



FM GLOBAL PLAN REVIEW GUIDELINES FOR ROCHESTER INSTITUTE OF TECHNOLOGY

FM Global develops sound property loss prevention solutions that help our clients better understand the nature and causes of their risk and, that, when implemented, can effectively improve their risk profile.

Questions concerning plan reviews or technical issues related to design or construction should be directed to the FM Global Boston Operations Lead Engineer or to your Account Engineer
Ameya Sampat

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Factory Mutual Insurance Company (FM Global) has developed this report for insurance underwriting purposes. The report is provided to you for informational purposes only to reduce the possibility of loss to property by bringing to your attention certain potential hazards or conditions. You must make the decision whether to take any action. FM Global undertakes no duty to any party by providing this report or performing the activities on which it is based. The liability of FM Global is limited to that contained in its insurance policies.

OVERVIEW

PURPOSE

FM Global provides plan review and new project loss prevention services exclusively to clients insured by FM Global. These services are designed to assist you in managing the changes at your locations 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. Ideally, the total turn around for plan review jobs received for distribution should be no more than 14 calendar days.

GENERAL GUIDELINES

What projects should involve FM Global?

Any Rochester Institute of Technology project that results in a change to protection, occupancy, construction or external exposure (i.e., the installation of a nearby buried pipeline, etc.) should be coordinated with FM Global. This could involve the installation of new sprinklers, construction of a new building, renovations of an existing building, or the installation of a new process that would involve flammable liquids or combustible dusts. Even a change where a noncombustible material is being replaced with a combustible one could have dramatic effects on the protection requirements. When in doubt, it is best to check with FM Global to see if a proposed change needs special attention.

Generally, what prints will FM Global need to see?

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

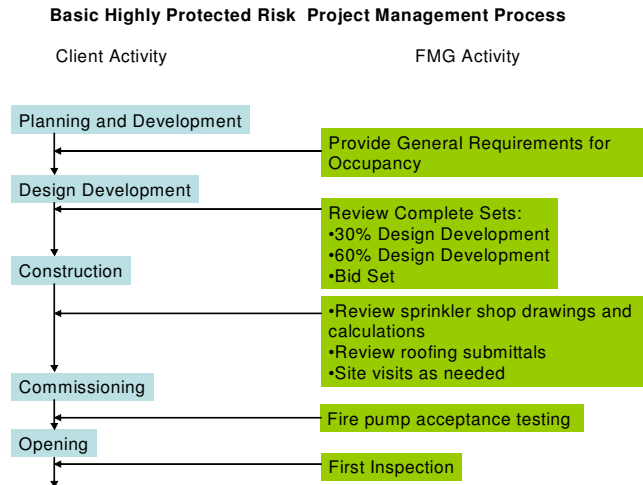
- Structural (Roof, Damage Limiting Construction, Fire Wall)
- Site Plans for new buildings or additions
- Architectural Drawings
- Sprinkler Drawings
- Alarm System Layout and Wiring
- Special Protection Systems (CO₂, Halon, Dry Chemical)
- Fuel Fired Equipment (Boilers, Ovens, Furnaces)
- Process Equipment
- Electrical Power Distribution
- Diesel Fuel Tanks and Fuel Piping Systems for Emergency Generators

In addition to prints - specifications, equipment lists and calculations should be submitted to enable a thorough review.

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

The sooner the better. Involving FM Global even at the conceptual planning stages can pay dividends in the long run. Identifying loss prevention concerns at the early stages of a project enables you to incorporate them in your design and to budget them in your cost estimates. Alternative methods of protection are much easier to explore in the conceptual stage than during construction and will help ensure you maintain the highest level of protection that is the most economical.



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. Here again, the key to making a project flow smoothly is to involve FM Global as early as possible in a project.

In addition to plan review, what other services are available to help manage changes?

FM Global field engineers conduct site surveys at potential locations for new facilities. During these visits, existing water supplies are evaluated to see if they will be sufficient for the proposed occupancy. The site is evaluated for flood hazards, exposures from adjacent buildings and utilities such as gas transmission mains.

During a project, special visits are conducted to monitor the status of construction, manage changes affecting loss prevention and to ensure that accepted designs are being installed in accordance with the reviewed prints. General safeguards during construction such as the control of combustible material, supervision of ignition sources and the control of fire protection impairments are monitored to ensure your facility is not being exposed by the project itself.

While it is impossible to discuss every detail concerning our plan review services, this gives you an overview of what is available. In the following pages, specific information concerning routine plan review submittals are covered for the most common projects.

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SPECIFIC PROJECTS

CONSTRUCTION PROJECTS

FM Global reviews construction plans/site plans to determine if any exposures to the site, whether they be natural or man-made (flood, gas pipelines, adjacent structures, etc.). The plans are also reviewed to determine how the addition and/or new building effect the overall property conservation of the facility.

1. **Site Plans** - These should include finished floor elevations, finished grading elevations, and details on additions and modifications to the yard mains, control valves and fire hydrants.
2. **Construction Drawings**- Along with these basic construction details, these should include finished roof elevations of both new and any adjacent, existing buildings. For "pre-engineered" metal buildings (*reference FM Global Data Sheet 1-31*), complete construction drawings and roof load calculations are required for a thorough review.
3. **Specific Exposures** – For areas requiring specialized construction, technically complete drawings and calculations should be submitted.
4. **Materials Used** – Use noncombustible materials (FM Approved or listed by UL or other recognized testing laboratory) for all suspended ceilings, supports and pipe and duct insulation (including adhesives). All filters should be UL Class 1, or equivalent. Keep all concealed spaces free of combustibles. Any new existing ceiling tiles, sounds attenuation blankets, HVAC duct insulation or building insulation should be made of FM Approved Materials, or non combustible materials. It is also acceptable to use non-plastic materials which have been tested to ASTM E-84 and have shown a flame spread rating of 25 or less.

ROOFING PROJECTS

FM Global reviews roofing plans in order to determine such items as fire spread potential, resistance to anticipated wind uplift pressures, and the anticipated rainfall and snow loading to the roofing system. The following items are needed in order to conduct a thorough review of new roof installations and reproofing projects.

1. **Structural Prints** - These should include information such as drawings of the roof installation, flashing installation, and roof design load (both live and dead load).
2. **Roof Drainage System** - Drawings should show drain sizes, locations with respect to building columns, and the number of drains to be installed. Roof drainage calculations should be submitted proving that the design drainage is adequate for the anticipated rainfall intensity. (*reference FM Global Data Sheet 1-54*)
5. **Snow Loading Calculations** – Snow loading potentials may exist. When applicable, these should be submitted to ensure that the average snow load due to an unbalanced snow load does not exceed the design live load of the roof. (*reference FM Global Data Sheet 1-54*)
3. **Roof Specifications and RoofNav Assembly Number** – FM Global Form 2688 “Application for Acceptance of Roofing Systems” should be completed for each type of roof covering system for each building. **RoofNav** is recommended for the selection of FM Approved roof assemblies. Contractors can find out more information at www.roofnav.com. Criterion for roof Securement can be found in FM Global Property Loss Prevention Data Sheet 1-29 *Roof Deck Securement and Above Deck Roof Components*.
4. **Wind Uplift Rating** – The uplift rating of the roofing system should be specified to ensure that it is properly designed to withstand the anticipated uplift pressures.
5. **Specific Flashing Details** – Roof edge flashing should be an FM Approved flashing assembly with the proper minimum wind rating. As an alternative for wind ratings up to and including Class 90, design and install in accordance with FM Global Property Loss Prevention Data Sheet 1-49.

FM Global can be contacted to obtain information regarding the anticipated wind uplift pressures, rainfall and snowfall intensities for a specific project.

AUTOMATIC SPRINKLER PROTECTION

FM Global reviews plans for automatic sprinkler protection installations to ensure that the proposed system provides adequate protection for the occupancy that it will be protecting, that the available water supply can support the proposed system demand, that the materials used for FM Approved, and that the system is being installed in accordance with FM Global recommended good practices. In addition, FM Global should be contacted for all water supply and system design criteria. The following are needed to conduct a thorough review of plans for automatic sprinkler systems:

1. **Prints** of the proposed automatic sprinkler system
2. **Hydraulic Calculations**
3. **Product Specifications** (sprinkler heads/piping/valves/peripheral equipment)
4. **Water supply** test data within 1 year
5. **Occupancy Details**
In order to review submitted plans to ensure adequate protection, accurate occupancy details must be provided. These include, but are not limited to materials being stored and storage height
6. **The Contractor's Materials and Test Certificate Form No. 85** should be completed by the installing contractor for all installations and submitted to FM Global.

FIRE PUMP/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 the installation is in accordance with FM Global accepted good practices. The information needed to perform a thorough fire pump/ booster pump installation includes:

1. **Prints** of the fire pump/booster pump installation.
2. **Manufacturer's Specifications & Cut Sheets** for the fire pump, driver, controller, etc.
3. **Pump Curve** -Manufacturer's Certified Bench Curve for the pump.
4. **Pump House Design & Layout information**
5. **One-Line Electrical Diagram** showing the electric feed arrangement to the pump.
6. Installation of the fire pump/booster pump should be in accordance with FM Global Property Loss Prevention Data Sheet 3-7 *Fire Protection Pumps*.

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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.

1. **Prints** – system component layout, control panel wiring, and battery backup if required.
2. **Manufacturer's Information** - including name and model number(s) of the entire system and all system components, if applicable.
3. Installation of the fire alarm systems should be in accordance with FM Global Property Loss Prevention Data Sheet 5-40 *Fire Alarm Systems*.

SPECIAL PROTECTION SYSTEMS

Special Protection Systems are systems utilizing various extinguishing agents and include Halon, 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. The following information is necessary to complete a thorough review of special protection systems:

1. **System Prints**
2. **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.
3. **Manufacturer's Equipment Specifications**
4. **Occupancy Details**
5. Satisfactory completion and submittal of the **Contractor's Application for Acceptance** for the specific special protection system.
6. Special Protection system should be in accordance with FM Global Data Sheet 4-0, *Special Protection Systems*.

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 FM Approved, and that all safeguards are configured and wired for proper sequence of operation. The following information is needed to conduct a thorough review of plans involving fuel-fired equipment:

1. **Fuel Train Piping Diagram**
2. **Electrical Ladder Diagram or Controller Program Logic**
3. **Equipment and Materials List** - The manufacturers name and model number should be included for all equipment
4. **Safety Ventilation Calculations for ovens**
 1. Direct fired ovens
 2. Ovens processing materials containing flammable solvents.

DIESEL FUEL/EMERGENCY GENERATOR PLANS

FM Global reviews plans to ensure that the hazard that diesel fuel creates when it is within a building are properly identified, evaluated and mitigated. The ideal location for diesel fuel supply tanks and emergency generators is outdoors, not within a building or on the roof of a building. Information necessary to provide a thorough diesel fuel plan review includes:

1. Specifications for the **main storage tank**
2. **Fuel oil riser diagram**
3. **Identification of interlocks** planned between leak detectors and the fuel oil pumps
4. **Emergency generator installation**
5. If the main tank and generator will not be located outside the building, the **specific construction assemblies** planned for the tank room and the emergency generator room.

MAILING INFORMATION

Plans should be submitted to:

FM Global
Boston Operations Field Engineering
Plan Review Department
1175 Boston-Providence Turnpike
PO Box 9102
Norwood, MA 02062

Plans can also be sent electronically to engbostonplanreview@fmglobal.com.

Questions concerning plan reviews or technical issues related to design or construction should be directed to the following:

Boston Operations Lead Engineer: bostonleadengineer@fmglobal.com; 781-440-8241, or
Ameya Sampat, FM Global Account Engineer; Ameya.Sampat@fmglobal.com ; 203-326-1790

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