Helix Technologies Pty Ltd

Project	New Project	Client	Helix QA
Project No.	4567	Design Date	09/03/2017
Category	Demo QA Petroleum	Atmos. Press	100.19 kPa
Network Type	Liquid	Calc. Method	Darcy
Description	Petroleum Pipe 1 mile		

Piping Calculations Manual, 2005, McGraw-Hill, E. Shashi Menon, P.E., Page 335, Example 6.16

Description	McGraw Hill Book Value	Helix Calculated Value	Comments
Head Loss ft	29.908 ft	29.879 ft	Helix used 0.03mm roughness

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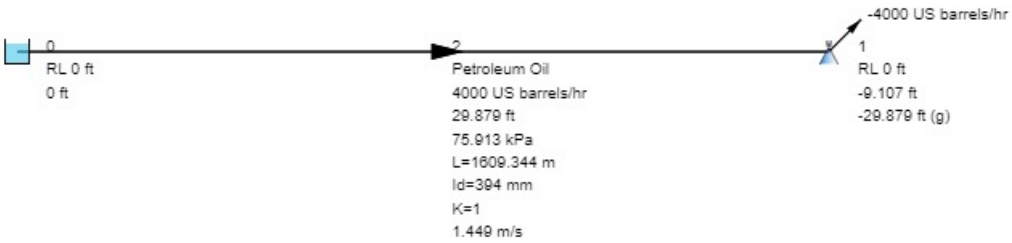

Petroleum Pipe 1 mile

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Description	Petroleum Pipe 1 mile		

Pipe No	2	From node to node	0 - 1
Description		Equipment No	
Liquid	Petroleum Oil	Viscosity	8.5 cp
Temperature	20 C	Density	850 kg/m3
Vapour Pressure	1 kPa		
Pipe Description	Steel Pipes AS1836 (ANSI B36.10)	Pipe Class	
Nominal Diameter	400 mm	Inside Diameter	394 mm
Outside Diameter	406 mm	Pipe Length	1609.344 m
Pipe Roughness	0.03 mm	Allowable Press.	2960 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	4000 US barrels/hr	Velocity	1.449 m/s
Friction Loss	29.527 ft	Fitting Losses	0.351 ft
Slurry Losses	0 ft	Orifice Losses	0 ft
Fixed Head Loss	0 ft	Booster Pump Head	0 ft
Total Head Loss	29.879 ft	Total Pressure Drop	75.913 kPa
Entry Total Head	0 ft	Exit Total Head	-29.879 ft
Entry Gauge Head	0 ft	Exit Gauge Head	-29.879 ft
Reynolds No.	57091.112	Friction Factor	0.020579 (Darcy f)

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Node No	0	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 ft		

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Node No	1	Node Type	Nozzle
Description		Equipment No	
Rel. Level (RL)	0 m	Pressure Input	0 kPa
Nozzle K value	0	Ext Flow (+In/-Out)	-4000 US barrels/hr
Int.(Gauge) Head	-29.879 ft	Int.(Gauge) Pressure	0 kPa
Total Node Head	-9.107 ft		