



XHBN.GuideInfo Joint Systems

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Joint Systems

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USE AND INSTALLATION

This category covers joint systems, which are specific constructions consisting of adjacent wall and/or floor assemblies and the materials designed to prevent the spread of fire through a linear opening between the wall and/or floor assemblies. The specifications for materials in a joint system and the assembly of the materials are details that directly relate to the established ratings. Information concerning these details is described in the individual systems. The hourly ratings apply only to the complete systems. Individual components are designated for use in a specific system to achieve specified ratings. The individual components are not assigned ratings and are not intended to be interchanged between systems. Additionally, the substitution or elimination of components required in a system should not be made unless specifically permitted in the individual system or in these general guidelines.

The certification of joint systems contemplate installation in heated and air-conditioned environments unless stated otherwise in the description of the system.

Materials used in the joint systems are intended to be installed in accordance with the manufacturer's instructions provided with the material. The structural integrity of the floor or wall assembly has not been investigated as a result of the openings.

When the joint system specifies the insulation material is to be compressed prior to installation into the joint, the uncompressed thickness necessary can be calculated as follows:

$$T_{uncomp} = (W_{nom} \times 100) / (100 - I_{comp})$$

Where:

T_{uncomp} = Uncompressed Thickness Necessary, in.

I_{comp} = Insulation Compression Percentage Specified in System, percent

W_{nom} = Nominal (Installed) Joint Width, in.

Unless otherwise indicated in the systems, the ratings for joint systems installed in walls apply when either face of the wall is exposed to fire. The ratings for joint systems installed in a floor apply when the underside or ceiling surface is exposed to fire.

The hourly fire-resistance ratings of the floor and wall assemblies in which, or between which, the joint system is intended to be installed are covered under Fire-resistance Ratings - ANSI/UL 263 (BXUV). Where the individual joint system references back to fire-resistance designs, all construction details of the individual design are intended to be followed. In addition, all details relative to the construction of the wall or floor assembly contained in the individual joint system are intended to be followed. Where the construction details shown in the fire-resistance design and the joint system differ, such as in stud size and spacing, fastener spacing, etc., the most restrictive construction details prevail.

Floor-to-floor and floor-to-wall joint systems that specify installation in concrete floors may include installation in floors consisting of fluted or corrugated steel deck topped with structural concrete, provided that (1) the concrete topping thickness measured above the top plane of the steel deck is equal to or greater than the minimum concrete thickness specified in the joint system, and (2) the joint system does not require any portion of the forming material or fill material to extend below the bottom plane of the floor.

The installation contractor and Authority Having Jurisdiction should ensure the specified properties of the packing and/or forming material are satisfied as noted in the individual certifications. Such properties may include material type (mineral wool, backer rod, fiberglass, etc.), physical properties (size, density, etc.) and installation (depth, orientation, compression, etc.). Attention should also be given to ensure the installed material matches the manufacturer (where applicable) in the individual certifications. The material and attributes are critical to the performance of the system and the ability of such system to satisfy the conditions of acceptance in ANSI/UL 1479, "Fire Tests of Penetration Firestops," and the local building code. The fire-resistance rating of the system is dependent upon the use and installation of the materials specified within the respective system.

The joint-sealant-material thickness published in the fire-resistance designs is measured wet (unless otherwise specified in the individual systems) and may be susceptible to a percentage of shrinkage during the curing process. Joint systems are investigated after the sealant materials are fully cured. Refer to the individual certifications for the investigated percentage of shrinkage.

Authorities Having Jurisdiction should be consulted as to the particular requirements covering the installation and use of these certified systems.

NUMBERING SYSTEM

The systems are identified by an alphanumeric identification system. The alpha components identify the type of joint system and whether the joint system has movement capabilities. The numeric components identify the nominal joint width. In the case of head-of-wall joint systems, the width of the joint does not include the voids created under the crests of metal deck floor or roof systems.

The first two alpha characters identify the type of joint system as follows:

Alpha Characters	Description of Joint System
FF	Floor-to-floor

WW	Wall-to-wall
FW	Floor-to-wall
HW	Head-of-wall
BW	Bottom-of-wall
CG	Wall-to-wall joints intended for use as corner guards

The third alpha character is either S or D. The S (static) signifies joint systems that do not have movement capabilities. This D (dynamic) signifies joint systems that do have movement capabilities.

The numeric component uses sequential numbers to identify the nominal width of the joint systems. The significance of the number used is:

Number Range	Nominal Joint Width
0000 - 0999	Less than or equal to 2 in.
1000 - 1999	Greater than 2 in. and less than or equal to 6 in.
2000 - 2999	Greater than 6 in. and less than or equal to 12 in.
3000 - 3999	Greater than 12 in. and less than or equal to 24 in.
4000 - 4999	Greater than 24 in.

ADDITIONAL INFORMATION

For additional information, see Fire-resistance Ratings ([BXRH](#)).

REQUIREMENTS

The basic standard used to investigate products in this category is [ANSI/UL 2079](#), "Tests for Fire Resistance of Building Joint Systems."

[ANSI/UL 2079](#) defines four types of joint systems: floor-to-floor, wall-to-wall, floor-to-wall and head-of-wall. In addition, bottom-of-wall joint systems have been investigated using the general methods and conditions of acceptance specified for the four defined types of joint systems.

All joint systems covered under this category have been investigated with a minimum positive furnace-pressure differential of 0.01 in. of water maintained at a distance of 12 in. below horizontal test assemblies and at the mid-height of vertical test assemblies.

[ANSI/UL 2079](#) requires joint systems with movement capabilities to be cycled through the intended range of movement prior to the fire test. The movement cycling is intended to demonstrate the compatibility between the individual components of the joint system and the fire-resistive assembly. Joint systems are required to be cycled through the intended movement range 500 or 100 complete movement cycles at a minimum rate of 1, 10 or 30 cycles per minute prior to the fire test.

Joint systems with movement capabilities are noted through the appearance of a Class I, II and/or III designation included as part of the heading information. The definitions of the movement class designations are as follows:

Movement Class	Min Number of Cycles	Min Cycling Rate (cycles per min)
Class I	500	1
Class II	500	10
Class III	100	30

Each joint system with movement capabilities specifies a nominal joint width and the movement capabilities, expressed in either a numerical value or as a percent of the nominal joint width. When the compression or extension movement capabilities are expressed as a percent, the minimum and maximum joint widths that the joint system can accommodate are calculated as follows:

$$W_{min} = W_{nom}[1 - (\% \text{ Comp} / 100)]$$

Where:

W_{min} = Minimum Joint Width, in.

W_{nom} = Nominal Joint Width, in.

% Comp = Movement Capability in Compression Direction, percent

and

$$W_{max} = W_{nom}[1 + (\% \text{ Ext} / 100)]$$

Where:

W_{max} = Maximum Joint Width, in.

W_{nom} = Nominal Joint Width, in.

% Ext = Movement Capability in Extension Direction, percent

When the shear movement capabilities are expressed as a percent, the shear movement capabilities in inches that the joint system can accommodate are calculated as follows:

$$\text{Shear} = W_{\text{nom}}(\% \text{ Shear} / 100)]$$

Where:

Shear = Shear Movement, in.

W_{nom} = Nominal Joint Width, in.

% Shear = Shear Movement, percent

All joint systems have been tested at their maximum joint width and maximum shear capabilities.

Joint systems intended to be load bearing are investigated with respect to the ability to carry the load during the fire test. The load-carrying capacity of such joints is noted in the individual joint system.

The conditions of acceptance in [ANSI/UL 2079](#) provide criteria for an assembly rating with an optional L rating and/or W rating. The L-rating criteria determines the amount of air leakage, in cubic feet per minute per linear foot of joint opening (CFM/LIN Ft), through the joint system at ambient and/or 400°F air temperature at an air-pressure differential of 0.30 in. W.C. The L ratings are intended to assist Authorities Having Jurisdiction, and others, in determining the suitability of joint systems for the protection of openings in floors and smoke barriers for the purpose of restricting the movement of smoke in accordance with ANSI/NFPA 101, "Life Safety Code."

The W rating, identified as Class 1, determines the capability of the joint system to maintain watertightness at ambient air conditions under 3 ft of water-pressure head (1.3 psi) for a period of 72 hours. The W rating may be applicable for building structures whose floors are subjected to incidental standing water and/or for buildings that house critical equipment as described in ANSI/NFPA 75, "Fire Protection of Information Technology Equipment," and ANSI/NFPA 76, "Fire Protection of Telecommunications Facilities."

The surface-flammability and smoke-development characteristics of certified materials used in joint systems are measured by the test method in [ANSI/UL 723](#) (ASTM E84), "Test for Surface Burning Characteristics of Building Materials." The flame-spread index of these materials is less than 200 and the smoke-developed index is less than 450. Surface-burning characteristics certifications are covered under Surface-burning Characteristics ([BIKT](#)).

Where indicated in the individual certifications, joint sealant materials have also been investigated to ASTM C1241, "Standard Test Method for Volume Shrinkage of Latex Sealants During Cure."

UL MARK

Those materials identified by an (*) in the system description text are eligible to be produced under the Follow-Up Service Program of UL. The Certification Mark of UL on the product is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service.

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