



Hydraulic Calculation of Fire Sprinkler Systems Inside of Revit MEP

Reinhard Lackner
Managing Director



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Class summary

This class shows the extension IDAT Sprinkler Tools for Revit to calculate a fire sprinkler system inside of Revit MEP.

We will see what additional parameters, such as minimum pressure and water density, must be set at the sprinkler to enable the performance of calculations.

The structure of the network has no limits (gridded and looped). The calculation is done with the Hazen-Williams formula according to the rules of the National Fire Protection Association, FM Global, VdS, and others.

The result can be displayed graphically inside of Revit and also printed in a table form.



Key learning objectives

At the end of this class, you will be able to:

- Design a sprinkler network in Revit software
- Define necessary parameters for the hydraulic calculation
- Perform the hydraulic calculation of sprinkler networks
- Optimize the sprinkler network

Reinhard Lackner

- Managing Director of the company IDAT/Germany
- Studied computer science at Technical University of Vienna



Define Sprinkler System in Revit

Demo

Configuration

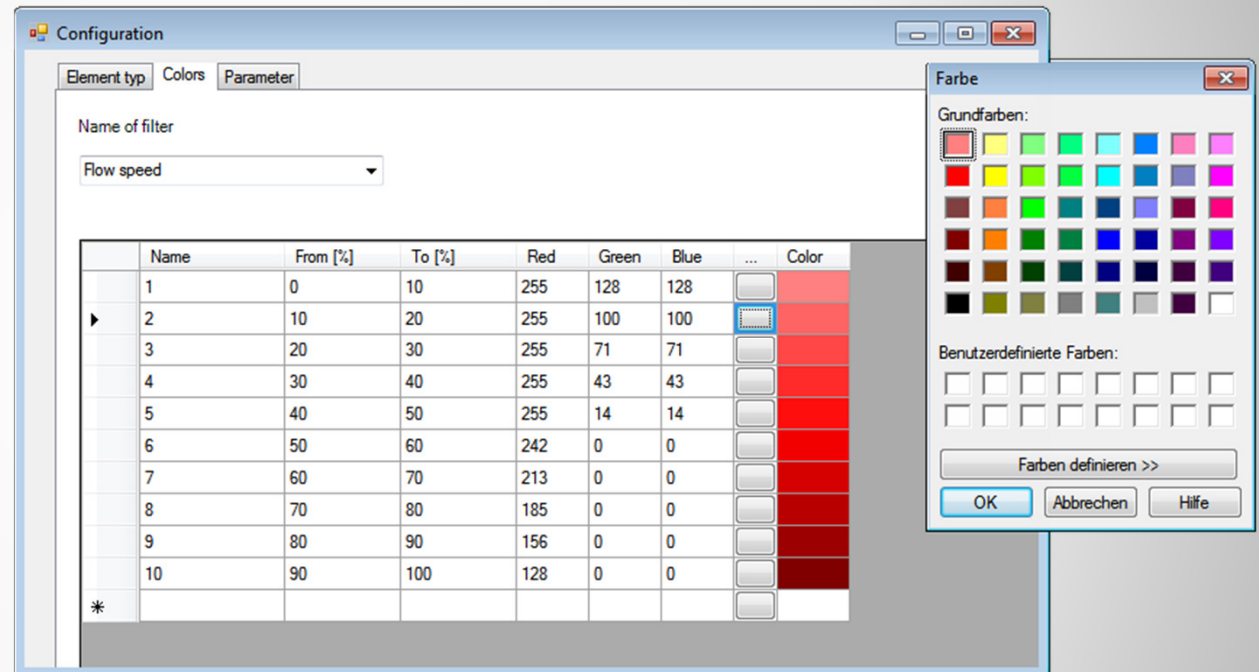
- Mapping of the Families to the sprinklers, tees, elbows, valves etc.
- Name can be compared by Category or Family

The screenshot shows the 'Configuration' dialog box with three tabs: 'Element type', 'Colors', and 'Parameters'. The 'Element type' tab is active. It contains the following sections:

- How to detect an element by the name of category or family:**
 - Element type:** A dropdown menu showing 'Sprinkler'.
 - Text list:** A text box containing 'Sprinklers'.
 - Name is compared to:** Two radio buttons, 'Category' (selected) and 'Family'.
 - Search in text:** Two radio buttons, 'Compare entire text' (selected) and 'Compare part of text'.
- List from document:**
 - Categories:** A list box containing 'Mechanical Equipment', 'Pipe Fittings', and 'Sprinklers'.
 - Families:** A list box containing 'M_Elbow - Generic', 'M_Pipe Connector - Other - Plumbing Eq', 'M_Sprinkler - Pendent - Hosted', 'M_Tee - Generic', and 'M_Transition - Generic'.

Configuration

- Color code for graphical presentation:
 - Friction lost
 - Flow speed
 - Discharge



Configuration

- Mapping of the pipe and sprinkler parameter

Configuration

Element type | Colors | Parameter

Typ of parameter

- ☒ Instance parameter pipe
- ☐ Instance parameter sprinkler
- ☐ Type parameter sprinkler

List of founded parameters

Mechanical

- Area
- Connection Type
- Diameter**
- Invert Elevation
- Material
- Pipe Segment
- Roughness
- Schedule/Type
- Section
- Segment Description
- System Abbreviation
- System Classification
- System Name
- System Type

-->

List of sprinklers with identical parameters

List 1

Kupfer - Hartgelötet

List of required parameters

Description	Group	Name
C-Value	Daten	Idat-R-CWert
DN-Value	Mechanical	Diameter
Pipe roughness	Daten	Idat-R-Rauigkeit
Name	Daten	Idat-R-Name
Additional code	Daten	Idat-R-Zusatzkennung
Additional length	Daten	Idat-R-Zusatzlänge
Additional text	Daten	Idat-R-Zusatztext
Remarks	Daten	Idat-R-Bemerkung
Code letter	Daten	Idat-R-Kennbuchstabe
Number	Daten	Idat-R-LfdNr
Pressure on end knod	Daten	Idat-R-EndDruck
Pressure loss	Daten	Idat-R-Druckverlust
Flow speed	Daten	Idat-R-FließGeschw
Flow rate	Daten	Idat-R-Fluss

OK Cancel

Necessary parameter for the calculation

- Pipe:
 - C-Value
 - DN-Value

- Sprinkler:
 - K-Factor
 - Protection area [m²]
 - Water admission [mm/min]
 - Minimum pressure [Bar]

Necessary parameter for the calculation

Demo

Calculation options

- Option can be set in project data:
 - Equivalent length table
 - Mode of operation
 - Active area
 - Calculation according Darcy-Weisbach formular

The screenshot shows the 'Project-specific data' dialog box with the following settings:

- Project data** tab is selected.
- Pipe diameter and equivalent lengths:** A dropdown menu is set to 'FM or NFPA'.
- Plant type:** Radio buttons are set to 'Wet system'.
- Mode of operation:** Radio buttons are set to 'Calculation of least favourable sprinkler'. Below this, 'Pressure [bar]' is set to 10, and 'Mark of sprinkler' is set to 1604.
- Active area:** Radio buttons are set to 'most favourable'. Below this, 'Active area' is set to 2. A note states '0 = Total pipe net'.
- Flowing time calculation:** A checkbox for 'Calculation' is checked. 'Mark of sprinkler' is set to 1594.
- Darcy-Weisbach:** A checkbox for 'Calculation acc. to Darcy-Weisbach' is unchecked. 'Density of fluid [kg/m³]' is set to 0, and 'Viscosity [mm²/s]' is set to 0.

Buttons at the bottom: OK, Abbrechen.



Calculation

Demo

Summary

The IDAT Sprinkler Tools can perform the calculation of a fire sprinkler system inside of Revit MEP.

Some additional parameters must be set at the sprinklers and pipes.

The structure of the network has no limits (gridded and looped).

The calculation can be done with the Hazen-Williams formula.

The result can be displayed graphically inside of Revit and also printed in a table form.

Thank you!

At the begin of next month you can download a trial version of the
IDAT Sprinkler Tools for Revit MEP:

www.idat.de

Contact me: lackner@idat.de

