

Information to be provided for network simulation

The use of PAnORaMA for several applications that it supports, including leak detection, requires a simulation of the proposed or existing network to be set up. This requires following mandatory inputs to be provided by the user.

Network Definition

The network is defined in terms of Nodes and Segments.

Nodes: A sketch of the network should show the input points (Start Nodes), Delivery points (End Nodes), Branch-off or tap-off points (Splitter Nodes), Comingling points where streams from two directions mix and then flow forward (Mixer Nodes), points where pipe size changes or some pressure measurement is carried out (Intermediate Nodes), points where pressure boosting or reducing devices such as pumps/compressor or valves are located (Equipment Nodes).

At the Start Nodes, user must specify pressure. At the End Nodes, Flow Rates should be specified.

At all nodes, user should indicate if pressure/flow is measured or not. The elevation at all the Nodes with respect to some datum (say Mean Sea Level) should be specified.

Segments: A piping section joining any two consecutive nodes is called Segment. For each such segment, user should provide physical pipe length, inner diameter and surface roughness. If surface roughness is not available, pipe material should be specified. Instead of pipe inner diameter, pipe outer diameter and schedule or wall thickness can be provided.

Instrumentation: For all pressure and flow measurements in the network, instrument accuracy should be mentioned.

Equipment: For pumps/compressors, control valves, characteristic curves should be provided. For control valves, set point information should be provided. For Pressure reducing stations, the valve coefficients or downstream pressure set point be provided. For all other valves in the network, valve type, size and valve coefficient should be provided. For all other in-line devices such as filters etc. pressure drop expected as a function of flow rate be provided.

Fluid Properties

The user should indicate the composition and properties of fluid (gas or liquid) for which the network is designed. The properties include density and viscosity at some temperature and pressure. If it is not available, composition should be provided.

Operating Data

For validation of simulation model, operating data grab for two hours will be desirable. It need not be steady state data. If this is not available, even 10 minutes data at reasonable steady state will be useful.

Non mandatory Inputs

If the user has a geographical map showing the location of various nodes as well as pipe route, commonly used name for nodes (such as village name, user company name etc), it will help generate a network display to show simulated network performance data.