



Line Sizing using Aspen Hysys



Example: Size the piping outlet of K.O.D which is located at the inlet of a methanol plant with the following condition:

Parameter	Value	Unit
Flow	133000	Kg/hr
Fluid	Methane	
Fluid Package	PR	
Pressure 1	52.9	bara
Length	1000	m
Temperature	40	C

Steps to be taken:

- 1.Add Methane to component list.
- 2.Select PR as the fluid package.
- 3.Enter simulation environment and drag a pipe and a material stream.



Material Stream: 1

Worksheet Attachments Dynamics

Worksheet

Conditions
Properties
Composition
Oil & Gas Feed
Petroleum Assay
K Value
User Variables
Notes
Cost Parameters
Normalized Yields
Emissions

Stream Name	1	Vapour Phase
Vapour / Phase Fraction	1.0000	1.0000
Temperature [C]	40.00	40.00
Pressure [kPa]	5290	5290
Molar Flow [kgmole/h]	8290	8290
Mass Flow [kg/h]	1.330e+005	1.330e+005
Std Ideal Liq Vol Flow [m3/h]	444.2	444.2
Molar Enthalpy [kJ/kgmole]	-7.523e+004	-7.523e+004
Molar Entropy [kJ/kgmole-C]	150.4	150.4
Heat Flow [kJ/h]	-6.237e+008	-6.237e+008
Liq Vol Flow @Std Cond [m3/h]	1.955e+005	1.955e+005
Fluid Package	Basis-1	
Utility Type		

OK

Delete Define from Stream... View Assay

Material Stream: 1

Worksheet Attachments Dynamics

Worksheet

Conditions
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	Mole Fractions	Vapour Phase
Methane	1.0000	1.0000

Total 1.00000

Edit... View Properties... Basis...

OK

Delete Define from Stream... View Assay



4. Click on Equipment Design/Line Sizing and then append list and select stream 1.

Flowsheet Case (Main) - Solver Active x Line Sizing: Line Sizing Manager-1 +

Sizing Settings Details Notes

Flow Correlation: Tulsa Unified Model (2-Phase)

Add Criteria

Name	Max Pressure Gradient [kPa/m]	Max Velocity [m/s]	Max Rho V ² [kg/m-s ²]	Description
Criteria-1	0.1000	<empty>	1.000e+004	A new criteria

OK

Delete Ignored

5. Go to setting and specify the criteria based on the next page table.

Flowsheet Case (Main) - Solver Active x Line Sizing: Line Sizing Manager-3 +

Sizing Settings Details Notes

Flow Correlation: Tulsa Unified Model (2-Phase)

Add Criteria

Name	Max Pressure Gradient [kPa/m]	Max Velocity [m/s]	Max Rho V ² [kg/m-s ²]	Description
Criteria-1	0.1000	<empty>	7500	A new criteria

OK

Delete Ignored



6. See the result in Sizing tab or Details Note.

Flowsheet Case (Main) - Solver Active - Line Sizing: Line Sizing Manager-3

Sizing Settings Details Notes

Name: Line Sizing Manager-3

Append Lines Insert Lines Clone Line Delete Line Change Stream

Schedule	STD
Pipe Nominal Diameter	350 mm
Pipe Inside Diameter (mm)	336.6
Pipe Wall Thickness (mm)	9.525
Pipe Roughness (mm)	4.572e-002
Force Single Phase	<input type="checkbox"/>
Sizing Criteria	Criteria-1
Pressure Gradient (kPa/m)	9.243e-002
Criteria Pressure Gradient (kPa/m)	0.1000
Velocity (m/s)	11.63
Criteria Velocity (m/s)	<empty>
Rho V ² (kg/m-s ²)	4829
Criteria Rho V ² (kg/m-s ²)	7500

OK

Delete Ignored

Vapour and steam lines	ρv^2 max. (kg.m ⁻¹ .s ⁻²)	Max. Velocity (m/s)	DP (bar/km)	
			Normal	Maxi
- Continuous operation				
P <= 20 bar g	6000)	
20 < P <= 50 bar g	7500)	
50 < P <= 80 bar g	10000)	
80 < P <= 120 bar g	15000)	
P > 120 bar g	20000)	
- Compressor suction	Compatible with above		0.2	0.7
- Compressor discharge	Compatible with above		0.45	1.15
- Discontinuous operation				
P <= 50 bar g	10000)	
50 < P <= 80 bar g	15000)	
P > 80 bar g	25000)	
- Column overhead	15000)	
	(high pressure columns)			
- Stripper vapor return			0.2	0.45
- Kettle vapor return			0.2	0.4

So based on Hysys analysis, the selected size is 14".