degree elbow r/d = 8	6	0.54	30
Entrance - flush 1/2	1	0.5	0
Exit - Sharp edged	1	1	0
Ball Valve, full bore	1	0.58	3

Total Fittings k	5.32	Total Fittings kf	0
Flow Rate	762.71 l/min	Velocity	2.67 m/s
Friction Loss	5.07 m	Fitting Losses	1.93 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	7 m	Total Pressure Drop	68.52 kPa
Entry Total Head	7 m	Exit Total Head	0 m
Entry Gauge Head	0 m	Exit Gauge Head	0 m
Reynolds No.	206981.88	Friction Factor	0.01814 (Darcy f)

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Node No	0	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	7 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	7 m		

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Description	Water Crane 410M ex 4-6 pg 4-3		

Node No	1	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	0 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	0 m		