

**Bentley**  
Advancing Infrastructure



# OpenFlows™ FlowMaster®

Hydraulic Calculator for Open Channels, Pipes, Weirs, Inlets, and Orifices

OpenFlows FlowMaster is an efficient calculator product for the design and analysis of a wide variety of hydraulic elements, such as pressure pipes, open channels, weirs, orifices, and inlets.

### Fast, Easy, Reliable

With OpenFlows FlowMaster, engineers can solve for any unknown property, design for any desired characteristic, and produce detailed reports and rating curves on the fly. OpenFlows FlowMaster's flexible interface lets users work on multiple projects simultaneously, organize their worksheets in folders, and save them for future use. The software also enables users to configure toolbars and dock windows to create work environments that match their workflows.

Productivity is improved further with OpenFlows FlowMaster's engineering libraries, which let users enter main data once and re-use it many times.

### Pressure Pipe Design

In OpenFlows FlowMaster, engineers can perform a quick check or design by plugging in the known information and automatically solving for pipe length, start and stop elevations and pressures, discharge, diameter, or roughness.

### Inlet and Gutter Hydraulics

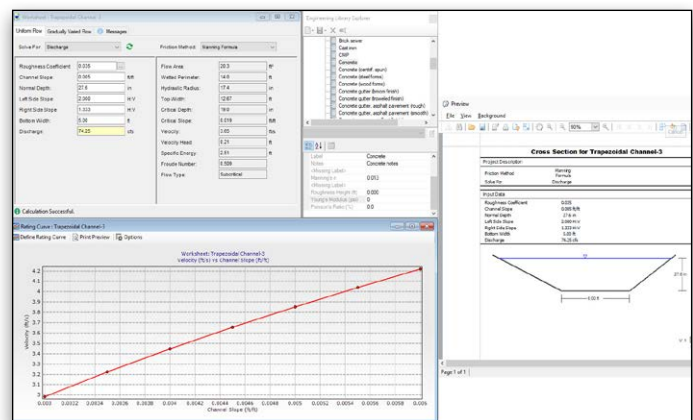
OpenFlows FlowMaster allows users to design and analyze grate, curb, ditch, slotted, and combination inlets using calculations based on the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 12 and Circular No. 22 methodologies.

In sag or on grade conditions a continuously or locally depressed gutter can be considered, and water spread and gutter depth for a gutter or pavement section can be calculated.

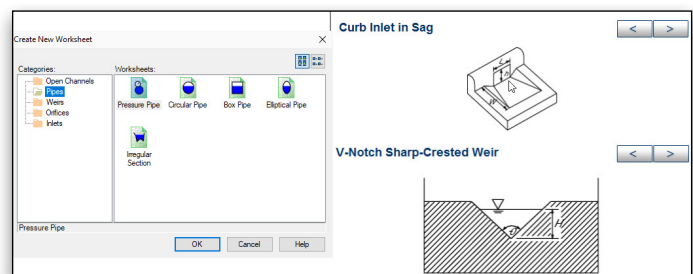
### Open Channel Hydraulics

With OpenFlows FlowMaster, engineers can easily design and analyze channels, ditches, and free surface pipes of any shape including circular, box, elliptical, parabolic, and irregular channels.

Under uniform flow, OpenFlows FlowMaster solves for discharge, capacity, normal depth, channel dimensions, slope, or roughness, and lets users compare the results using different friction methods.



Design and analyze any type of hydraulic structure.



Manage data easily using the Project Explorer and engineering libraries.

Gradually varied flow calculations can also be performed for any free surface flow element. Engineers can generate profile views from the calculated results, and view the points in tabular form.

### Weir and Orifice Modeling

Modelers can size weirs that account for discharge, weir coefficients, and crest, headwater and tailwater elevations for the following types: rectangular, V-notch, Cipolletti, broad crested, or a custom type.

Users of OpenFlows FlowMaster can also design rectangular, circular and generic orifice structures that account for submergence, and produce rating tables and curves for various headwater and tailwater elevations.

## System Requirements

### Platform Pre-requirements

OpenFlows FlowMaster runs without platform restrictions as a stand-alone application

### Processor

As per minimum operating system requirements

### Memory

As per minimum operating system requirements

### Operating System

Microsoft Windows 10, Windows 10 x 64, Windows 8, Windows 8 x 64, Windows 7, Windows 7 x 64

Note: Windows 7 operating system is supported only with its service pack (SP1) installed

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# OpenFlows FlowMaster At-A-Glance

## Interface, Editing, and Model Management

- Built-in interactive tutorials
- Project Explorer (projects display and management)
- Element worksheets (for convenient data input)
- Customizable engineering libraries
- Material engineering libraries
- Global engineering-units management
- Support for ProjectWise®

## Hydraulics

- Flow algorithms: uniform, critical, gradually varied flow (for free surface flow)
- Friction-loss methods: Kutter, Manning, Darcy-Weisbach: Swamee and Jain, Darcy-Weisbach: Colebrook-White, Hazen-Williams
- Open channels: rectangular, triangle, trapezoidal, gutter, parabolic, irregular
- Pipes: pressure, circular, box, elliptical, irregular

- Weirs: rectangular sharp-crested, V-notch sharp-crested, Cipolletti sharp-crested, submerged sharp-crested, broad-crested, triangular, and trapezoidal
- Orifices: rectangular, circular, generic (including the modeling of sluice gates)
- Inlets:
  - » HEC-12 and HEC-22 flow computation methodologies
  - » Flows in gutter on grade, including uniform gutter cross slope and composite gutter section
  - » Flow in ditch or median section on grade
  - » Inlet types (on grade and in slag): grate, curb opening, ditch, combination, slotted drain

## Results Presentation

- Summarized and detailed reports of inputs and outputs
- Advanced tabular reporting with filtering and sorting capabilities
- Rating tables
- Rating curves
- Gradually varied flow profile graphs and tables
- Cross section plots