



Plan Review and Project Services

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PURPOSE

FM Global field engineering provides plan review and project loss prevention services exclusively to clients insured by FM Global. These services are designed to assist you in *managing change* to ensure that you maintain the highest level of loss prevention possible. The purpose of this guide is to provide you with information that will help you coordinate activities with FM Global to enable you to realize the maximum benefit of these services.

GENERAL GUIDELINES

What projects should involve FM Global?

- All new construction (includes prospecting new locations for relocation or expansion)
- Existing facility renovations resulting in significant change in occupancy or construction
- Modifications to fire protection (new construction & renovations)
- Re-roofing projects or roof modifications
- Diesel fuel installations/modifications associated with boilers and/or generators
- External exposures (e.g. installation of a nearby buried pipeline, etc.)

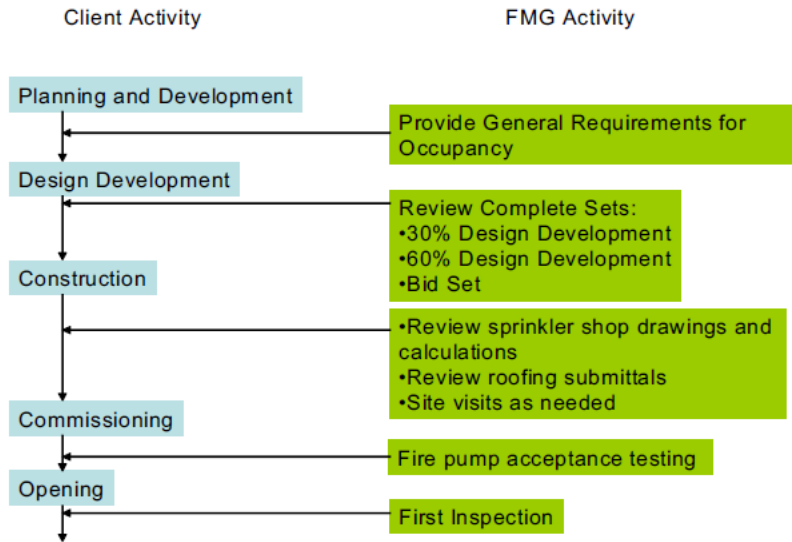
Minor interior renovations such as relocating interior gypsum walls, door/hardware changes, furnishings, and so on **should not** be submitted for review. When in doubt, check with FM Global to see if a proposed change needs special attention.

At what point should FM Global be involved with your changes?

The sooner the better. Identifying loss prevention concerns at the conceptual stages of a project enables you to incorporate them in your design and to budget them in your cost estimates.



Basic Highly Protected Risk Project Management Process





What can be done to ensure outside vendors follow FM Global guidelines?

In your specifications for a new project, ask that all designs meet FM Global standards. Require contractors to submit plans and receive acceptance prior to starting any work. Specify that, where applicable, FM Approved equipment be used.

Generally, what prints will FM Global need to see?

While this can vary from project to project, the following is a generic list of prints that we typically review:

- Full Construction Set (Civil, Architectural, Structural, ME&P, Fire Protection)
- RoofNav Assembly # and RoofNav Contractor's Package (www.roofnav.com)
- Sprinkler Drawings, Fire Pump Data, Underground Fire Main/Water Supply Details
- Fire Alarm System Layout and Wiring
- Special Protection Systems (CO₂, *Inergen*, *FM200*, dry chemical)
- Fuel Fired Equipment (Boilers, Ovens, Furnaces)
- Process Equipment
- Diesel Generator Fuel Piping, Transfer Pump, Day Tank Arrangement

In addition to prints, submit specifications, equipment lists, and calculations to enable a thorough review. All materials should be FM Approved.

SPECIFIC PROJECTS

Construction Drawings (Additions & New Buildings)

FM Global reviews construction plans/site plans for various reasons including:

- To determine any hazards exposing the site such as flood, earthquake, gas pipelines, railroad sidings, adjacent structures, etc.
- To determine how the new building or addition affects the overall property conservation of the facility.
- To confirm that wind, rain and snow loads used in the design are adequate for the site.

Roof Projects (New)

FM Global reviews roof plans to determine resistance to anticipated wind uplift pressures and fire spread potential. The following information is needed to conduct a thorough review of new roof installations and re-roofing projects.

- **Structural Prints:** Include drawings and details of the roof cover, flashing, and design loads (live and dead load).



- **Roof Drainage System**: Submit drawings that show drain sizes, locations with respect to building columns, and the number of drains. Submit roof drainage calculations proving that the design drainage is adequate for the anticipated rainfall intensity.
- **Snow Loading Calculations**: When applicable, submit these to ensure that an unbalanced snow load does not exceed the design live load of the roof.
- **Wind Uplift Rating**: Specify the uplift rating of the roofing system to ensure that it is designed to withstand the anticipated uplift pressures. Contact FM Global for uplift pressures.
- **Specific Flashing Details**: Follow design and installation guidelines provided in FM Global Loss Prevention Data Sheet 1-49, *Perimeter Flashing*, or provide an FM Approved assembly.
- **Roof Specification including**: RoofNav Assembly Number (www.roofnav.com) and RoofNav Contractor's Package (printed from the RoofNav website; roof system manufacturer can provide this information).
- **Fastening Specifications**: include the manufacturer's name, model, and the proposed fastening density. Secure roof decks and roof covers per RoofNav Assembly and FM Data Sheet 1-29 *Roof Deck Securement and Above-Deck Roof Components* specifications.

Reroofing Projects or Recovers

All of the above information is applicable to re-roofing projects. Information such as design load, snow load, etc. is important if the new roofing system will encroach on the design live load of the structure.

Contact FM Global for information regarding anticipated wind uplift pressures, rainfall and snowfall intensities for a specific project.

AUTOMATIC FIRE PROTECTION

Sprinkler Protection Installations

FM Global reviews plans for automatic sprinkler protection installations to ensure that the proposed system provides adequate protection for the occupancy, that the available water supply can support the proposed system demand, that the materials used are FM Approved, and that the system is being installed in accordance with FM Global recommended good practices. Contact FM Global for water supply and system design criteria.

Submit the following information for review of automatic sprinkler system plans:

- **Prints/drawings** of the proposed automatic sprinkler system
- **Hydraulic Calculations**
- **Equipment Manufacturers Specifications**
 - Use FM Approved equipment when it is available. This includes but is not limited to: sprinklers, sprinkler pipe, fittings, control valves, and peripheral equipment including alarm switches, tamper switches, air pumps, earthquake bracing, etc.
- **Occupancy Details**



- In order to properly evaluate the sprinkler systems adequacy, provide a detailed description of the occupancy. Include production equipment, operations, production processes, materials being stored, storage height, storage arrangement (palletized on floor, palletized in racks, etc.).

- Instruct the installing contractor to complete the **Contractor's Materials and Test Certificate**, Form No. 85, for all installations and submit a copy to FM Global.

Fire/Booster Pump Installations

FM Global reviews fire pump booster pump installation plans to ensure that the installation will provide an adequate water supply to meet system demands, all components are FM Approved, and that the installation is in accordance with FM Global accepted good practices.

Submit the following information for review of **all** fire pump installations:

- **Prints** of the proposed pump arrangement
- **Manufacturer's Product Data Sheets** for *pump, driver, and controller*.
- **Manufacturer's Product data Sheets** for all materials and peripherals.
- **Manufacturer's certified bench curve** for the pump.
- **Pump House** design & layout information including:
 - Location
 - Construction

Specifically for **electric** fire pump installations:

- Single-Line Diagram showing the electric feed path to the pump.

ALARM SYSTEMS

FM Global reviews plans for fire alarm system installations to ensure that the system provides the required level of detection in the area of installation and that all equipment is FM Approved either as a system or on a component basis.

Submit the following information for review of alarm system plans:

- **Manufacturer's Product Data Sheets** including make and model number(s):
 - For the entire system, if applicable
 - For all system components and options, if applicable.
- **Manufacturer's Product Data Sheets** for all equipment



- **Prints showing** system component layout, control panel wiring, battery backup.

Initiating device circuits and signaling line circuits may be connected to operate any of the following:

- Manual fire alarm box
- Automatic fire detection like smoke, heat, flame, etc.
- Sprinkler waterflow alarm
- Automatic fire pump supervision
- Tamper switches for sprinkler control valves
- Dry pipe air pressure supervision
- Supervision of other fire suppression systems

SPECIAL PROTECTION SYSTEMS

Special protection Systems are systems utilizing various extinguishing agents and include Inergen, FM 200, Carbon Dioxide, Dry Chemical, Water Spray and Foam systems. FM Global reviews plans for special protection systems to make sure that these systems provide adequate protection as required for a specific hazard.

Submit the following information for review of special protection systems:

- **System Prints**
- **Pre-Engineered vs. Component Systems**
 - Select an FM Approved Pre-Engineered gaseous suppression system from the FM Global Approval Guide
- **Calculations**
 - The contractor's or installer's calculations are needed to show that the required concentrations or densities, and durations are available from the special protection system.
- **Manufacturer's Equipment Product Data Sheets**
- **Occupancy Details**
 - Room and subfloor dimensions (length, width, height). Type of equipment/occupancy to be protected. Comment on the presence of ordinary combustibles (desks, chairs, paper, etc.)

FUEL-FIRED EQUIPMENT

FM Global reviews plans for fuel-fired equipment installations to ensure that all necessary controls and safeguards are included in the installation, all equipment used is Factory Mutual research approved, and that all safeguards are configured and wired for proper sequence of operation.

Submit the following information for review of fuel-fired equipment installations:



- Fuel Train Piping Diagram
- Electrical Ladder Diagram or Controller Program Logic
- Equipment and Materials List: The manufacturers name and model number should be included for all equipment.



DESIGN GUIDELINES SPECIFIC TO PROVIDENCE, RI

Information in this section will provide general guidance to building designers to assist in determining the type of construction needed to resist external forces exerted on the building in the Providence region.

- Design Lateral Loads
 - Basic Wind Speed (3 sec. gust) 90 mph
 - Ground Roughness (Wind Exposure) C, but evaluated building to building
 - Safety Factor 2.0
 - Building Importance Factor 1.15
 - Ground Snow Load 40 psf

- Other Design
 - Rainfall Intensity: 2.5 in/hr