

Hydraulic Calculator

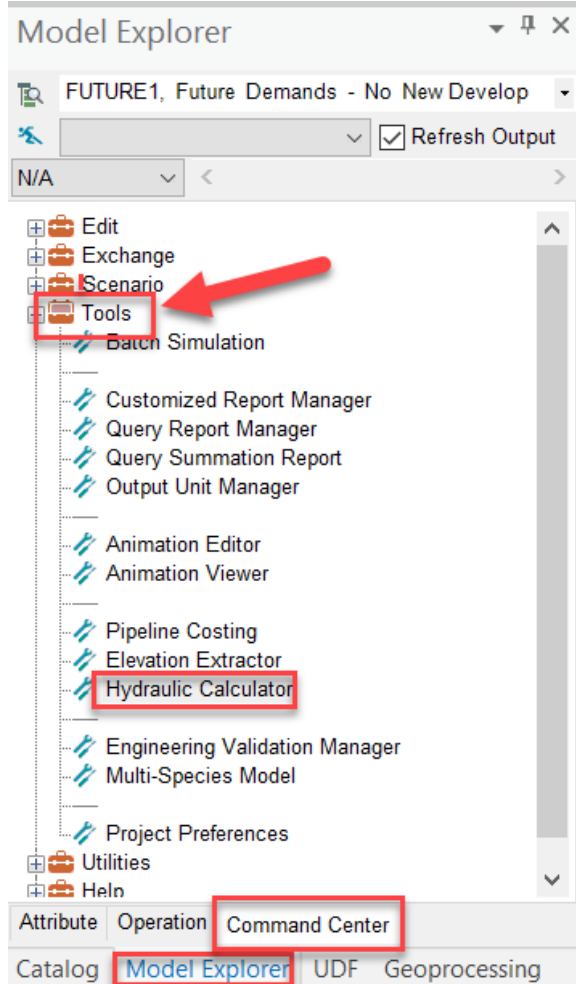
The **Hydraulic Calculator** is used to quickly determine the flow characteristics in a pipe (i.e., its velocity and headloss) given its diameter, length, roughness, and a water flow rate.



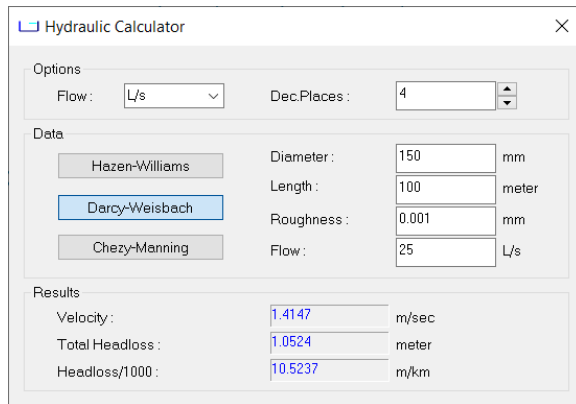
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To open the **Hydraulic Calculator**, go to the **Model Explorer**, click **Command Center** tab on the bottom, navigate to the **Tools** group, and click **Hydraulic Calculator**.

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To run the calculator, specify the pipe variables and then select one of the headloss equations (**Hazen-Williams**, **Darcy-Weisbach**, or **Chezy-Manning**). The results are automatically generated.



Options

- **Flow** - Select from the drop-down box a unit for the water flow rate. The choice of flow unit also determines the units used for the other input and output variables. The options are gallons per

minute (gpm), cubic feet per second (cfs), millions of gallons per day (mgd), Imperial millions of gallons per day (Imgd), acres-feet per day (a-f/d), liters per second (L/s), liters per minute (Lpm), megaliters per day (ML/d), cubic meters per hour (m³/h), or cubic meters per day (m³/d).

- **Dec. Places** - Choose a decimal place for your flow unit (e.g., choose two places: .02).

Data

- **Diameter** - The inner diameter of the pipe.
- **Length** - The length of the pipe.
- **Roughness** - The roughness of the pipe, which has different interpretation depending on the headloss equation selected (e.g., the roughness is the diameter of the equivalent sand-grain pipe wall material in mm for the Darcy-Weisbach equation).
- **Flow** - The water flow rate in the pipe.
- **Hazen-Williams** - Click on the **Hazen-Williams** button to compute the results for Velocity, Total Headloss, and Unit Headloss.
- **Darcy-Weisbach** - Click on the **Darcy-Weisbach** button to compute the results for Velocity, Total Headloss, and Unit Headloss.
- **Chezy-Manning** - Click on the **Chezy-Manning** button to compute the results for Velocity, Total Headloss, and Unit Headloss.

Results

- **Velocity** - The average cross-sectional water velocity in the pipe.
- **Total Headloss** - The total drop in hydraulic head between the beginning and the end of the pipe.
- **Headloss/1000** - The slope of the hydraulic grade line within the pipe, expressed as the headloss per 1000 units of length.