

UL Alphanumeric Schedule

Type of Penetrant Floor Penetration Systems	Concrete Floors - Minimum thickness Less than or equal to 5"					Concrete Floors - Minimum thickness More than 5"					Framed Floors									
	Caulk	Device	F	T	L	W	Caulk	Device	F	T	L	W	Caulk	Device	F	T	L	W		
No Penetrating Item Blank Opening 0000-0999	CAJ-0081		4	4	X		CBJ-0022		2	2			FC-0002		2	2				
	CAJ-0097		2		X															
	CAJ-0105		2	2																
	CAJ-0138		2	1					FA-0005	2	1									
		FA-0005		2	1				FA-0006	3										
Metallic Pipe, Conduit or Tubing 1000-1999	CAJ-1226		3		X		CBJ-1047 CBJ-1055 CBJ-1059		2	2			FC-1009 FC-1059 FC-1168 FC-1142 FC-1147		2					
	CAJ-1597		3	2	X	X			2	2					2					
	FA-1105		2	2	X	X			3	3					2	2	1			
		FA-1106		2	2	X		X		2	2					1	1			
		FA-1128		2		X		X		3		X		X		1	1			
Non-Metallic Pipe, Conduit or Tubing 2000-2999	CAJ-2109		3	3	X	X	CBJ-2011 CBJ-2014 CBJ-2017 FB-2029 FB-2048 FB-2050		2	1			FC-2030 FC-2160 FC-2232 FC-2263 FC-2389 FC-2432		2	2				
	CAJ-2567		2	2	X	X			2	2					2	2				
		FA-2053		2		X		X		4	4					1	1			
		FA-2054		3	3	X		X		3	2					1	1			
		FA-2213		2		X		X		3		X		X		1	1			
										3		X		X		2	2	1		
Electrical Cables 3000-3999	CAJ-3208		3				CBJ-3024		3				FC-3012 FC-3044 FC-3071 FC-3074 FC-3094 FC-3110		2	1				
	CAJ-3216		2						FA-3007	3						1	1			
		CAJ-3285		3	3	X				CAJ-3285	3	3		X			1	1		
		CAJ-3298		2	2	X				CAJ-3298	2	2		X			1	1		
		CAJ-3320		2		X				CAJ-3320	2			X			1	1		
		FA-3033		3						FA-3033	3						2	2	1	
Cable Trays with Electrical Cables 4000-4999	CAJ-4093		3		X		CBJ-4025 CBJ-4026		2	1										
	CAJ-4094		2							2	1									
	CAJ-4071		2																	
Insulated Pipes 5000-5999	CAJ-5061		3				CBJ-5013 CBJ-5015 CBJ-5018 FB-5004 FB-5005		2	1			FC-5004 FC-5036 FC-5037 FC-5065 FC-5066		2	1	X			
	CAJ-5091		2	1	X					2	1					1	1			
	CAJ-5320		2	2						3						2	1			
		FA-5018		3	3					3	2					1	1			
		FA-5046		3						3	2					1	1			
Miscellaneous Electrical Penetrants - Elec Buss 6000-6999	CAJ-6002		2																	
	CAJ-6017		3																	
	CAJ-6042		2																	
Miscellaneous Mechanical Penetrants - "Metal Duct and Insulated Metal Duct" 7000-7999	CAJ-7051		3	1			CBJ-7005		3				FC-7013 FC-7025 FC-7036 FC-7043		1					
	CAJ-7084		2													1				
	CAJ-7145		2	1												2	2			
	CAJ-7154		2													1				
Groupings of Penetrations "Multiple Penetrations" 8000-8999	CAJ-8143		2				CBJ-8024 CBJ-1049 FB-5003		2				FC-8009 FC-8014 FC-8026 FC-8032		1	1				
	CAJ-8148		2							2						1				
	CAJ-8210		3							2	1					1	1			
	FA-8012		2													1	1			
		FA-8016		3																

LEGEND

F - Rating
T - Rating
L - Rating
W - Rating

**UL System
Alignment**

Left - Caulk
Right - Device
Middle - Shaft
Wall

**Bold -
Membrane**

UL Alphanumeric Schedule

Type of Penetrant Wall Penetration Systems	Concrete or Masonry Walls - Minimum Thickness less than or equal to 8"					Concrete or Masonry Walls - Minimum Thickness more than 8"					Gypsum Framed Walls										
	Caulk	Device	F	T	L	W	Caulk	Device	F	T	L	W	Caulk	Shaft	Device	F	T	L	W		
No Penetrating Item Blank Opening	CAJ-0081		4	4	X		CBJ-0022		2	2			WL-0014		2	1	X				
	CAJ-0097		2		X																
	CAJ-0105		2	2																	
	CAJ-0138		2	1																	
Metallic Pipe, Conduit or Tubing	CAJ-1226		3		X		CBJ-1047 CBJ-1055 CBJ-1059		2	2			WL-1054 WL-1164 / WL-1410 WL-1206 WL-1380 WL-1506		2		X				
	CAJ-1597		3	2	X	X			2	2					2						
	WJ-1168		2						3	3					2						
	WJ-1248		2	2	1										2						
Non-Metallic Pipe, Conduit or Tubing	CAJ-2109		3	3	X	X	CBJ-2011 CBJ-2014 CBJ-2017		2	1			WL-2078 WL-2128 WL-2447 WL-2217 WL-2292 WL-2605		2	2	X				
	CAJ-2567		2	2	X	X			2	2					2						
	WJ-2071		2						4	4					4	4	X				
	WJ-2072		2	2	X										2						
	WJ-2120		2	1											2	1					
	WJ-2267		2	2	1										2	2	1				
Electrical Cables	CAJ-3208		3				CBJ-3024		3				WL-3065 WL-3272 / WL-3310 WL-3334 WL-3395 WL-3396 WL-3161 WL-3278 WL-3414 / WL-3415		2		X				
	CAJ-3216		2												2						
	WJ-3060		2		X										4	2	X				
	WJ-3215		2	2	1										2		X				
	WJ-3200		2		X										2	2	X				
	WJ-3167		4	2	X										2						
	CAJ-3285		3	3	X										2						
	CAJ-3320		3												2	2	1				
																2					
Electrical Box													CLIV		2						
Cable Trays with Electrical Cables	CAJ-4093		3		X		CBJ-4025 CBJ-4026		2	1			WL-4011 WL-4049 WL-4060		2		X				
	CAJ-4094		2						2	1					2						
	CAJ-4071		2												2						
	WJ-4050		2																		
Insulated Pipes	CAJ-5061		3				CBJ-5013 CBJ-5015 CBJ-5018		2	1			WL-5029 WL-5047 WL-5240		3	1	X				
	CAJ-5091		2	1	X				2	1					2						
	CAJ-5320		2	2					3						2						
Miscellaneous Electrical Penetrants - Elec Buss	CAJ-6002		2										WL-6019		2						
	CAJ-6017		3																		
	CAJ-6042		2																		
Miscellaneous Mechanical Penetrants - "Metal Duct and Insulated Metal Duct"	CAJ-7051		3	1			CBJ-7005		3				WL-7042 WL-7153 WL-7155 WL-7156 WL-7068		2						
	CAJ-7084		2												2						
	CAJ-7145		2	1											2		X				
	CAJ-7154		2												2						
	WJ-7109		2		X										2						
Groupings of Penetrations "Multiple Penetrations"	CAJ-8143		2				CBJ-8024 CBJ-1049		2				WL-8013 WL-8079		2		X				
	CAJ-8148		2						2						2	2					
	CAJ-8210		3																		

LEGEND

- F - Rating
- T - Rating
- L - Rating
- W - Rating

UL System Alignment

- Left - Caulk
- Right - Device
- Middle - Shaft
- Wall

Bold - Membrane

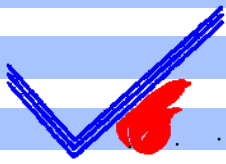
UL Alphanumeric Schedule

Type of joint Fire Rated Joint Systems	Joint Width Less Than or Equal to 2"						Joint Width Greater Than 2", Less Than or Equal to 6"							
	0000-0999						1000-1999							
	Caulk	Spray	Device	F	L	M	Caulk	Spray	F	L	M			
Continuity Joint		CJ-D-0004		2		50	N/A**							
		CJ-D-0008		1		100								
		CJ-D-0009		1		100								
		CJ-D-0010		1		100								
Concrete Floor-to-Floor	FF-D-1012			2	1	7	FF-D-1012		2	1	7			
		FF-D-1013		2		14		FF-D-1013		2		14		
	FF-D-1011			3		14	FF-D-1011		3		14			
		FF-D-1026		3		25		FF-D-1026		3		25		
Edge of Concrete Floor Slab-to-Wall	FF-D-1047			4		12								
	FW-D-1011			3		14	FW-D-1011		3		14			
	FW-D-1012			2	1	7	FW-D-1012		2	1	7			
		FW-D-1013		2		14		FW-D-1013		2		14		
Concrete or Block Wall to Flat Concrete Slab Floor (Top of Wall)		FW-D-1021		3		25		FW-D-1021		3		25		
	FW-D-1047						FW-D-1125		4	1	12			
		HW-D-0097		2		14	HW-D-1008		3		14			
Concrete or Block Wall to Concrete Over Fluted Metal Deck (Top of Wall)	HW-D-0268			3	1	12	HW-D-1009		2	1	7			
	HW-D-1008			3		12	HW-D-1103		4	1	12			
	HW-D-0268			3	1	12								
Gypsum Wall to Flat Concrete Slab Floor (Top of Wall)	HW-D-0080			2		33		HW-D-1037		2		14		
	HW-D-0081			2		33								
		HW-D-0098		2	1	12								
		HW-D-0294		4	1	12								
Gypsum Shaft Wall to Flat Concrete Slab Floor (Top of Wall)	HW-D-0082			2		33		HW-D-1068		2		40		
	HW-D-0083			2	1	17								
		HW-D-0106		2	1	20								
		HW-D-0757		2	1	66								
Gypsum Shaft Wall to Concrete Over Fluted Metal Deck (Top of Wall)		HW-D-0758		2	1	66								
	HW-D-0342			2	1	8	N/A**							
		HW-D-0042*		2	1	50	HW-D-1011		3		100			
		HW-D-0049*		2	1	50	HW-D-1012		3		100			
		HW-D-0087*		2	1	20	HW-D-1020		2		100			
		HW-D-0089*		2	1	20								
		HW-D-0045		2		33								
		HW-D-0046*		2		33								
		HW-D-0076*		2		17								
		HW-D-0077*		2	1	17								
Gypsum Shaft Wall to Flat Concrete Over Fluted Deck (Top of Wall)		HW-D-0292		4	1	12								
	HW-D-0119			3		100	N/A**							
	HW-D-0120			3		100								
		HW-D-0569		2	1	50								
Concrete Wall to Wall		HW-D-0570		2	1	50								
		WW-D-0017		2	1	12	WW-D-1011		3		14			
	WW-D-0032			3	1	12	WW-D-1012		2	1	7			
	WW-D-0082			2		17								
	WW-D-1011			3		14								
Gypsum Wall-to-Concrete Wall	WW-D-1047			4		12								
	WW-D-0040			2	1	7	N/A**							
		WW-S-0074		2	1									
Bottom of Wall		WW-S-0075		2	1									
	BW-S-0001			2	1		N/A**							
	BW-S-0002			2	1									
	BW-S-0023			2										
		BW-S-0039		2	1									
	BW-S-0040		2	1										

LEGEND
 F - Rating
 L - Rating
 M - Movement

UL System Alignment
 Left - Caulk
 Middle - Spray
 Right - Device
Bold - Shaft Wall

* Top-of-Wall Joint May Include Spray-On Monokote Fireproofing
 ** Contact Hilti For Current UL System or Engineering Judgment
Note: Per UL System, Verify Class II, or Class III Movement Classification



REPAIR OF FIRE-RATED GYPSUM PANEL PRODUCT SYSTEMS (GA-225-15)

Fire-rated gypsum panel product systems may be damaged during the life cycle of buildings. To maintain the required fire-rated separation between occupancies or areas, damaged systems must be repaired so that they are restored to their original fire-resistive condition. The repair must follow procedures dictated by the severity of the damage.

Small holes (such as those caused by a door-knob) can be repaired by patching. To maintain the integrity of the surface membrane, a gypsum panel product patch must be mechanically secured in the diaphragm; attachment with joint compound material only is not acceptable. The patching material should be cut from type X or proprietary type X gypsum panel product of a thickness equal to the original materials so that the patching material is in the same geometric shape as, but slightly larger than, the damaged area. The damaged area is then further enlarged to match exactly the size of the patching material. Use caution when cutting or fastening into stud cavities to avoid electrical shock or water leaks. Thermal insulation, if present, must be restored. Metal runner track is secured to the inside edges of the damaged area. The patching material is screw attached to the exposed face of the runner track with fasteners a maximum of 8 in. (200 mm) apart. The patch should be treated with tape and joint compound to restore appearance, fire resistance qualities, and acoustical performance.

NOTE: Overlapping of joint tape can result in finishing problems.

Several alternative proprietary clip products are available which provide mechanical support for patching. Manufacturers of these products should be contacted for information.

If mechanically or environmentally caused damage covers more than 100 in² (700 cm²) in 100 ft² (10 m²) of wall or ceiling area, all materials in the damaged area back to the original framing must be removed to make the repair. Framing in the area to be repaired should be inspected and replaced if necessary without increasing original framing spacing. Replacement material should be cut to fill the opening and mechanically attached to the framing. Ends and edges of the board that are not backed by framing materials should be supported with metal runner track. The repaired area should be finished with tape and joint treatment compound as necessary.

Multiple-layer systems typically require that joints be staggered between layers. Proper repair of multiple-layer systems requires that face layers of board be removed beyond the base layer joint so as to retain the staggered joint feature.

To improve the appearance of large areas that are in structurally sound, but aesthetically unacceptable condition, a new layer of regular or type X gypsum board may be attached to the existing surface with adhesive or mechanical fasteners without adversely affecting the fire resistance rating or acoustical performance.



Figure 1. Damaged Gypsum Board



Figure 2. Square-Off Damaged Area



Figure 3. Frame Cutout



Figure 4. Apply Gypsum Board Patch



Figure 5. Tape and Finish Patched Area



Figure 6. Redecorate Repaired Area

This document may be revised or withdrawn from circulation at any time. The status of the document should be verified by the user prior to following any recommendations contained herein. To verify that you have the most current edition of the document, access the Gypsum Association website at: www.gypsum.org.

UL System Nomenclature overview

Through Penetrations

F = Floors

W = Walls

C = Floors or walls (Combined)

- A. Concrete floors 5 inches thick or less**
- B. Concrete floors greater than 5 inches thick**
- C. Framed doors – Floor/Ceiling assemblies**
- D. Steel deck construction**
- E. Floor-ceiling assemblies consisting of concrete with membrane protection**
- J. Concrete or masonry walls 8 inches thick or less**
- K. Concrete walls greater than 8 inches thick**
- L. Framed walls – gypsum wallboard assemblies**
- M. Bulkheads**

The four digit number describes the penetration item(s)

0000 - 0999	Blank openings
1000 - 1999	Metal pipe, conduit or tubing
2000 - 2999	Non-metallic pipe conduit or tubing
3000 - 3999	Cables
4000 - 4999	Cable trays
5000 - 5999	Insulated pipes 8" or less
6000 - 6999	Miscellaneous electrical (busway)
7000 - 7999	Miscellaneous mechanical
8000 - 8999	Mixed penetrating items

Understanding the System Nomenclature

Joint Systems

FF = Floor-to-Floor

WW = Wall-to-Wall

FW = Floor-to-Wall

HW = Head-to- Wall

CG = Wall-to-Wall Joints intended as corner guards

CW = Curtain wall (perimeter fire barrier system)

The third letter signifies the movement capabilities of the joint system

S = No movement (Static)

D = Allows movement (Dynamic)

The four digit number describes nominal joint width

0000 - 0999 Less than or equal to 2"

1000 - 1999 Greater than 2" and less than or equal to 6"

2000 - 2999 Greater than 6" and less than or equal to 12"

3000 - 3999 Greater than 12" and less than or equal to 24"

4000-4999 Greater than 24"