CYPEFIRE

CYPEFIRE **Design** | CYPEFIRE **Hydraulic Systems**

Software for **Architecture**, **Engineering** and **Construction**
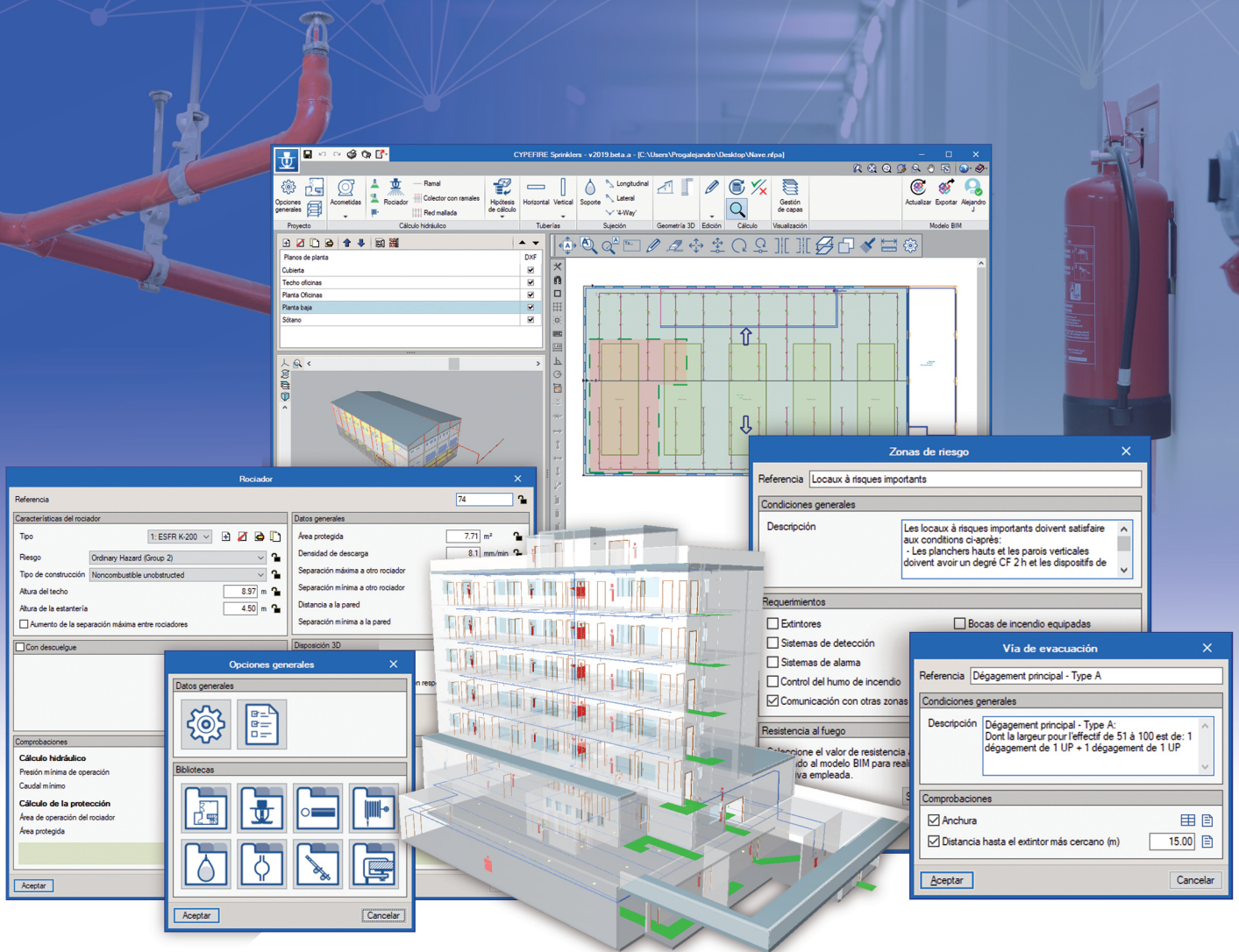
CYPEFIRE Design

CYPEFIRE Design is an application created to help the designer during the process of designing and verifying the characteristics of the building and of the fire protection installations.

The workspace allows to create and quickly edit the main characteristics of a fire protection project (compartmentation of zones, limitation of external propagation, means of evacuation of occupants, protection facilities, access for firefighters, etc.).

CYPEFIRE Design is integrated into the Open BIM workflow through the IFC standard.

Field of application

CYPEFIRE Design is an application that allows the design of fire protection installations with customized configurations, as well as the possibility of using the predefined codes that exist in the software.

Programs settings

The program workspace allows you to create and introduce all the necessary elements for a fire protection installation in a quick and easy way.

In addition, from the programs settings panel you can define all the checks you want to perform on the elements of the fire installation (areas, risk areas, safe areas, stairs, routes, evacuation routes ...).
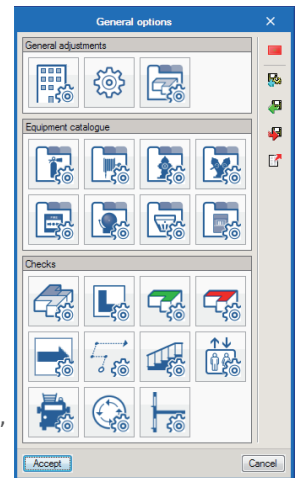

Libraries

The program offers a selection of elements whose characteristics are stored in different libraries (fire extinguishers, fire hose reel, dry column, hydrants ...). The properties of each element are defined from the catalogs of the main manufacturers of the sector, however, these libraries are fully editable by the user to modify the parameters or add new elements if he considers it.

Zones

The program allows you to create and enter the zones on the model and apply the necessary checks.

On the zones you can edit a multitude of parameters: requirements of fire extinguishers, sprinklers, alarm systems, and include the article and the description of the standards that bind this requirement, the limits of surface, volume and height from which to demand these requirements.
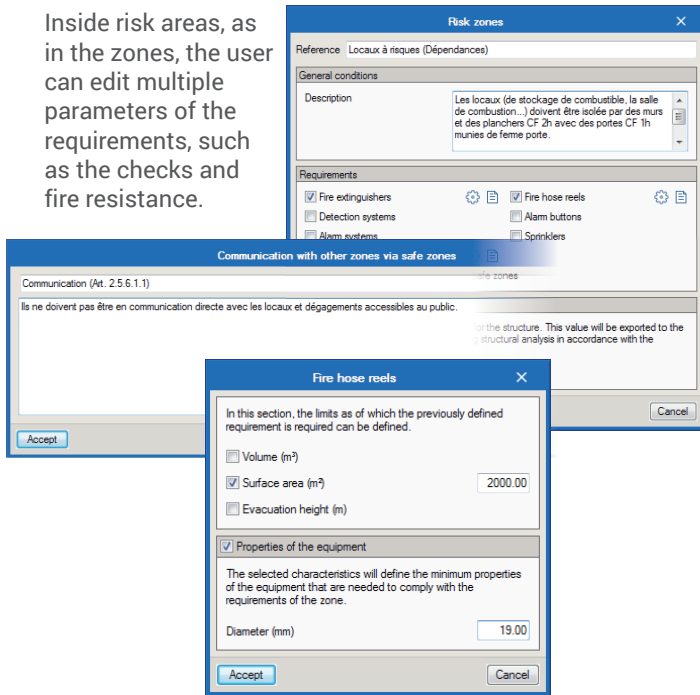
Checks for surface, height and number of plants and even the required fire resistance of the structural elements can be checked later.
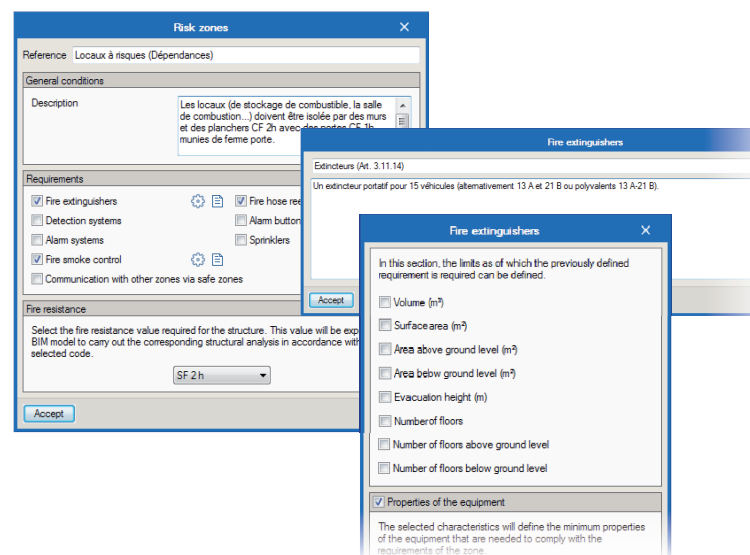
Risk areas

The risk areas are those spaces that represent a greater degree of danger, which is why it is stored inside CYPEFIRE Design.

Inside risk areas, as in the zones, the user can edit multiple parameters of the requirements, such as the checks and fire resistance.
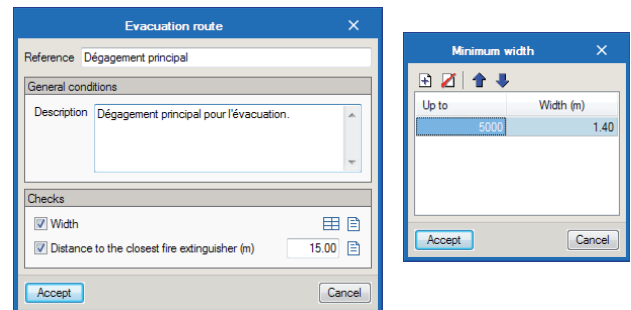
Safe areas

Safe areas are spaces that are to be compartmentalized within a space or require certain kinds of spaces to have a greater degree of security. These spaces are provided in many international regulations and have different checks, both surface and width.

Stairs

The level of protection of the stairs varies depending on the fire resistance indicated by each regulation, as well as whether they are open or outdoors, with CYPEFIRE Design you can edit both the height, number of floors you serve and minimum width of the sections.
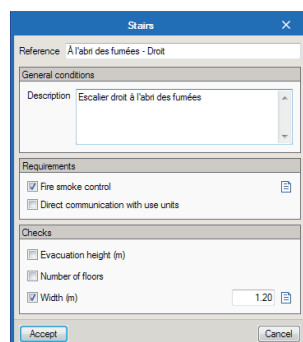
The smoke control and the isolation of the stairs are requirements that we can activate to check on our model.

Outside propagation

CYPEFIRE Design includes the tool to perform the checks related to external propagation.

With this option we can represent the cases of our model in the application and verify that all the distances are at least sufficient to prevent propagation of the fire between floors or buildings.
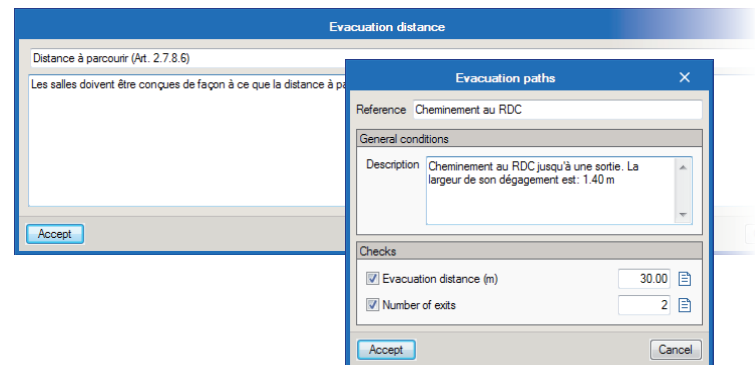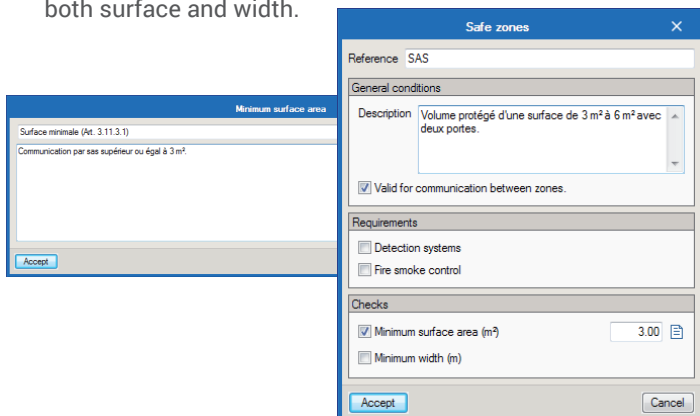
Evacuation of occupants

Carrying out the design of the evacuation routes with CYPEFIRE Design is very easy, because the application will guide the user to introduce routes where they have not been arranged and will carry out the checks that have been defined:

- Minimum width
- Maximum distance to fire extinguisher

Evacuation routes

In order to show clear and concise results, the user of CYPEFIRE Design can decide which evacuation routes he wants to check, both the maximum distance traveled by the occupants and the minimum number of achievable exits are possible checks.

With the simple tool, you can select to which evacuation routes these checks are applied to.

Protection facilities

CYPEFIRE Design includes all the equipment to be able to carry out a fire protection installation. Among the equipment we find:

- Fire extinguishers
- Equipped fire hydrants
- Alarm system
- Dry column
- Alarm buttons
- Hydrants
- Central detection
- Detectors

Firemen intervention

CYPEFIRE Design users have two graphic tools to check the minimum dimensions of the maneuvering spaces and the approach roads that allow the fire brigade to access the building.
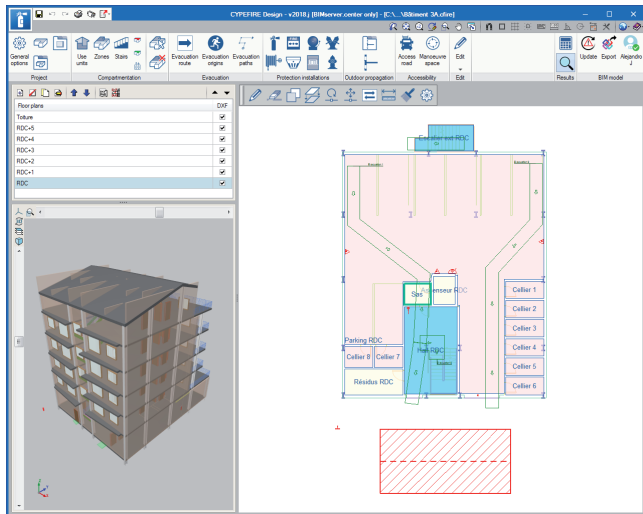
Documentation

CYPEFIRE Design can generate the following documentation:

- Checks: A summary list in which all the checks that are made on the main elements of the work appear. Quickly and easily you can see what errors exist in the model.
- Project: The project is a document that shows in detail the main elements of the work, the checks that are carried out on them, with the article and the description of the standard introduced.
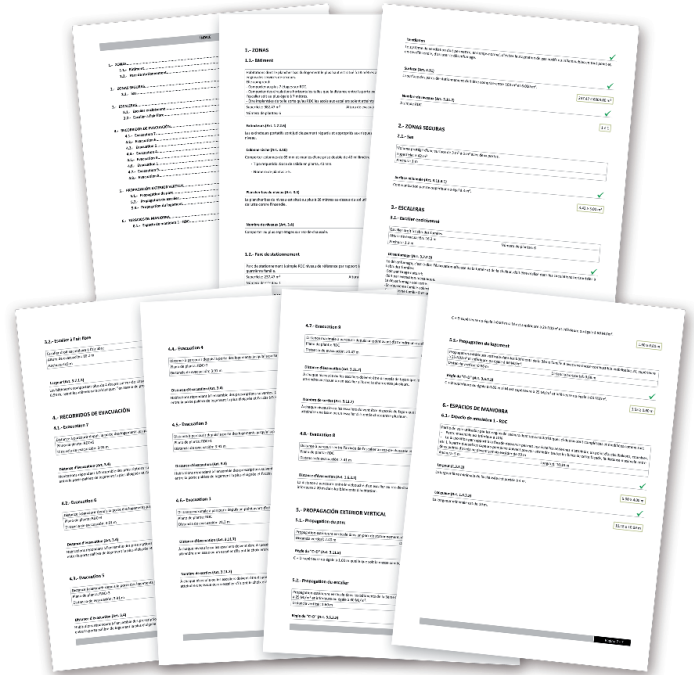

Open **BIM** workflow

CYPEFIRE Design is a tool integrated in the Open BIM workflow. The integration is carried out through the exchange of data files in the IFC4 standard between the different applications that operate on the same project.

Thanks to this communication CYPEFIRE Design exports the information of the sectors to carry out the calculation in CYPECAD, it also communicates with CYPELUX to share the information of the roads and the equipment.
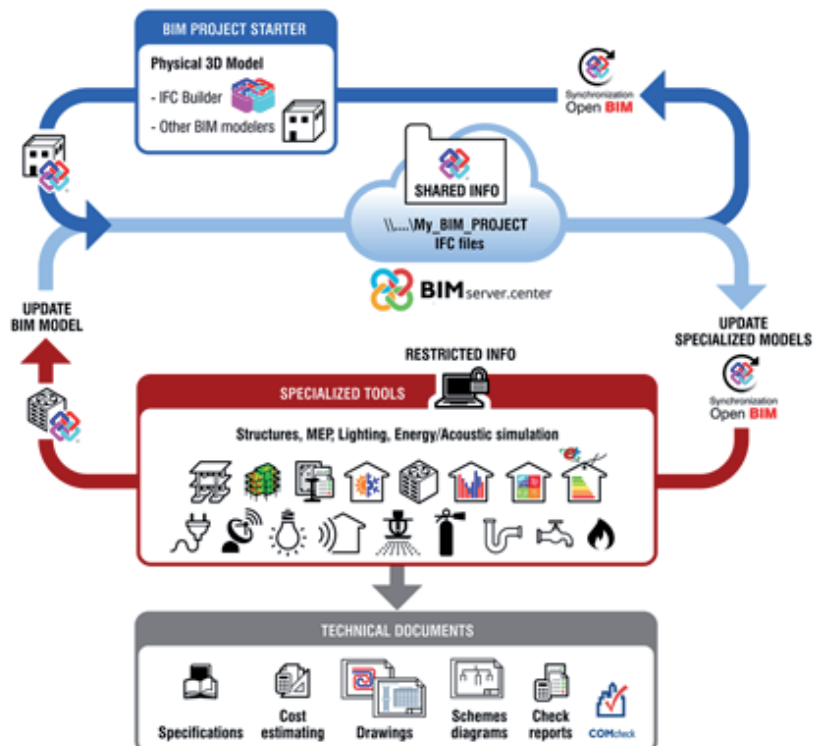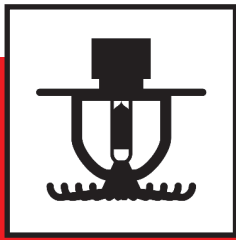
CYPEFIRE Hydraulic Systems

CYPEFIRE Hydraulic Systems is an application created to carry out the design of sprinklers systems in accordance with Singapore code CP 52:2004 and NFPA® 13 codes.

Includes the EPANET® application (developed by the Water Supply and Water Resources Division of the U.S. Environmental Protection Agency's National Risk Management Research Laboratory) to perform the hydraulic calculations.

CYPEFIRE Hydraulic Systems is integrated into the Open BIM workflow via the BIMserver.center platform.

Field of application

The scope of application of CYPEFIRE Hydraulic Systems includes all those facilities included in the Singapore code CP 52:2004 and the NFPA® 13 (National Fire Protection Association) code, the most internationally accepted standard for the wide variety of solutions offered to solve sprinkler installations.

The hazards classification on every BIM model can be done according to the danger of the spaces. In function of the danger of this spaces, the NFPA® 13 has more restrictive checks. (Light Hazard, Ordinary Hazard and Extra Hazard).
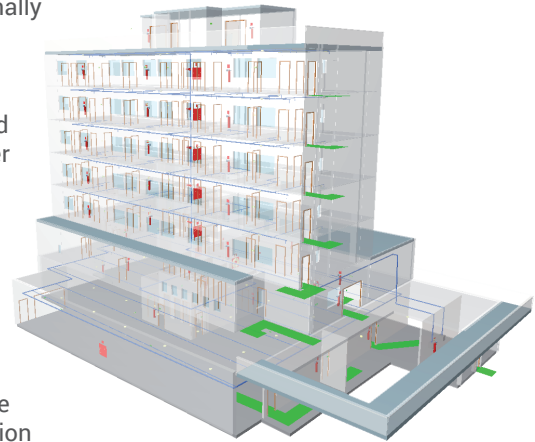
Workspace

The workspace of the software allows the creation and quick dimensioning of sprinklers systems thanks to the implemented tools, such as the automatic disposition of grid or branch systems and automatic generation of areas of operation.
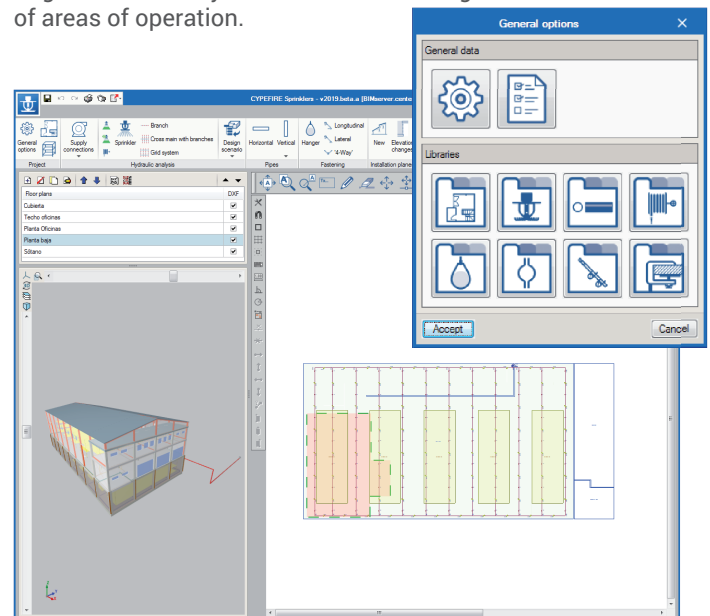
The users can see and easily correct the errors on the main elements of the model after the analysis (tank, pipes, sprinklers, pumps).

CYPEFIRE Hydraulic Systems
Fire protection   Fire extinguishing

Hydraulic calculation

CYPEFIRE Hydraulic Systems uses the EPANET 2 calculation engine (developed by the Water Supply and Water Resources Division of the National Risk Management Research Laboratory) to carry out the hydraulic calculations necessary to design the sprinkler system.

EPANET is a calculation engine internationally recognized to carry out the following:

- Simulate systems of any size
- Compute friction head loss using the Hazen-Williams or the Darcy Weisbach formula
- Model constant or variable speed pumps
- Model pressure-dependent flow issuing from sprinkler heads

The use of EPANET allows obtaining an accurate calculation result, sufficiently valid to comply with CP 52:2004 and NFPA® 13, as well as including the option of using a loss ratio to consider the load losses due to the singular elements.

Libraries

The application offers a selection of elements whose characteristics are stored in different libraries (sprinklers, pipes, hangers, fastener ...). The properties of each element are defined from the catalogs of the main manufacturers of the sector, however, these libraries are fully editable by the user to modify the parameters or add new elements if he considers it.
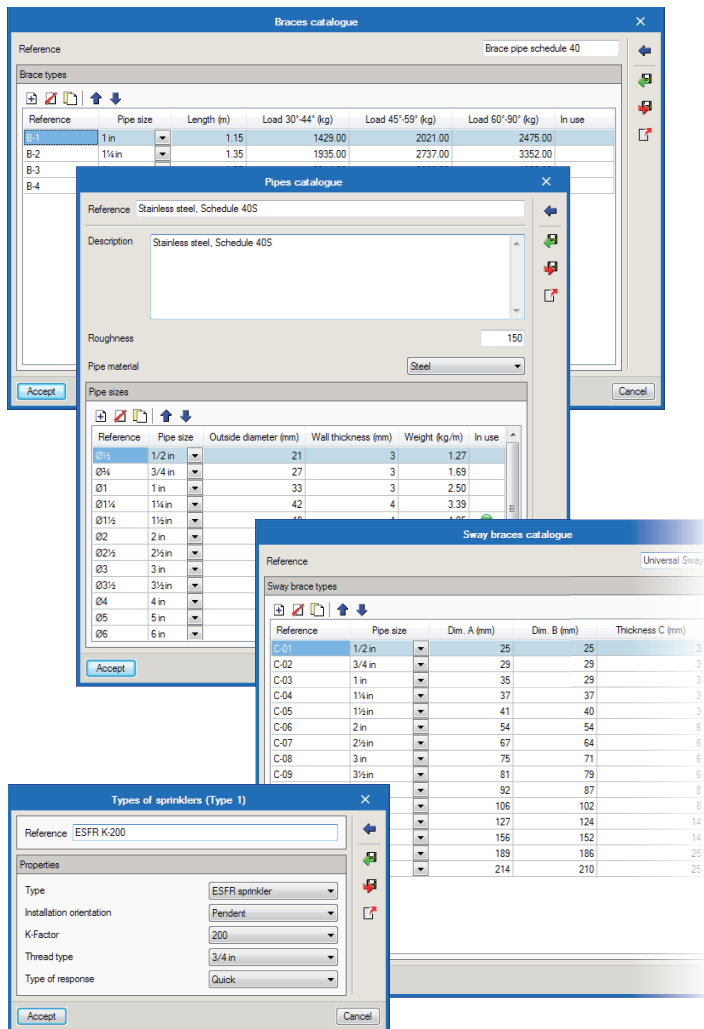
Sprinklers

Here are some of the principal properties of the sprinklers:

- K-factor
- Type of sprinkler (Standard, Standard sidewall, Residential or ESFR)
- Orientation (Upright or Pendent)

Pipes

To run the hydraulic analysis there are some parameters needed like:

- Roughness
- Material
- Pipe size

Hangers

In the case of hangers or seismic assemblies you have to define some of these parameters:

- Rod size
- Maximum brace load
- Maximum fastener load

Checks

When the user runs the analysis, CYPEFIRE Hydraulic Systemsperforms some checks on the main elements of the model to carry out the hydraulic analysis, after that the application performs the checks corresponding to the CP 52:2004 and the NFPA® 13.

Here are some examples of the principal checks carried out:

Sprinklers

- Pressure and minimum flow of operation.
- Maximum allowable protected area
- Maximum allowable operating area
- Maximum and minimum distance between sprinklers
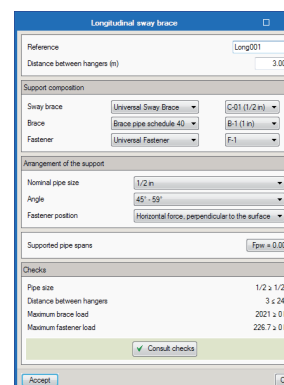- Maximum and minimum distance between sprinkler and wall

Tank

- Minimum volume

Pressure group and connection

- Operating point of the sprinkler system is inside the operating curve.

Hangers

- Maximum distance between hangers
- Minimum diameter of the hanger rod
- Seismic brace assembly
- Maximum distance between each type of seismic assembly
- Maximum load of the brace
- Maximum load of the fastener

Calculation hypothesis

This is an area that allows users to generate the calculation hypothesis of the sprinkler system, always including the most remote sprinkler in the network. It also allows the users to simulate the operation of the fire hose reels to increase the flow contributed to the network.

Finally, the generation of areas of influence essential for the calculation of the seismic supports and the horizontal loads they must support.
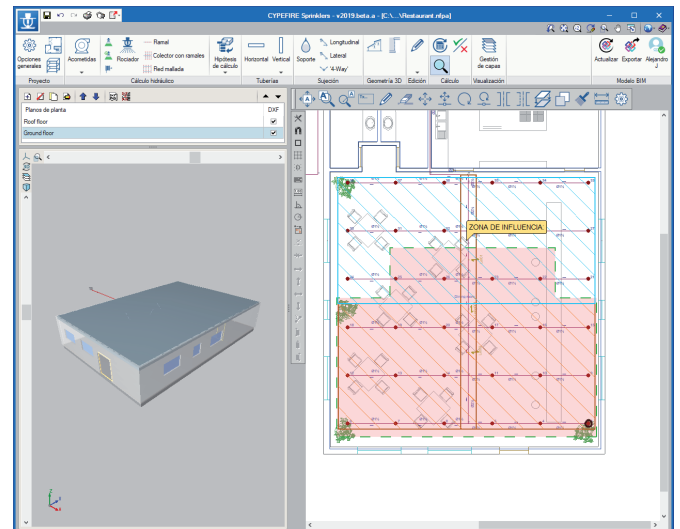
3D layout

CYPEFIRE Hydraulic Systems provides different tools so that the user can generate a sprinkler system that adapts as much as possible to the 3D environment, being able to generate:

- Risers: Vertical sections that connect different floor plans to each other.
- Vertical pipes: A vertical section within the same floor plan to overcome obstacles.
- Installation plans: Plans used to arrange a whole series of elements at a height different from the height of the installation of the floor plan. On these planes, slopes can be introduced to install the sprinkler system on inclined roofs.
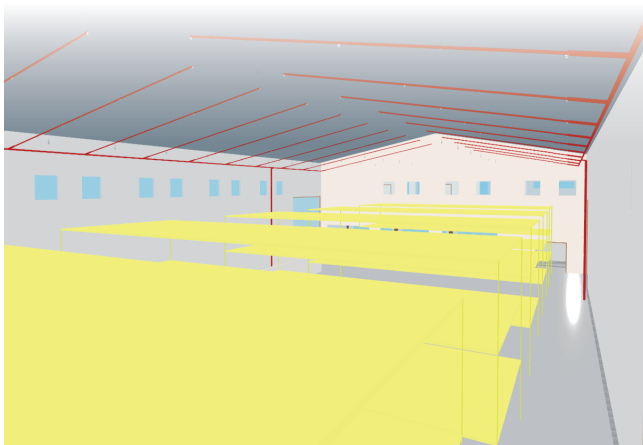
Documentation

CYPEFIRE Hydraulic Systems can generate the necessary documentation to justify compliance with CP 52:2004 or NFPA® 13 regulations, including:
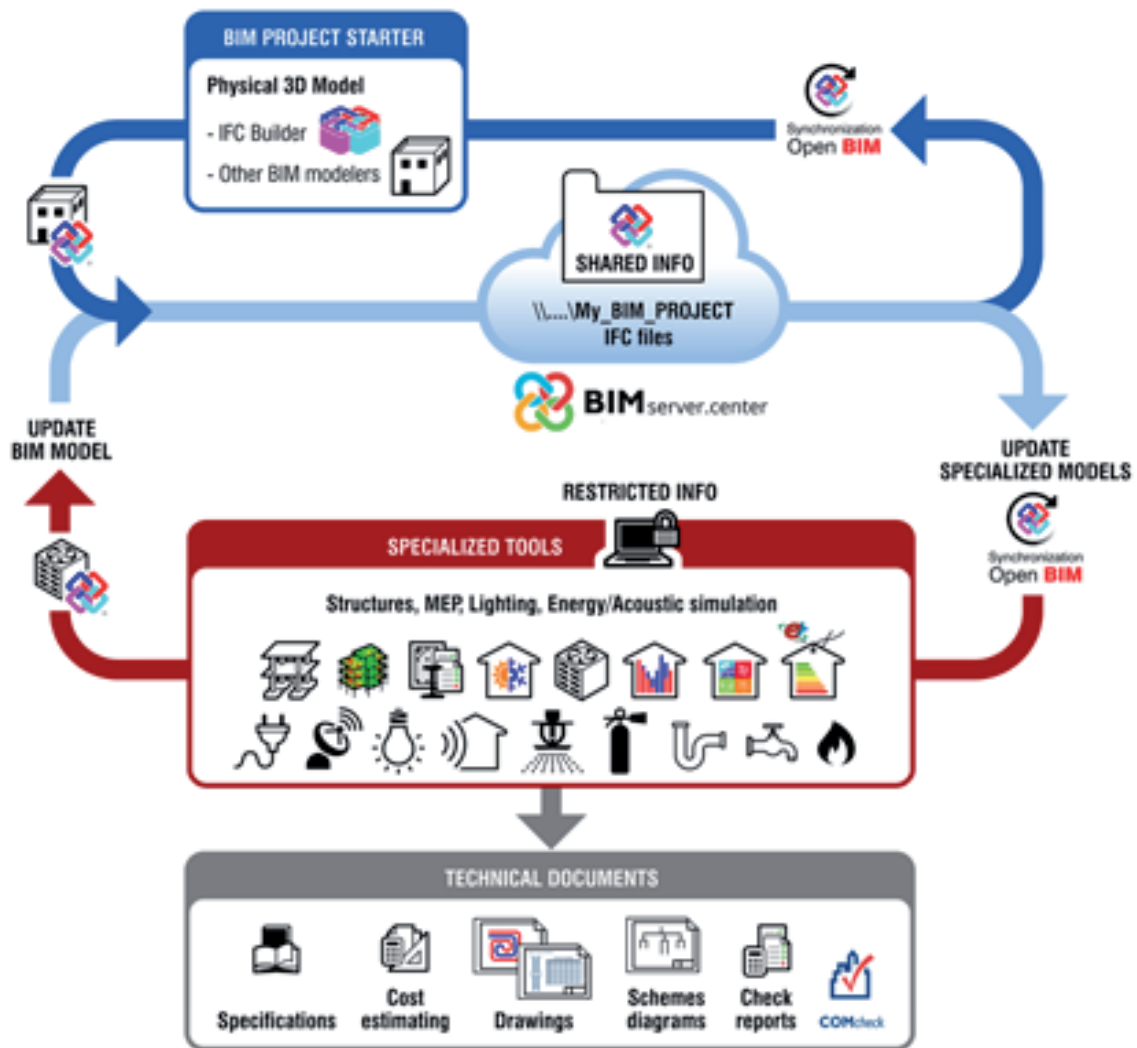
- System summary sheet.
- List of hydraulic calculation: Information referring to each section of pipeline and to each node of the sprinkler system.
- Installation graph: Graph to see both the curve of the installation and the curve of the pressure group.
- List of seismic supports: The justifying lists of each seismic support used on the model
- Plans
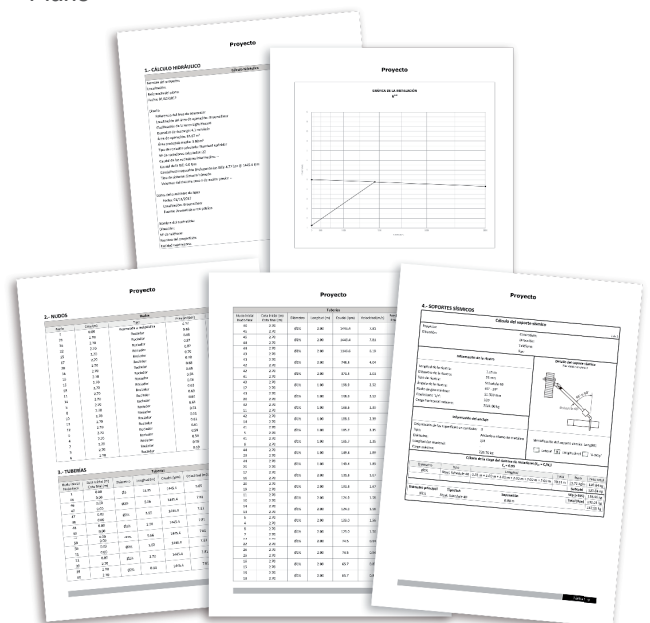
CYPEFIRE Hydraulic Systems is integrated into the Open BIM workflow via the BIMserver.center platform. The integration is carried out through the exchange of data files in the IFC4 standard between the different applications that operate on the same project.

Thanks to this communication CYPEFIRE Hydraulic Systems can import the zones which have been designed to have a sprinkler installation, from the fire protection application (CYPEFIRE Design).

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