



Virtual Engineer: Sporlan Division

Line Sizing

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Line Sizing

The Line Sizing tools can be used to size lines and pressure drop of liquid, discharge, and suction lines and fittings.

Liquid Line Sizing

Properly sized liquid lines carry liquid refrigerant from the condenser to the receiver or to the expansion valve with minimal pressure drop. Please consult ASHRAE Fundamentals Handbook for more information on proper line sizing.

Discharge Line Sizing

Properly sized discharge lines carry refrigerant discharge vapor from the compressor to the condenser with minimal pressure drop, while maintaining adequate velocity to carry circulated oil. Please consult ASHRAE Fundamentals Handbook for more information on proper line sizing. For discharge line calculations, Virtual engineer assumes isentropic compression plus 50°F, with 25°F superheated vapor entering the compressor.

Suction Line Sizing

Properly sized suction lines carry refrigerant suction vapor from the evaporator to the compressor with minimal pressure drop, while maintaining adequate velocity to carry circulated oil. Please consult ASHRAE Fundamentals Handbook for more information on proper line sizing.

Line Sizing in Virtual Engineer

Inputting Sizing Information

Refrigerant is the type of refrigerant the system is operating with, by ASHRAE R-number designation.

Evaporator Temperature is the saturated temperature at evaporator or suction pressure. Virtual Engineer will allow Liquid Temperature to be less than the Evaporator Temperature.

Condensing Temperature is the saturated temperature at discharge or condensing pressure. It is checked against the Liquid Temperature. Virtual Engineer will not allow Condensing Temperature to be less than Liquid Temperature.

Liquid Temperature is the liquid refrigerant temperature at the inlet of the expansion valve.

Equivalent Length is the total equivalent length of line, including tubes and fittings.

Vertical Height is total vertical rise of the liquid line.


Enter the required information into the left pane of the sizing tool. As information is entered, Virtual Engineer will filter products meeting that criteria in the right pane. When you have entered the required information, valid line sizes will be available to compare in the right pane.

Getting Results and Comparing Choices

Click the “Compare” button at the top of the right pane to be taken to the Compare Table. The Compare Table will display the results of the selection, and the values input. The best selection within each compared product will be highlighted. The Compare Table will also show other selections within the compared products.

Click the “Select Columns” button at the upper left corner of the Compare Table to select what values you would like to appear in the Compare Table. Below is a quick explanation of the columns that can be selected for the line sizing tools:

- **Tube OD:** The outside diameter of the tubing
- **Tube ID:** The inside diameter of the tubing
- **Reynolds Number:** A dimensionless value that measures the ratio of internal forces to viscous forces and describes the degree of laminar or turbulent flow
- **Velocity:** Velocity of the refrigerant in the line at specified mass flow
- **Delta P:** Pressure drop across the line
- **Delta T:** Temperature drop across the line
- **Line Size:** The size of the line
- **Warnings:** Any warnings associated with the selection, such as a high or low loading condition, will display here.

After selecting columns, you can click and drag the column header to change the order of the columns. You can also click the  in the column headers to further narrow or sort your results.

Click the “Group by Series” button at the top of the Compare Table to group the results by the valve family they belong to. Click the button again to ungroup.

Click the “Close” button below the Compare Table or the X in the upper right corner of the screen to close the Compare Table and return to the input screen.

Configuring a Part and Saving Results

In the second column of the Compare Table, there are two buttons that can appear: “Configure” or “Select.”

Click the “Configure” button next to the desired series to be taken to its eConfigurator. The eConfigurator can be used to configure a part according to your unique system. The eConfigurator will give an item number that can be used to purchase your part. Click the “Save” button to save your configuration and return to Virtual Engineer’s dashboard. The configured part will appear in your system.

If a “Select” button appears next to the desired series, then there is no eConfigurator currently available for that product, and the series will be selected without any configuration.

Click the “Export” button at the upper right corner of the Compare Table to save your results as an Excel spreadsheet.

Click the blue page icon in the “RPT” column of the Compare Table to generate a summary report of your inputs and choices. If the part was configured using an eConfigurator, the item number will also appear in the summary report. This report can be downloaded as a PDF and printed as needed.