Helix Technologies Pty Ltd

Project	Helix QA	Client	Helix QA
Project No.	4567	Design Date	14/03/2017
Category	Demo Liquid Oil	Atmos. Press	100.19 psi
Network Type	Liquid	Calc. Method	Darcy
Description	Oil Pipeline Example		

Oil Pipeline Worked Example, ref. 2500 Solved Problems in Fluid Mechanics and Hydraulics, Jack B. Evett et.al

Example 9.68 on pg 21. 1 mile of 6" Wrought iron pipe at 2.0ft3/s flow rate with SAE 10 oil at 68 F.

Calculation Comment	Published Value	Helix Calculation
Head Loss	647 ft	638.6 ft
Velocity	10.19 ft/s	10.1859 ft/s
Pressure Drop per mile	244 psi/mile	243.35 psi/mile

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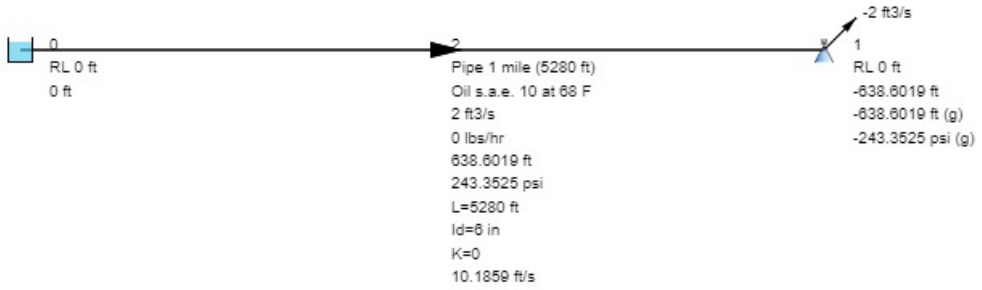

Oil Pipeline Example

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Pipe No	2	From node to node	0 - 1
Description	Pipe 1 mile (5280 ft)	Equipment No	
Liquid	Oil s.a.e. 10 at 68 F	Viscosity	81.4 cp
Temperature	20 C	Density	879 kg/m3
Vapour Pressure	0 psi		
Pipe Description	Wrought Iron 6"	Pipe Class	Sch 40
Nominal Diameter	6 in	Inside Diameter	6 in
Outside Diameter	6.8 in	Pipe Length	5280 ft
Pipe Roughness	0.0018 in	Allowable Press.	150 psi
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	2 ft3/s	Velocity	10.1859 ft/s
Friction Loss	638.6019 ft	Fitting Losses	0 ft
Slurry Losses	0 ft	Orifice Losses	0 ft
Fixed Head Loss	0 ft	Booster Pump Head	0 ft
Total Head Loss	638.6019 ft	Total Pressure Drop	243.3525 psi
Entry Total Head	0 ft	Exit Total Head	-638.6019 ft
Entry Gauge Head	0 ft	Exit Gauge Head	-638.6019 ft
Reynolds No.	5109.3365	Friction Factor	0.0374985 (Darcy f)

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

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Description	Oil Pipeline Example		

Node No	1	Node Type	Nozzle
Description		Equipment No	
Rel. Level (RL)	0 ft	Pressure Input	0 psi
Nozzle K value	0	Ext Flow (+In/-Out)	-2 ft3/s
Int.(Gauge) Head	-638.6019 ft	Int.(Gauge) Pressure	-243.3525 psi
Total Node Head	-638.6019 ft		