



Vescom Floor System Fire Ratings

C - Fire Ratings

One of the most critical issues and code requirements for architects is ensuring that building design addresses fire safety issues. The building codes require fire resistance ratings for floor assemblies. A fire-resistance rating refers to the period (1 hour, 1 ½ hour, 2 hours, and 3 hours) an assembly can contain a fire and perform its intended structural function. These ratings are determined by subjecting an assembly to a standard fire exposure as defined in ASTM E119.

Through testing and evaluation by Underwriters, Laboratory VESCOM has multiple approved Underwriter Laboratory approved fire-rated assemblies including sheetrock ceilings, acoustical ceiling panels, and spray-on fireproofing.

Ceiling Assemblies with Sheetrock (Gypsum Board Membrane) Ceilings

Vescom has accomplished a fire-rated assembly that services all the fire code requirements and at the same time meets all the mechanical

VESCOM's premier UL Fire Rating for residential buildings is BXUV.G531. These ratings cover 95% of residential work. By attaching the ceiling to the joist bottom chord the cost of the ceiling is reduced by 2/3rd. The sheetrock ceiling can be level with no soffits since the circulating mechanical distribution goes within the plenum of the joists. There are multiple ratings with sheetrock ceilings. They are listed in the G500s. BXUV.G531 is the most inclusive and is summarized in detail.

Acoustical Ceiling Lay in Panels

Acoustical ceiling assembly areas are covered under UL Ratings such as in commercial or institutional applications are in the G200s. They include the handing of recessed lighting and large duct ceiling penetrations.

Spray on Fireproofing

These ratings involve multiple types of spray fireproofing and multiple manufacturers. The applications are normally on the commercial and institutional buildings where occupancy or use will change periodically and required renovation periodically. VESCOM has built multiple speculative office buildings where spray fireproofing assemblies were the preferred choice. The spraying of open web joist is accomplished predominately by applying nylon mesh to the webs first with an adhesive, spraying one side concentrating on the web, waiting to dry, and then spraying the other side.



Commentary on BXUV>G531

This table below lists fire-resistant assemblies using VESCOM joist systems, as well as the related evaluation reports. The actual UL Ratings are embedded for your reference.

BXUV.G531 Summary and Commentary

The most prolific UL Rating which we use is BXUV.G531. It is for residential, senior living, and hotel-type occupancy. Over the years it has been expanded to meet the needs of the residential marketplace with the ever-increasing demand for different mechanical and architectural innovations. As with all the UL VESCOM ratings “if you don’t see it”, that does not mean we cannot work with UL to extrapolate from previous tests and experience the assemblies need for a specific project.

Requirements	Commentary
The concrete requirement is 3500 PSI normal weight concrete. It is 2 3/16” of concrete on a 1 5/16 metal decking for a total of 3 1/2”	Many projects over the years have been built with thicker or thinner slabs. Some used lightweight concrete. Many engineers want to use 4000 PSI concrete.
One layer of 1/2” or 5/8” Type C sheetrock is required for the ceiling	To attach the one layer of sheetrock, 7/8” 25-gauge hat channels are attached to the bottom chord of the joist 2’-0” on center.
8” joists and deeper can be used with this rating while allowing for unprotected openings as specified in the rating.	6” joists are allowed but do not qualify for the liberal mechanical openings allowed with deeper joists.
The size of the welded wire mesh is 6 X 6 W2.0/W2.0 or heavier. It is determined by the structural requirement of the span and the load.	The normal parameter of the residential slab construction, which is a 40-pound live load, spans 52” between joists and requires the W2.0/w2.0 wwm. When the parameters change heavier mesh may be required. When it is in just one part of the project, we double up the mesh and it is sufficient
The usual spans between the joist are 52”. This is modified in multiple cases due to plumbing, mechanical, electrical, or architectural, conflicts.	The rating allows 6’-0” spacing under the limitation that three (3) adjacent spans will not be more than 14 feet. The need for the 6-foot spacing usually occurs with back-to-back bathrooms or the need for a mechanical unit between joists.
The decking used for this rating is a 1 5/16” galvanized 24-gauge decking.	Another size decking is sometimes used for a special requirement on the project. Since the concrete acts as a heat sink in the case of a fire, the volume of concrete per square foot must equal or exceed the typical condition.

<p>Unprotected duct opening is allowed if they are a maximum of 20 square inches where they are not within 12" of a joist. One unprotected opening is allowed for every 100 square feet of ceiling area.</p>	<p>If an apartment is 1200 square feet, 12 unprotected openings are allowed. These 100 sq. ft. areas are not 10' X 10' areas but can be interpreted to mean 12 openings where these openings are not clustered or concentrated in one area of the apartment.</p>
<p>Equivalent to unprotected duct opening are "plenum box outlets" which are larger than 20 square inches, but their construction allows them to be unprotected.</p>	<p>Various ceiling penetrations are allowed which are equivalents to the 20 square inch opening including 6" and 8" rounds, 10" X8" rectangular, 10" X10", 14" X14" and openings for lights, exhaust duct, etc. Each opening construction is spelled out in the UL Rating.</p>
<p>Various Flexible Air ducts with equivalent ceiling penetrations are allowed.</p>	<p>This allows flexible exhaust air ducts for bathrooms and kitchens to travel through the joists to the exterior wall. Venting through the exterior wall eliminates the vertical exhaust duct to the roof traditionally used. It also eliminates the floor-to-floor sound transfer which is so disturbing to residence.</p>
<p>Hanging the ceiling is also allowed.</p>	<p>Various hung ceilings assemblies are allowed. This gives contractors flexibility where lower ceilings are required, or there are other reasons to hang the ceiling as opposed to attaching it.</p>

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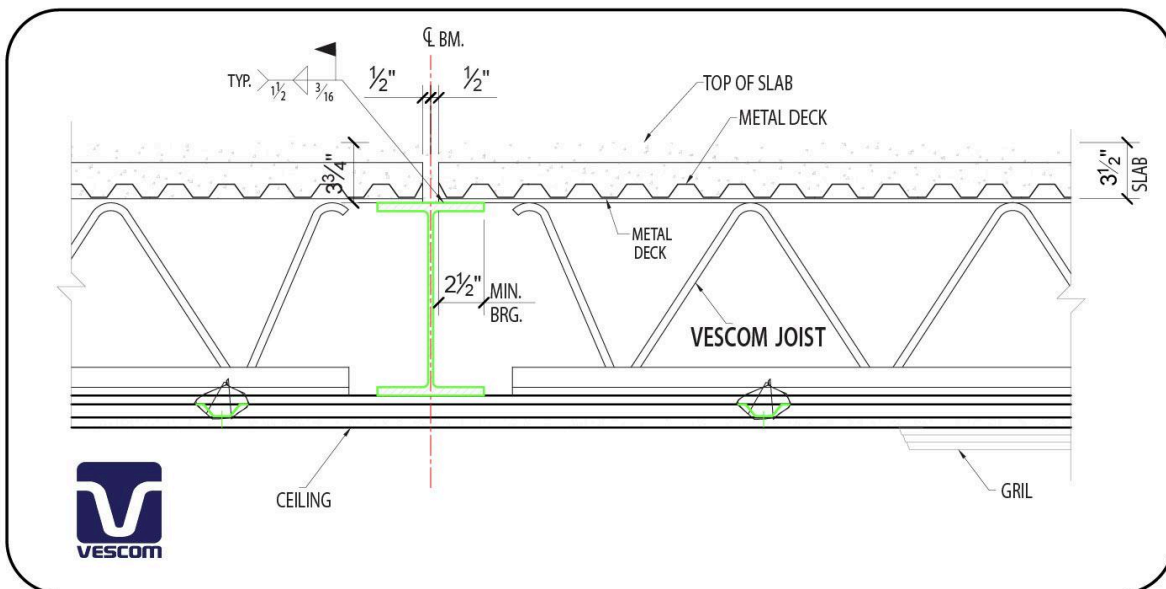




Table of Fire Rating

Vescom Floor – Ceiling Assemblies

Acoustical Ceiling

Design No.	Construction Detail	Decking Type	Ratings (Hrs.)	Ceiling	Slab Thickness	Joist Parameters
BXUV.G203	Hung Acoustical Ceiling with Ductwork and Recessed Light Fixtures	1 5/16" UFX	1 1/2 & 2 hrs.	Acoustical	2 3/16" above Decking	Minimum 10" Deep 48" On Center
BXUV.G211	Hung Acoustical Ceiling with Ductwork and Recessed Light Fixtures	1 5/16" UFX	1 1/2, 2 & 3 hrs.	Acoustical	2 3/16", 3" above Decking	Minimum 10" Deep 48" On Center
BXUV.G222	Hung Acoustical Ceiling with Ductwork and Recessed Light Fixtures	1 5/16" UFX	2 hrs.	Acoustical	2 3/16" above Decking	Minimum 10" Deep 48" On Center
BXUV.G243	Hung Acoustical Ceiling with Ductwork and Recessed Light Fixtures	1 5/16" UFX	1 1/2, 2 & 3 hrs.	Acoustical	2 3/16", 3 3/16" above Decking	Minimum 10" Deep 48" On Center
BXUV.G229	Hung Acoustical Ceiling with Ductwork and Recessed Light Fixtures	1 5/16" UFX	1 1/2 & 2 hrs.	Acoustical	2 5/16" above Decking	Minimum 10" Deep 48" On Center

Gypsum Ceiling

Design No.	Construction Detail	Decking Type	Ratings (Hrs.)	Ceiling	Slab Thickness	Joist Depth
BXUV.G525	Attached and Suspended Gypsum Board Ceiling	1 5/16" UFX	2 & 3 hrs.	1 layer 5/8" Type C Gypsum Board	2 3/16" above Decking	Minimum 8" Deep



BXUV.G530	Attached and Suspended Gypsum Board Ceiling	1 5/16" UFX	1 1/2 & 2 hrs.	1 layer 1/2" Type C Gypsum Board	2 3/16" above Decking	Minimum 8" Deep
BXUV.G531 See Summary Above	Attached and Suspended Gypsum Board Ceiling	1 5/16" UFX	1, 1 1/2 & 2 hrs.	1 layer 1/2" Type C Gypsum Board	2 3/16" above Decking	Minimum 6" 52" OC up 72" per restrictions

Spray Applied Fire Resistive Materials

Design No.	Construction Detail	Slab Type	Ratings (Hrs.)	Spray on Deck	Spray on Joist	Minimum Component Sizes
BXUV.G701	Monokote or Equal	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G703	Monokote or Equal	1 5/16" UFX See Rating	1, 1 1/2, 2 & 3 hrs.	See Rating	See Rating	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G705	Varied - See Rating	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G707	Carboline Co. Etc.	1 5/16" UFX See Rating	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G708	Carboline Co. Etc.	1 5/16" UFX See Rating	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G714	Promate & Flamtechic	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G717	Type 300 by Various Manufacturers	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	Varies	Varies	No minimum Required
BXUV.G801	Isolatek International	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G805	Isolatek International	1 5/16" UFX + 2 3/8" to 3 7/8" Concrete	1, 1 1/2, 2 & 3 hrs.	See Rating	See Rating	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs



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BXUV.G806	Promate Type FC and DF	1 5/16" UFX + 2 3/4" Concrete	1, 1 1/2, 2 & 3 hrs.	1/2"	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.G808	Promate Type FC and DF	1 5/16" UFX See Rating	1, 1 1/2, 2 & 3 hrs.	Varies	1 1/2"	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs
BXUV.D780	Multiple Manufacturers	1 5/16" UFX See Rating	1, 1 1/2, 2 & 3 hrs.	See Rating	See Rating	0.708 sq. in for Top and Bottom Chords - 0.442 sq in. for Webs