Seismic Technical Guide

Seismic Clip Perimeter Interface

ACM7 Seismic Clip



USG® offers numerous perimeter options designed to accommodate Donn® suspension systems and the ACM7 Seismic Clip with USG acoustical ceiling panels in seismic design categories A-F.

USG teamed with the Pacific Earthquake Engineering Research Center (PEER) University of California, Berkeley to conduct full-scale dynamic seismic shake-table testing to evaluate and qualify the seismic performance of these perimeter assemblies. This testing proved that the assemblies offered are approved for use and provide a code-compliant solution meeting International Building Code (IBC) requirements, including installations in all seismic design categories. Use this selector as a guide to ensure that a perimeter molding meets your design criteria. For fire-rated applications, check the UL design for approved molding shapes and sizes. Because codes continue to evolve, check with a local official prior to designing and installing a ceiling system.*

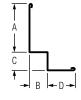
Wall Molding



	Shadowline edge at perimeter with Square edge panel	Square edge at perimeter with Shadowline panel
exposed grid wall molding 3 tacoustical panel 3	exposed grid wall molding acoustical panel	twall molding 1 tacoustical panel

	A	B
M7	7/8"	7/8"
M70L	7/8"	7/8"
M9	15/16"	9/16"
M20	1"	2"

Shadow Molding



Shadowline edge at perimeter with Shadowline edge panel	Shadowline edge at perimeter with Square edge panel	Shadowline edge at perimeter with Fineline edge panel		
exposed grid	exposed grid exposed grid tshadow molding 2 Lacoustical panel	exposed grid		

	A	D	U	ן
MS124	15/16"	1/4"	5/16"	15/16"
MS144	3/4"	3/8"	1/2"	3/4"
MS154	7/8″	13/16"	13/16"	7/8"
MS174	7/8"	3/8″	3/8"	9/16"
MS274	7/8"	3/4"	9/32"	1-1/4"

- 1. Shadowline tapered panel will result in mouse hole at molding.
- 2. Reveal depth will vary by product.
- 3. Detail requires field cut and reveal of perimeter panels.
- *See last page for Seismic Code Reference Standards.



Border Panels

Suspended ceilings are among the most widely used nonstructural components. Past earthquakes have demonstrated the susceptibility of suspended ceilings to failure during seismic events. To address this vulnerability, design codes have incorporated specific design and installation criteria for suspended ceilings.

The basic concerns for nonstructural system/component failure include:

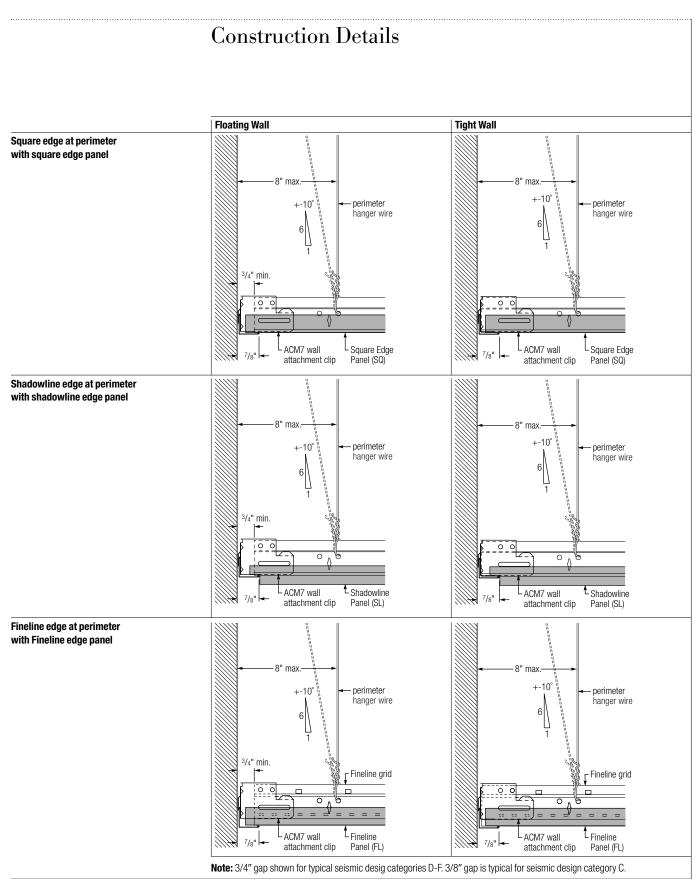
- Direct threat to life
- Indirect threat to life (the inability of occupants to safely exit a building)
- Loss of building function (loss of revenue and service)
- Repair costs

The suspension system must accommodate or resist movement to keep the system and the items it supports in place, particularly around the border of a suspended ceiling. One installation standard is to cut the suspension system tee ends 3/4" on two adjacent floating sides for seismic design categories D-F or 3/8" for seismic design category C. This installation principle is for the suspension system tee ends and not for the border ceiling panels. Ceiling panels are manufactured in nominal dimensions so they can fit into suspended ceiling modules. As a result they are dimensionally smaller than the grid modules supporting them and as such are not considered to increase the rigidity of the ceiling suspension system or restrict it when movement is necessary. Border ceiling panels shall not be cut back 3/4" on the two adjacent floating sides for seismic design categories D-F or 3/8" for seismic design category C as this practice will make the border condition more susceptible to failure due to the decreased support of the border panel edge. Border ceiling panels, including reveal edge panels, shall be field cut to fit the border suspension system module without creating a 3/4" gap on the two adjacent floating sides for seismic design categories D-F or 3/8" for seismic design category C.

Testing

A complete range of all USG ceiling panels covering all sizes, edge details, thicknesses, and panel types were subjected to earthquake acceleration levels for the purpose of seismic certification by shake-table testing. The studies were performed at the Pacific Earthquake Engineering Research Center (PEER) University of California, Berkeley using an earthquake simulator. Full-scale seismic testing was performed to evaluate and qualify the seismic performance of all USG ceiling panels.

Border Panels



Standard Wall Molding Selector

				M7	M9	M20
				7/8" T/8" T/8" Details on page 3.	15/16" 15/16" 9/16" Details on page 4.	Details on page 5.
rid Profiles					, p	Dotaile on page of
1-5/8″ Tee H OX®	eight	DX/DXL24 DX/DXL26	Т	Details on	Not Recommended	Details on
Centricitee™	15/8"	DXT/DXLT26 DXCE24 DXLA24 DXLA26	DXLA26 ZXLA24 ZXLA26	page 7	Detailed explanation on page 8	page 9
1-1/2″ Tee H X	eight	DX/DXL24		1		
JA	11/2"	(Canada) DX422 DX/DXL424 DX/DXL426 DX/DXL524		Details on	Not Recommended	Details on
CENTRICITEE	11/2"	DXT24 DXLT24 DXT422 DXT424 DXLT424 DXLT424	DXW26 DXWCE424 DXCE424 DXLA424 ZXLA424	page 7	Detailed explanation on page 8	page 9
1-3/4" Tee H Fineline®	eight	DXF/DXLF 1/8 DXFF DXF229 DXF429 DXF529	DXFF229 DXFF429	Details on page 7	Not Recommended Detailed explanation on page 8	Details on page 9
1-13/16″ Tee	e Height					
DENTITEE™	113/16"	DXI24 HRC DXI26 HRC DXI224 HRC	DXI424 HRC DXI524 HRC	Details on page 7	Not Recommended Detailed explanation on page 8	Details on page 9

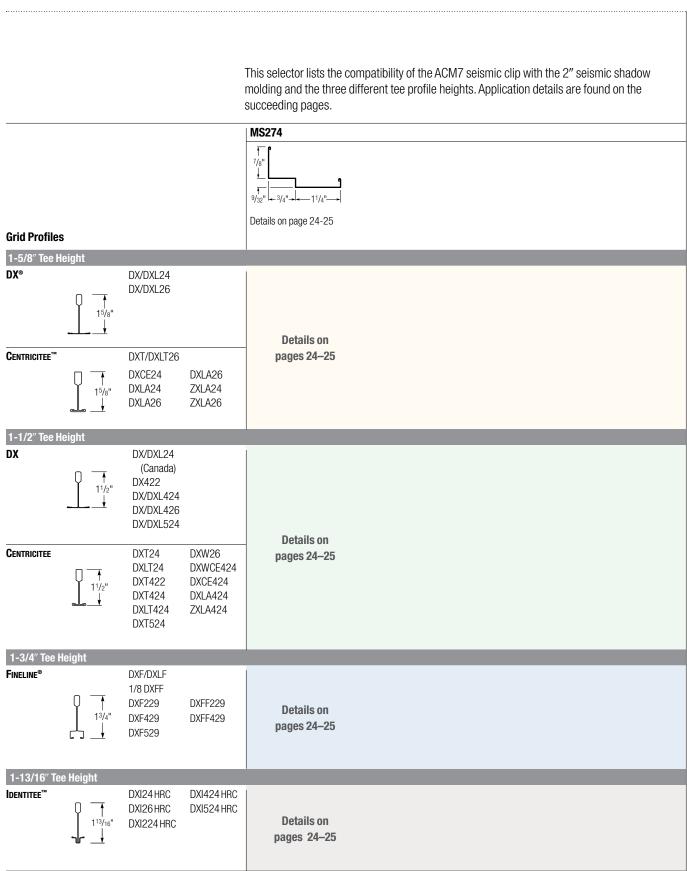
Shadow Molding Selector

This selector lists the compatibility of the ACM7 seismic clip with the various wall moldings and the three difference tee profile heights. Application details are found on the succeeding pages.

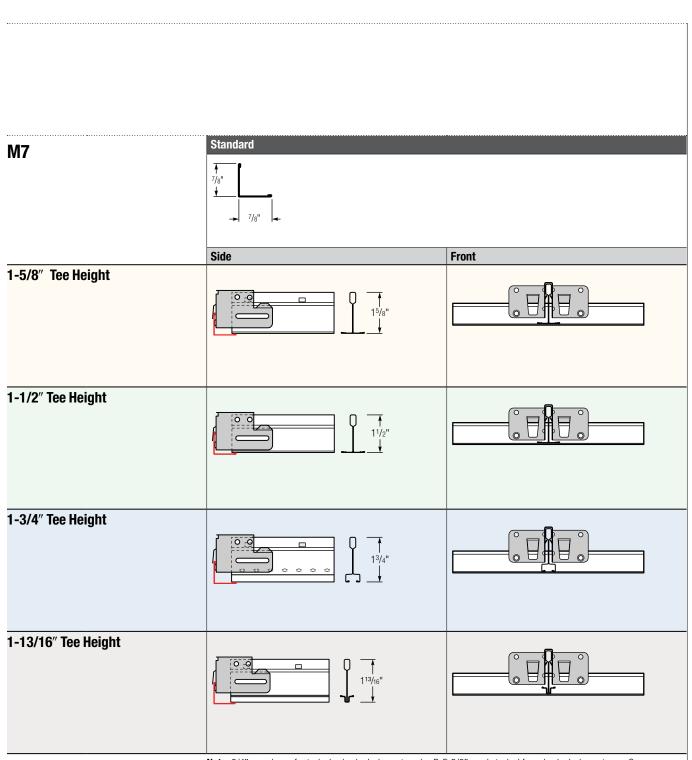
	MS124		MS144		MS154	MS174	
	1/4" -5/16"	5/16"	1/2"	3/8" 1/2"	3/4"	3/8"	3/8"
Shadow Molding Attachment	Standard	Rotated	Standard	Rotated	Standard	Standard	Rotated
	Details on pages 10-	-13	Details on page 14-1	7	Details on page 18-19	Details on page 20-2	3

		Details on pages 10-	13	Details on page 14-1	7	Details on page 18-19	Details on page 20-23	3
Grid Profiles	Tee Align	ment with Upp	er or Lower Le	g of Shadow N	lolding			
1-5/8" Tee Height								
DX/DXL24 DX/DXL26 15/8"	Lower	Details on page 10	Details on page 12	Details on page 14	Details on page 16	Details on page 18	Details on page 20	Details on page 22
CENTRICITEE DXT/DXLT26 DXCE24 ZXLA24 15/8" DXLA24 ZXLA26 DXLA26	Upper	Details on page 11	Details on page 13	Details on page 15	Details on page 17	Details on page 19	Details on page 21	Details on page 23
1-1/2" Tee Height								
DX/DXL24 (Canada) 11/2" DX422 DX/DXL424 DX/DXL426 DX/DXL524 CENTRICITEE DXT24 DXW26 DXLT24 DXWCE424	Lower	Details on page 10	Details on page 12	Details on page 14	Details on page 16	Details on page 18	Details on page 20	Details on page 22
DXT422 DXCE424 DXT424 DXLA424 DXLT424 ZXLA424 DXT524 1-3/4" Tee Height	Оррег	page 11	page 13	page 15	page 17	page 19	page 21	page 23
FINELINE DXF/DXLF						I		
1/8 DXFF DXF229 DXFF229 DXF429 DXFF429 DXF529	Lower	Details on page 10	Details on page 12	Details on page 14	Details on page 16	Details on page 18	Details on page 20	Details on page 22
1-13/16" Tee Height								
DXI24 HRC	Lower	Details on page 10	Details on page 12	Details on page 14	Details on page 16	Details on page 18	Details on page 20	Details on page 22

2" Shadow Molding Selector

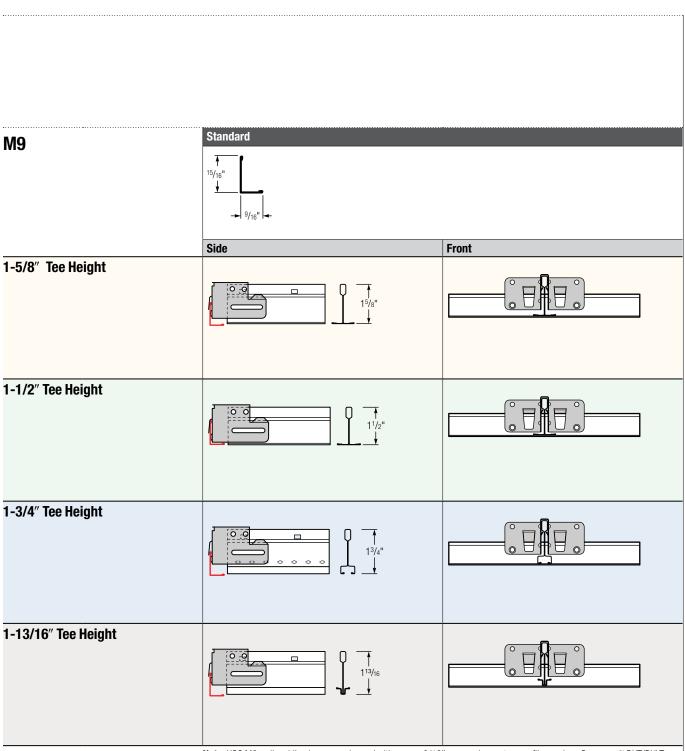


Standard Wall Molding Details



Note: 3/4'' gap shown for typical seismic design categories D-F. 3/8'' gap is typical for seismic design category C.

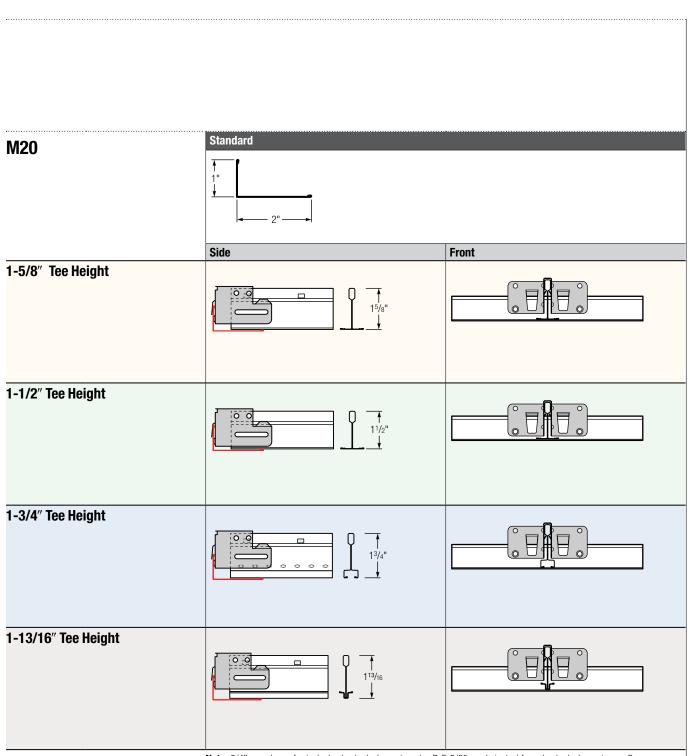
Standard Wall Molding Details



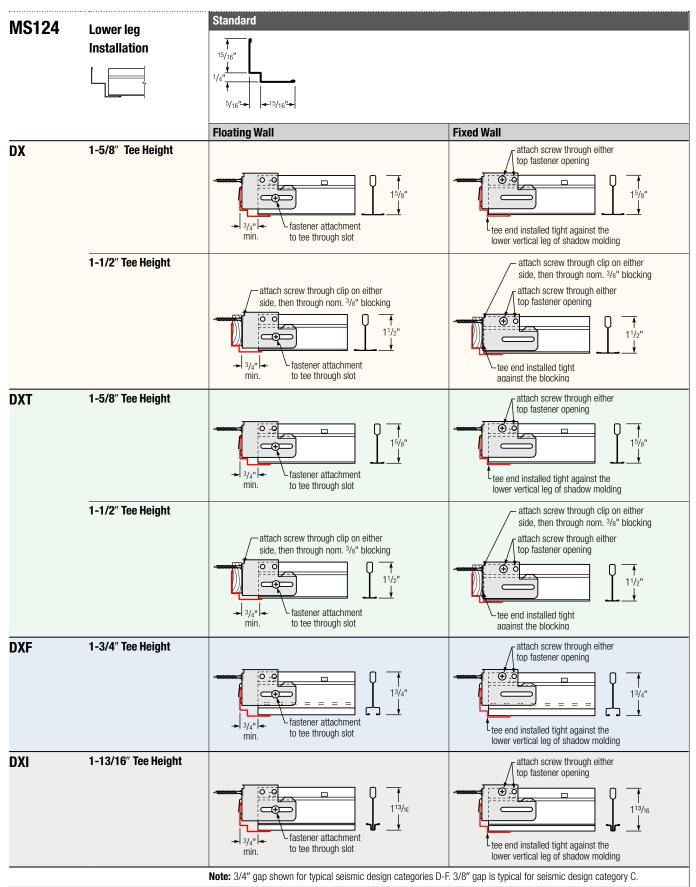
Note: USG M9 wall molding is commonly used with narrow 9/16" suspension system profiles such as Centricitee™ DXT/DXLT, Fineline® DXF/DXLF and Fineline® 1/8 DXFF. When the USG ACM7 seismic clip is used with M9 wall molding in Seismic Design Categories D, E and F, a slight gap between the tee end and the wall molding leg will exist—where a 3/4" end wall clearance of the tee ends is required on two adjacent sides—as the horizontal leg of M9 is 9/16". Therefore it is recommended that M7 wall molding be used in lieu of M9 wall molding in these applications.

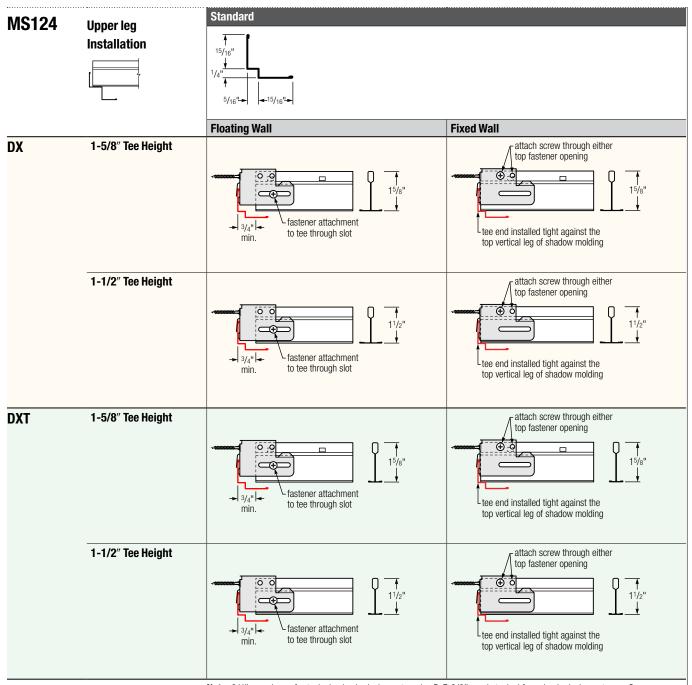
Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.

Standard Wall Molding Details

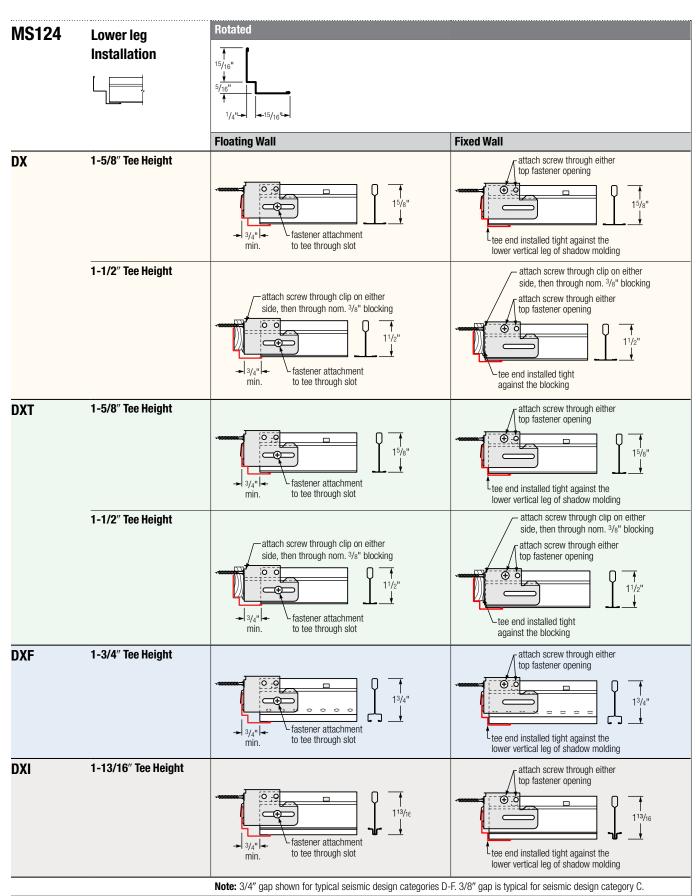


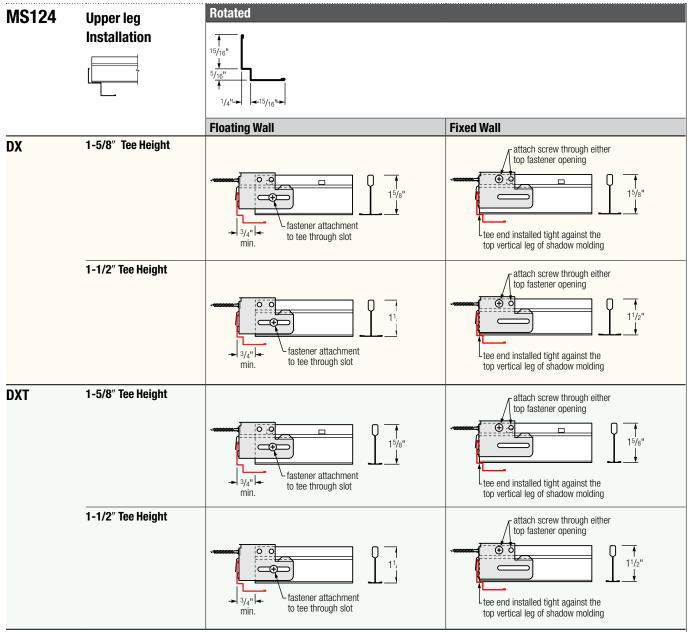
Note: 3/4'' gap shown for typical seismic design categories D-F. 3/8'' gap is typical for seismic design category C.



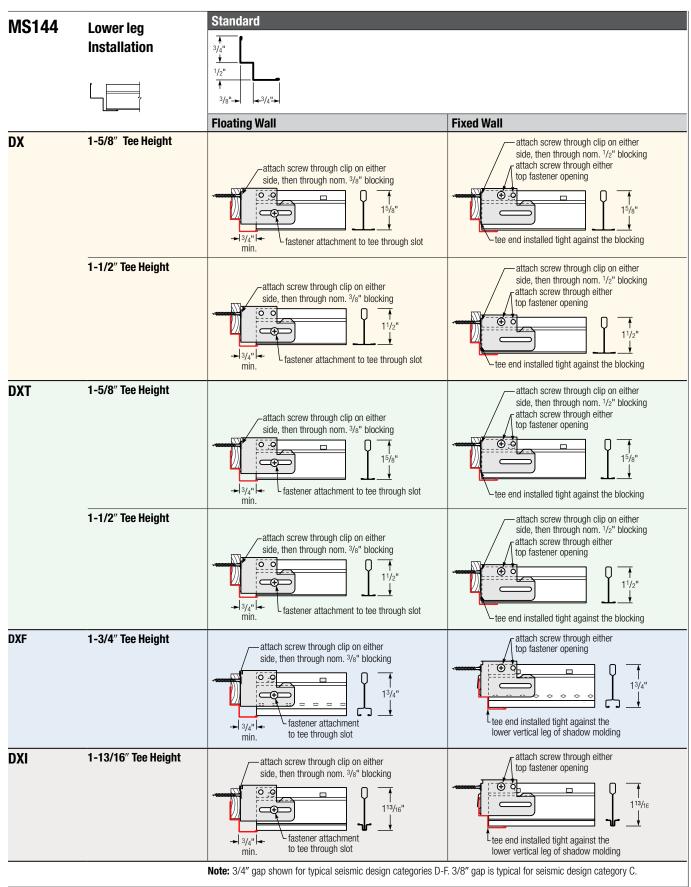


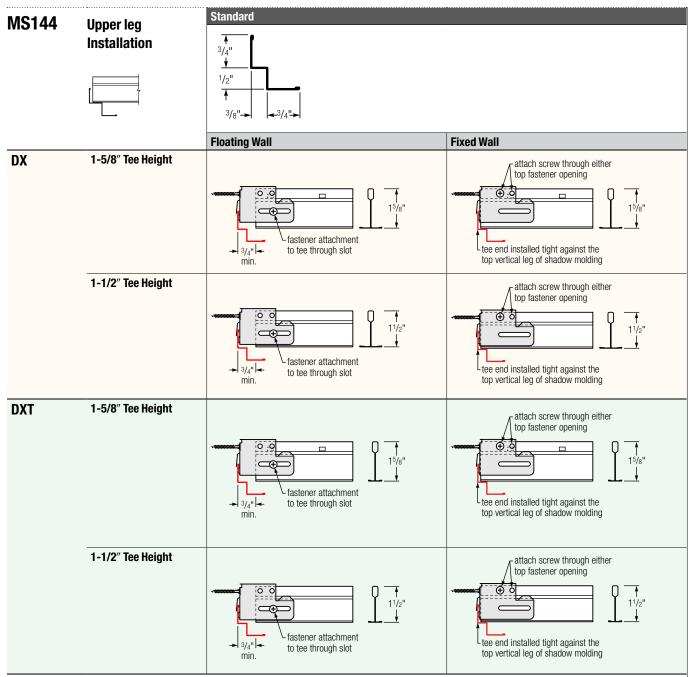
Note: 3/4'' gap shown for typical seismic design categories D-F. 3/8'' gap is typical for seismic design category C.



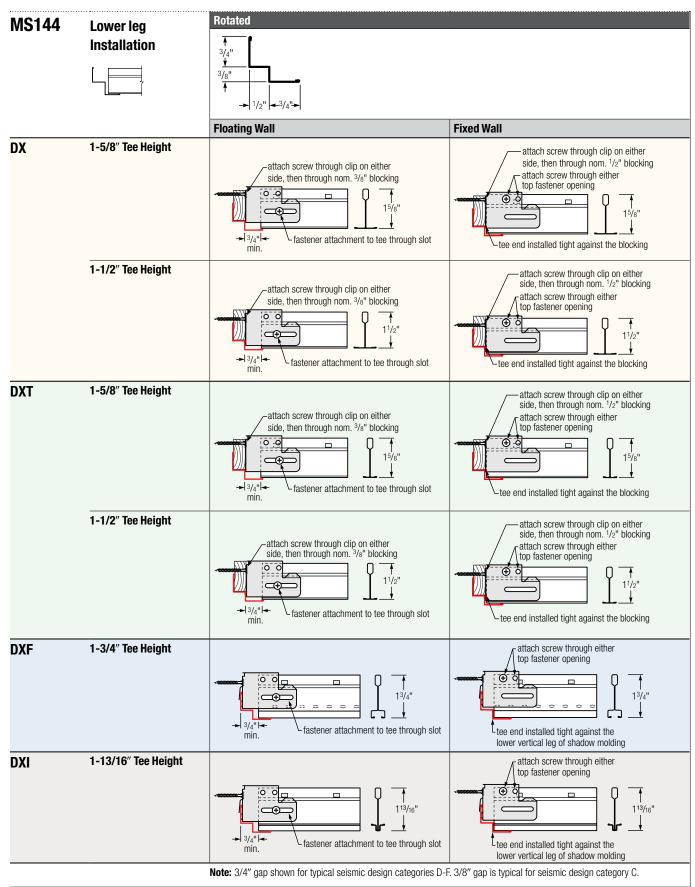


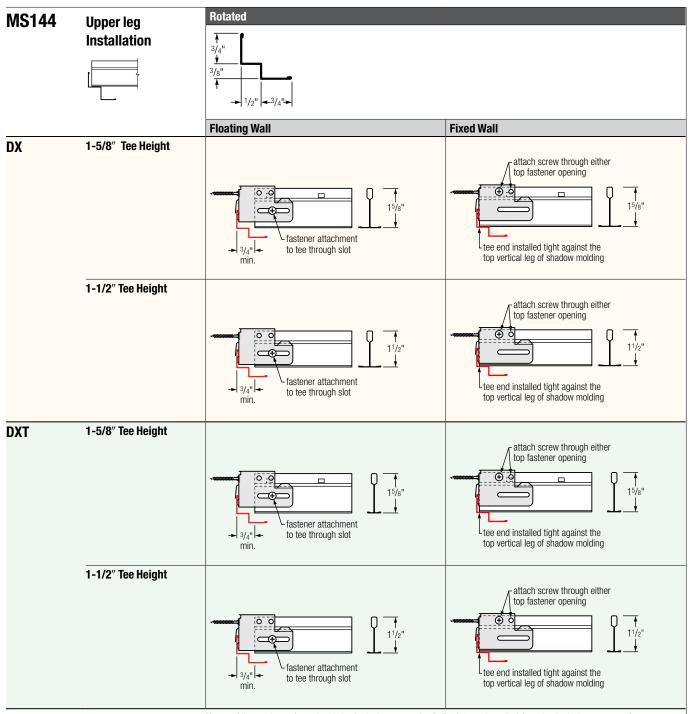
Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.



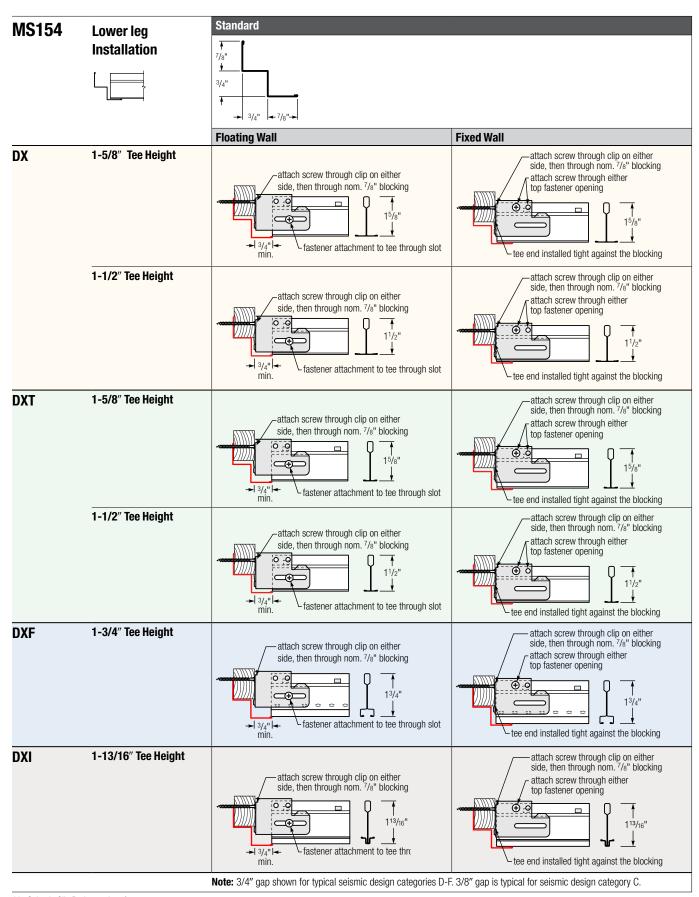


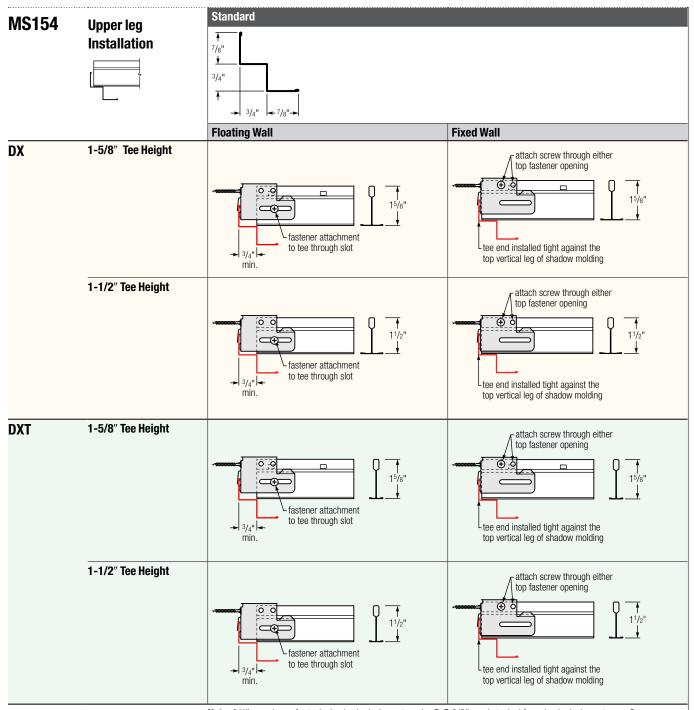
Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.



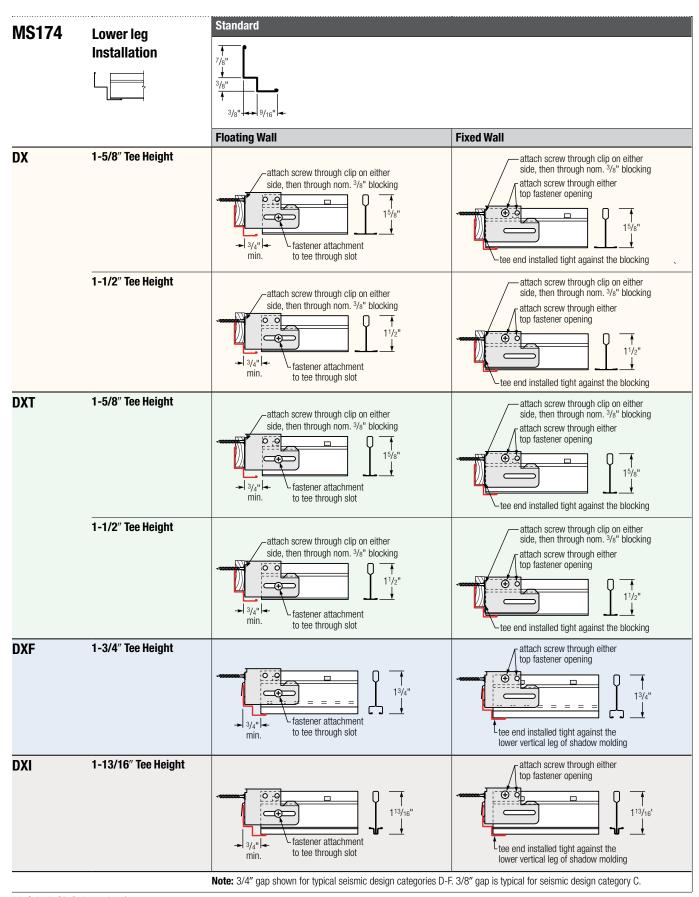


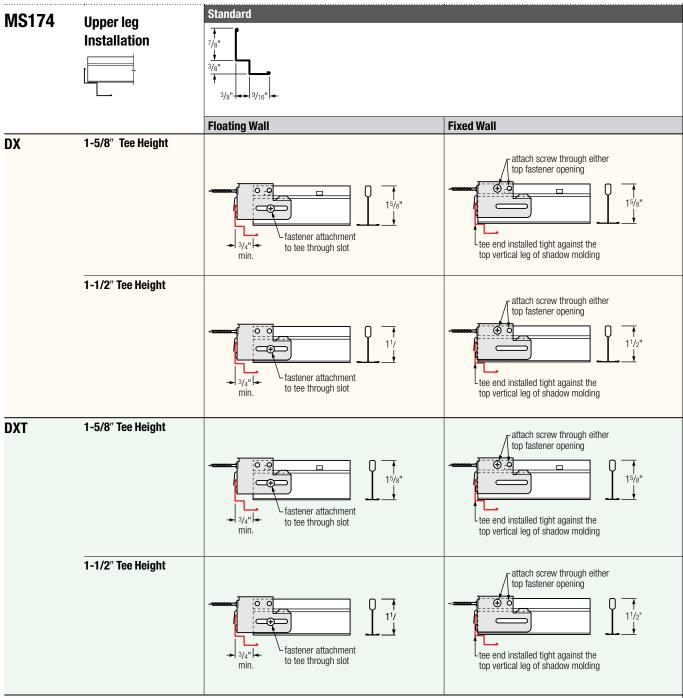
Note: 3/4'' gap shown for typical seismic design categories D-F. 3/8'' gap is typical for seismic design category C.



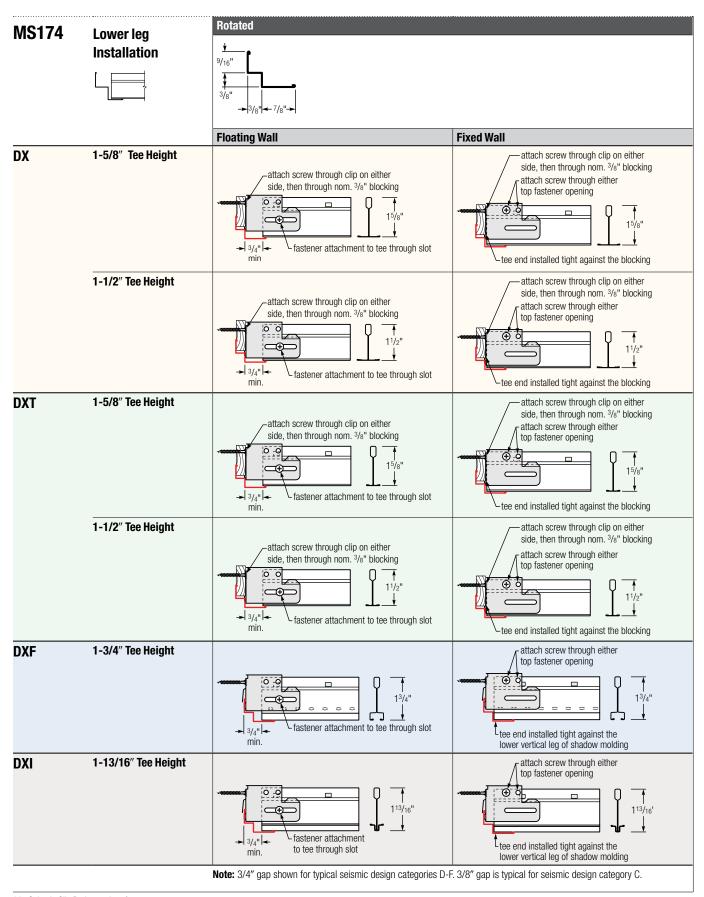


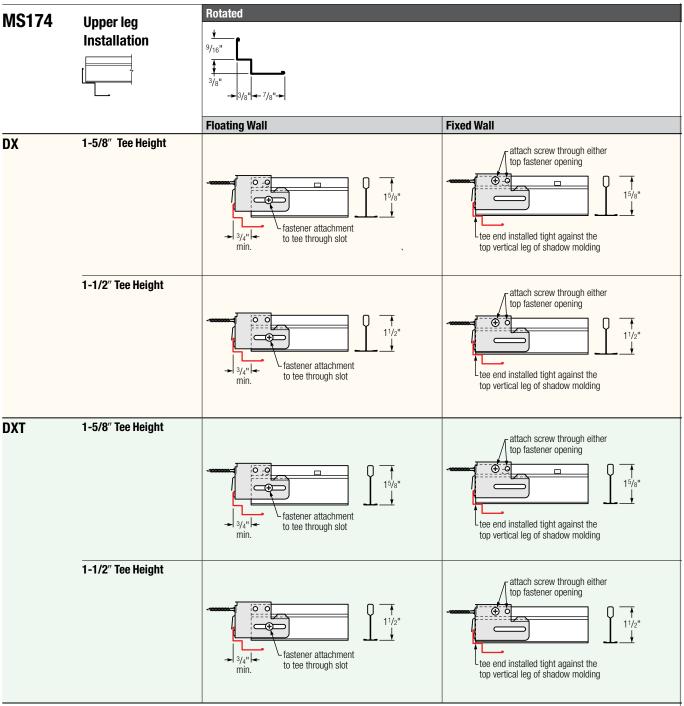
Note: 3/4'' gap shown for typical seismic design categories D-F. 3/8'' gap is typical for seismic design category C.



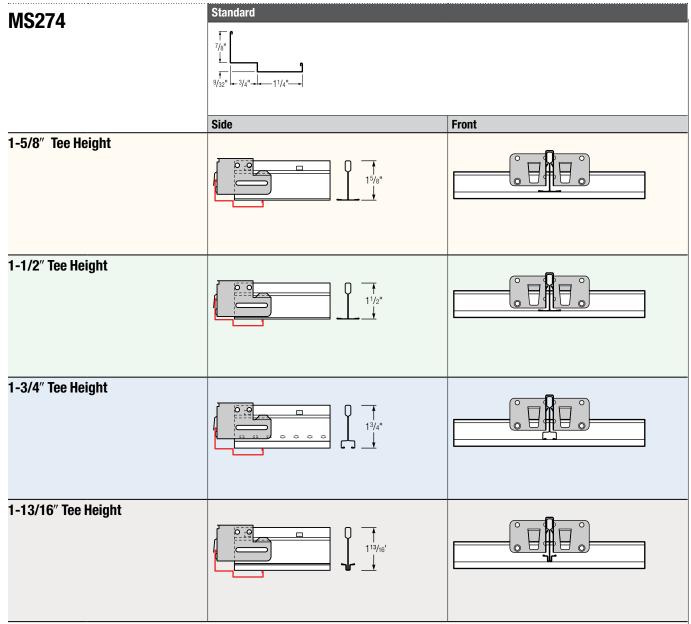


Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.

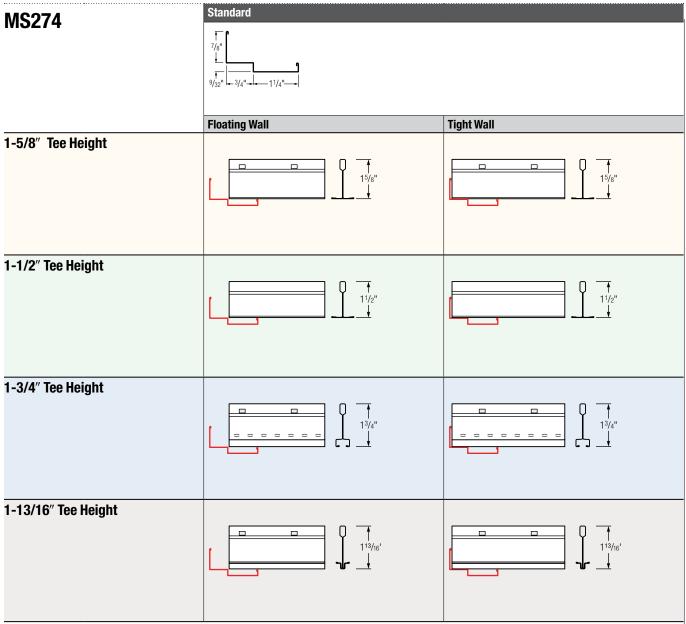




Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.



Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.



Note: 3/4" gap shown for typical seismic design categories D-F. 3/8" gap is typical for seismic design category C.

Seismic Code Reference Standards

	Installation Guidelines for Suspended Ceilings							
International Building Code (IBC)	2003 IBC	2006 IBC	2009 IBC	2012 IBC				
American Society of Civil Engineers (ASCE)	ASCE7-02	ASCE7-05	ASCE7-05	ASCE7-10				
Ceilings Interior Systems Construction	CISCA Zones 0-2	CISCA Zones 0-2	CISCA Zones 0-2	ASTM E580				
Association (CISCA) or	CISCA Zones 3-4	CISCA Zones 3-4	CISCA Zones 3-4					

International Building Code (IBC) defines Seismic Design Categories A, B, C, D, E, and F. www.iccsafe.org

ASCE/SEL7 Minimum Design Loads for Buildings and Other Structures

American Society of Civil Engineers/Structural Engineer Institute (ASCE/SEI) www.asce.org

Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (Zones 3-4) Recommendations for Direct-hung Acoustical Tile and Lay-in Panel Ceilings (Zones 0-2)

CISCA Ceilings & Interior Systems Construction Association (CISCA) www.cisca.org

ASTM InternationI E580/E580M Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquate Ground Motions.

ASTM International (formerly American Society for Testing and Materials) www.astm.org

Further References

USG Seismic Ceiling Resource Center

Seismic Technical Guides seismicceilings.com

Product Information

See usa.com for the most up-to-date product information.

Installation

Must be installed in compliance with ASTM C636, ASTM E580, CISCA, and standard industry practices.

Code Compliance

The information presented is correct to the best of our knowledge at the date of issuance. Because codes continue to evolve, check with a local official prior to designing and installing a ceiling system. Other restrictions and exemptions may apply This is only intended as a quick reference.

Purpose

This seismic technical guide (STG) is intended as a resource for design professionals, to promote more uniform criteria for plan review and jobsite inspection of projects. This STG indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered and adopted.

ICC Evaluation Service, Inc., Report Compliance

Suspension systems manufactured by USG Interiors, Inc., have been reviewed and are approved by listing in ICC-ES Evaluation Report ESR-1222 Evaluation Reports are subject to reexamination, revision and possible cancellation. Please refer to usgdesignstudio.com or usg.com for current reports.

L.A. Research Report Compliance

Donn brand suspension systems manufactured by USG Interiors, Inc., have been reviewed and are approved by listing in the following L.A. Research Report number: 25764

Notice

We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use Our liability is expressly limited to replacement of defective goods Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

Safety First!

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read MSDS and literature before specification and installation.

