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Conspectus's Tech Tips received the national Communications Award from the Construction Specifications Institute September 2011.

**ABSTRACT:**

Select fire resistant assemblies efficiently. Understand the basics of each design source, selection options and available tools to effectively narrow the search and select the correct solution.

**FILING:**

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C1010 - Interior Partitions  
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07 81 00 - Applied Fireproofing  
09 20 00 - Plaster and Gypsum Board

**KEYWORDS:**

Fire rating, building code, UL, GA, IBC, building assemblies, protection materials,

**REFERENCES:**

Gypsum Association  
GA-600 - Fire Resistance Design Manual

Underwriters Laboratories  
UL Certifications Directory Fire Resistance-Rated Systems and Products

International Code Council  
International Building Code, 2009 edition.

## A Guide to Fire Resistant Assemblies

By David Stutzman, AIA, CSI, CCS, SCIP, LEED AP

### Background

Selecting the right fire resistant assemblies for a project can be a daunting task. However with a basic understanding of the available design sources, selection options, and available tools, the task can be simplified and the results improved.

### Code Review

As a project design begins to take shape, one of the first tasks is to perform a code review. The result will inform the design team of issues that must be addressed.

Determining fire resistance ratings for building systems and assemblies is a primary concern of the code review. Manipulating design parameters to minimize or eliminate fire resistance ratings can result in significant cost savings to the project.

The International Building Code (IBC) will dictate what assemblies must be rated and the hourly rating required. Ratings can be required for floor and roof assemblies, exterior walls, shafts, and interior partitions. The required ratings will depend on:

- Building construction type and occupancy,
- Mixed use occupancy,
- Location with respect to property line, and
- Sprinklers.

Including sprinklers in a project, when not otherwise required, can substitute for a 1-hour fire resistance rating for Type IIA, IIIA, and VA building construction.

### What is Needed

The IBC requires that architects submit documents for permits that provide sufficient information to show the project complies with the code. Because the code controls fire resistance ratings, the documents must show how the design will comply. Typically the code officials expect to find compliant designs for fire resistant assemblies shown on the drawings.

Now that the code review is complete, it is time to research the kinds of fire protection required for the project. The sources listed below can be used for selecting rated assemblies:

- UL Certifications Directory Fire Resistance-Rated Systems and Products
- Gypsum Association Fire Resistance Design Manual (GA-600)
- IBC Section 720 Prescriptive Fire Resistance
- IBC Section 721 Calculated Fire Resistance

Searching for the most appropriate assembly design has been somewhat complicated by technology. The UL and GA documents are available online at the URLs in the hyperlinks indicated above.

The UL Certifications Directory is accessed by searches. A search results page is displayed from which individual designs can be selected for viewing. The results can be printed, but the formatting is not conducive to a print layout.

GA-600 is split into two scanned PDF files that can be viewed, but not downloaded, printed, or searched. There are no bookmarks or internal hyperlinks to help navigate the document. It is best to open both files in separate tabs to be sure the correct designs can be found. IBC Section 720 provides tables with text descriptions of each assembly. This requires reading the entire description to know if the design is appropriate. IBC Section 721 provides detailed instructions for calculating fire resistance of various materials and assemblies. The UL Directory and GA-600 provide a graphic depiction of each design which allows quick assessment of each design. Both are available in paper form for a fee. The graphics are helpful. If extensive searches are required, consider buying the documents to reduce search time.

## Searching the Designs

The UL Certifications Directory search function can be helpful, but you must understand the numbering for the UL designs before searching the directory. The UL Guide Information for Fire Resistance Ratings contains a chart that shows the types of protection for various assemblies. UL designs are identified by an initial letter and a three-digit number, D501 for example. The letter and number have specific meaning about the assembly construction and the type of protection. The unused letter prefixes are reserved for future use. Not all protection materials associated with each number are available for each assembly type. The Guide Information chart contains hyperlinks that will return search results for the available designs within each category. This chart is a quick way to narrow a search to the most

appropriate designs. However, the linked search results pages may contain many designs that still must be accessed individually. To simplify the search try UL's Ultimate Fire Wizard that helps narrow your search and saves the results. GA-600 follows the same concept of organizing the designs by assembly. However, the assemblies are then subdivided into noncombustible and combustible construction and further subdivided by hourly ratings. The only protection material is gypsum board, so there is no need to identify the materials as the UL Certifications Directory does.

One advantage of GA-600 is that some designs are listed with acoustic ratings. Floors are shown with Impact Isolation Class (IIC) ratings. Walls and partitions are shown with Sound Transmission Class (STC) ratings. These acoustic ratings are helpful when designing projects with dwelling units. IBC Section 1207 requires minimum IIC and STC ratings for assemblies separating dwelling units. A convenient index to the fire resistance designs by IIC and STC ratings is provided to help guide the design selection when acoustic performance is important. Beware that UL Directory and GA-600 designs can be proprietary when tests are performed with specific materials rather than a class of materials.

## Apply the Selections

After making all the selections for the fire resistant designs, be sure to read the UL Guide Information and the GA-600 introductory information. This general data applies to all designs and may impose additional requirements that are not discussed in the listed designs. The introductions will help explain how to use a selected design when a project application is

not identical to the tested design. Project beam and column sizes will rarely match the designs, so the introduction explains what latitude exists with the design and how to adjust the protection to suit the project.

Finally, note the selected designs on the project drawings. Then inform your specifier what selections were made. The specs must document the correct products and application to ensure the completed construction matches the selected designs.

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