Control Valve Sizing in Aspen Hysys

Example 1: Size the control valve with the following conditions. The control valve acts as PV and is installed at the outlet of a methanol plant inlet K.O. drum.

Parameter	Value	Unit
Flow	133000	Kg/hr
Fluid	Methane	
Fluid Package	PR	
Pressure 1	52.9	bara
Pressure 2	51	bara
Temperature	40	C

Size the control valve in both Aspen Hysys and Fisher and compare the input provision and results.

Sizing in Aspen Hysys

Steps to be taken:

1.Add Methane to component list

2.Select Peng-Robinson as fluid package

3.Enter simulation environment and provide the process data.

4.Select a control valve and connect stream 1 to its inlet while connect stream 2 to its outlet.

5.Specify the pressure drop in control valve based on given table.

6.Go to rating tab, select universal gas sizing, specify the opening to be 100%. Also specify the characteristic to be linear.

Note:

Valve characteristics

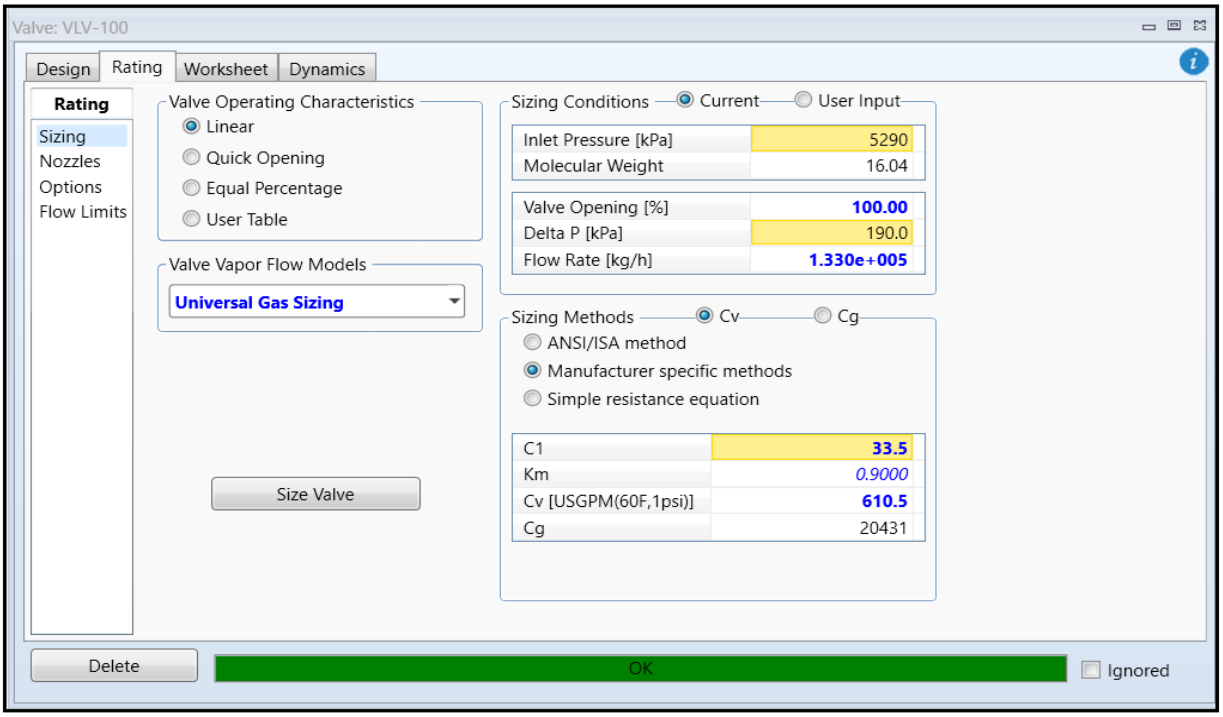
A unique and simple procedure for valve characteristic determination for almost all Chemical Plants.

1. Use Equal Percentage if the valve functions as FV or TV

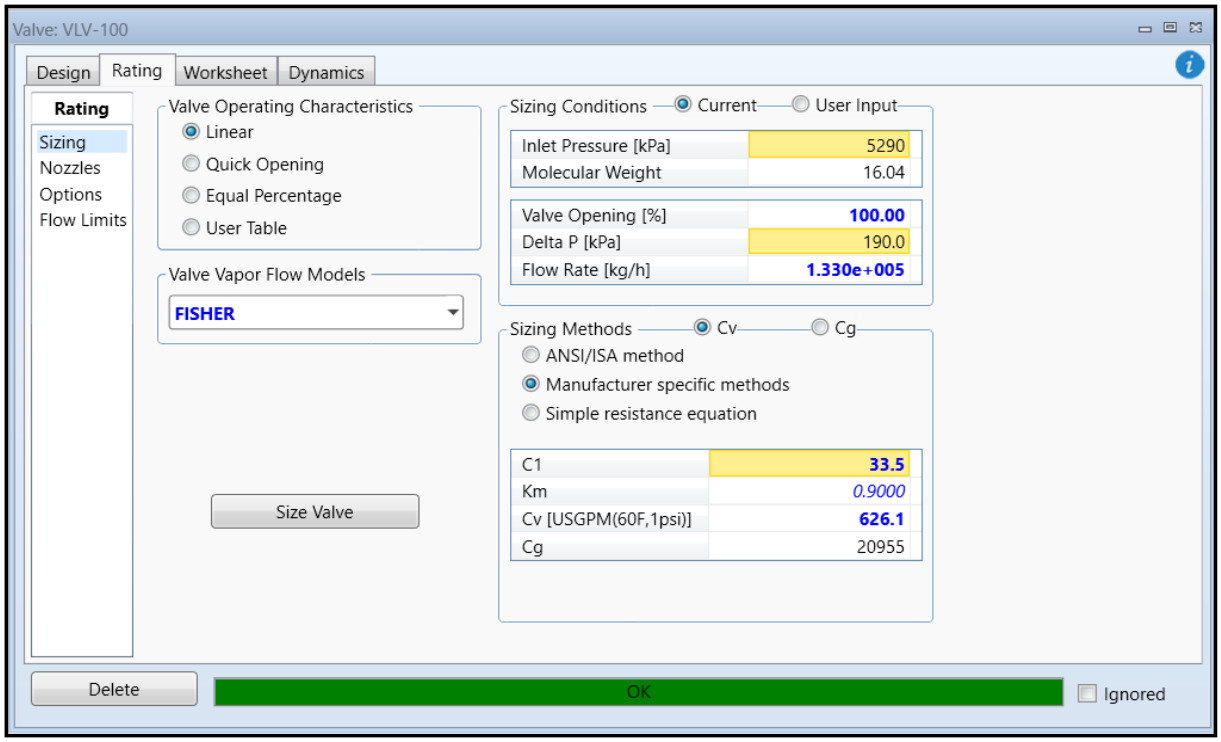
2. Use Linear if the valve functions as PV or LV

3. Use Linear if there is Split Range Control

Note: Due to process demands, above rules might not apply to some situations.

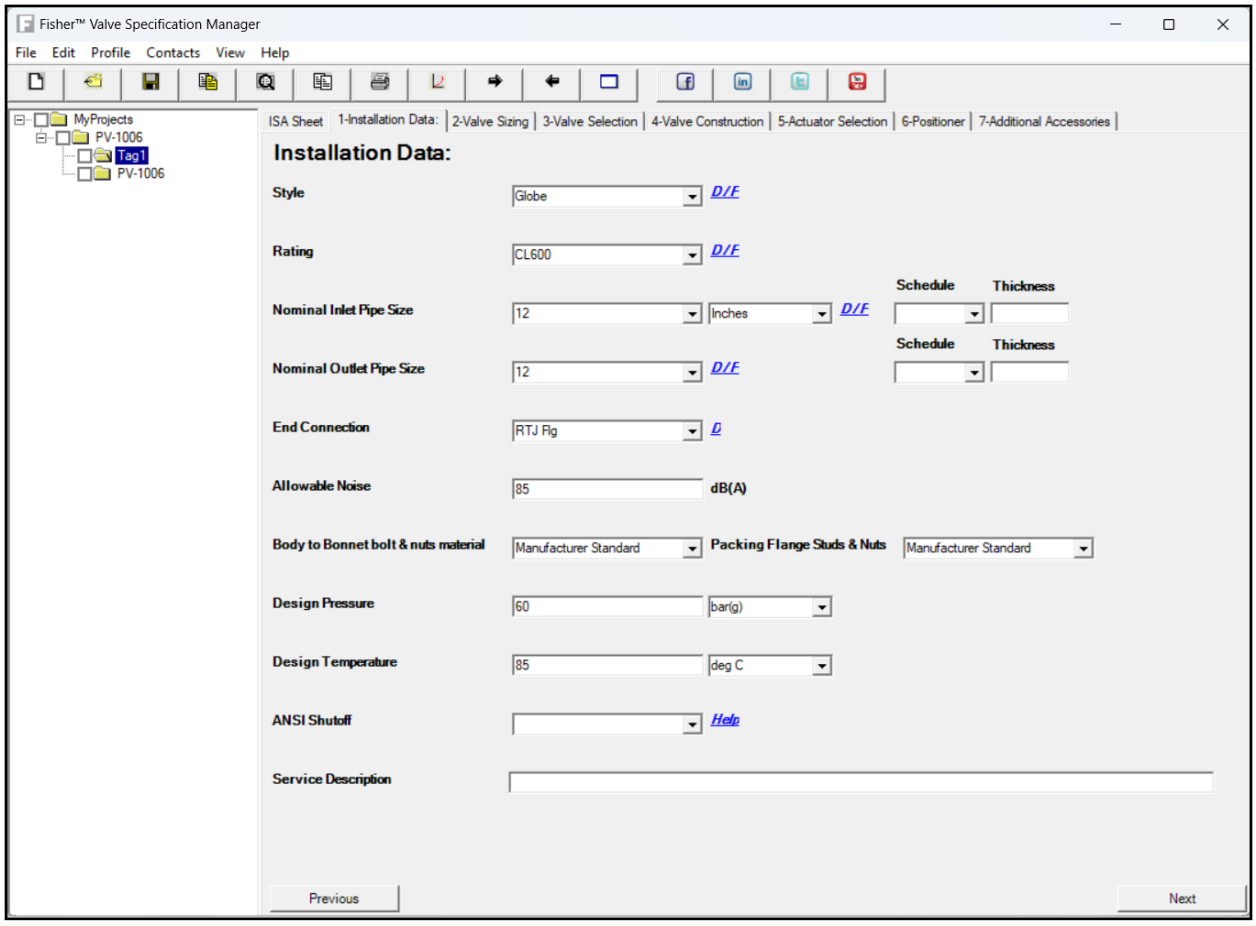


Now select Fisher as vapor flow model and size valve again.

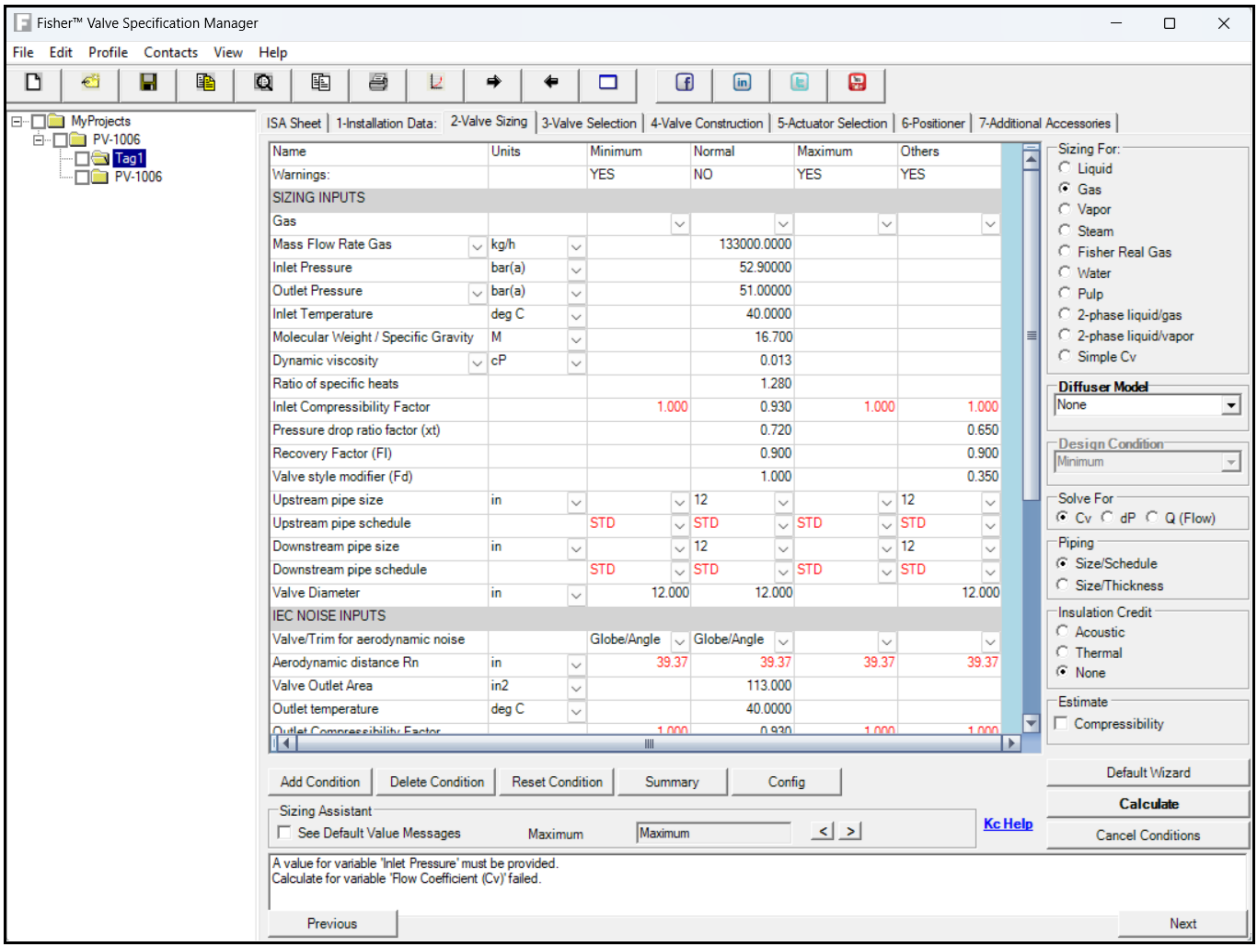


Sizing in Fisher FSM

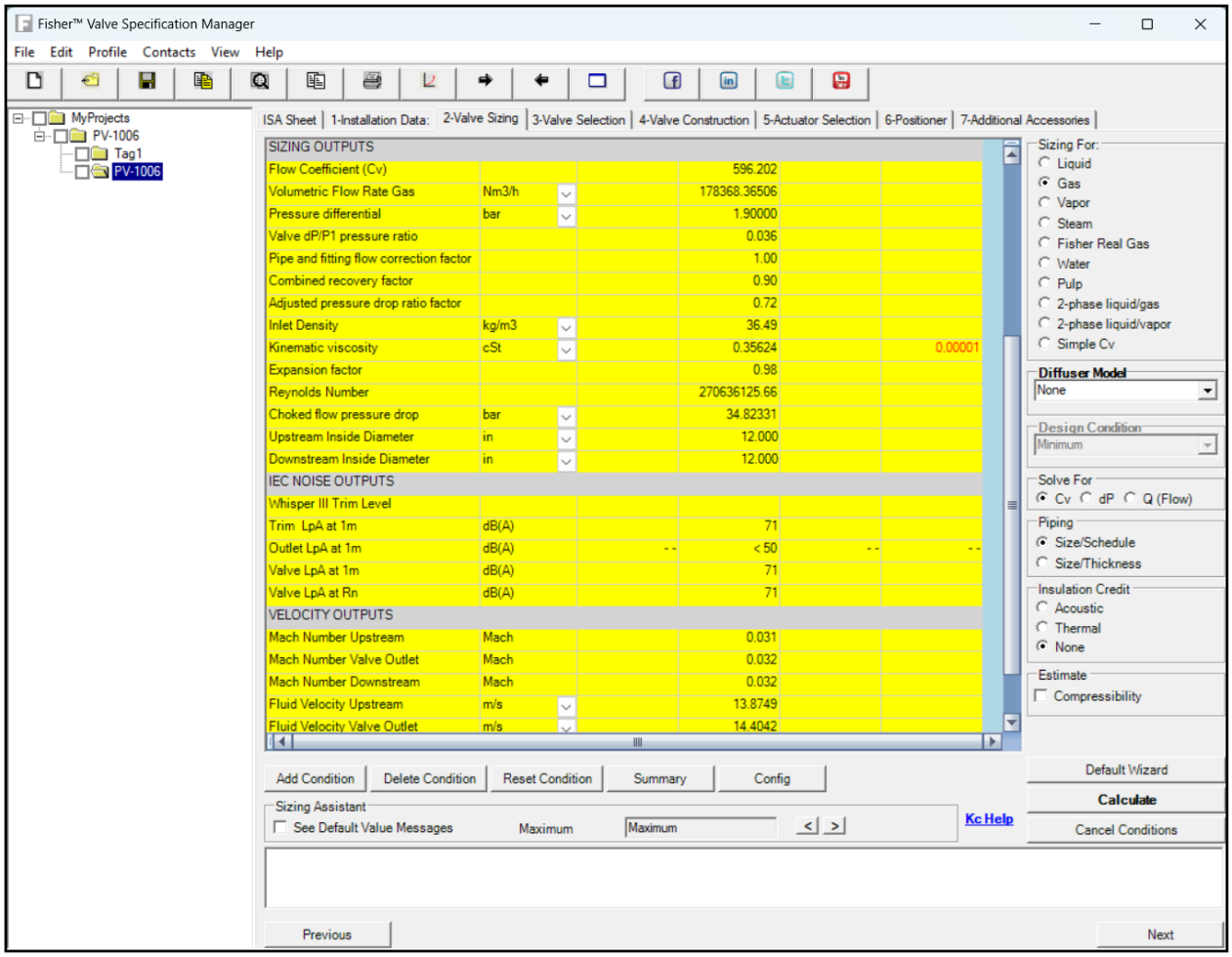
1.Data entry



2.Process data entry



3.FSM Output


Fisher™ Valve Specification Manager
File Edit Profile Contacts View Help
MyProjects
PV-1006
Tag1
PV-1006
ISA Sheet | 1-Installation Data: | 2-Valve Sizing | 3-Valve Selection | 4-Valve Construction | 5-Actuator Selection | 6-Positioner | 7-Additional Accessories
SIZING OUTPUTS
Flow Coefficient (Cv) 596.202
Volumetric Flow Rate Gas Nm3/h 178368.36506
Pressure differential bar 1.90000
Valve dP/P1 pressure ratio 0.036
Pipe and fitting flow correction factor 1.00
Combined recovery factor 0.90
Adjusted pressure drop ratio factor 0.72
Inlet Density kg/m3 36.49
Kinematic viscosity cSt 0.35624 0.00001
Expansion factor 0.98
Reynolds Number 270636125.66
Choked flow pressure drop bar 34.82331
Upstream Inside Diameter in 12.000
Downstream Inside Diameter in 12.000
IEC NOISE OUTPUTS
Whisper III Trim Level
Trim LpA at 1m dB(A) 71
Outlet LpA at 1m dB(A) -- < 50 -- --
Valve LpA at 1m dB(A) 71
Valve LpA at Rn dB(A) 71
VELOCITY OUTPUTS
Mach Number Upstream Mach 0.031
Mach Number Valve Outlet Mach 0.032
Mach Number Downstream Mach 0.032
Fluid Velocity Upstream m/s 13.8749
Fluid Velocity Valve Outlet m/s 14.4042
Sizing For:
Liquid
Gas
Vapor
Steam
Fisher Real Gas
Water
Pulp
2-phase liquid/gas
2-phase liquid/vapor
Simple Cv
Diffuser Model
None
Design Condition
Minimum
Solve For
Cv dP Q (Flow)
Piping
Size/Schedule
Size/Thickness
Insulation Credit
Acoustic
Thermal
None
Estimate
Compressibility
Add Condition
Delete Condition
Reset Condition
Summary
Config
Default Wizard
Calculate
Cancel Conditions
Sizing Assistant
See Default Value Messages
Maximum
Maximum
Kc Help
Previous
Next

Result comparison

CV	Value
CV by Universal Gas Sizing	610
CV by Fisher in Aspen Hysys	626.1
CV by Fisher in FSM	596.2

Appendix