Pump & Valves

Pipes and Accessories · https://mes100.com/docs/pump-valves/

Pump & Valves can be assigned to pipes. Click on button to view the options which allows users to choose between pump and valve.

Pump

To insert a pump, click on pump in the option and select Pump Type by clicking the dropdown list which is Constant Power and Pump Curve.

Constant Power Pump

The constant power pump provides additional pressure head to all nodes downstream of the pipe assigned with the pump based on the constant power formula. Users are required to provide pump power in units of Kilowatts, in which the calculated pump head will be added to all nodes located downstream of the pipe assigned with the pump.

Pump Curve Pump

The pump curve option allows users to provide the flow-head curve of the pump for the software. Users can provide pump heads at different flow values, in which pump head to be added to other nodes downstream will be determined based on the flow-head curve created.

Note: If an invalid pump curve is created, the Equation box above will display ‘Invalid curve’, e.g. if both flow and head values increase together.

After the input is completed, click OK. The pump icon will be added to the pipe(s) assigned with the pump.

Parallel Pumps

Parallel pumps can be placed, with no restrictions on pump type or pump input. Parallel pumps are created when multiple lines connect to the same nodes directly (as shown in picture below). However, in order to insert a parallel pump, **the first pipe drawn must be assigned as a pump first**.

Pumps in Series

Pumps in series can be created via assigning multiple pipes connected to one another in a series with a pump, as shown in picture below.

Valves

There are several types of valves can be chosen: Pressure reduction valve (PRV), Pressure sustaining valve (PSV), Sluice valve (SV), Non-return valve (NRV), Pressure Breaker Valve, Flow Control Valve, Throttle Control Valve and General Purpose Valve.

In order to assign a pipe with valve, kindly click on the Valve option after clicking button in the Pump/Valve column. Then choose the valve type on dropdown list button.

The function of each valve and its icon is further described in the following sections below.

Pressure Reducing Valve (PRV)

The pressure reducing valve ensures that the maximum residual pressure at the downstream/end node of the pipe does not exceed the value provided by the user. In addition, it ensures that water flow direction follows the direction shown in the input view.

Note: The flow direction can be changed by double-clicking on the pipeline.

Pressure Sustaining Valve (PSV)

The pressure sustaining valve tries to ensure that the minimum residual pressure at the upstream/start node of the pipe is not below the value provided by the user. In addition, it ensures

that water flow direction follows the direction shown in the input view.

Note: The flow direction can be adjusted by double-clicking on the pipeline.

Sluice Valve

When a sluice valve is assigned to a pipe, users can opt to open or close the valve to control flow through the pipe. When the sluice valve is opened, water is allowed to flow through the pipe. When the sluice valve is closed, water cannot flow through the pipe.

Non-returning Valve

When a non-returning valve is assigned to a pipe, the flow direction of the pipe is controlled based on the direction in which the valve is pointed, as shown in picture below.

Note: The flow direction can be adjusted by double-clicking on the pipeline.

Pressure Breaker Valve (PBV)

When a pressure breaker valve is assigned to a pipe, specified pressure loss can be assigned to occur across the valve. The flow through the valve can be either direction. It is not a true physical device but it can be used to model in situations where a particular pressure drop is known to exist.

Flow Control Valve (FCV)

Flow control valve is used to limit or regulate the flow. It can be used in order to ensure the flow that flows across the valve is not larger than the configured value.

Throttle Control Valve (TCV)

Throttle control valve is used to increase or decrease the flows and to control the pressure in the system. TVC simulates a partially opened valve by using a specific adjusted minor head loss

coefficient.

General Purpose Valve

System resistance curve allows users to determine the flows and pressure graphically. It allows users to provide the flow and head loss value for the software to generate the graph. Using the graphical approach, users can easily determine the head loss for a given flow rate without having to resort for calculations.

Pump and Valve Status

The status of pumps and valves can be checked after analysis in the ‘Pipes for Peak Calculation’ and ‘Pipes for Fire Calculation’ tabs under ‘Excel Report” results and also under ‘Analysis Output (Word)’ results.

The meaning of the pump/valve and their status is explained in the table below.

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