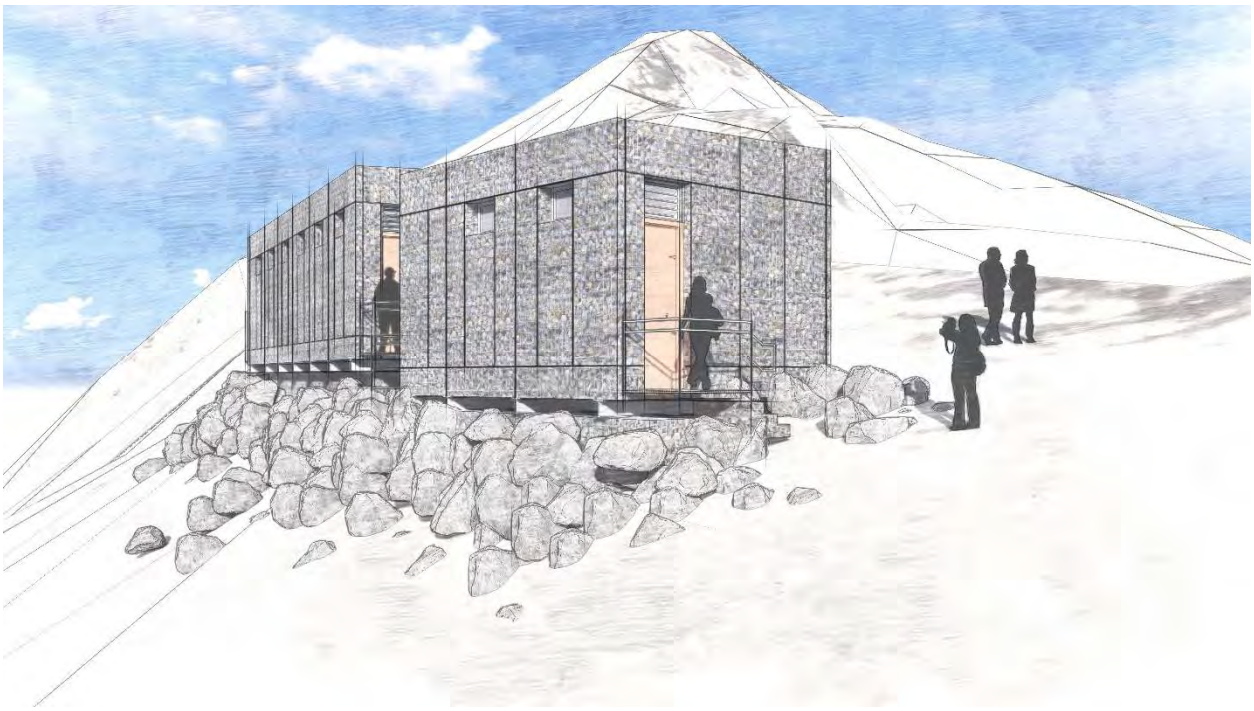
REHABILITATE CLIMBING FACILITIES AT CAMP MUIR

TITLE II DESIGN DEVELOPMENT AND CONSTRUCTION DOCUMENTS SERVICES
MOUNT RAINIER NATIONAL PARK, PIERCE COUNTY, WASHINGTON

100% CONSTRUCTION DOCUMENTS - PRODUCT CUT-SHEETS
140P8525F0011
PMIS # 307228

DECEMBER 03, 2025



*All materials for this requirement are "Brand Name or Equal". The contents provided in this attachment are recommended by the designer of record, but not required. Product used shall meet/exceed what is stated in the specifications.

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Camp Muir Climbing Shelter
Gabion siding retention baskets
Baskets to have integral galvanized angle frame -- see drawings

Gabion SUPPLY

info@gabionsupply.com (mailto:info@gabionsupply.com)
866-391-6295 (tel:866-391-6295)
Hours: Mon-Fri 8am-5:30pm CST

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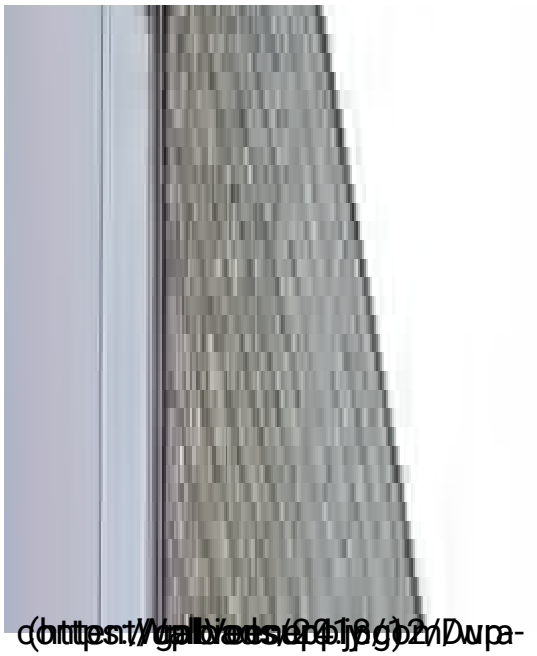

(http://gabionsupply.com/Dura-

DURA-WALL gabion wall veneer is an architectural concept consisting of narrow width (6" - 12") welded wire mesh gabion baskets securely anchored to a structural wall then filled in place with rocks... resulting in a durable natural stone face veneer.

Constructed of heavy gauge (9 or 6 ga) galvanized steel wire mesh, the veneer can be applied almost any time of the year without the use of heavy equipment or skilled labor to fill the gabions ... and a life expectancy of over 75 years.

Gabion stone veneers sometimes called gabion cladding is becoming more and more popular. Used in both interior and exterior applications it is easy to add a natural stone aesthetic mixed with the modern look of the surrounding gabion cage. While it still takes a little physical labor to install a gabion veneer, you don’t have to be an artisan to end up with a great looking finished product.

Should you hire a contractor to install a gabion stone veneer?

Higher Quality of Work

Contractors are generally experienced and have an eye for placing the stone. While a gabion veneer system makes it easier to install for a DIYer it also makes it easier for a contractor to install a stone veneer system. Their expertise really comes into play when

Saves You Time and Labor

While gabion veneers do not require as much artisan expertise as a natural stacked stone veneer with grout they do still require moving large quantities of stone so you should definitely take this in to account when deciding what value to place on hiring a contractor to install the products.

Saves You Money

As mentioned above, you are moving a large volume of stone. A contractor is more likely to have the expertise not to make a mistake during the install whether it is the basket system, tie back system or stone fill. Any mistakes made causing you to redo your work is compounded by the volume of stone as you get further into the install.

Having gone over the advantages of hiring a contractor to install you gabion veneer or cladding project it is definitely doable for a capable DIYer and we are always here to help.

When Should You Install a Gabion Stone Veneer?

Gabion stone veneers can be installed in most weather as you don't have to worry about the moisture level in grout like a traditional stone veneer. The gabions baskets are placed and then the stone is just stacked inside the gabion basket as part of the cladding system. And of course the weather doesn't matter when you are installing a gabion veneer in the interior of a house.

Transform Any Space With Dura-Wall Natural Stone Veneers

Features and Benefits

Dura-Wall veneers deliver exceptional value through versatile design capabilities and durable construction. The system incorporates premium natural stone veneer materials that weather naturally while maintaining structural integrity. We engineer each component to work seamlessly together, creating stone veneer wall systems that stand the test of time.

maintenance while providing maximum visual impact for your investment. Our proven installation methods ensure consistent results across projects of any scale.

The system offers several key advantages:

- **Natural sound absorption properties:** Dura-Wall veneer is an excellent choice for properties near busy streets or highways. The layered stone construction helps reduce noise levels, creating a more peaceful environment.
- **Weather-resistant engineering:** Your wall maintains its appearance and structural integrity through years of exposure to the elements.
- **Customizable aesthetic:** Match existing architecture or create striking standalone designs. Multiple stone sizes and variations can achieve your desired look, making each decorative stone veneer wall unique to your property.

Applications and Use Cases

Dura-Wall veneer systems excel in various applications across residential and commercial projects:

- **Perimeter walls:** Estates and commercial properties benefit from the system's combination of security and visual appeal. Our natural stone veneer finish creates an upscale appearance while providing essential boundary definition and protection.
- **Landscape retaining walls:** Incorporate multiple tiers and curves, allowing for creative garden designs and effective erosion control. Our veneer solutions adapt to various terrain challenges while enhancing your property's natural beauty.
- **Sound barrier installations:** Provide effective noise reduction near highways or industrial areas while avoiding the institutional appearance of standard concrete barriers. These retaining wall veneer solutions offer functionality and aesthetic appeal.
- **Endless possibilities:** Create an elegant courtyard entrance, decorate a wine bar, establish secure property boundaries, or enhance upscale commercial developments.

Why Choose Dura-Wall by Gabion Supply?

We set ourselves apart through our commitment to quality and comprehensive support. Our expertise in stone veneer wall systems ensures you receive the guidance needed for successful project completion. The Dura-Wall system represents years of development and refinement based on real-world applications and customer satisfaction.

Sign-up now for updates and information! ▲

Contact our team today to discuss your retaining wall project needs. We provide detailed consultations to help determine the best configuration for your specific requirements. Our experts can guide you through material selection and installation planning to ensure optimal results for your exterior project.

If you would like any additional information on Gabion Supply's Dura-Wall Stone Veneer system, give us a call today! 866-391-6295.

EXAMPLES OF DURA-WALL PROJECTS

(https://gabionsupply.com/wp-content/uploads/2018/12/Dura-WallVeener5.jpg)

(https://gabionsupply.com/wp-content/uploads/2018/12/Dura-WallVeener6.jpg)

(https://gabionsupply.com/wp-content/uploads/2018/12/Dura-WallVeener10.jpg)

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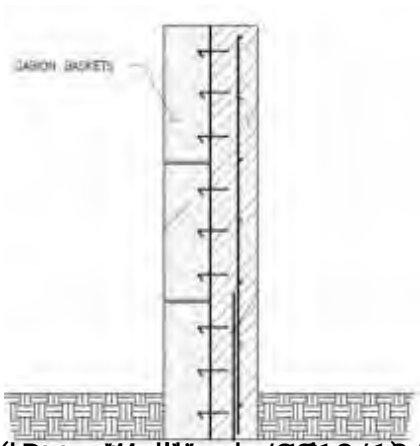
(https://gabionsupply.com/wp-content/uploads/2018/12/

(https://gabionsupply.com/wp-content/uploads/2018/12/

EXAMPLES OF DURA-WALL INTERIOR VENEER WALLS

Sign-up now for updates and information!

TYPICAL ANCHORING DETAILS



STONE FACE WITH FILL MATERIAL

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WOOD PRODUCTS COUNCIL

Mass Timber Overview:

Systems, Products & Codes

Bruce Lindsey
Regional Director
WoodWorks

Photo: Structurlam

MASS TIMBER OVERVIEW

Heavy Timber
Photo: Benjamin Benschneider

Mass Timber
Photo: John Stamets

Glue Laminated Timber (GLT)

Cross-Laminated Timber (CLT)

Nail-Laminated Timber (NLT)

Photo: Think Wood

Photo: StructureCraft

Photo: LendLease

Photo: Ema Peter

Dowel-Laminated Timber (DLT)

Photo: StructureCraft

Mass plywood panels (MPP)

Photo: Freres Lumber

Decking

Photo: StructureCraft

Photo: LEVER Architecture

Photo: Bernard André Photography

EFFICIENCY FOUND IN UNDERSTANDING SUPPLY CHAIN, DESIGNING ACCORDING TO ITS CAPABILITIES

Photo: DR Johnson

Photo: Ema Peter

STRUCTURAL SOLUTIONS | POST, BEAM + PLATE

Photo: Seagate Structures

STRUCTURAL SOLUTIONS | POST + PLATE

Photo: Lendlease

STRUCTURAL SOLUTIONS | HYBRID LIGHT-FRAME + MASS TIMBER

STRUCTURAL SOLUTIONS | HYBRID STEEL + MASS TIMBER

Photo: Structurlam

Concealed Connectors

Self Tapping Screws

Photos: Rothoblaas

Beam to Column

Photo: StructureCraft

Photo: Structurlam

Column to Foundation

Photo: Alex Schreyer

Panel to Panel & Supports

Photo: Charles Judd

Photo: Alex Schreyer

Mass Timber Projects In Design and Constructed in the US (December 2019)

Stage	Mass Timber	# of Projects
Construction Started / Built	CLT	125
	NLT	9
	DLT	6
	Heavy Timber Decking	66
	Post & Beam	44
	Total	250
In Design	CLT	266
	NLT	17
	DLT	3
	Heavy Timber Decking	38
	Post & Beam	134
	Total	458
Grand Total		708

State	Stage	
AK	In Design	1
AL	Construction Started / Built	3
	In Design	8
AR	Construction Started / Built	3
	In Design	5
AZ	In Design	3
CA	Construction Started / Built	32
	In Design	68
CO	Construction Started / Built	14
	In Design	11
CT	Construction Started / Built	3
	In Design	6
DC	Construction Started / Built	2
	In Design	5
DE	In Design	2
FL	Construction Started / Built	15
	In Design	18
GA	Construction Started / Built	4
	In Design	13
HI	In Design	3
IA	Construction Started / Built	1
ID	Construction Started / Built	3
	In Design	3
IL	Construction Started / Built	5
	In Design	11
IN	Construction Started / Built	1
	In Design	1
KS	In Design	2
KY	Construction Started / Built	1
	In Design	2
LA	In Design	5
MA	Construction Started / Built	13
	In Design	25
MD	Construction Started / Built	1
	In Design	7
ME	Construction Started / Built	1
	In Design	14
MI	Construction Started / Built	2
	In Design	6
MN	Construction Started / Built	2
	In Design	4
MO	Construction Started / Built	5
	In Design	5

State	Stage	
MS	In Design	4
MT	Construction Started / Built	6
	In Design	5
NC	Construction Started / Built	13
	In Design	22
ND	In Design	1
NE	Construction Started / Built	1
	In Design	3
NH	Construction Started / Built	1
	In Design	1
NJ	Construction Started / Built	1
	In Design	6
NM	Construction Started / Built	1
NV	In Design	2
NY	Construction Started / Built	6
	In Design	24
OH	Construction Started / Built	1
	In Design	5
OK	Construction Started / Built	1
	In Design	2
OR	Construction Started / Built	25
	In Design	23
PA	Construction Started / Built	3
	In Design	5
RI	Construction Started / Built	2
	In Design	1
SC	Construction Started / Built	9
	In Design	11
TN	Construction Started / Built	3
	In Design	4
TX	Construction Started / Built	17
	In Design	37
UT	Construction Started / Built	3
	In Design	3
VA	Construction Started / Built	6
	In Design	7
VT	Construction Started / Built	1
	In Design	8
WA	Construction Started / Built	28
	In Design	44
WI	Construction Started / Built	8
	In Design	12
WV	Construction Started / Built	2
WY	Construction Started / Built	1

Considering mass timber for a project? Ask us anything.

For free project support, contact:
help@woodworks.org
woodworks.org/project-assistance

http://www.woodworks.org/publications-media/building-trends-mass-timber/

Photo: Nordic Structures

PRECEDENT PROJECTS | UMASS AMHERST DESIGN BUILDING

Photo: ©Albert Vecerka/Esto

PRECEDENT PROJECTS | UMASS AMHERST DESIGN BUILDING

Photos: Baumberger Studio/PATH Architecture

PRECEDENT PROJECTS | CARBON 12 | PORTLAND, OR

Photo: Hines

Photo: Corey Gaffer courtesy Perkins + Will

PRECEDENT PROJECTS | T3 MINNEAPOLIS

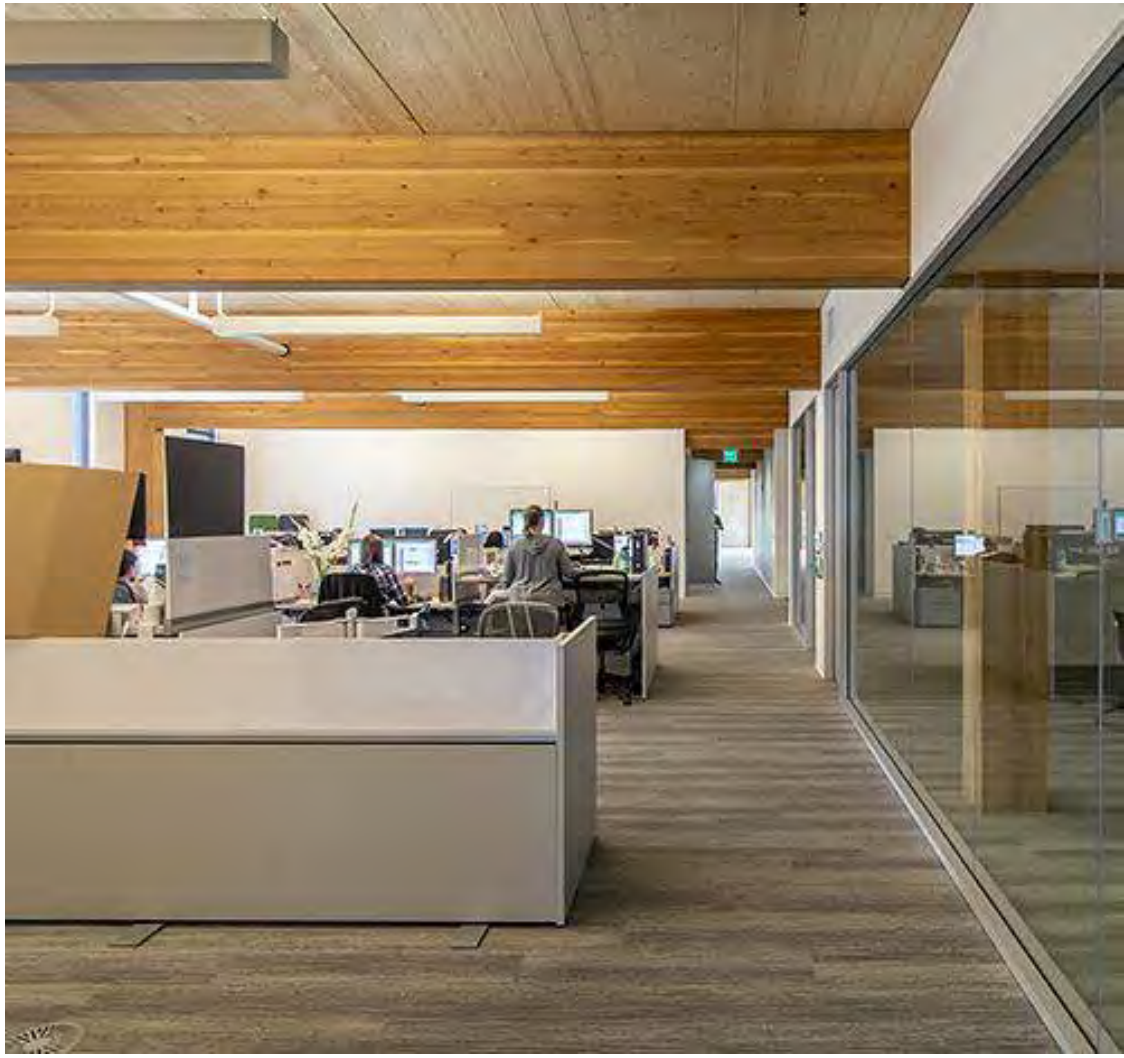
Photos: StructureCraft

Photo: Hartshorne Plunkard Architecture

PRECEDENT PROJECTS | T3 ATLANTA

Photos: Flank

PRECEDENT PROJECTS | 360 WYTHE BROOKYLN, NY

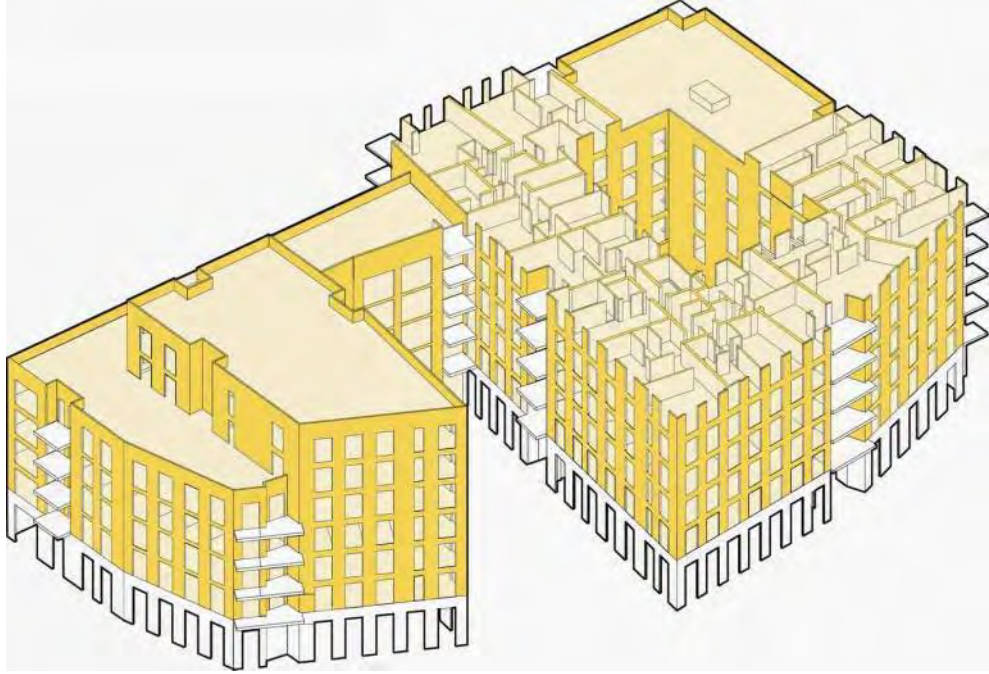


Photos: Swinerton | DJC Oregon

PRECEDENT PROJECTS | FIRST TECH CREDIT UNION HILLSBORO, OR

Photos: Michael Elkan | Naturally Wood | UBC

PRECEDENT PROJECTS | BROCK COMMONS



Photos: Daniel Shearin | Waugh Thistleton Architects

PRECEDENT PROJECTS | DALSTON WORKS | LONDON

Photos: Bygg Mesteren | Voll Arkitekter

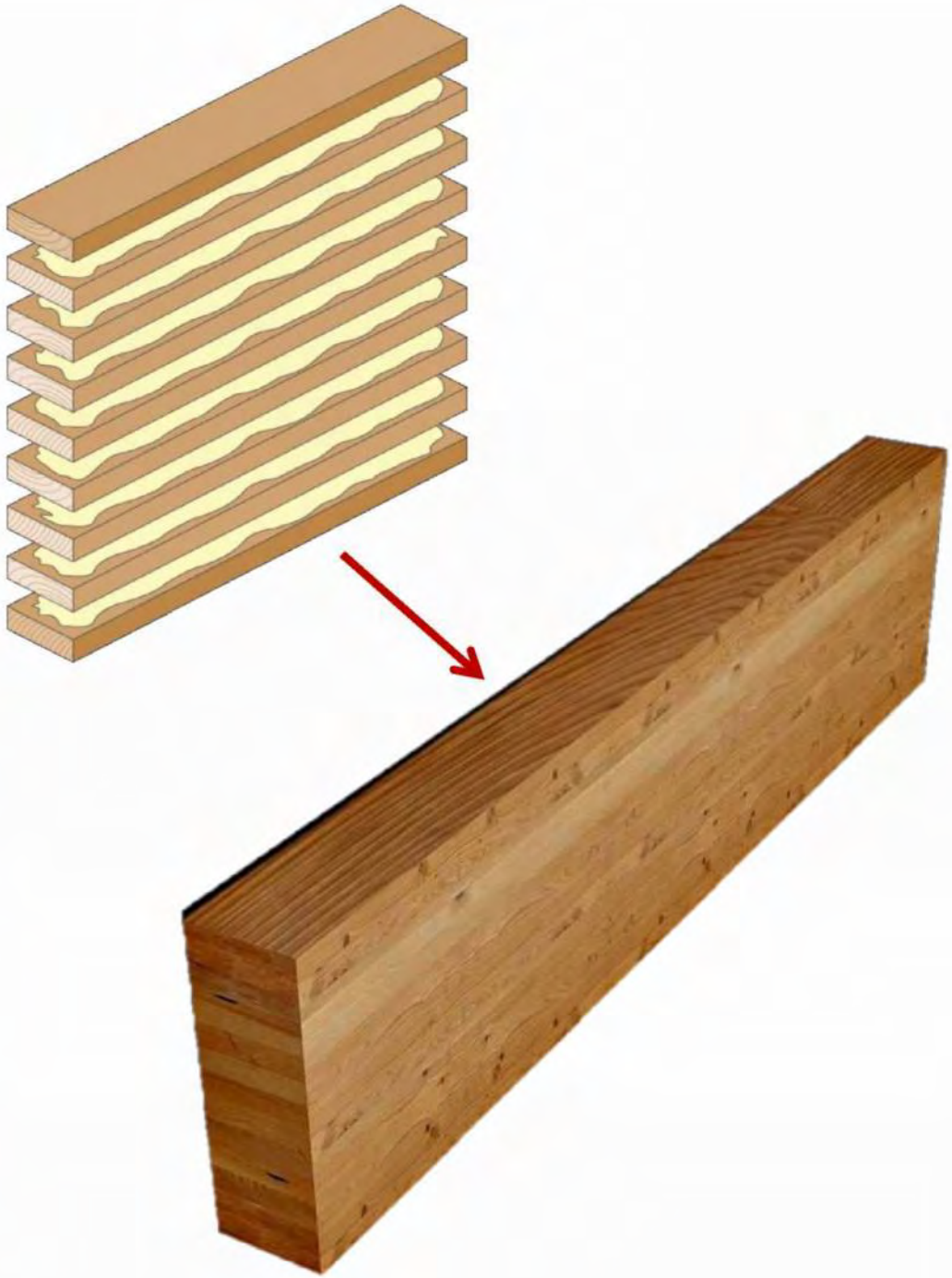
PRECEDENT PROJECTS | MJOSTARNET | NORWAY

MASS TIMBER PRODUCTS

Glue Laminated Beams & Columns (GLB)

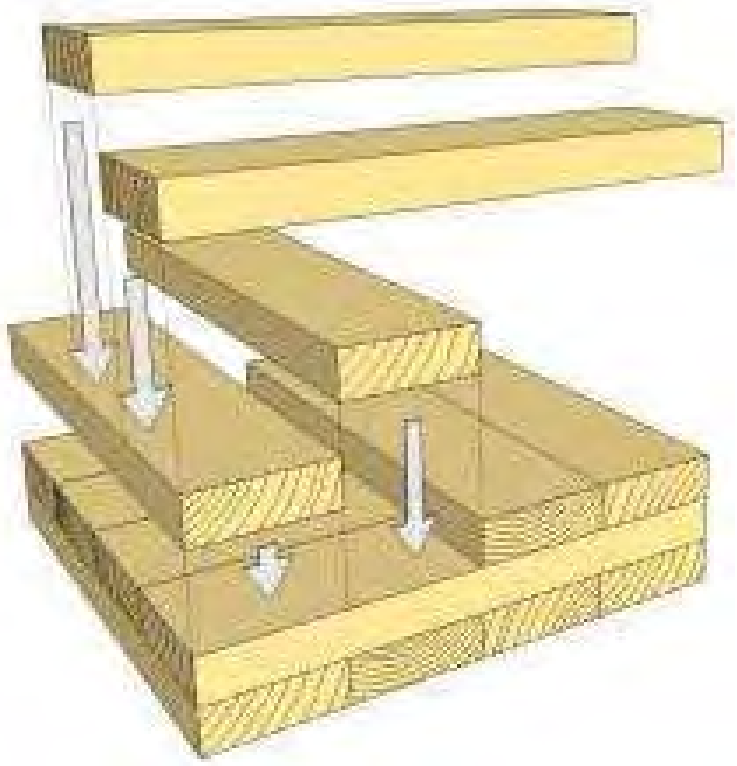
Glue Laminated Timber (GLT)

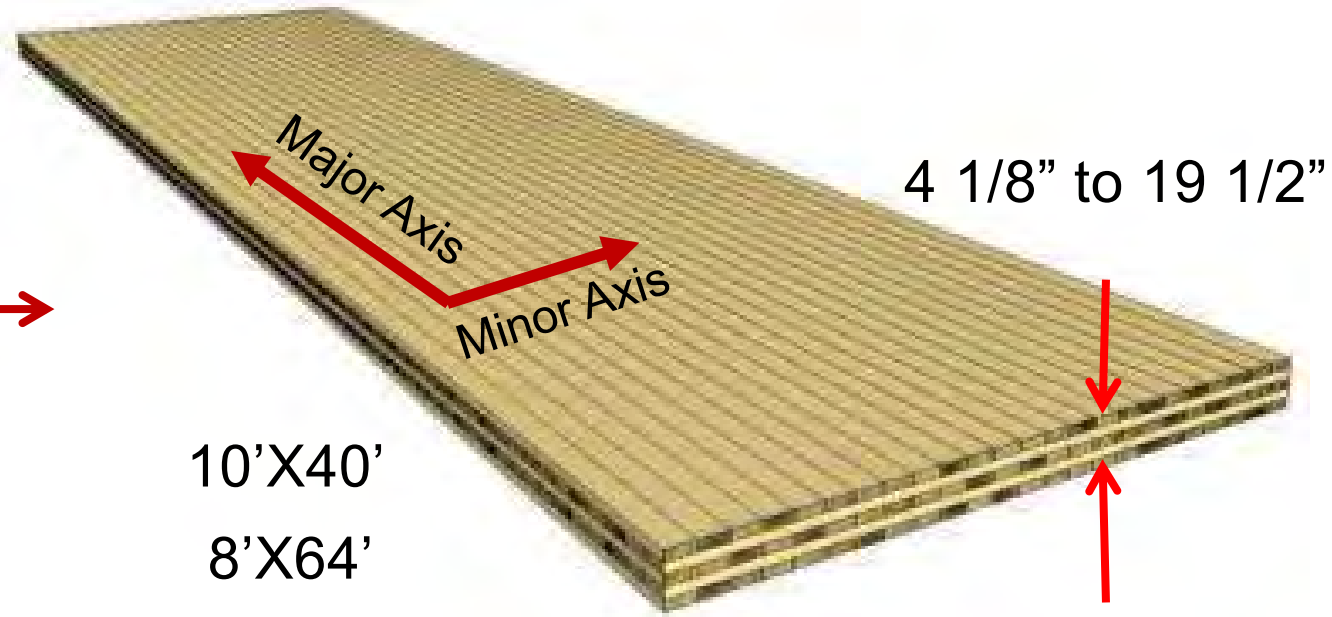
Photo: Manasc Isaac Architects/Fast + Epp



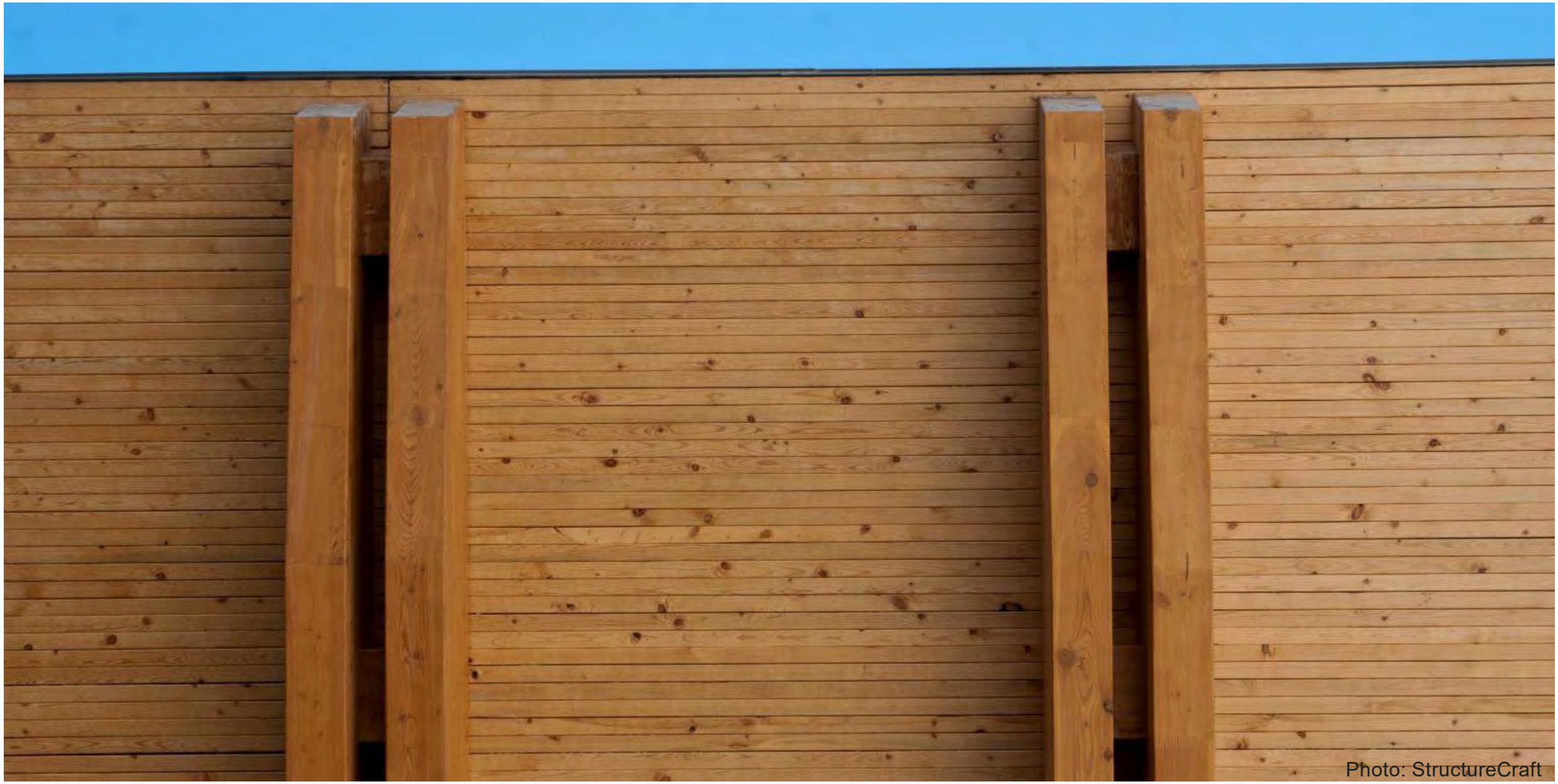
Cross-Laminated Timber (CLT)

Cross-Laminated Timber (CLT)





Nail-Laminated Timber (NLT)



Nail-Laminated Timber (NLT)

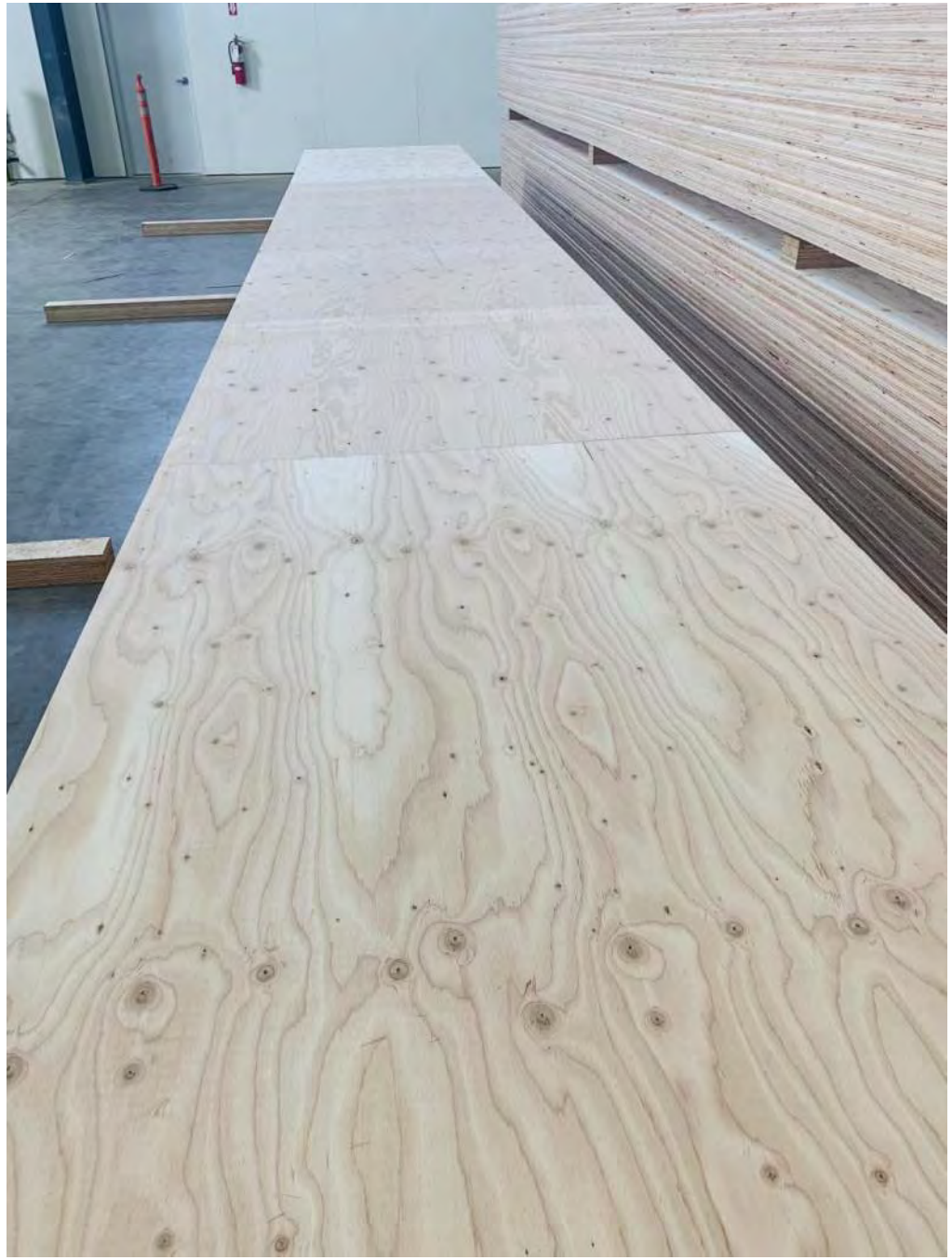
Photo: Think Wood

Photo: StructureCraft

Dowel-Laminated Timber (NLT)

Photo: StructureCraft

Mass Plywood Panels (MPP)



Photos: Freres Lumber

Other Mass Timber Product Options

Glue Laminated Timber
GLT

Laminated Veneer Lumber
LVL

Parallel Strand Lumber
PSL

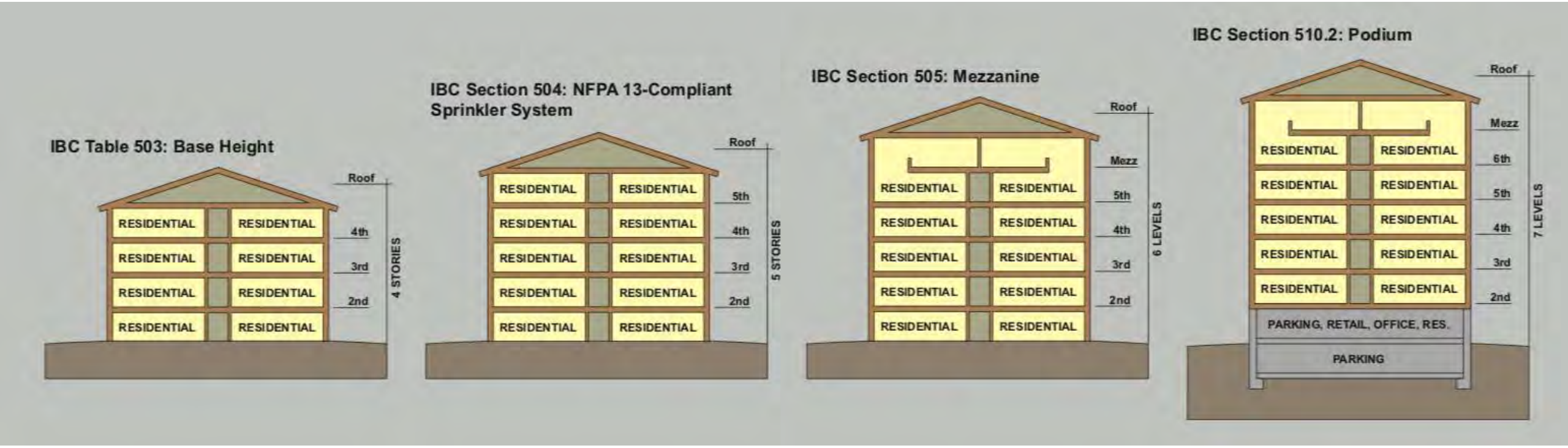
Laminated Strand Lumber
LSL

Timber-Concrete Composite
TCC

Decking

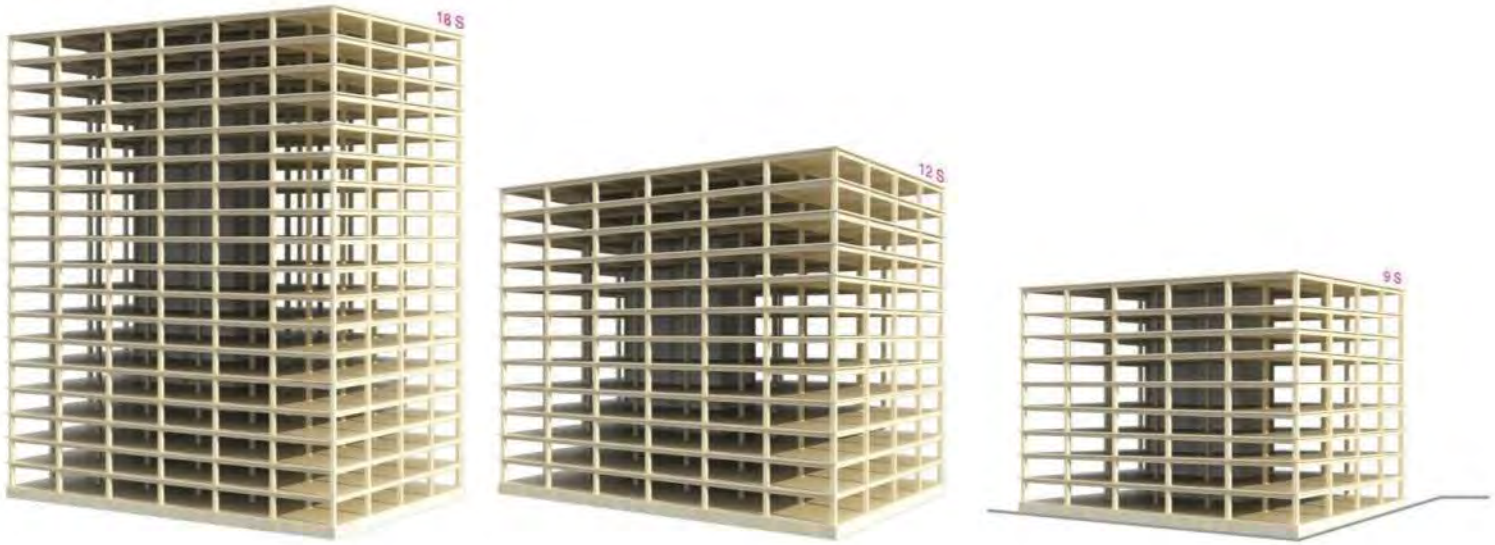
Photos: StructureCraft

Mass Timber in Low- to Mid-Rise: 1-6 Stories in Construction Types III, IV or V



Credit: WoodWorks

Tall Mass Timber: Up to 18 Stories in Construction Types IV-A, IV-B or IV-C



18 STORIES
BUILDING HEIGHT 270'
ALLOWABLE BUILDING AREA 972,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-A

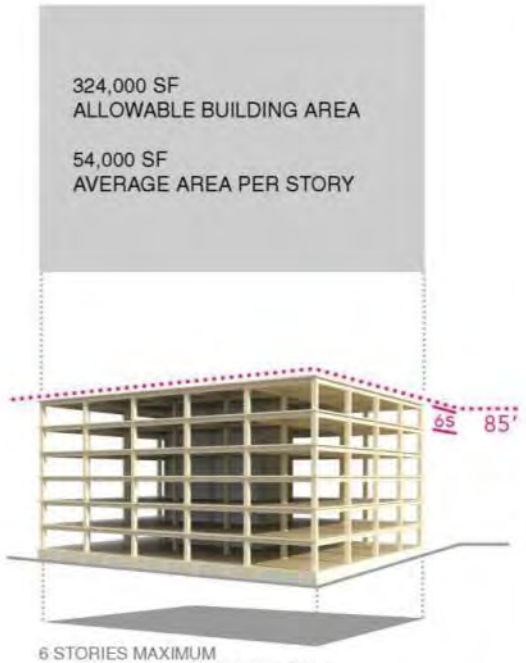
12 STORIES
BUILDING HEIGHT 180 FT
ALLOWABLE BUILDING AREA 648,000 SF
AVERAGE AREA PER STORY 54,000SF

TYPE IV-B

9 STORIES
BUILDING HEIGHT 85'
ALLOWABLE BUILDING AREA 405,000 SF
AVERAGE AREA PER STORY 45,000 SF

TYPE IV-C

IBC 2021



6 STORIES MAXIMUM
85'-0" MAXIMUM BUILDING HEIGHT
324,00 SF MAXIMUM AREA

TYPE IV- HT

IBC 2015

BUSINESS OCCUPANCY [GROUP B]

*BUILDING FLOOR-TO-FLOOR HEIGHTS ARE SHOWN AT 12'-0" FOR ALL EXAMPLES FOR CLARITY IN COMPARISON BETWEEN 2015 TO 2021 IBC CODES.

Credit: Susan Jones, atelierjones

WoodWorks Tall Wood Design Resource

- 2021 IBC provisions
- Design Steps
- Free download at woodworks.org

WoodWorks™
WOOD PRODUCTS COUNCIL

Tall Wood Buildings in the 2021 IBC
Up to 18 Stories of Mass Timber

Scott Breneman, PhD, SE, WoodWorks – Wood Products Council • Matt Timmers, SE, John A. Martin & Associates • Dennis Richardson, PE, CBO, CASp, American Wood Council

In January 2019, the International Code Council (ICC) approved a set of proposals to allow tall wood buildings as part of the 2021 International Building Code (IBC). Based on these proposals, the 2021 IBC will include three new construction types—Type IV-A, IV-B and IV-C—allowing the use of mass timber or noncombustible materials. These new types are based on the previous Heavy Timber construction type (renamed Type IV-HT) but with additional fire-resistance ratings and levels of required noncombustible protection. The code will include provisions for up to 18 stories of Type IV-A construction for Business and Residential Occupancies.

Based on information first published in the Structural Engineers Association of California (SEAOC) 2018 Conference Proceedings, this paper summarizes the background to these proposals, technical research that supported their adoption, and resulting changes to the IBC and product-specific standards.

Background: ICC Tall Wood Building Ad Hoc Committee

Over the past 10 years, there has been a growing interest in tall buildings constructed from mass timber materials (Breneman 2013, Timmers 2015). Around the world there are now dozens of timber buildings constructed above eight stories tall. Some international examples include:

Building Name	Location	Stories	Completion Date

MASS TIMBER FIRE-RESISTANCE

Photo Credit: FPInnovations

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS)

BUILDING ELEMENT	TYPE I		TYPE II		TYPE III		TYPE IV	TYPE V	
	A	B	A	B	A	B	HT	A	B
Primary structural frame[f] (see Section 202)	3[a]	2[a]	1	0	1	0	HT	1	0
Bearing walls Exterior[e, f] Interior	 3 3[a]	 2 2[a]	 1 1	 0 0	 2 1	 2 0	 2 1/HT	 1 1	 0 0
Nonbearing walls and partitions Exterior	See Table 602								
Nonbearing walls and partitions Interior[d]	0	0	0	0	0	0	See Section 602.4.6	0	0
Floor construction and associated secondary members (see Section 202)	2	2	1	0	1	0	HT	1	0
Roof construction and associated secondary members (see Section 202)	$1^1/_2$[b]	1[b,c]	1[b,c]	0[c]	1[b,c]	0	HT	1[b,c]	0

For SI: 1 foot = 304.8 mm.

a. Roof supports: Fire-resistance ratings of primary structural frame and bearing walls are permitted to be reduced by 1 hour where supporting a roof only.

b. Except in Group F-1, H, M and S-1 occupancies, fire protection of structural members shall not be required, including protection of roof framing and decking where every part of the roof construction is 20 feet or more above any floor immediately below. Fire-retardant-treated wood members shall be allowed to be used for such unprotected members.

c. In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required.

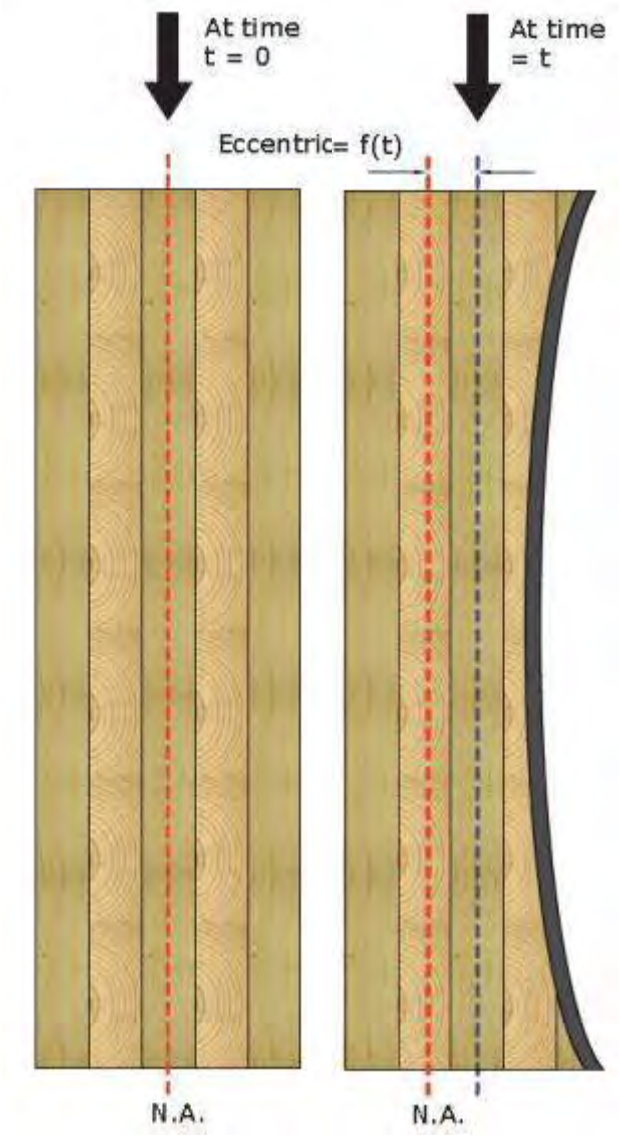
d. Not less than the fire-resistance rating required by other sections of this code.

e. Not less than the fire-resistance rating based on fire separation distance (see Table 602).

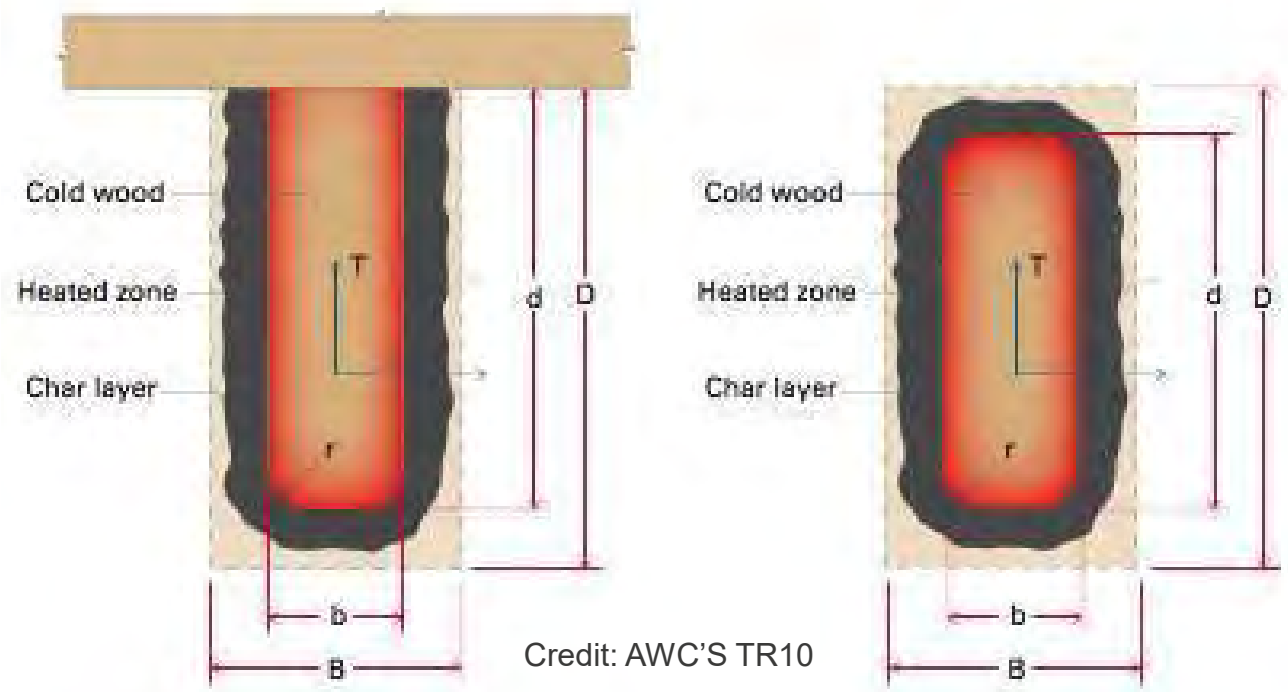
f. Not less than the fire-resistance rating as referenced in Section 704.10.

Credit: IBC Table 601

Mass Timber's Fire-Resistive Performance is Well-Tested, Documented and Recognized via Code Acceptance



Credit: CLT Handbook



Credit: AWC'S TR10

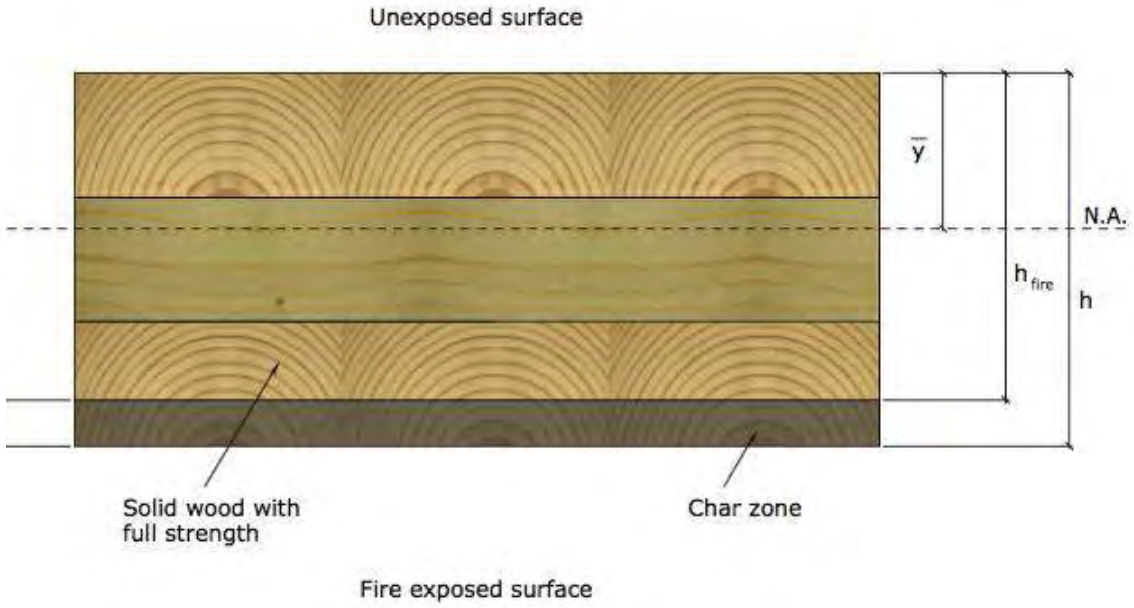
How do you determine Fire Resistance Rating of Mass Timber?

2 Options:

1. Calculations in Accordance with IBC 722 → NDS Chapter 16
2. Tests in Accordance with ASTM E119

Credit: Urban One

$a_{eff} = 1.2a_{char}$



MT FRR Calculations Method:

- IBC 703.3 allows several methods of determining FRR. One is calculations per 722.
- 722.1 refers to NDS Chpt 16 for exposed wood FRR

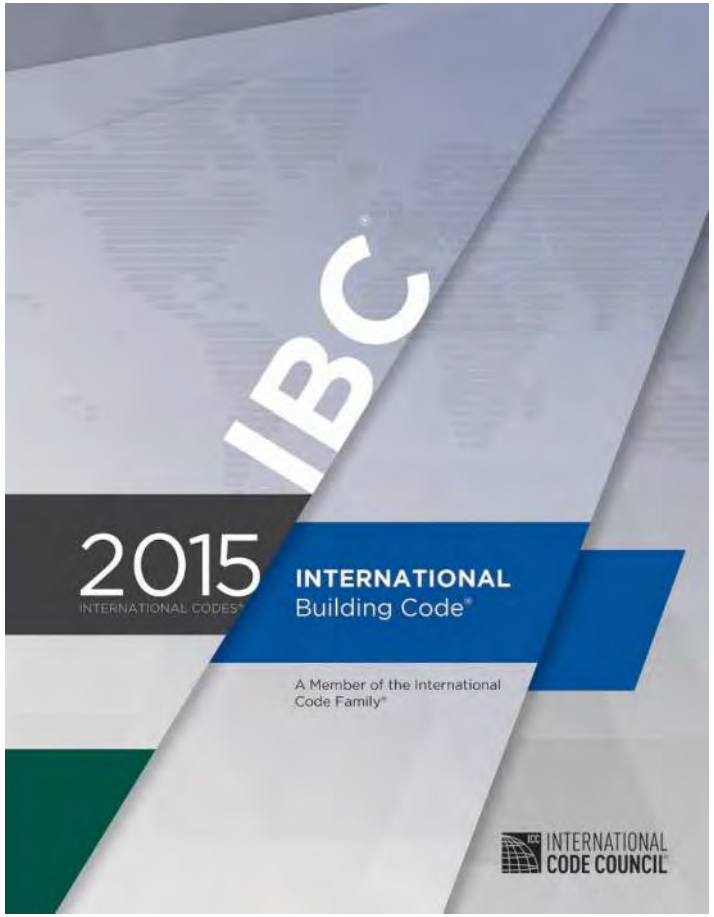
703.3 Methods for determining fire resistance. The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263. The required *fire resistance* of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:

3. Calculations in accordance with Section 722.

Credit: IBC Chapter 7

722.1 General. The provisions of this section contain procedures by which the *fire resistance* of specific materials or combinations of materials is established by calculations. These procedures apply only to the information contained in this section and shall not be otherwise used. The calculated *fire resistance* of concrete, concrete masonry and clay masonry assemblies shall be permitted in accordance with ACI 216.1/TMS 0216. The calculated *fire resistance* of steel assemblies shall be permitted in accordance with Chapter 5 of ASCE 29. The calculated *fire resistance* of exposed wood members and wood decking shall be permitted in accordance with Chapter 16 of ANSI/AF&PA *National Design Specification for Wood Construction (NDS)*.

Code Path for Calculated FRR of Exposed MT



Code Path for Exposed Wood Fire-Resistance Calculations

IBC 703.3
Methods for determining fire resistance

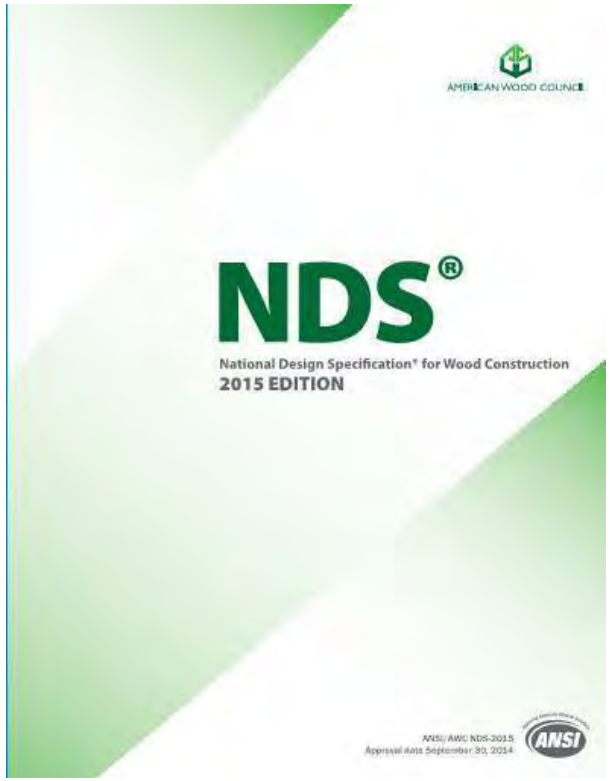
- Prescriptive designs per IBC 721.1
- ***Calculations in accordance with IBC 722***
- Fire-resistance designs documented in sources
- Engineering analysis based on a comparison
- Alternate protection methods as allowed by 104.11

IBC 722
Calculated Fire Resistance

"The calculated *fire resistance* of exposed wood members and wood decking shall be permitted in accordance with **Chapter 16 of ANSI/AWC National Design Specification for Wood Construction (NDS)**

NDS Chapter 16
Fire Design of Wood Members

- Limited to calculating fire resistance up to 2 hours
- Char depth varies based on exposure time (i.e., fire-resistance rating), product type and lamination thickness. Equations and tables are provided.
- TR 10 and NDS commentary are helpful in implementing permitted calculations.



Credit: FPInnovations

NDS Chapter 16 includes calculation of fire resistance of NLT, CLT, Glulam, Solid Sawn and SCL wood products

Credit: AWC'S NDS

Table 16.2.1B Effective Char Depths (for CLT with β_n=1.5in./hr.)

Required Fire Endurance (hr.)	Effective Char Depths, a_{char} (in.)								
	lamination thicknesses, h_{lam} (in.)								
	5/8	3/4	7/8	1	1-1/4	1-3/8	1-1/2	1-3/4	2
1-Hour	2.2	2.2	2.1	2.0	2.0	1.9	1.8	1.8	1.8
1½-Hour	3.4	3.2	3.1	3.0	2.9	2.8	2.8	2.8	2.6
2-Hour	4.4	4.3	4.1	4.0	3.9	3.8	3.6	3.6	3.6

Nominal char rate of 1.5”/HR is recognized in NDS. Effective char depth calculated to account for duration, structural reduction in heat-affected zone

Credit: David Barber, ARUP

Credit: AWC’S NDS

Table 16.2.1A Char Depth and Effective Char Depth (for β_n = 1.5 in./hr.)

Required Fire Resistance (hr.)	Char Depth, a_{char} (in.)	Effective Char Depth, a_{eff} (in.)
1-Hour	1.5	1.8
1½-Hour	2.1	2.5
2-Hour	2.6	3.2

Tested Assemblies Method:

- **Many successful Mass Timber ASTM E119 fire tests have been completed by industry & manufacturers**

NGC Testing Services

Fire Testing Laboratory

IAS ACCREDITED Testing Laboratory TL-216

TEST REPORT

Page 1 of 53

for

American Wood Council

222 Catoctin Circle SE, Suite 201
Leesburg, VA 20175

Standard Methods of
Fire Tests of Building Construction and Materials
ASTM E 119 – 11a

Test Report No: WP-1950
Assignment No: K-1089
Subject Material: Cross-Laminated Timber and Gypsum Board Wall Assembly (Load-Bearing)
Test Date: October 4, 2012
Report Date: October 15, 2012

Prepared by: Michael J. Rizzo, Test Engineer

Reviewed by: Robert J. Menchetti, Director, Laboratory Facilities and Testing Services

TEST REPORT

Intertek

REPORT NUMBER: 102891256SAT-001
ORIGINAL ISSUE DATE: February 27, 2017
REVISED DATE: N/A

EVALUATION CENTER
16015 Shady Falls Road
Elmendorf, TX 78112
Phone: (210) 635-8100
Fax: (210) 635-8101
www.intertek.com

RENDERED TO

Structurlam Products LP
2176 Government Street
Penticton, BC V2A 8B5
Canada

PRODUCT EVALUATED: CrossLam® CLT Un-restrained Load-Bearing Floor/Ceiling Assembly
EVALUATION PROPERTY: Fire Resistance

FPInnovations
NRC·CNRC

Project No. 301006155
Final Report 2012/13

Preliminary CLT Fire Resistance Testing Report

by

Lindsay Osborne, M.A.Sc.
Christian Dagenais, Eng., M.Sc.
Scientists
Advanced Building Systems – Serviceability and Fire Group

and

Noureddine Bénichou, Ph.D.
Senior Research Officer
National Research Council of Canada – Fire Research Resource Centre

WOODWORKS INVENTORY OF FIRE TESTED MT ASSEMBLIES

Table 1: North American Fire Resistance Tests of Mass Timber Floor / Roof Assemblies

WoodWorks
WOOD PRODUCTS COUNCIL

CLT Panel	Manufacturer	CLT Grade or Major x Minor Grade	Ceiling Protection	Panel Connection in Test	Floor Topping	Load Rating	Fire Resistance Achieved (Hours)	Source	Testing Lab
3-ply CLT (114mm 4.488 in)	Nordic	SPF 1650 Fb 1.5 EMSR x SPF #3	2 layers 1/2" Type X gypsum	Half-Lap	None	Reduced 36% Moment Capacity	1	1 (Test 1)	NRC Fire Laboratory
3-ply CLT (105mm 4.133 in)	Structurlam	SPF #1/#2 x SPF #1/#2	1 layer 5/8" Type X gypsum	Half-Lap	None	Reduced 75% Moment Capacity	1	1 (Test 3)	NRC Fire Laboratory
5-ply CLT (175mm 6.875")	Nordic	E1	None	Topside Spline	2 staggered layers of 1/2" cement boards	Loaded, See Manufacturer	2	2	NRC Fire Laboratory March 2016
5-ply CLT (175mm 6.875")	Nordic	E1	1 layer of 5/8" Type X gypsum under Z-channels and furring strips with 3 5/8" fiberglass batts	Topside Spline	2 staggered layers of 1/2" cement boards	Loaded, See Manufacturer	2	5	NRC Fire Laboratory Nov 2014
5-ply CLT (175mm 6.875")	Nordic	E1	None	Topside Spline	3/4 in. proprietary gypcrete over Maxxon acoustical mat	Reduced 50% Moment Capactiy	1.5	3	UL
5-ply CLT (175mm 6.875")	Nordic	E1	1 layer 5/8" normal gypsum	Topside Spline	3/4 in. proprietary gypcrete over Maxxon acoustical mat or proprietary sound board	Reduced 50% Moment Capactiy	2	4	UL
5-ply CLT (175mm 6.875")	Nordic	E1	1 layer 5/8" Type X Gyp under Resilient Channel under 7 7/8" I-Joists with 3 1/2" Mineral Wool between Joists	Half-Lap	None	Loaded, See Manufacturer	2	21	Intertek 8/24/2012
5-ply CLT (175mm 6.875")	Structurlam	E1 M5 MSR 2100 x SPF #2	None	Topside Spline	1-1/2" Maxxon Cyp-Grete 2000 over Maxxon Reinforcing Mesh	Loaded, See Manufacturer	2.5	6	Intertek, 2/22/2016
5-ply CLT (175mm 6.875")	DR Johnson	V1	None	Half-Lap & Topside Spline	2" gypsum topping	Loaded, See Manufacturer	2	7	SwRI (May 2016)
5-ply CLT (175mm 6.875")	Nordic	SPF 1950 Fb MSR x SPF #3	None	Half-Lap	None	Reduced 59% Moment Capacity	1.5	1 (Test 3)	NRC Fire Laboratory
5-ply CLT (175mm 6.875")	Structurlam	SPF #1/#2 x SPF #1/#2	1 layer 5/8" Type X gypsum	Half-Lap	None	Unreduced 101% Moment Capacity	2	1 (Test 6)	NRC Fire Laboratory
7-ply CLT (245mm 9.65")	Structurlam	SPF #1/#2 x SPF #1/#2	None	Half-Lap	None	Unreduced 101% Moment Capacity	2.5	1 (Test 7)	NRC Fire Laboratory
5-ply CLT (175mm 6.875")	SmartLam	SL-V4	None	Half-Lap	nominal 1/2" plywood with 8d nails	Loaded, See Manufacturer	2	12 (Test 4)	Western Fire Center 10/26/2016
5-ply CLT (175mm 6.875")	SmartLam	V1	None	Half-Lap	nominal				
5-ply CLT (175mm 6.875")	DR Johnson	V1	None	Half-Lap	nominal	See Manufacturer			11/01/2016
5-ply CLT (160mm 6.37")	KLH	CV3M1	None	Half-Lap & Topside spline	None	Loaded, See Manufacturer	1	18	SwRI

Free download at woodworks.org

WoodWorks™
WOOD PRODUCTS COUNCIL

Fire-Resistive Design of Mass Timber Members

Code Applications, Construction Types and Fire Ratings

Richard McLain, PE, SE • Senior Technical Director • WoodWorks
Scott Breneman, PhD, PE, SE • Senior Technical Director • WoodWorks

For many years, exposed heavy timber framing elements have been permitted in U.S. buildings due to their inherent fire-resistance properties. The predictability of wood's char rate has been well-established for decades and has long been recognized in building codes and standards.

Today, one of the exciting trends in building design is the growing use of mass timber—i.e., large solid wood panel products such as cross-laminated timber (CLT) and nail-laminated timber (NLT)—for floor, wall and roof construction. Like heavy timber, mass timber products have inherent fire resistance that allows them to be left exposed and still achieve a fire-resistance rating. Because of their strength and dimensional stability, these products also offer a low-carbon alternative to steel, concrete, and masonry for many applications. It is this combination of exposed structure and strength that developers and designers across the country are leveraging to create innovative designs with a warm yet modern aesthetic, often for projects that go beyond traditional norms of wood design.

This paper has been written to support architects and engineers exploring the use of mass timber for commercial and multi-family construction. It focuses on how to meet fire-resistance requirements in the International Building Code (IBC), including calculation and testing-based methods. Unless otherwise noted, references refer to the 2018 IBC.

Mass Timber & Construction Type

Before demonstrating fire-resistance ratings of exposed mass timber elements, it's important to understand under what circumstances the code currently allows the use of mass timber in commercial and multi-family construction.

A building's assigned construction type is the main indicator of where and when all wood systems can be used. IBC Section 602 defines five main options (Type I through V) with all but Type IV having subcategories A and B. Types III and V permit the use of wood framing throughout much of the structure and both are used extensively for modern mass timber buildings.

Type III (IBC 602.3) – Timber elements can be used in floors, roofs and interior walls. Fire-retardant-treated wood (FRTW) framing is permitted in exterior walls with a fire-resistance rating of 2 hours or less.

Type V (IBC 602.5) – Timber elements can be used throughout the structure, including floors, roofs and both interior and exterior walls.

Type IV (IBC 602.4) – Commonly referred to as 'Heavy Timber' construction, this option

Carbon12 | Portland, Oregon
Kaiser Group | Path Architecture
Munzing Structural Engineering

Mass Timber Fire Design Resource

- Code compliance options for demonstrating FRR
- Updated as new tests are completed
- Free download at woodworks.org

FIRE PROTECTION OF CONNECTIONS

Photo: Structurlam

Connections between building elements must be able to maintain fire resistance rating no less than that required of the connected members.

Photo: MyTiCon

16.3 Wood Connections

Wood connections, including connectors, fasteners, and portions of wood members included in the connection design, shall be protected from fire exposure for the required fire resistance time. Protection shall be provided by wood, fire-rated gypsum board, other approved materials, or a combination thereof.

Source: NDS

Multiple ways to demonstrate connection fire protection: calculations, prescriptive NC protection, test results, others as approved by AHJ

Photo: John Stamets

Photo: Josh Partee

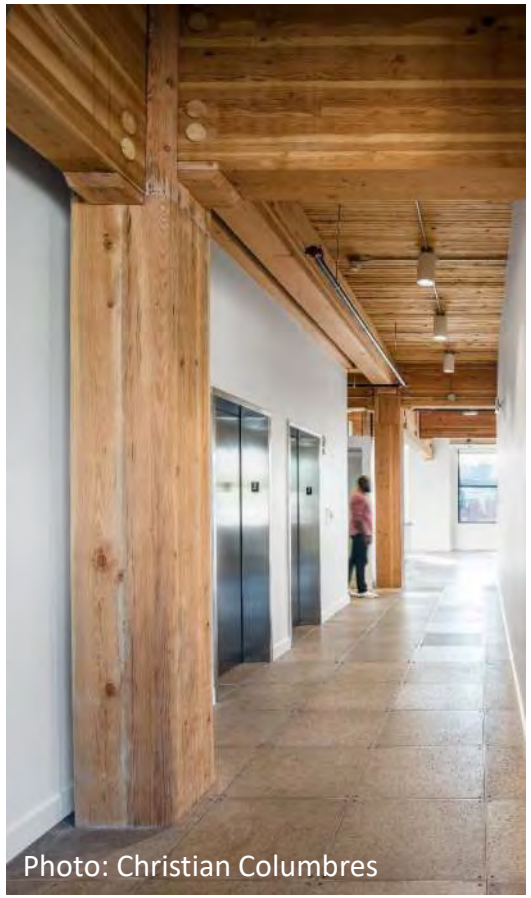


Photo: Christian Columbres

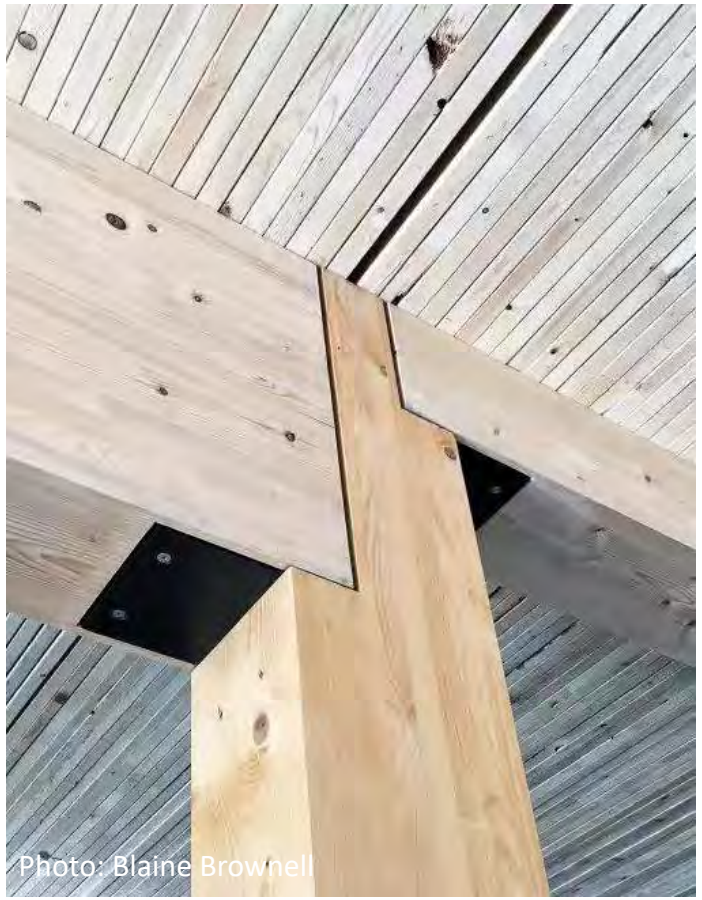


Photo: Blaine Brownell

2017 Glulam Beam to Column Connection Fire Tests under standard ASTM E119 time-temperature exposure

Photo: ARUP/SLB

Softwood Lumber Board

Glulam Connection Fire Test

Summary Report

Issue | June 5, 2017

SOUTHWEST RESEARCH INSTITUTE

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION

FIRE TECHNOLOGY DEPARTMENT
WWW.FIRE.SWRI.ORG
FAX (210) 522-3377

NSF

FIRE PERFORMANCE EVALUATION OF A LOAD BEARING GLULAM BEAM TO COLUMN CONNECTION, INCLUDING A CLT PANEL, TESTED IN GENERAL ACCORDANCE WITH ASTM E119-16a, *STANDARD TEST METHODS FOR FIRE TESTS OF BUILDING CONSTRUCTION AND MATERIALS*

FINAL REPORT
Consisting of 32 Pages

Full Report Available:

https://www.thinkwood.com/wp-content/uploads/2018/01/reThink-Wood-Arup-SLB-Connection-Fire-Testing-Summary-web.pdf

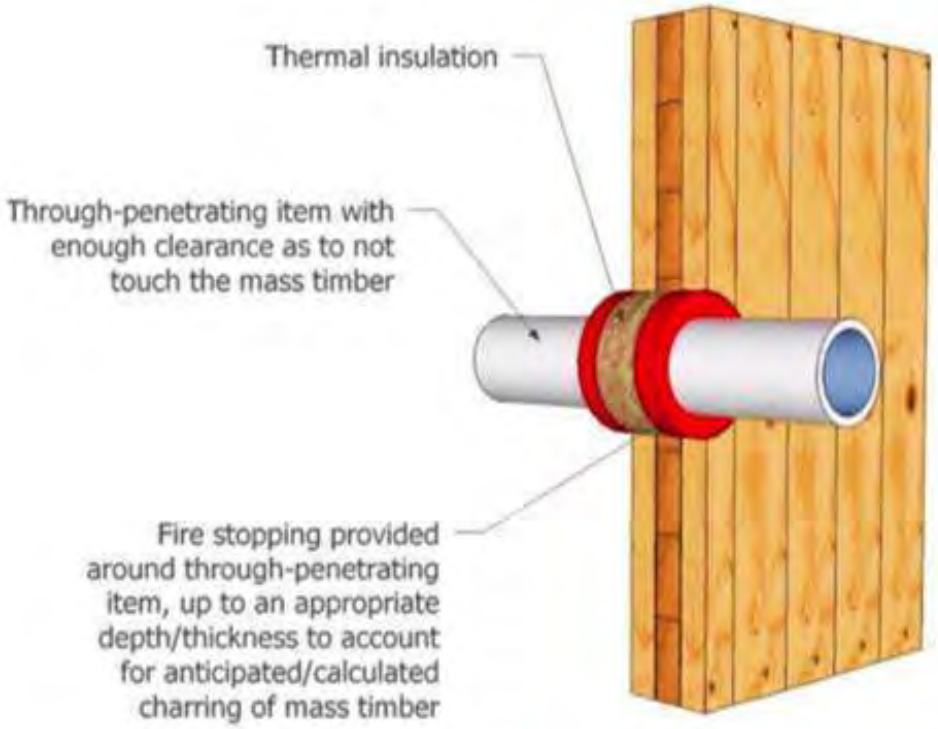
FIRE PROTECTION OF PENETRATIONS

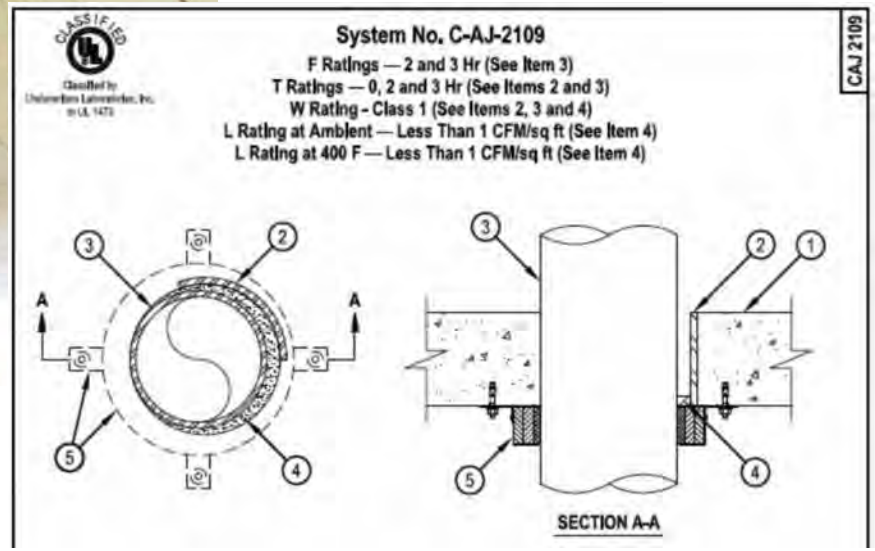
Photo: Alex Schreyer

Although not a new code requirement, more testing & information is becoming available on firestopping of penetrations through MT assemblies

Photos: AWC/FPInnovations

Most firestopping systems include combination of fire safing (eg. noncombustible materials such as mineral wool insulation) plus fire caulk





Photos: AWC/FPInnovations/Hilti

Inventory of Fire Tested Penetrations in MT Assemblies

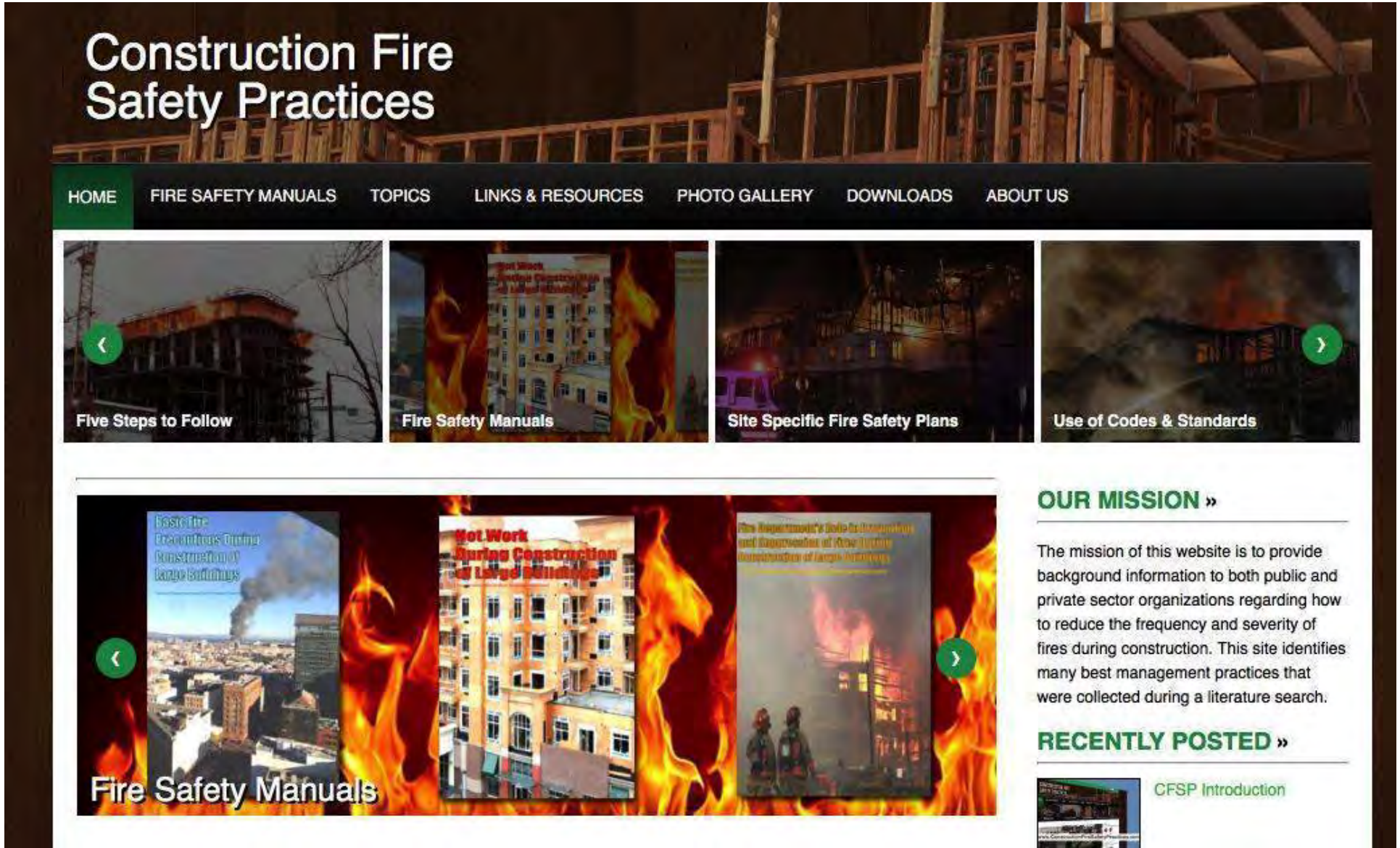
WoodWorks
WOOD PRODUCTS COUNCIL

Table 3: North American Fire Tests of Penetrations and Fire Stops in CLT Assemblies

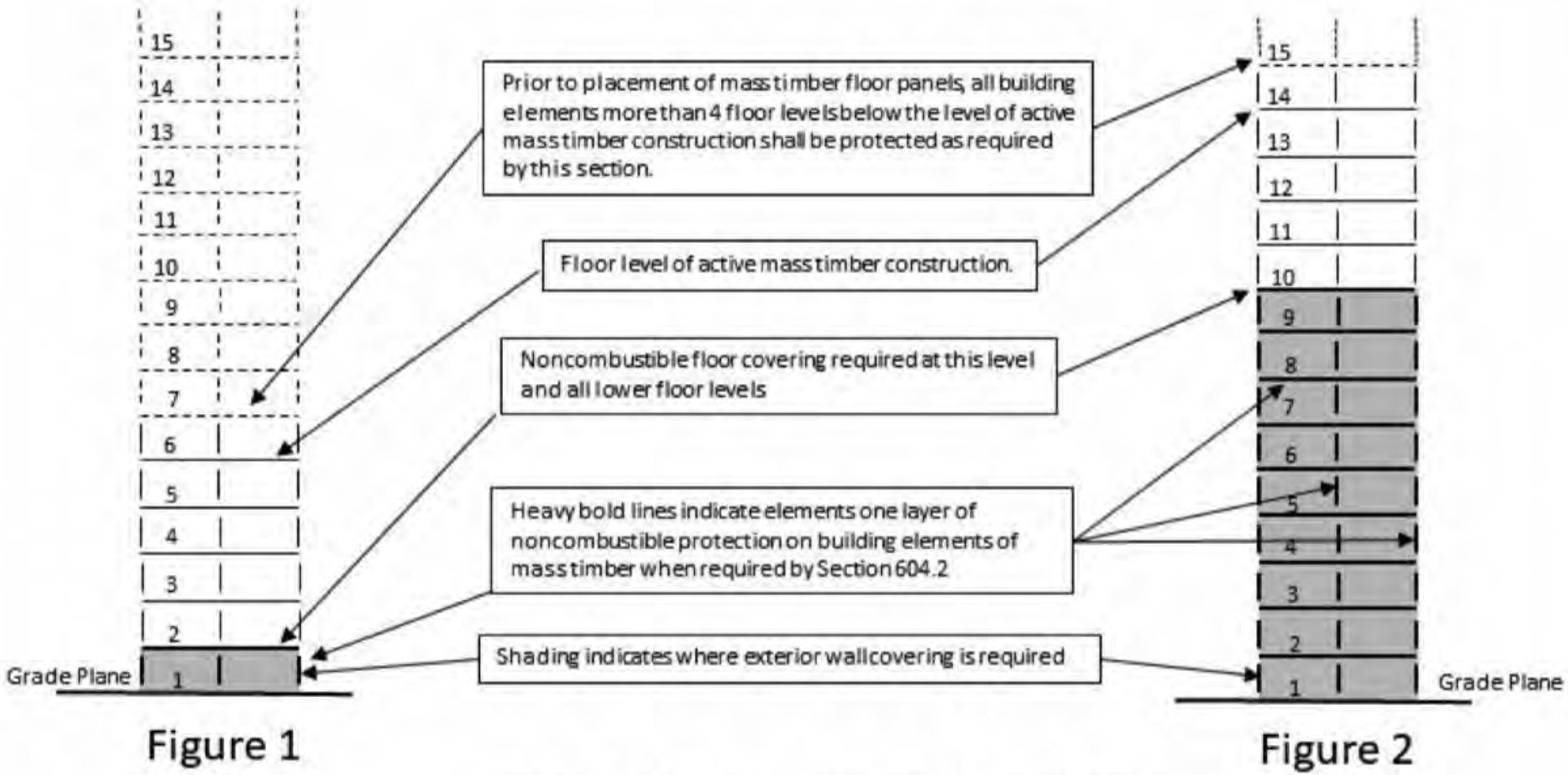
CLT Panel	Exposed Side Protection	Penetrating Item	Penetrant Centered or Offset in Hole	Firestopping System Description	F Rating	T Rating	Stated Test Protocol	Source	Testing Lab
3-ply (78mm 3.07")	None	1.5" diameter data cable bunch	Centered	3.5 in diameter hole. Mineral wool was installed in the 1in. annular space around the data cables to a total depth of approximately 2 – 5/64 in. The remaining 1in. annular space from the top of the mineral wool to the top of the floor assembly was filled with Hilti FS-One Max caulking.	1 hour	0.5 hour	CAN/ULC S115	26	Intertek March 30, 2016
3-ply (78mm 3.07")	None	2" copper pipe	Centered	4.375 in diameter hole. Pipe wrap was installed around the copper pipe to a total depth of approximately 2 – 5/64 in. The remaining 1in. annular space starting at the top of the mineral wool to the top of the floor assembly was filled with Hilti FS-One Max caulking.	1 hour	N.A.	CAN/ULC S115	26	Intertek March 30, 2016
3-ply (78mm 3.07")	None	2.5" sched. 40 pipe	Centered	4.92 in diameter hole. Pipe wrap was installed around the schedule 40 pipe to a total depth of approximately 2 – 5/64 in. The remaining 1in. annular space starting at the top of the pipe wrap to the top of the floor assembly was filled with Hilti FS-One Max caulking.	1 hour	N.A.	CAN/ULC S115	26	Intertek March 30, 2016
3-ply (78mm 3.07")	None	6" cast iron pipe	Centered	8.35 in diameter hole. Mineral wool was installed in the 1in. annular space around the cast iron pipe to a total depth of approximately 2 – 5/64 in. The remaining 1in. annular space starting at the top of the pipe wrap to the top of the floor assembly was filled with Hilti FS-One Max caulking.	1 hour	N.A.	CAN/ULC S115	26	Intertek March 30, 2016
3-ply (78mm 3.07")	None	Hilti 6 in drop in device. System No.: F-B-2049	Centered	9.01" diameter hole. Mineral wool was installed in the 1 – 1/4in. annular space around the drop-in device to a total depth of approximately 1 – 7/64in and the remaining 1in. annular space from the top of the mineral wool to the top edge of the 9 – 1/64in. hole in the CLT was filled with Hilti FS-One Max caulking.	1 hour	0.75 hour	CAN/ULC S115	26	Intertek March 30, 2016
5-ply CLT (131mm 5.16")	None	1.5" diameter data cable bunch	Centered	3.5" diameter hole. Mineral wool was installed in the 1in. annular space around the data cables to a total depth of approximately 4 – 5/32 in. The remaining 1in. annular space from the top of the mineral wool to the top of the floor assembly was filled with Hilti FS-One Max caulking.	2 hours	1.5 hours	CAN/ULC S115	26	Intertek March 30, 2016
5-ply CLT (131mm 5.16")	None	2" copper pipe	Centered	4.375 in diameter hole. Pipe wrap was installed around the copper pipe to a total depth of approximately 4 – 5/32 in. The remaining 1in. annular space starting at the top of the mineral wool to the top of the floor assembly was filled with Hilti FS-One Max caulking.	2 hours	N.A.	CAN/ULC S115	26	Intertek March 30, 2016
5-ply CLT (131mm 5.16")	None	2.5" sched. 40 pipe	Centered	4.92 in diameter hole. Pipe wrap was installed around the schedule 40 pipe to a total depth of approximately 4 – 5/32 in. The remaining 1in. annular space starting at the top of the pipe wrap to the top of the floor assembly was filled with Hilti FS-One Max caulking.	2 hours	0.5 hour	CAN/ULC S115	26	Intertek March 30, 2016
5-ply CLT (131mm 5.16")	None	6" cast iron pipe	Centered	8.35 in diameter hole. Mineral wool was installed in the 1in. annular space around the cast iron pipe to a total depth of approximately 4 – 5/32 in. The remaining 1in. annular space starting at the top of the pipe wrap to the top of the floor assembly was filled with Hilti FS-One Max caulking.	2 hours	N.A.	CAN/ULC S115	26	Intertek March 30, 2016
5-ply CLT (131mm 5.16")	None	Hilti 6 in drop in device. System No.: F-B-2049	Centered	9.01" diameter hole. Mineral wool was installed in the 1 – 1/4in. annular space around the drop-in device to a total depth of approximately 1 – 7/64in and the remaining 1in. annular space from the top of the mineral wool to the top edge of the 9 – 1/64in. hole in the CLT was filled with Hilti FS-One Max caulking.	2 hours	1.5 hours	CAN/ULC S115	26	Intertek March 30, 2016
5-ply (175mm 6.875")	None	1" nominal PVC pipe	Centered	4.21 in diameter with a 3/4 in plywood reducer flush with the top of the slab reducing the open in Firestop wrap strip at two locations with a 30 gauge steel sleeve which extended from the top of t with the bottom of the wrap strip flush with the bottom of the steel sleeve and the second was wi of the slab. The void between the steel sleeve and the CLT and between the steel sleeve and pipe a leaving a 3/4 in deep void at the top of the assembly. Hilti FS-One Max Intumescent Firestop Sealant was applied to a depth of 3/4 in on the top of the assembly between the plywood and steel sleeve as well as the steel sleeve and pipe.					

Free download at woodworks.org

ConstructionFireSafetyPractices.com



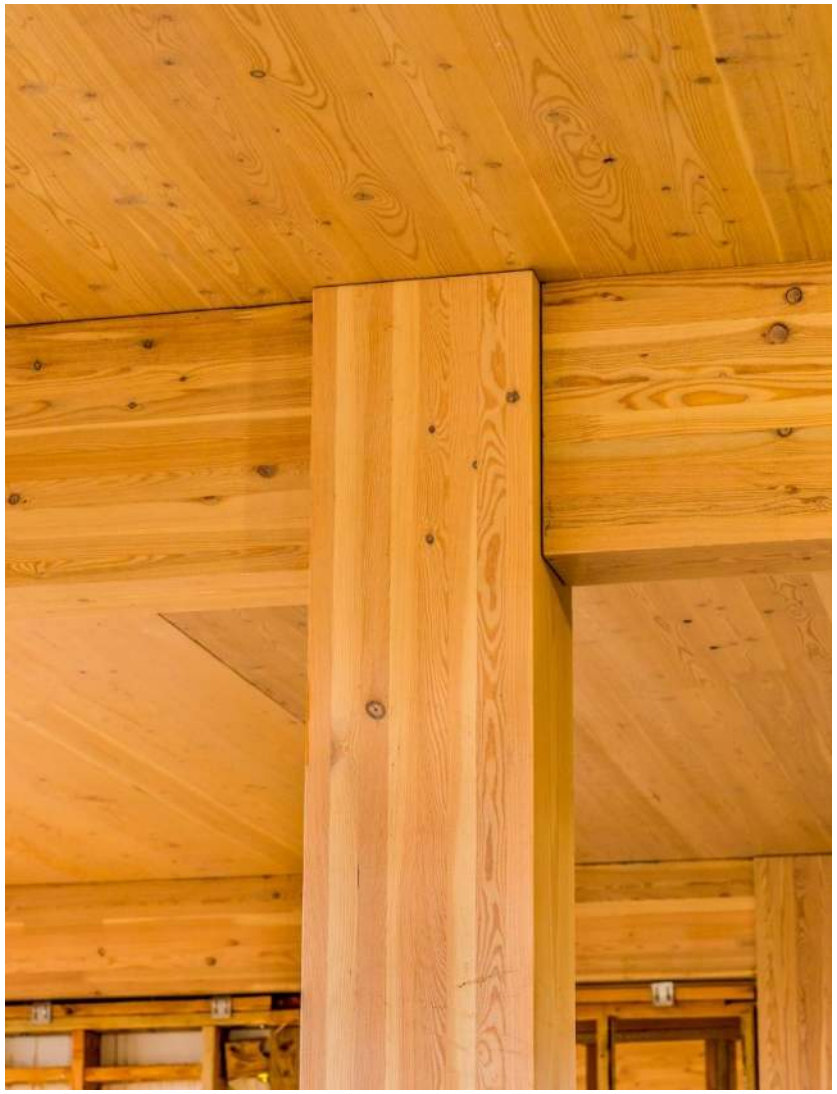
2021 IBC Construction Fire Safety for Tall Mass Timber



Examples of Protection During Construction For Mass Timber Buildings Greater Than 6 Stories Above Grade Plane

Credit: ICC

MASS TIMBER: STRUCTURE IS FINISH



Photos: Baumberger Studio/PATH Architecture/Marcus Kauffman | Architect: PATH Architecture

BY ITSELF, NOT ADEQUATE FOR ACOUSTICS

T3 Minneapolis
Architect: MGA I Michael Green Architecture, DLR Group
Structural Engineer: Magnusson Klemencic Associates
Design Assist + Build: StructureCraft

Photo: Corey Gaffer courtesy Perkins + Will

TABLE 1:

Examples of Acoustically-Tested Mass Timber Panels

Mass Timber Panel	Thickness	STC Rating	IIC Rating
3-ply CLT wall[4]	3.07"	33	N/A
5-ply CLT wall[4]	6.875"	38	N/A
5-ply CLT floor[5]	5.1875"	39	22
5-ply CLT floor[4]	6.875"	41	25
7-ply CLT floor[4]	9.65"	44	30
2x4 NLT wall[6]	3-1/2" bare NLT 4-1/4" with 3/4" plywood	24 bare NLT 29 with 3/4" plywood	N/A
2x6 NLT wall[6]	5-1/2" bare NLT 6-1/4" with 3/4" plywood	22 bare NLT 31 with 3/4" plywood	N/A
2x6 NLT floor + 1/2" plywood[2]	6" with 1/2" plywood	34	33

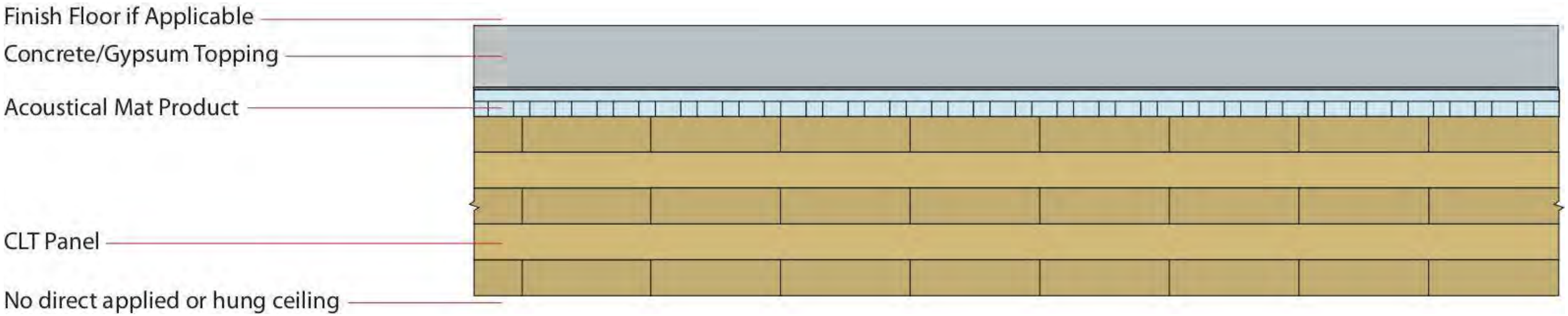
Source: Inventory of Acoustically-Tested Mass Timber Assemblies, WoodWorks[7]

Concrete Slab:
6” Thick
80 PSF
STC 53

CLT Slab:
6-7/8” Thick
18 PSF
STC 41

There are three main ways to improve an assembly's acoustical performance:

1. Add mass
2. Add noise barriers
3. Add decouplers



Common mass timber floor assembly:

- Finish floor (if applicable)
- Underlayment (if finish floor)
- 1.5” to 4” thick concrete/gypcrete topping
- Acoustical mat
- WSP (if applicable)
- Mass timber floor panel exposed on ceiling side

Image credit: AcoustiTECH

MASS TIMBER ACOUSTICS DESIGN RESOURCE

WoodWorks™
WOOD PRODUCTS COUNCIL

Acoustics and Mass Timber: Room-to-Room Noise Control

Richard McLain, PE, SE • Senior Technical Director • WoodWorks

T3 Minneapolis
Architect: MGA | Michael Green Architecture, DLR Group
Structural Engineer: Magnusson Klemencic Associates
Design Assist + Build: StructureCraft

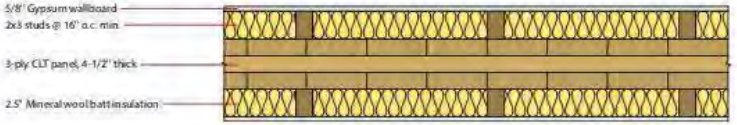
The growing availability and code acceptance of mass timber—i.e., large solid wood panel products such as cross-laminated timber (CLT) and nail-laminated timber (NLT)—for floor, wall and roof construction has given designers a low-carbon alternative to steel, concrete, and masonry for many applications. However, the use of mass timber in multi-family and commercial buildings presents unique acoustic challenges.

While laboratory measurements of the impact and airborne sound isolation of traditional building assemblies such as light wood-frame, steel and concrete are widely available, fewer resources exist that quantify the acoustic performance of mass timber assemblies. Additionally, one of the most desired aspects of mass timber construction is the ability to leave a building's structure exposed as finish, which creates the need for asymmetric assemblies. With careful design and detailing, mass timber buildings can meet the acoustic performance expectations of most building types.

http://www.woodworks.org/wp-content/uploads/wood_solution_paper-MASS-TIMBER-ACOUSTICS.pdf

FIGURE 3:
Interior CLT partition wall with chase walls on both sides

Example Mass Timber Wall Assembly, STC 58
Plan View



Source: US CLT Handbook

Mass Timber Assembly Options: Walls

Mass timber panels can also be used for interior and exterior walls—both bearing and non-bearing. For interior walls, the need to conceal services such as electrical and plumbing is an added consideration. Common approaches include building a chase wall in front of the mass timber wall or installing gypsum wallboard on resilient channels that are attached to the mass timber wall. As with bare mass timber floor panels, bare mass timber walls don't typically provide adequate noise control, and chase walls also function as acoustical improvements. For example, a 3-ply CLT wall panel with a thickness of 3.07" has an STC rating of 33.[4] In contrast, Figure 3 shows an interior CLT partition wall with chase walls on both sides. This assembly achieves an STC rating of 58, exceeding the IBC's acoustical requirements for multi-family construction. Other examples are included in the inventory of tested assemblies noted above.

Acoustical Differences between Mass Timber Panel Options

The majority of acoustically-tested mass timber assemblies include CLT. However, tests have also been done on other mass timber panel options such as NLT and dowel-laminated timber (DLT), as well as traditional heavy timber options such as tongue and groove decking. Most tests have concluded that CLT acoustical performance is slightly better than that of other mass timber options, largely because the cross-orientation of laminations in a CLT panel limits sound flanking.

For those interested in comparing similar assemblies and mass timber panel types and thicknesses, the inventory noted above contains tested assemblies using CLT, NLT, glued-laminated timber panels (GLT), and tongue and groove decking.

Improving Performance by Minimizing Flanking

Even when the assemblies in a building are carefully designed and installed for high acoustical performance, consideration of flanking paths—in areas such as assembly intersections, beam-to-column/wall connections, and MEP penetrations—is necessary for a building to meet overall acoustical performance objectives.

One way to minimize flanking paths at these connections and interfaces is to use resilient connection isolation and sealant strips. These products are capable of resisting structural loads in compression between structural members and connections while providing isolation and breaking hard, direct connections between members. In the context of the three methods for improving acoustical performance noted above, these strips act as decouplers. With airtight connections, interfaces and penetrations, there is a much greater chance that the acoustic performance of a mass timber building will meet expectations.

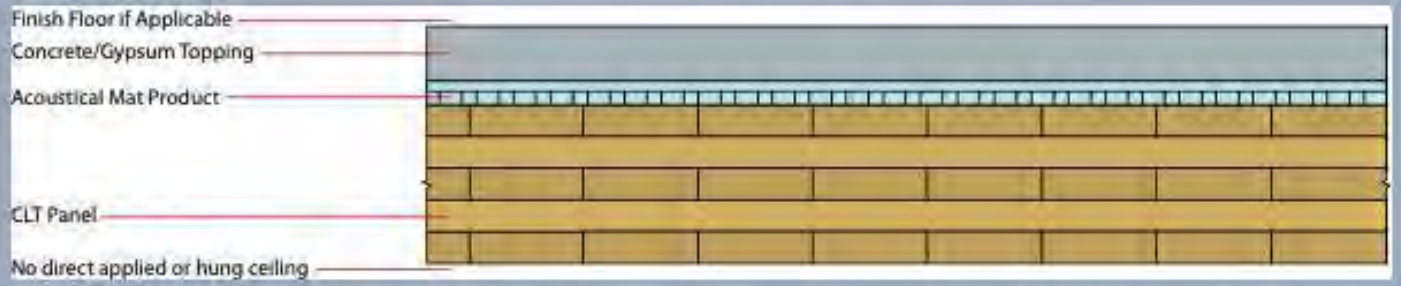
Acoustical isolation strips

Photos: Portfolios

WoodWorks Inventory of Acoustically Tested MT Assemblies

Table 1: CLT Floor Assemblies with Concrete/Gypsum Topping, Ceiling Side Exposed

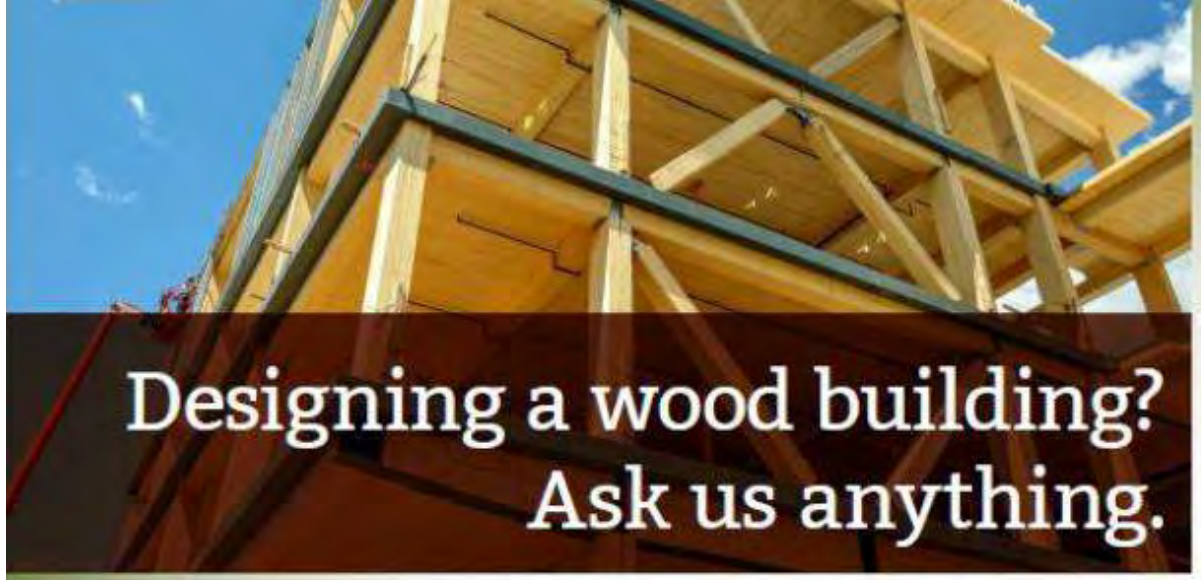
WoodWorks
WOOD PRODUCTS COUNCIL



CLT Panel	Concrete/Gypsum Topping	Acoustical Mat Product Between CLT and Topping	Finish Floor	STC[1]	IIC[1]	Source
CLT 5-ply (6.875")	1-1/2" Gyp-Crete®	Maxxon Acousti-Mat® 3/4	None	47[2] ASTC	47[2] AIIC	1
			LVT	-	49[2] AIIC	
			Carpet + Pad	-	75[2] AIIC	
			LVT on Acousti-Top®	-	52[2] AIIC	
			Eng Wood on Acousti-Top®	-	51[2] AIIC	
			None	49[2] ASTC	45[2] AIIC	
		USG SAM N25 Ultra	LVT	48[6]	47[6]	16
			LVT Plus	48[6]	49[6]	58
			Eng Wood	47[6]	47[6]	59
	1-1/2" Levelrock®		LVT	48[6]	44[6]	16

More than 400 Tested Assemblies

Free download at woodworks.org



Designing a wood building?
Ask us anything.

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FREE PROJECT SUPPORT | EDUCATION | RESOURCES

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WoodWorks™

WOOD PRODUCTS COUNCIL

WoodWorks can help connect you with:

Manufacturers

Suppliers

Distributors

Experienced Designers, Contractors, Installers

And Much More

Questions?

This concludes The American Institute of Architects Continuing Education Systems Course

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Regional Director
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Fisheries Supply
Marine Supplies Since 1928

Camp Muir
Ceiling Mounted Hook

RONSTAN

Heavy Duty Pad Eye - Round Base - 4 X M6 (1/14″) Holes

SKU: 378627 | **Item ID:** RON RF2429-06

- Stainless Steel

Description

The Ronstan Heavy Duty Pad Eye - Round Base is a robust marine hardware component designed for demanding nautical applications.

- Constructed from high-grade 316 stainless steel for superior corrosion resistance in marine environments.
- Features a round base design that provides maximum surface area contact for secure mounting and load distribution.
- Round base allows for versatile mounting on flat surfaces, providing multiple attachment points and load-bearing capabilities.
- Engineered for heavy-duty applications, suitable for rigging, sailing, marine construction, and industrial marine uses.
- Precision-machined to ensure structural integrity and consistent performance under high-stress conditions.
- Polished and passivated finish enhances both aesthetic appeal and long-term corrosion protection.
- Designed to withstand significant working loads while maintaining structural reliability in challenging maritime conditions.
- Compatible with various fastening methods, including through-bolting and welding, depending on specific application requirements.
- Ideal for use on boats, marine structures, industrial equipment, and other applications requiring a strong, reliable attachment point.
- Meets or exceeds marine industry standards for material quality and performance.

Specifications

MFG #: RF2429-06 | **Holes** 4 X M6 (1/14″)

B	5/16″
BL	8800 lb
D	2″

JM EPDM R 75 mil

Camp Muir Climbing Shelter
Primary Roof Membrane (fully adhered to NLT)

Polyester-Reinforced
Ethylene Propylene Diene Monomer Membrane

Meets the requirements of ASTM D 4637, Type II

Component
M
Membrane
Single Ply

Features and Components

Membrane: Cured EPDM (ethylene propylene diene monomer) reinforced with a tough 1,000+ denier polyester mat. Excellent puncture and hail resistance.

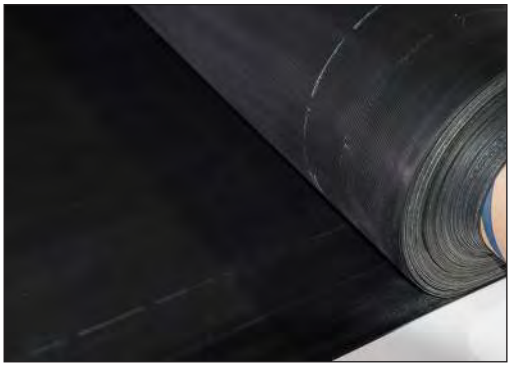
Fully Extruded: Produces fewer air voids, more uniform thickness and smoother sheets.

Vulcanization Process: Combines two layers of membrane to produce a fully cross-linked monolithic membrane.

Polymer Formulation: Performs in extreme temperature climates and withstands differential movement (elongation).

UV-Stabilization Properties: Offers outstanding ozone and weather resistance delivering one of the longest service lives available.

Technical Expertise: Backed by 30+ years of EPDM experience and installations.



Color

Black

System Compatibility

This product may be used as a component in the following systems. Please reference product application for specific installation methods and information.

Multi-Ply	BUR		APP		SBS			
	HA	CA	CA	HW	HA	CA	HW	SA
	Do not use with Multi-Ply systems							

Single Ply	TPO		PVC		EPDM		
	MF	FA	MF	FA	MF	FA	BA
	Compatible with the selected Single Ply systems above						

Key: **HA** = Hot Applied **CA** = Cold Applied **HW** = Heat Weldable **SA** = Self Adhered **MF** = Mechanically Fastened **FA** = Fully Adhered **BA** = Ballasted

Energy and the Environment

Property	Value
Reflectivity* (ASTM C 1549)	0.06
Emissivity* (ASTM C 1371)	0.88
Post-consumer Recycled Content	0%
Pre-Consumer Recycled Content	0%

*Test methods for reflectivity and emissivity are LEED®- and CRRC®-approved.

Peak Advantage® Guarantee Information

Enhanced guarantees are now available on certain systems for wind and puncture. Consult your local sales representative for more information and for specific guarantee terms and costs.

Product	Guarantee Term
When used in most JM EPDM Systems*	Up to 25 years

*Contact JM Technical Services for specific systems.

Codes and Approvals

CLASSIFIED C UL US

FM APPROVED

Installation/Application

Ballasted Adhered Mechanically Fastened

Refer to JM EPDM Application Guides and Detail Drawings for instructions.

Packaging and Dimensions

Roll Size	10' x 100' (3.05 m x 30.48 m)
Roll Coverage	1000 ft² (92.66 m²)
Extruded In:	Milan, OH

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

JM EPDM R 75 mil

Polyester-Reinforced Ethylene Propylene Diene Monomer Membrane

Meets the requirements of ASTM D 4637, Type II

Tested Physical Properties

Physical Properties		ASTM Test Method	Standard for ASTM D 4637, Type II	JM EPDM – R 75 mil
Strength	Breaking Strength (lbf)	D 751 A	> = 90	287
	Elongation at Fabric Break, Ultimate (%)	D 751 A	> = 15	MD 35, XMD 36*
	Elongation, Ultimate (%)	D 412	> = 250	482
	Tear Strength (lbf)	D 751 B	> = 10	104
	Dynamic Puncture Resistance, 10J, Type II	D 5635	pass	pass
	Static Puncture Resistance, 55.1 lbf, Type II	D 5602	pass	pass
Longevity	Overall Sheet Thickness (in.)	D 751	+/- 10%	pass
	Thickness Over Scrim, Weathering Side (in.)	D 7635	0.015	0.033
	Brittleness Point (°F)	D 2137	< = -49	pass
	Ozone Resistance	D 1149	pass	pass
	Water Absorption (mass %)	D 471	< = 8	0.1
Heat Aged Performance	Heat Aged 670 hrs @ 240°F	D 573		
	Breaking Strength (lbf)	D 751	> = 80	297
	Elongation, Ultimate (%)	D 412	> = 200	284
	Linear Dimensional Change (%)	D 1204	< ± 1	0.02
Weathering Performance	Weathering Resistance, 5040 KJ/(m2-nm) @ 340 nm	D 4637 / G 151 / G 155		
	Visual Inspection	–	pass	pass

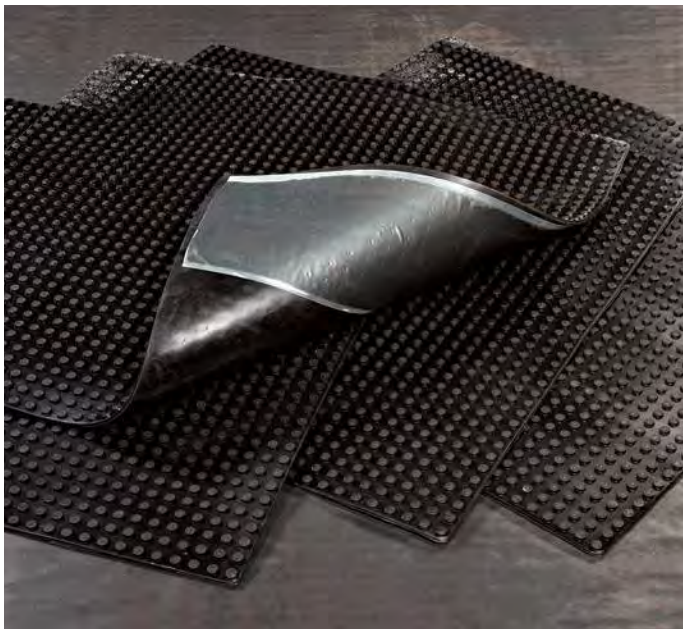
* MD = Machine Direction
XMD = Cross-Machine Direction

Refer to the Safety Data Sheet and product label prior to using this product. The Safety Data Sheet is available by calling (800) 922-5922 or on the Web at www.jm.com/roofing.

CARLISLE SYNTEC SYSTEMS

Sure-Seal® EPDM
Pressure-Sensitive Molded Walkway Pads

Camp Muir Climbing Shelter
Roof Membrane Protection Layer (under roof gabions)



Overview

Carlisle's Sure-Seal EPDM Pressure-Sensitive (PS) Molded Walkway Pads are designed to protect the membrane in those areas exposed to repetitive foot traffic.

Walkways must be installed at all traffic concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.) regardless of traffic frequency Walkways must also be installed if regular maintenance (once a month or more) is necessary to service rooftop equipment.

Features and Benefits

- Excellent tear and puncture resistance
- UV resistance
- Slip resistance

Installation

1. The entire surface where the PS Molded Walkway Pad will be applied must be clean. The adhesive on the back of the PS Molded Walkway Pad will not adhere to dusted or dirty surfaces. Any residual contamination will be detrimental to the bond strength of the adhesive.
2. Remove all foreign material.
   a. Remove excess mica dust by brooming or wiping with a clean, dry rag or Carlisle HP Splice Wipe.
   b. The use of Weathered Membrane Cleaner may be necessary. This process is essential on membrane that has been exposed for a number of weeks.

      Note: Permeation-resistant gloves (that meet ANSI/ISEA 105-2005) are required for hand protection when cleaners or primers are being used.
   c. Allow the membrane to dry thoroughly before proceeding.
3. Application of HP-250 or Low-VOC EPDM Primer
   a. Standard Membrane - Apply the primer with a clean HP Splice Wipe (or equivalent). Scrub the area of the membrane (where the PS Molded Walkway Pad is to be applied) in a circular motion to achieve a thin, even coating on the membrane. The properly cleaned/primed area will be uniform in color without streaks and free of globs or puddles.
   b. Pre-Kleened™ Membrane - Roller-apply the primer to the membrane with a short nap-length paint roller. The coated area will be free of globs or puddles.

      Note: The use of excessive amounts of primer will not significantly enhance the adhesion of the PS Molded Walkway Pad to the EPDM membrane. Use only the amount necessary to obtain 100% coverage of the area where the PS Molded Walkway Pad will be applied.
4. Allow the primer to properly flash off until it does not transfer to a dry finger touch. Install the PS Molded Walkaway Pads as soon as the primer flashes off to minimize potential dust contamination and promote adhesion in colder weather.
5. Allow a 1"-wide (25 mm) gap between PS Walkway Pads. Discontinue Walkways over field splices allowing a minimum 1" (25 mm) gap.

Review Carlisle specifications and details for complete installation information.

CARLISLE SYNTEC SYSTEMS

Sure-Seal EPDM
Pressure-Sensitive Molded Walkway Pads

Precautions

- The product is to be used as a walkway only and is not designed as a substitute for ballast.
- PS Molded Walkway Pads cannot be installed within 10' (3 m) of the roof perimeter or on projects that exceed 50' (15 m) in height for Design “B” systems. Concrete pavers may be used in these areas.
- When installing walkways in conjunction with ballast, avoid the entrapment of small ballast below walkways. Also, avoid excessive application of primer on ballasted systems installed over EPS insulation.
- PS Molded Walkway Pads are a maintenance item and are not covered under the Carlisle membrane systems warranty.

Typical Properties and Characteristics

Color	Black or Gray
Total Pad Thickness	0.375" (9 mm) +/- 10%
Tensile Strength, psi ASTM D412 Unaged	500
Tear Resistance, ibf/in ASTM D624 Unaged	250
Size	30" x 30" (750 mm x 750 mm)
Packaging	50 per skid
Weight	10 lbs. each

Typical properties and characteristics are based on samples tested and are not guaranteed for all samples of this product. This data and information is intended as a guide and does not reflect the specification range for any particular property of this product.

LEED® Information

Pre-consumer Recycled Content	100%
Post-consumer Recycled Content	0%
Manufacturing Location	Carlisle, PA Greenville, IL
Solar Reflectance Index (SRI)	N/A

800-479-6832 | P.O. Box 7000 | Carlisle, PA 17013 | Fax: 717-245-7053 | **www.carlislesyntec.com**

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REPRINT CODE: 603144 EPDM-1098 - “Sure-Seal EPDM Pressure-Sensitive Molded Pads Product Data Sheet”

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VaproShield®
Breathable Membrane Systems for Roofs & Walls

Camp Muir Climbing Shelter
Floor Slab Protection Layer (Slopeshield SA on top of NLT floor slab, under sports flooring)

Mass Timber Moisture Protection

vapor permeable membranes for comprehensive mass timber moisture protection during and after construction. Roof Deck/Floor Deck Protection: SlopeShield Plus Self-Adhered, Framework Protection: WallShield IT, Wall WRB/Air Barrier: PanelShield SA

Wall Slab Protection Layer (Panelshield SA on exterior walls, under gabion system)

Product Description

SlopeShield Plus Self-Adhered roofing underlayment offers permanent mass timber roof deck/floor deck protection by allowing vapor to pass through (breathable) but not air or liquid water.

WallShield IT Integrated Tape water resistive barrier (WRB) membrane offers mass timber post, column, and beam protection by allowing vapor and air to pass through but not liquid water.

PanelShield SA is a permeable polyester air barrier (AB) and water resistive barrier (WRB) sheet membrane offers permanent protection for exterior walls by allowing vapor to escape through but not air or liquid water.

Basic Use

SlopeShield Plus SA is installed on the roof deck/floor deck as the structure is erected and taped using VaproTape on the seams. The underlayment can be installed on a low slope (1/4":12 to 2:12) assembly or a steep slope (2:12 or greater) assembly.

WallShield IT is wrapped around post/columns and beams, and uses VaproTape at the seams.

PanelShield SA is designed for exterior walls with rainscreen cladding materials. VaproShield offers additional WRB air barrier membranes for walls including open joint cladding, see individual product data sheets.

Materials

SlopeShield Plus SA: spun-bond polyester

WallShield IT: multiple layers of spun-bonded polypropylene

PanelShield SA: spun-bond polyester

Benefits

All **SlopeShield Plus SA, WallShield IT, and PanelShield SA** offer the following benefits to protect mass timber in the factory and through construction and occupancy:

- Resists bulk water intrusion
- **Dries mass timber** through moisture vapor diffusion
- May be **installed on damp surfaces**
- **Tough** and **durable** to tools, foot traffic, and machinery
- **Six to 12 months** UV and climate exposure
- Self-adhered membranes **do not require primer**
- **Simple installation** – requires only basic tools
- **Zero VOC exposure**

SlopeShield Plus SA and PanelShield SA benefits:

- **Monolithic sheet goods** covering entire mass timber roof deck/floor deck versus simple taped splines which offer little to protection or drying capacity, resulting in water damage and mold
- **Consistent millage thickness** – a factory-made rolled good ensures consistent properties and performance
- **Airtight barrier** – stops air infiltration as per the ASTM E2178 air permeance material test and meets energy code
- **Tested to industry standards** for air barrier, water resistive barriers and roofing underlayment

WallShield IT post/column and beam benefits:

- **Reduces structural compromise** from wetting
- **Cutting-edge drying capacity**, promotes rapid drying
- **Easily removed**, reused for other post/columns and beams, or recycled

Compatible Substrates

- All mass timber types:
- Cross-laminated timber (CLT)
- Nail-laminated timber (NLT)
- Dowel-laminated timber (DLT)
- Vertically laminated veneer lumber (LVL)
- Glue-laminated timber (GLT)
- Laminated strand lumber (LSL)
- Timber-concrete composites (TCC)
- Parallel strand lumber (PSL)
- Mass plywood panel (MPP)

For additional substrates view individual product data sheets or contact VaproShield Technical.

Wall and Roofing System Compatibility

View individual product data sheets.
Contact VaproShield Technical if you have any additional substrate or compatibility questions.

Applications

Mass timber post/columns, roof decks/floor decks, and walls. View individual product data sheets for additonal application information.

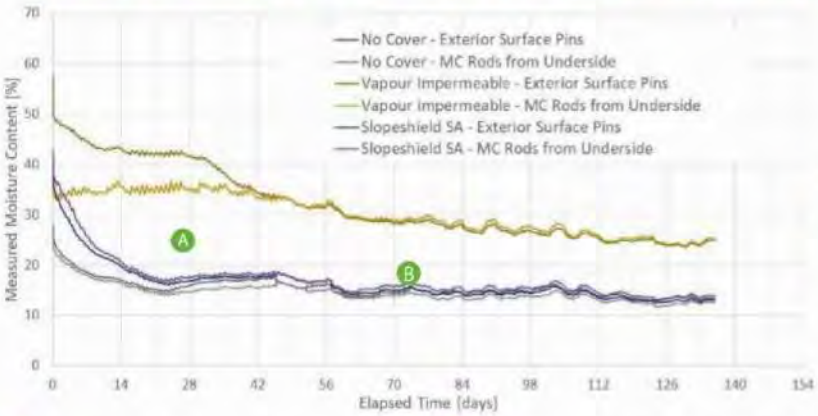
Availability

VaproShield products are available throughout North America, Central and South America, and New Zealand.

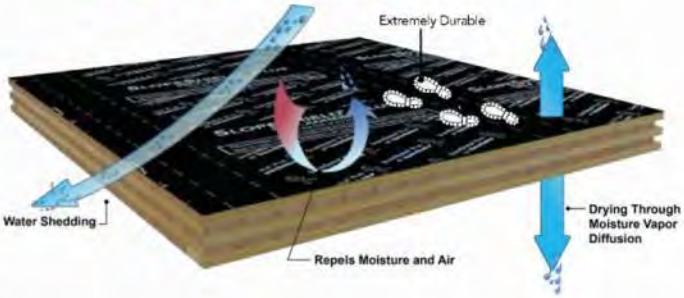
Warranty

A 20-year material warranty is available.

Comprehensive Mass Timber Moisture Protection



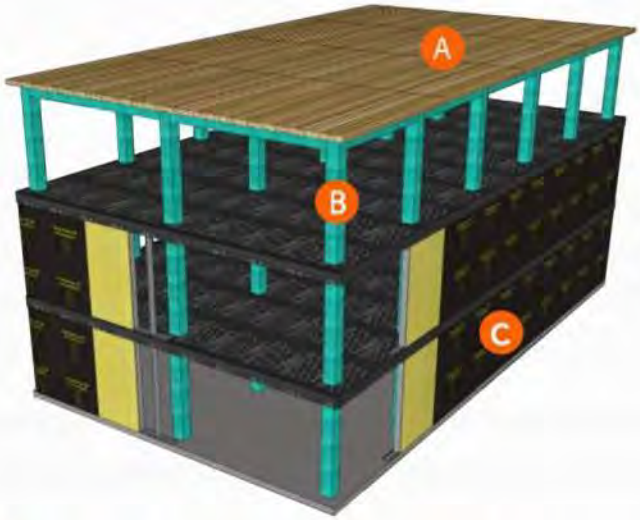
SlopeShield Plus SA



A In a drying study, conducted by RDH Building Science Laboratories, SlopeShield Plus SA allowed a wet (42% moisture content) mass timber panel to dry to **below 20% moisture content in 14 days.**

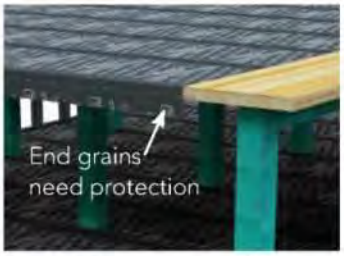
B At 60 days the SlopeShield Plus SA has **maintained** the mass timber panel **moisture content** at **15%,** while the impermeable membrane, with little drying capacity, shows a moisture content at 30%, clearly in the danger zone for decay, mold, and staining to occur.

Slopeshield Plus SA vapor permeable moisture protection **does not inhibit drying**. The design allows **moisture vapor to escape** while concurrently **blocking liquid water and air**, compared to a vapor barrier that can indefinitely delay drying and trap moisture, causing unseen rot and decay.



A

Install SlopeShield Plus SA over mass timber roof deck/ floor deck to protect it from moisture intrusion and construction damage. Tape all seams using VaproTape.



End grains are especially susceptible to water intrusion. By allowing SlopeShield Plus SA to overhang the structure, end grains are protected when water is squeegeed off the deck.

B

Wrap post/columns and beams with WallShield IT to protect against moisture intrusion and construction damage. Use VaproTape to hold seams together when required.

C

As the wall substrate is erected install a VaproShield continuous vapor permeable air barrier to protect walls and rough openings.

PHYSICAL PROPERTIES			
PROPERTY	SlopeShield Plus Self-Adhered	WallShield IT Integrated Tape	PanelShield SA
Color	Black with White Lettering (top)	Green (top), White (back)	Black/Yellow
Thickness	0.51 mm (20 mil)	0.56 mm (22 mil)	0.45 mm (18 mil)
Membrane Weight	447 g/m² (1.46 oz/ft2)	191.4 g/m2 (0.627 oz/ft2)	355.64 g/m2 (1.17 oz/ft2)
Roll Weight	50.6 lbs (23.0 kg)	34 lbs (15 kg)	48.6 lbs (22 kg)
Roll Dimensions	59" x 102' (1.5 m x 31.1 m)	59" x 164' (1.5m x 50m)	59" x 102' (1.5m x 31.1m)
Roll Coverage	500 ft² (46.6 m²)	807 ft² (75 m²)	500 ft2 (46.65 m2)
Skid	25 rolls	20 rolls	25 rolls
Field Exposure Before Enclosed or Permanent Cladding/Roofing System	180 days (6 months)	180 days (6 months)	12 months
Minimum Application Temperature	20°F (-6°C)	Unlimited	20° F (-6 C)
Service Temperature	minus 40°F (-40°C) - 250°F (121°C)	minus 40°F (-40°C) - 183°F (84°C)	minus 40°F (-40°C) to 250°F (121°C)

Testing

Tested to industry standards for vapor permeable roofing underlayment air barrier materials.
View individual product data sheets for industry standard testing data.

Installation

STORAGE AND HANDLING

Store materials on end in original packaging at temperatures between 40°F and 120°F (4.4°C and 48.9°C). Protect materials from direct sunlight and inclement weather until ready for use.

SAFETY

CAUTION: Release liners are slippery. To prevent injury, liner should be removed from under foot as soon as membrane is installed and disposed of properly.

Work crews are safe around VaproShield membranes they contain zero VOCs or toxins.

Persons who access any roofs, involved with roof construction, repair or maintenance shall use appropriate personal protective equipment including, but not limited to, hard hats, eye protection, and leather gloves and must be trained on safe practices relevant to their work.

Where the use of ladders, scaffolds, platforms, or temporary floors are utilized, safety lines and safety harnesses shall be used. Please access the OSHA Web site at www.osha. gov, contact your local OSHA office, or visit the local federal bookstore to obtain the most current information on OSHA 29 CFR 1926.

PREPARATION

For self-adhered membranes all surfaces must be dry, sound, clean, "as new" condition, and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the roofing underlayment or WRB air barrier. Fill voids and gaps in substrate greater than ½" (12.7 mm) in width to provide an even surface.

BEST PRACTICE INSTALLATION

SlopeShield Plus SA

Install SlopeShield Plus SA over mass timber roof deck/floor deck, tape all seams using VaproTape.

Protect base of post/columns by cutting SlopeShield Plus SA to post/column base width and wrap around the base of the post/column. Remove release film and adhere to roof deck/floor deck and up posts/columns to the height of the topping slab surface. Cut strips of SlopeShield Plus SA and notch to protect corners. Remove release film and adhere to roof deck/floor deck and post/column. Use VaproTape to cover all seams and edges of the SlopeShield Plus SA.

WallShield IT

Wrap post/columns and beams with WallShield IT to protect against moisture intrusion and construction damage. Use VaproTape to hold seams together when required.

PanelShield SA

All overlaps must be a minimum of 3" (8 cm) on vertical and horizontal seams. Inside and outside vertical corner overlaps should be a minimum 6" (15 cm) in both directions, staggered a minimum of 24" (61 cm), and should not occur directly above or below windows or doors. Use a roller to activate pressure-sensitive adhesive.

Visit VaproShield.com for complete installation instructions and details.

LIMITATIONS

SlopeShield Plus Self-Adhered should be covered within 180 (6 months) of installation with permanent roofing/flooring material. Minimum recommended application temperature of 20˚F (- 6.0˚C) and rising.

PanelShield SA should be covered with cladding within 12 months of field assembly. Minimum field assembly recommended installation temperature of 20˚ F (- 6.0˚ C) and rising.

If desired adhesion is not attained between membranes due to site conditions, VaproShield recommends applying a bead of VaproBond as an additional solution to pressure rolling.

COMPREHENSIVE MASS TIMBER MOISTURE PROTECTION

VAPROSHIELD®
Breathable Membrane Systems for Roofs & Walls

A FLOORS

SlopeShield Plus Self-Adhered is designed to protect mass timber floors and decks and remains permanently installed.

B FRAMEWORK

*WallShield IT provides **temporary protection** of vulnerable mass timber structural elements such as columns and beams.*

C WALLS

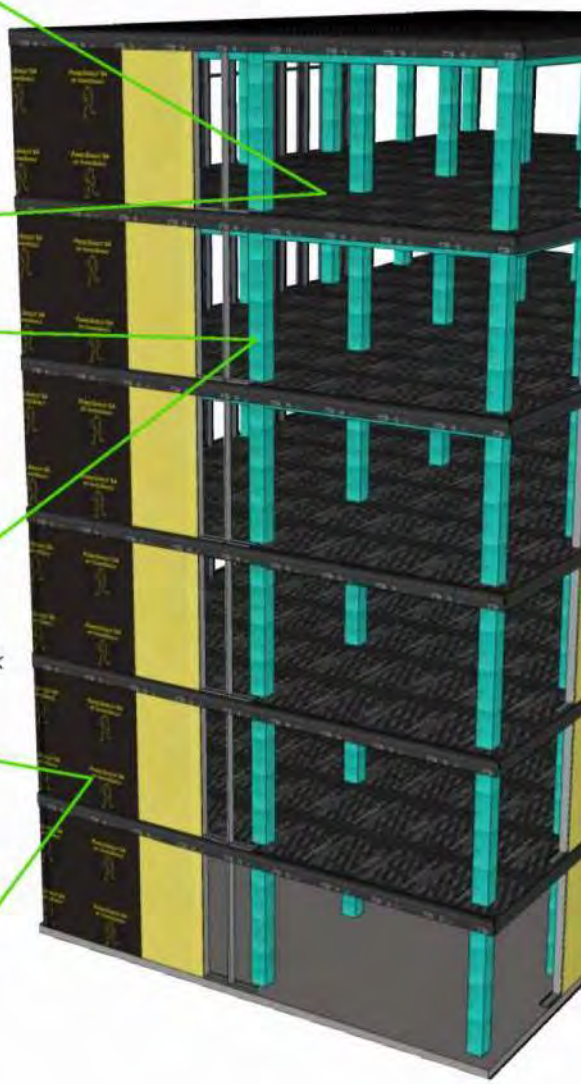
PanelShield SA guards walls from damaging moisture intrusion and remains permanently installed.

MASS TIMBER PROTECTION

The Heartwood, Seattle, WA

The Aliki Perroti and Seth Frank Lyceum, Amherst, MA

400 W Elm, Conshohocken, PA



SLOPESHIELD® PLUS
SELF-ADHERED

WALLSHIELD® IT
INTEGRATED TAPE

PANELSHIELD™ SA

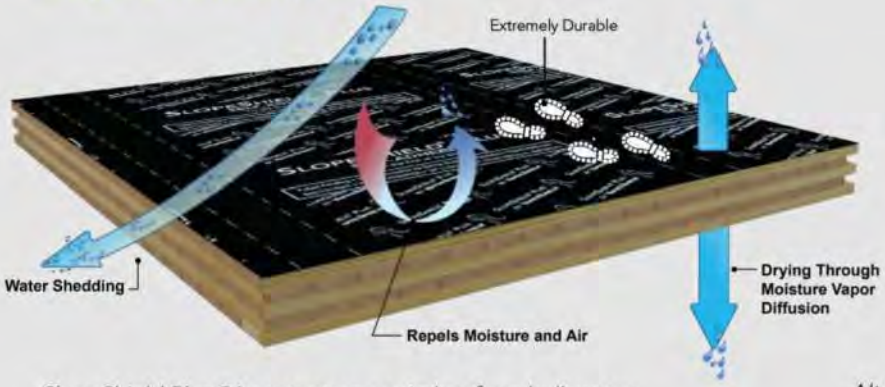
MAXIMIZE DRYING, MINIMIZE WETTING

Mass timber projects can be susceptible to **mold, cracks, and potential structural damage** when a moisture protection strategy is not implemented. Builders can avoid costly damage by **using SlopeShield Plus SA**— a fully self-adhered, high drying capacity sheet membrane—to simultaneously **protect and dry** the mass timber structure. SlopeShield Plus SA is **tough** and **durable** to heavy machinery and foot traffic. It can be applied in below freezing temperatures and offers **six month** UV and climate exposure to meet the demands of today's **scheduling challenges.**

Outer portions of mass timber layers may dry disproportionally faster compared to the inner layers, causing checking, staining, dimensional changes, and compromising structural values.

MOISTURE PROTECTION STRATEGIES

SlopeShield Plus SA

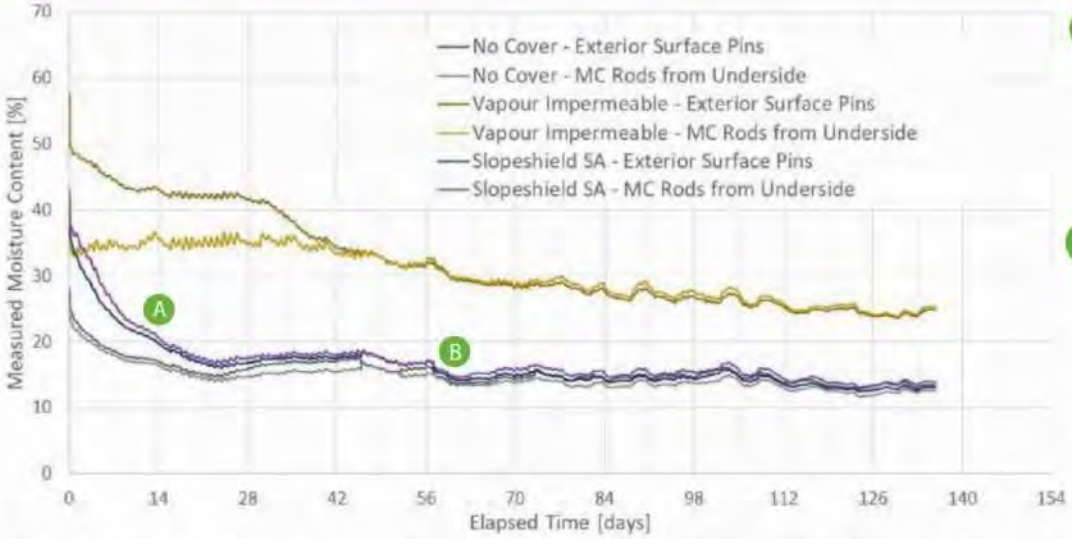


SlopeShield Plus SA protects mass timber from bulk water intrusion and concurrently dries mass timber through moisture vapor diffusion.

Taped Splines Will Leak

Alternative protection such as taped splines will leak and less durable lower perm sheet goods offer little to no drying capacity, resulting in water damage and mold.

WHY USE A VAPOR PERMEABLE MATERIAL?



A In a drying study, conducted by RDH Building Science Laboratories, SlopeShield Plus SA allowed a wet (42% moisture content) mass timber panel to dry to **below 20% moisture content in 14 days.**

B At 60 days the SlopeShield Plus SA has **maintained** the mass timber panel **moisture content** at **15%,** while the impermeable membrane, with little drying capacity, shows a moisture content at 30%, clearly in the danger zone for decay, mold, and staining to occur.

Slopeshield Plus SA vapor permeable moisture protection **does not inhibit drying**. Once the mass timber dries, it will not get wetter and the mass timber deck is protected from future rain events compared to a vapor barrier that can indefinitely delay drying and trap moisture, causing unseen rot and decay.

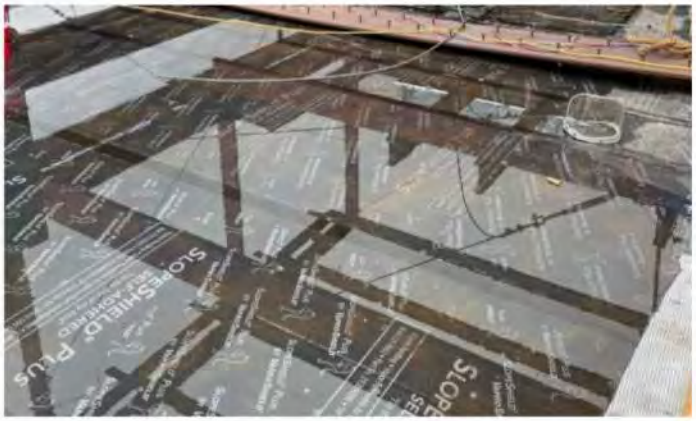
FLOORS

SLOPESHIELD PLUS SA PROTECTION BENEFITS

- Resists bulk water intrusion
- High drying capacity: 30 perms
- Permanent installation works in conjunction with acoustical mat and concrete topping slab
- Apply in wet or freezing weather
- Tough and durable to tools and machinery
- Excellent traction, slip resistant
- Six month UV and climate exposure
- Monolithically covers seams, splines
- Integrates with VaproShield's wall membranes for post/column and beam protection

SlopeShield Plus SA installed with VaproTape will protect the mass timber floor or deck from bulk water infiltration. *Installation College Building, Amherst, MA*

Durable to foot traffic and heavy equipment, SlopeShield Plus SA can withstand 6 months UV and climate exposure. *Installation College Building, Amherst, MA*



SlopeShield Plus SA even handles ponding water which can be easily swept away. *Installation: Commercial Building, Seattle, WA*

TOUGH AND DURABLE

End grains are especially susceptible to water intrusion. By allowing SlopeShield Plus SA to overhang the structure, end grains are protected when water is squeegeed from the deck after and during rain events. *Installation: College Building, Amherst, MA*

By protecting the interior floors with SlopeShield Plus SA, work can commence on the lower floors helping to keep the project on schedule. *Installation: Multi-Family, Seattle, WA*

FRAMEWORK

WALLSHIELD IT PROTECTION BENEFITS

- Temporary protection for framework and beams
- Protects against moisture infiltration, reducing structural compromise from wetting
- Guards against UV damage, mold, and wood discoloration
- Cutting-edge drying capacity, 123 perms, promotes rapid drying
- Durable and abrasion resistant
- Quickly installs in all weather conditions
- Easily removed, reused, or recycled

WallShield IT (green) temporarily protects beams and framework during construction from moisture infiltration, UV damage, wood discoloration, and is easily removed at the end of the project to showcase the beauty of the wood structure. *Installation: College Building, Amherst, MA*

WALLS

PanelShield SA covered the rough openings and walls, protecting the inside construction materials against bulk water intrusion. When fenestration assemblies arrived, the crew quickly cut out PanelShield SA from the rough openings and utilized the field membrane as part of the flashing system. *Installation: Seattle,WA*

PANELSHIELD SA PROTECTION BENEFITS

- Permanent vapor permeable air barrier wall protection
- Extremely durable, use to temporarily cover rough openings
- 12 months UV and climate exposure, ideal for long-term projects
- Aggressive adhesive firmly grips to all common substrates
- Superb drying capacity, 26 perms
- All weather installation, including below freezing
- Does NOT require primer
- Cost effective permeable polyester air barrier/WRB solution

Learn More About Mass Timber Moisture Protection at VaproShield.com.

MASS TIMBER PROTECTION

VaproShield's high drying capacity, breathable membranes offer a comprehensive mass timber moisture protection strategy; specified in Div. 1 or Div. 6.

SLOPESHIELD® PLUS
SELF-ADHERED

WALLSHIELD® IT
INTEGRATED TAPE

PANELSHIELD™ SA

**Mass timber is a broad term encompassing multiple types of products: cross-laminated timber (CLT), nail-laminated timber (NLT), interlocking cross-laminated timber (ICLT), glue-laminated timber (GLT), vertically laminated veneer lumber (LVL), laminated strand lumber (LSL). Multiple mass timber products can be used in the same building.*

Camp Muir Climbing Shelter
Attachment system for solar panels

UNISTRUT®

P1000H3

Materials & Finishes - Standard:

- **Pregalvanized (PG):** Conforms to ASTM A653 SS GR 33, G90.
- **Unistrut Defender (DF):** Conforms to ASTM A1046 SS GR 33
- **Hot Dip Galvanized (HG):** Steel conforms to ASTM A1011 SS GR 33, Finish conforms to ASTM A123
- **Perma-Green (GR):** Steel conforms to ASTM A1011 SS GR 33, E-Coat finish
- **Perma-Gold (ZD):** Steel conforms to ASTM A1011 SS GR 33, Finish conforms to ASTM B633, Type II SC3
- **Plain (PL):** Conforms to ASTM A1011 SS GR 33

Materials & Finishes - Special Metals:

- **Stainless Steel, Type 304 (SS):** ASTM A240, Type 304 *
- **Stainless Steel, Type 316 (ST):** ASTM A240, Type 316 *
- **Aluminum (EA):** ASTM B221, Type 6063-T6 (Extruded) *

* These materials have different physical properties and performance characteristics. Please contact us for design support.

Part No.	Length (ft)	Finish	Product Weight / Ft (lbs/ft)
P1000H3	20	PG	1.75
P1000H3	10	PG	1.75
P1000H3	20	HG	1.85
P1000H3	10	HG	1.85
P1000H3	20	GR	1.75
P1000H3	10	GR	1.75
P1000H3	20	PL	1.75
P1000H3	10	PL	1.75

Beam Loading - P1000H3

Span (in)	Max Allow. Uniform Load (lbs)	Deflection at Uniform Load (in)	Uniform Loading at Deflection			Lateral Bracing Reduction Factor
			Span/180 (lbs)	Span/240 (lbs)	Span/360 (lbs)	
24	1,521	0.06	1,521	1,521	1,521	1.00
36	1,017	0.13	1,017	1,017	810	0.94
48	765	0.22	765	684	450	0.88
60	612	0.35	585	432	288	0.82
72	504	0.50	405	306	198	0.78
84	432	0.68	297	225	144	0.75
96	378	0.89	225	171	117	0.71
108	342	1.14	180	135	90	0.69
120	306	1.40	144	108	72	0.66
144	252	2.00	99	72	54	0.61
168	216	2.72	72	54	36	0.55
192	189	3.55	54	45	NR	0.51
216	171	4.58	45	36	NR	0.47
240	153	5.62	36	NR	NR	0.44
Note	NR - Not Recommended					

Refer to the General Specifications for loading information.

Column Loading - P1000H3

Unbraced Height (in)	Allowable Load at Slot Face (lbs)	Max Column Load Applied at C.G.			
		K=0.65 (lbs)	K=0.80 (lbs)	K=1.0 (lbs)	K=1.2 (lbs)
24	3,550	10,740	9,890	8,770	7,740
36	3,190	8,910	7,740	6,390	5,310
48	2,770	7,260	6,010	4,690	3,800
60	2,380	5,910	4,690	3,630	2,960
72	2,080	4,840	3,800	2,960	2,400
84	1,860	4,040	3,200	2,480	1,980
96	1,670	3,480	2,750	2,110	1,660
108	1,510	3,050	2,400	1,810	KL/r>200
120	1,380	2,700	2,110	KL/r>200	KL/r>200
144	1,150	2,180	1,660	KL/r>200	KL/r>200

Refer to the General Specifications for loading information.

Project:

Architect / Engineer:

Date: **Phone:**

Contractor

Address:

Notes:

Approval Stamp:

Camp Muir Climbing Shelter Windows

WWW.WAUSAUWINDOW.COM
1.877.678.2983

Photo ©BE&K Building Group

Gould Turner Group

Gateway Medical Center

HURRICANE IMPACT

WINDOW SYSTEMS

UP TO 10 YEAR LIMITED WARRANTY

WAUSAU

WINDOW AND WALL SYSTEMS

ENHANCED PROTECTION FOR ESSENTIAL FACILITIES CALLS FOR HURRICANE IMPACT-TESTED WINDOW PRODUCTS MEETING THE MOST STRINGENT PERFORMANCE REQUIREMENTS.

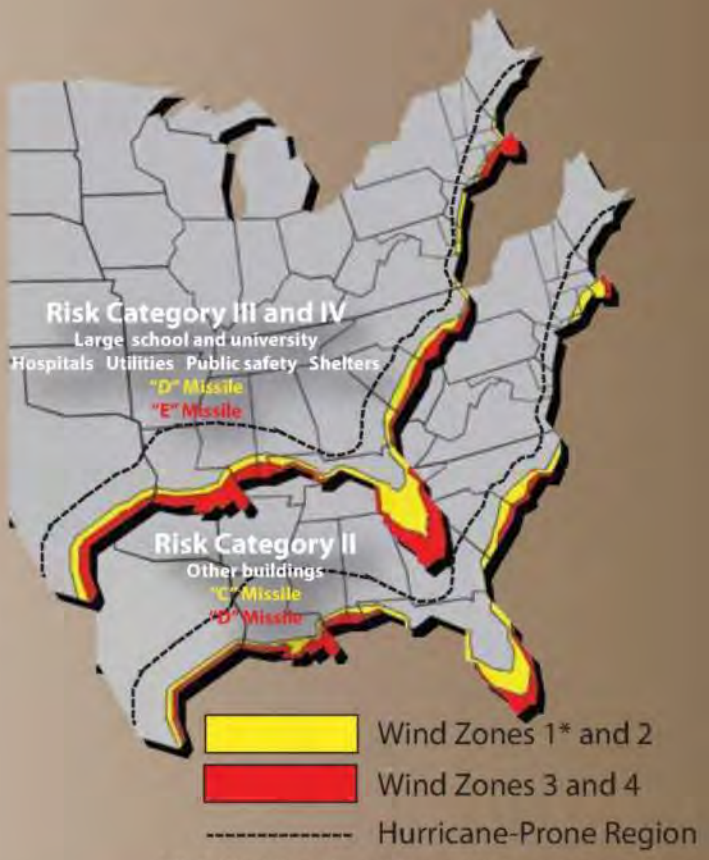
WAUSAU WINDOW AND WALL SYSTEMS' INVENT™ 3250I-HP-XLT, 4250I-HP-XLT AND 3250-HP SERIES CASEMENT, PROJECTED AND FIXED WINDOWS RISE TO THE CHALLENGE, AND ARE OFFERED WITH A BROAD RANGE OF TEST-PROVEN OPTIONS AND ACCESSORIES.

Whether the design goal is basic code compliance or a higher level of protection for property and occupants, Wausau's hurricane impact windows answer the call.

The most current 2010 edition of the American Society of Civil Engineers ASCE-7 "Design Loads for Buildings and Other Structures," in conjunction with the International Building Code IBC-2012, establish design wind speeds for all building types. The schematic maps at right show the extent of hurricane-impact requirements cited in IBC-2012. Be sure to check local code and project specifications for requirements applicable to any particular site or project - and verify whether additional protection may be warranted.

Wausau products are "large missile" tested to comply with requirements both below and above 30 feet, without non-uniformity in glass appearance that can result from the use of different "small missile" glass. "D" missile impact uses a nine-pound, 2x4-inch stud fired at 50 feet per second. "E" missile impact increases velocity to 80 feet per second. Impacts are followed by cyclical pressure testing.

All testing is conducted in compliance with stringent Miami-Dade TAS protocols, and Wausau window products carry Miami-Dade Notices of Acceptance (NOAs), Florida Product Approvals, and Texas Department of Insurance (TDI) listings.



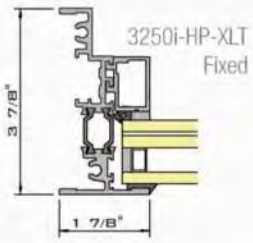
in.vent™

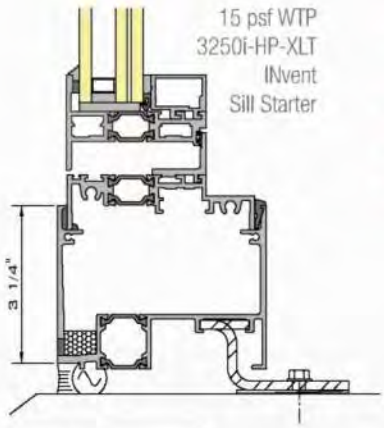
www.wausauwindow.com Download details, specifications and product performance information

INvent 3250i- and 4250i-HP -XLT

Hurricane Impact Resistant Fixed and Operable Windows

- 3-7/8" (3250i) and 4-7/8" (4250i) frame depth
- 24mm XLT polyamide thermal barrier
- AAMA AW-100 Architectural Performance Class
- Fixed, project-in or project-out casement, project-out awning or project-in hopper
- Integral blinds with access doors available
- 0.125" extrusion wall thickness
- Conventional hardware or multi-lock option
- Large "D" missile impact tested for basic protection in Wind Zones 1-4
- "E" missile impact tested for essential facilities' enhanced protection in Wind Zones 3-4
- Tested with receptors and steel strap anchors to address varying substrate configurations





Allowable Air	Water	NFRC U-Factor	CRF_f	STC
0.10 cfm/sqft at 6.24 psf	15 psf	0.34 to 0.64 BTU/hr.sqft.°F	46 to 65	31 to 42

Test results may vary - Thermal and acoustical performance cited with non-hurricane-impact resistant glass.

Between-Glass Blinds

Low maintenance and glare control

- Available with 1" or 5/8" aluminum slats in 16 standard colors
- Occupant privacy and glare-reduction tilt control with slip-clutch feature
- Concealed raise-lower cords for uniform exterior appearance
- Hinged interior doors for custodial access
- Triple-glazed options for control of solar heat gain

Window Hardware

For Occupant or Custodial Operation - Durable and Attractive Designs

Euro-style locking handle

Linear operation keeper latch

Cam handle

Butt hinge

Four-bar hinge

TEST SUMMARY
WAUSAU Invent™ 3250i- and 4250i–HP-XLT Series Hurricane Windows

CONFIGURATION or OPTION	"D" MISSILE TESTED Miami-Dade TAS Protocols	"E" MISSILE TESTED Miami-Dade TAS Protocols
Risk Category II Buildings	Wind Zones 1, 2, 3 and 4*	Not required
Risk Category III and IV Buildings	Wind Zones 1 and 2	Wind Zones 3 and 4
Design Wind Pressure	80 psf (ASD)	100 psf (ASD)
Glass and Glazing Types 1/4" fully tempered (FT) or heat strengthened (HS) exterior	G1 or G2 : Wet-glazed 1-5/16" IG : 1/4" FT or HS exterior 1/2" air space 9/16" Vanceva® laminated	G5 or G6 : Wet-glazed 1-7/16" IG : 1/4" FT or HS exterior 1/2" air space 11/16" Vanceva® laminated
	G3 or G4 : Dry-glazed 1-5/16" IG : 1/4" FT or HS exterior 1/2" air space 9/16" SentryGlas® laminated	G7 or G8 : Dry-glazed 1-7/16" IG : 1/4" FT or HS exterior 1/2" air space 11/16" SentryGlas® laminated
	Triple-glazed G1 or G2 exterior 5/8" or 1" blinds interior access door	Triple-glazed G5 or G6 exterior 5/8" or 1" blinds interior access door
	Triple-glazed G3 or G4 exterior 5/8" or 1" blinds interior access door	Triple-glazed G7 or G8 exterior 5/8" or 1" blinds interior access door
Overall Window System		
Frame Depth	3-7/8" or 4-7/8"	3-7/8" or 4-7/8"
Meeting Rails	2-7/8"	2-7/8"
Self-Stacking Mullions	Available	Available
Project-Out Casement Vents**		
Maximum Vent Size (Width x Height)	36" x 60"	36" x 60"
Locks	Linear operation multi-lock or cam handles	Linear operation multi-lock or cam handles
Hinges	Butt hinges or stainless steel (SS) four-bar friction hinges	Butt hinges or SS four-bar friction hinges
Notice of Acceptance (NOA) Miami-Dade County, Florida	#13-0917.05 Expires April 2023	#13-0917.05 Expires April 2023
Project-Out Awning Vents**		
Maximum Vent Size (Width x Height)	60" x 36"	60" x 36"
Maximum Fixed-over-Awning (punched opening only)	60" x 84"	60" x 84"
Locks	Cam handles	Cam handles
Hinges	SS four-bar friction hinges	SS four-bar friction hinges
Notice of Acceptance (NOA) Miami-Dade County, Florida	#13-0917.07 Expires April 2023	#13-0917.07 Expires April 2023
Project-In Casement Vents		
Maximum Vent Size (Width x Height)	36" x 60"	36" x 60"
Locks	Linear operation or Euro multi-lock or cam handles	Linear operation or Euro multi-lock or cam handles
Hinges	Butt hinges or SS four-bar friction hinges	Butt hinges or SS four-bar friction hinges
Notice of Acceptance (NOA) Miami-Dade County, Florida	#13-0917.04 Expires April 2023	#13-0917.04 Expires April 2023
Project-In Hopper Vents		
Maximum Vent Size (Width x Height)	60" x 36"	Not available
Maximum Fixed-over-Hopper (punched opening only)	60" x 84"	
Locks	Cam handles	
Hinges	SS four-bar friction hinges	
Notice of Acceptance (NOA) Miami-Dade County, Florida	#13-0917.08 Expires April 2023	
Fixed Windows		
Maximum Fixed Lite Size (Width x Height) also see Table below	45-3/8" x 69 - 3/8" Glass Size 48" x 72" Window Dimension	45-3/8" x 69 - 3/8" Glass Size 48" x 72" Window Dimension
Interior or Exterior Glazing	Interior or Exterior	Interior or Exterior
Notice of Acceptance (NOA) Miami-Dade County, Florida	#13-0917.06 Expires April 2023	#13-0917.06 Expires April 2023
Anchors and Accessories for all window types		
Receptors and Starters	Receptors directly anchored to substrate or with steel strap anchors	Receptors with steel strap anchors
Anchors	Steel strap anchors	Steel strap anchors
Screens	Wickets or hinged screens required	Wickets or hinged screens required
Between-Glass Blinds	5/8" or 1" blinds	5/8" or 1" blinds

*Risk Category II buildings require only C missile protection in Wind Zones 1 and 2.
**Roto operators, grid muntins and beveled glazing rebates are not available on Invent HP-XLT Series windows

STACK MULLIONS and INTEGRAL IMPOSTS

Length	DESIGN LOAD CAPACITY (psf)									
	Imposts	Stacks	Imposts	Stacks	Imposts	Stacks	Imposts	Stacks	Imposts	Stacks
54	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
60	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
66	100.0	100.0	100.0	100.0	100.0	100.0				
72	100.0	100.0	96.3	100.0	87.7	92.1				
Width	36		42		48		54		60	

Production line sampling, with impact on and water testing prior to shipment, helps ensure real-world performance equal to the laboratory

3250-HP Series Hurricane Windows

Wausau's AAMA AW-120 rated 3250-HP Hurricane windows have been the product of choice for dozens of hospitals in hurricane-prone regions, and are Miami Dade Product Control Approved:

- Fixed window, large missile
  Notice of Acceptance (NOA) #12-0416.07
  Miami-Dade County, Florida, 25Apr17
- Fixed window, small missile
  Notice of Acceptance (NOA) #12-0416.09
  Miami-Dade County, Florida, 25Apr17
- Casement window, large missile
  Notice of Acceptance (NOA) #12-0416.06
  Miami-Dade County, Florida, 25Apr17
- Casement window, small missile
  Notice of Acceptance (NOA) #12-0416.08
  Miami-Dade County, Florida, 25Apr17

3250-HP Hurricane

ADVANTAGE BY WAUSAU

PRE-ENGINEERED STANDARD PRODUCTS FOR COMPETITIVE PRICING AND QUICK DELIVERY

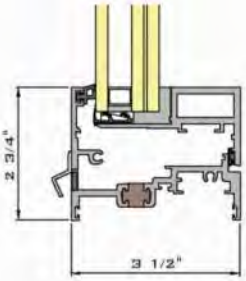
Miami-Dade Product Control Approval Wausau 3250-HP Large Missile Impact-Resistant Fixed Windows												
Short Dimension	Design Load Capacity (Positive and Negative psf)											
	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg
30"	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0
36"	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0		
42"	80.0	90.0	80.0	90.0	80.0	90.0	80.0	90.0				
49"	80.0	90.0	80.0	90.0	80.0	90.0						
54"	72.6	81.7	72.6	81.7								
59"	66.4	74.7										
Long Dimension	59"		65"		72"		84"		98"		117"	

1. All window dimensions are frame dimensions +/- ½".
2. Sizes listed are maximum allowable at load indicated. If no load is listed for a given size, the size exceeds allowable and is not acceptable.
3. Casement size maximum is 4'-0" wide by 6'-0" high with allowable design pressures of +80 psf and -90 psf.

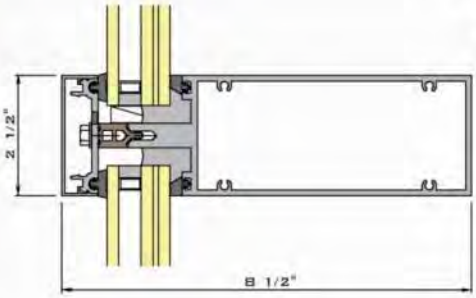
SuperWall™

Wausau's 6250 and 8250 Series SuperWall systems have been tested to meet the large missile requirements of ASTM 1996 for Wind Zone 1, including module sizes up to 5'-6" x 10'-1".

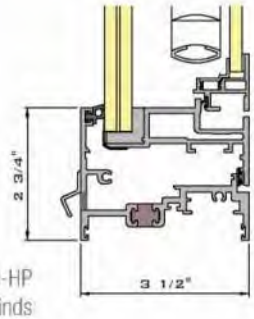
SuperWall Hurricane



3250-HP Hurricane



SuperWall



3250-HP with Blinds

WAUSAU
WINDOW AND WALL SYSTEMS

WAUSAU'S EXTRUDED ALUMINUM FRAMES CONTAIN RECYCLED CONTENT AVERAGING 70% OR GREATER.

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IVES

(https://www.trudoor.c

Ives SB360 Heavy Duty Surface Bolt

$91.72

Usually Ships: 1-2 Business Days

- Meets ANSI/BHMA A156.16
- 1-1/4″ throw for maximum security
- UL Listed up to 3 hours (fire-rated)

Quantity: - 1 + ADD TO CART | $91.72

Product Overview

Ives SB360 Surface Bolt, 12″ Length, US2C/604 Clear Zinc Finish

- Surface bolt has 1-1/4″ throw for maximum security
- Jimmy-resistant design, bolt locks automatically when thrown, can be released only be pressing knob toward door while retracting
- Ideal for all types of doors
- Available in 12″ length
- Unit locks in both the up and down position
- Accepts padlock (not furnished) with maximum 3/8″ diameter shackle, minimum 1-3/4″ shackle opening height
- Units packed with one-way wood screws for added security − Standard wood screws also supplied
- Units packed with a universal top strike (US)

Certifications

- Meets ANSI/BHMA A156.16
- UL10C Listed (3 hour) fire doors up to 10’0″
- Miami Dade County NOA listed
- Florida Building Commission listed
- FEMA 361 and 320 listed

Dimensions

- Bar: 3/4″ wide x 3/4″ thick
- Overall width: 2-1/32″
- Overall projection: 2-1/16″
- Top Strike: 1-1/2″ wide x 1-1/2″ long x 3/16″ thick

Specifications

Brand	Ives (https://www.trudoor.com/brand/ives/)
Finishes	US2C/604 Clear Zinc

15% Off your order with code SEPT15. Shop Now

PERKO

PERKO® Flush Lifting Handle, 3" x 2-1/4"

Model # 255711 Mfg # 1220DP0CHR

$39.99 | (11) Advice & How-To

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Ready today

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1 Year: **$4.99** | 2 Year: **$6.49** | 3 Year: **$7.99**

— 1 +

ADD TO CART - $39.99

Pay with affirm on orders over $50

Product Details

Heavy duty lifting handles that keep out of the way

Heavy deck hatches can be difficult to lift with smaller and often single-finger lifting rings. Perko makes it easier with flush handles that provide enough space for 2-3 fingers. These chrome plated cast bronze and chrome plated zinc lifting handles can be mortised into hatches 5/8" thick or greater to provide a truly flush finish (can be installed in thinner material, however, underside of casting will be visible through required cut-out). Regardless if you select a bronze or zinc lifting handle, each is pre-drilled for counter-sunk oval or flat head screws. Give yourself the extra pulling power with Perko flush lifting handles.

Key Features

- Large handle makes lifting heave deck hatches easier on your hands
- Available in chrome plated zinc or bronze
- Two sizes available to match the application
- Can surface mounted or mortised into hatch for completely flush installation (3/32" thick flange, 1/2" overall depth bronze handles, 3/8" overall depth zinc handle)
- Compatible with oval and flat head screws
- Requires #8 FH screws (sold separately)
- Made in The USA

Mounting Template

View More

Specifications

Chat Now

FEATURED WEST ADVISOR®

BEST
dormakaba Group

40H Series

Heavy Duty Mortise Locks

by BEST

BEST: Setting the Standard for Security

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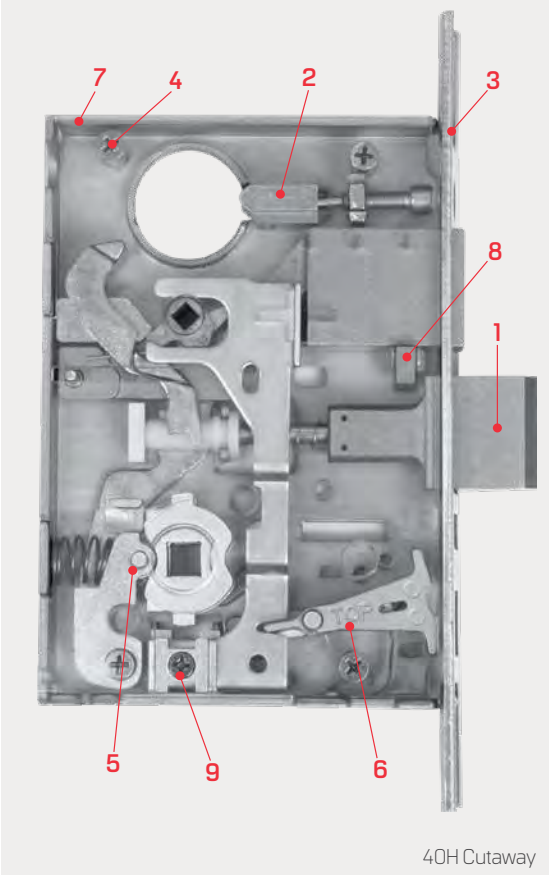
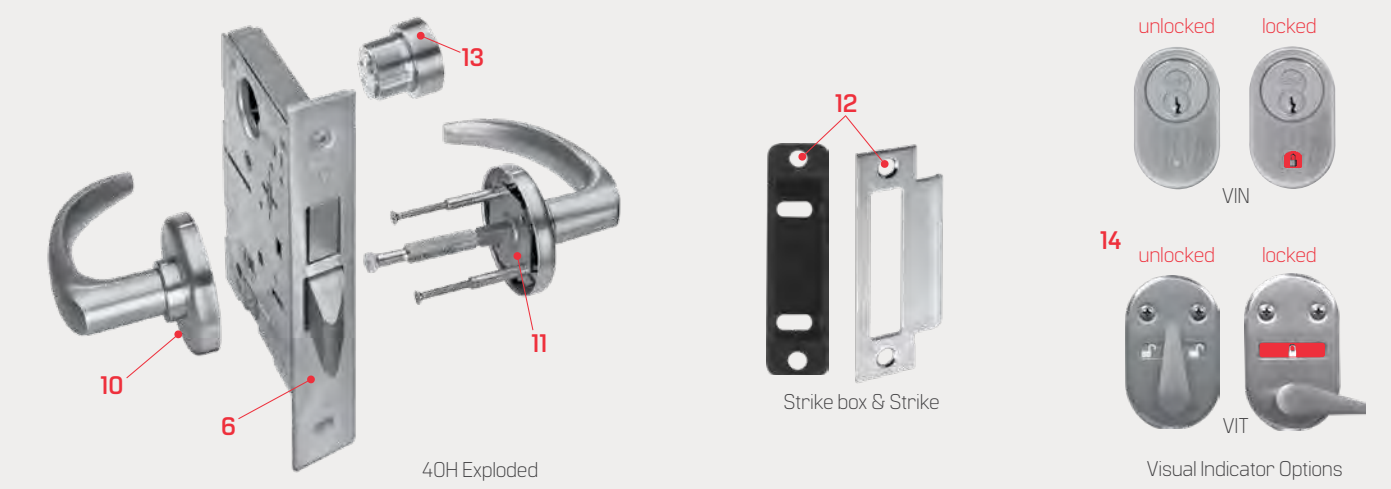
40H Series – Features

1. Solid one-piece stainless steel anti-friction latch provides 50% more surface contact with strike for superior strength and security. Reversible latch rotates 180 degrees for easy handing change without opening case. Precision-engineered curve provides enhanced cycle life with reduced wear to the strike.
2. Non-handed cylinder retainer.
3. Armored front completely surrounds latch and deadbolt providing increased lateral strength. Staked assembly design allows the armored front to self-align with the door bevel during installation.
4. Enhanced case integrity achieved through four case cover screws (one at each corner), plus interlocking armored front and cover design at the latch.
5. Roller bearing hub mechanism provides smooth, wear resistant operation.
6. Locking toggle includes clear indication of "locked" and "unlocked" states. 7. 40H case, cover, and armored front manufactured from 0.095" cold rolled steel for strength and durability.
8. Fusible link.
9. Four position hub toggle design determines whether each hub is always locked, always unlocked, or locked by key for easy handing change without opening case.
10. Lever return spring mechanism located in trim for enhanced protection against lever droop, providing a firm, positive return of the lever to the horizontal position.
11. Self-aligning trim mechanism for fast, easy, and accurate installation.
12. Curved lip strike and strike box assembly provides an aesthetic, non-handed solution to complement field reversible case.
13. Solid machined cylinder rings with wavy washer provides resistance to wrenching of cylinder. Cylinder security screw prevents removal of cylinder without first removing interchangeable core.
14. Visual indicator options show a padlock icon open for unlocked and padlock icon closed and painted red for locked.
15. Non-handed stainless steel auxiliary bolt for ease of changing hand. (not shown)



40H Cutaway



40H Exploded
Strike box & Strike
Visual Indicator Options

Specifications

ADA-Americans With Disabilities Act:
45H Series –The design and operation of the BEST® mortise lock meets the intent of the standard for ANSI A117.1 section 404.2.6.

Builders Hardware Manufacturers Association:
45H Series –ANSI A156.13, Series 1000, Grade 1 Operation and Strength, Grade 2 Security. To meet Grade 1 Security, a drill resistant core (1CD, 1CDP, 1CDF, or 1CDX) must be used with escutcheon trims, and 1EK7K4 high security cylinder must be used with sectional trims.

47H Series – ANSI A156.13, Series 1000, Grade 1 Operational, Strength, and Security.

Underwriters Laboratories® – The 40H series is listed by Underwriters Laboratories for use on a 3 hour A label doors. These locks also carry the C-UL mark which is officially accepted in all of Canada, indicating compliance with appropriate Canadian standards and codes. The 47H series locks conform to UL437 standard for key locks, referencing door locks. The 1EJ7J4 cylinder used in the 47H series also conforms to UL437 standard for key locks, referencing high security cylinders, and is listed for Canada as well as the United States.

Florida Building Code (FBC) Listed – See certification listing for all 40H series lock functions that are certified for use in applications requiring a design pressure rating as specified.

Description	Model	Single Door	Double Door
PSF w/o DeadBolt	45H and 47H	+-60	+-35
PSF w/ DeadBolt	45H and 47H	+-60	+-35
PSF w/ DeadBolt	48H and 49H	+-40.5	+-40.5

Auxiliary bolt – Stainless steel, non-handed.

Backset – 2-3/4"

Case –0.095" cold rolled steel, 5- 7/8" H x 7/8" D x 4-1/16" W. Steel is zinc dichromate plated for corrosion protection.

Deadbolt – Stainless steel, 1" throw.

Latchbolt –Solid stainless steel, 3/4" throw. Latch is oil-impregnated for anti-friction operation. Reversible without opening case.

Strike – For complete strike package spec's see page 5.

Door Thickness – Standard lock configuration designed for doors 1-3/4" thick. Thick door configuration available for doors up to 5" thick (specify thickness when ordering).

Faceplate –Stainless steel, brass or bronze material, 8" H x 1-1/4" W x 1/16" T. Lock face automatically adjusts to proper bevel during installation.

Products protected by one or more of the following patents: 4,873,853 5,590,555 5,794,472

Finishes –

- 605 - bright brass, clear coated
- 606 – satin brass, clear coated
- 611 – bright bronze, clear coated
- 612 – satin bronze, clear coated
- 613* – oxidized satin bronze, oil rubbed
- 618 – bright nickel plated, clear coated (brass base material)
- 619 – satin nickel plated, clear coated (brass base material)
- 622 – flat black coated (brass base material) 625 – bright chromium plated (brass base material)
- 626 – satin chromium plated (brass base material)
- 629 – bright stainless steel
- 630 – satin stainless steel
- 690* – dark bronze coated (brass base material)

*613 finish is designed to wear over time, providing an "antique" appearance.
*690 finish will continue as a dark brown appearance over time.

Antimicrobial Finish –

- 626AM – satin chrome plated with UltraShield™ antimicrobial protected coating
- 630AM – satin stainless steel with UltraShield™ antimicrobial protected coating

The BEST UltraShield finish inhibits the growth of bacteria and other microbes on the surface of the hardware.

NOTE: BEST UltraShieldTM option is recommended for use on any hardware application where product cleanliness is a high priority. i.e; Hospital/Healthcare, Elderly Care, Education, Transportation, Food-Service, Hospitality.

Specifications

#4 Knob –Diameter – 2-1/8" ; Projection on door – 2-7/8" Material machined from solid brass or bronze.

Decorative and Special Order Lever Handles –Stainlesssteel base material with applied finish.

Standard Lever Handles – Brass, bronze, or stainless steel base material for standard lever designs. Lever styles #3, #14, and #15 return to a minimum of 1/2" of door surface. Lever styles #3 and #14 conform to California Titles 19 and 24. Lever styles 12, 16 and 17 do not return. Levers project 2-15/16" from door surface with H, J, R and S trim. Levers project 3-1/64" with M and N trim..

Roses – Wrought brass, bronze, or stainless steel base material.
H – Flat w/ round edge, 2-3/4" diameter.
R – Contoured w/ round edge, 2-3/4" diameter.
S – Flat w/ beveled edge, 3-1/2" diameter.

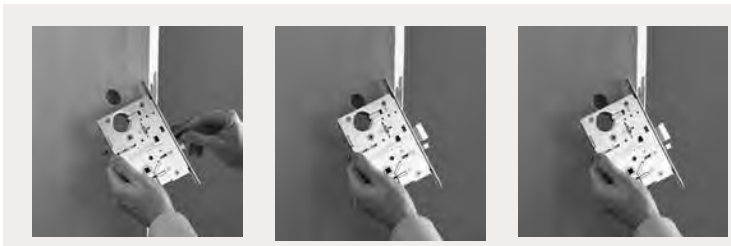
Escutcheons – J – Wrought brass, bronze, or stainless steel base material, 7-1/2" H x 2-9/32" W x 17/32" T. M & N – Forged brass or bronze, 8" H x 2-1/8" W x 37/64" T, through bolt mounted (no exposed screws outside). M – Standard cylinder; N – Concealed cylinder.

Vandal Trim –VT– Vandal trim is available in standard finish for H, J, M, N, R, and S trims in either #14 or #15 levers.

NOTE: Not available in single or dummy trim functions. If compliance to California Building Code Title 19 & 24 is required, the #14 lever design must be specified.

Visual Indicators –VIN– Visual indication uses an unlocked padlock or locked padlock image with red background to indicate lock state. VIT–Visual indication uses a thumb-turn with color coded locked and unlocked icons – red indicates door is secure and green indicates door is unsecure.

Universal Lock Design Concept



Strength, Durability...and now Flexibility. Sure, a mortise lock is one of the strongest and longest lasting locks available. But who says it has to be the most complex to order and install? When designing the 40H mortise lock, BEST® decided to focus on things that would make the lock easier to use, while at the same time maintaining the strength, durability, and dependability you would expect in a BEST® mortise lock.

In addition to the ability to quickly change the lock handing, the universal case design of the 40H provides the ability to reconfigure a lock into many different functions easily and quickly, often by rearranging existing parts without disassembling the lock case. The efficiency of the design enables over 12 of the most commonly used lock functions to be included in just 3 case configurations.

The 40H provides the ability to postpone decisions on how the lock will be configured all the way up to the point of installation, making it one of the most flexible and user-friendly mortise locks available. This translates into value for anyone involved in the process, whether they're an architect, specification writer, distributor, or end-user.

Flexibility in Ordering

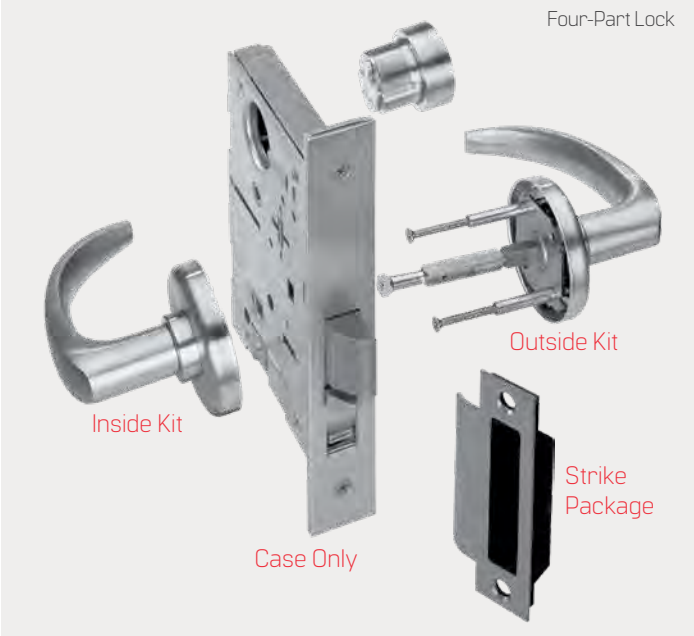
BEST offers three ways in which to order the 40H mortise lock. YOU get to choose which method meets your needs.

Function Specific Lock - If you know exactly what you need in a mortise lock, and are confident that your needs won't change, then order your 40H locks in the traditional way by specifying the exact function, trim, finish, and handing. BEST® will build the locks to work exactly as specified, so they may or may not have the ability to be converted to another function in the future.

Universal Lock - If you want to keep your options open, this method of ordering the 40H is for you. BEST® has developed three "universal" functions that can be configured to a variety of common functions, all without opening the lock case. When any of the universal functions are ordered as a complete lock, all the necessary parts (including trim) are provided to configure any of the functions in that group. Universal locks can only be ordered with sectional trim. If escutcheon trim is needed, order a three-part lock.

UNR	ANSI	UNT	ANSI	UNAB	ANSI
A – office	F04	L – privacy	F19	AB – office	F20
AT – office	F04	T – dormitory	F13	TA – dormitory	F12
D – storeroom	F07			TD – dormitory	
N – passage	F01				
NX – exit	F31				
R – classroom	F05				

Four-Part Lock – For the maximum flexibility in ordering a mortise FOUR-PART LOCK lock, BEST® provides a way to order your 40H lock in four parts: Inside Trim, Case Only, Outside Trim and Strike Packages. The kits that make up these four parts have been carefully designed so that when all three are combined you have everything found in a complete 40H lock. This order method is ideal for customers wanting to stock a variety of trim designs with a minimal number of lock cases.



Parts Ordering Made Easy – No more searching through service manuals or calling technical support for the right part numbers. BEST® has developed a variety of kits you can order when you only need part of a 40H mortise, rather than the whole lock.

Case Only – A Case Only lock includes all parts normally included with a complete lock that are not specifically associated with either the inside or outside trim, including: lock case, face plate, strike and strike box, fasteners (for case and strike), and installation instructions. Case Only mortise locks will be shipped in the standard mortise packaging, allowing trim kits to be included at a future date to make a complete lock.

Trim Kit – A 40H Trim Kit is simply one half of a complete trim package. An Outside Trim Kit must always be matched up with an Inside Trim Kit to operate with a lock. Each kit includes all the necessary parts (including fasteners) required for installation that are associated with just the one side of the door.

Lever Set – A lever set kit provides the inside lever assembly (with set screw) and outside lever assembly (with spindle attached). Thick Door and Tactile Lever options are available for this kit.

Faceplate Kit – Face Plate kit includes a finished faceplate and the appropriate screws. Security Head screws are an option for this kit.

Replacement Spindle – As a security feature, the outside spindle on the 40H is designed to twist off during abuse before any internal damage to the lock occurs. The Replacement Spindle kit is a quick, easy, and inexpensive way to replace any spindles damaged by attack or abuse. This kit includes the inside and outside spindles, plus the pin to attach the outside lever.

Screw Kit – Nothing's more frustrating than spending time searching for the part number of a single screw. With the 40H Screw Kits, you don't have to worry about that anymore. These kits have been designed to provide all the necessary fasteners for one lock in a single bag. All you need to know is the trim style and finish, and you're set. Security head screws are an option for this kit.

Function Letter Chart

UNR	ANSI	ANSI	UNAB
	1DT	F19	L
	2DT	F02	LB
F04	A		LT
F20	AB	F01	N
F04	AT	F31	NX
F21	B	F05	R
	B5	F06	RHB
	B7	F35	S
F08/F10	BA	F13	T
	BW	F12	TA
F09	C		TD
	CHB	F30	W
F07	D	F17	AD
F14	G	F29	RD
F15	H	F16	WD
F15	HJ	F18	YD
F34	INA		UNR
F33	IND		UNT
F32	INL		UNAB

Strike Packages

S1 – Standard strike:

4-7/8" x 1-1/4" x 3/32", nonhanded, curved lip, 1-1/4" lip to center strike. Fits standard door frame ANSI A115.1, and comes with plastic strike box.

S5 – Latchbolt-only strike:

4-7/8" x 1-1/4" x 3/32", handed, curved lip, 1-1/4" lip to center strike. Fits standard door frame ANSI A115.1, and comes with wrought steel strike box.

S6 – Latchbolt/Deadbolt strike:

4-7/8" x 1-1/4" x 3/32", handed, curved lip, 1-1/4" lip to center strike. Fits standard door frame ANSI A115.1, and comes with wrought steel strike box.

How to order: 45H

45H	7	R	14	H	626	RH	
Series	**Core Housing**	**Function Code**	**Lever Style**	**Trim Style**	**Finishes**	**Door Hand**	**Options**
45H – standard mortise lock	0 – keyless 7– 7-pin housing accepts all Best cores	A – office D – storeroom L – privacy N – passage R – classroom T – dormitory etc.	**Standard Levers:** 3– solid tube/ return 12– solid tube/ no return 14– curved return 15– contour/angle return 16– curved/ no return 17– gull wing **Knobs:** 4– round	H– 2 3/4" dia. R– 2 3/4" dia. S– 3 1/2" dia. J– wrought M– forged N– forged (concealed cyl.)	618 626 630 690 **Satin** 606 612 613 619 **Bright** 605 611 622 625 629 **Antimicrobial** 626AM 630AM	RH RHRB LH LHRB	LL– lead lined SH– security head screws Thick Door– (specify thickness if other than 1-3/4") TAC– tactile lever/knob 7/8 LTC– 7/8" lip-to-center strike VIN*– visual indicator S1– standard strike S5– latchbolt-only strike S6– latchbolt/deadbolt strike VT– vandal trim VIT*– visual indicator thumbturn VIB*– double visual indicator WS– windstorm label
		pages 15-18			page 3	page 9	

How to order: 47H

47H	7	R	14	M	626	RH	
Series	**Core Housing**	**Function Code**	**Lever Style**	**Trim Style**	**Finishes**	**Door Hand**	**Options**
47H – lever / knob high security mortise lock	7–7 pin housing, must use 5C cores and long blade keys	A – office D – storeroom R – classroom T – dormitory etc.	**Standard Levers:** 3– solid tube/ return 12– solid tube/ no return 14– curved return 15– contour/angle return 16– curved/ no return 17– gull wing **Knobs:** 4– round	H– 2 3/4" dia. R– 2 3/4" dia. S– 3 1/2" dia. M– forged	626 630 **Antimicrobial** 626AM 630AM	RH RHRB LH LHRB	K– non UL cylinder LL– lead lined Thick Door– (specify thickness if other than 1-3/4") TAC– tactile lever/knob 7/8 LTC– 7/8" lip-to-center strike VIN*– visual indicator S1– standard strike S5– latchbolt-only strike S6– latchbolt/deadbolt strike VT– vandal trim WS– windstorm label
		pages 15-18			page 3	page 9	

*VIT option only compatible with H, R, S, J & M trim styles. VIN & VIB options only compatible with H, R & J trim styles.

How to order: 45H Case Only

45HCA	R	626	RH	
Series	**Function Code**	**Finishes**	**Door Hand**	**Options**
47H – lever / knob high security mortise lock	A – office D – storeroom R – classroom T – dormitory etc.	605 606 611 612 613 618 619 622 625 626 629 630 690	RH RHRB LH LHRB	SH– security head screws 7/8 LTC– 7/8" lip-to-center strike
	pages 15-18	page 3	page 9	

How to order: 40H Trim Kits

40HTK	OS2	14	H	626	
Series Backset	**Function Code**	**Lever/Knob Style**	**Trim Style**	**Finishes**	**Options**
40HTK– trim kit	IS1– inside lever only IS2– inside lever x thumb turn IS3– inside lever x cylinder IS4*– inside cylinder only IS5– inside thumb turn only IS6– inside lever x cylinder x VIN OS1– outside lever only OS2– outside lever x cylinder OS3– outside lever x emergency plate OS4*– outside cylinder only OS5– outside lever x VIN OS6– inside lever x cylinder x VIN NOTE: VIN– visual indicator pages 15-18	**Standard Levers:** 3– solid tube/ return 12– solid tube/ no return 14– curved return 15– contour/ angle return 16– curved/ no return 17– gull wing **Knobs:** 4– round	H– 2-3/4" dia. R– 2-3/4" dia. S– 3-1/2" dia. J– wrought M– forged N– forged (concealed cyl.)	605 606 611 612 613 618 619 622 625 626 629 630 690 page 3	D– double cylinder Thick Door– (specify thickness if other than 1-3/4") SH– security head screws TAC– tactile lever/knob

* Only works with H, R, S, M and N trim.

How to order: 40H Strike Packages

40HST	S1	626	
Series	**Kit Number**	**Finishes**	**Options**
40HST– strike package	S1– standard strike S5– latchbolt-only strike S6– latchbolt/deadbolt strike 4– strike box only page 5	605 606 611 612 613 618 619 622 625 626 629 630 690 page 3	Thick Door– (specify thickness if other than 1-3/4") 7/8LTC– 7/8" lip-to-center strike SH– security head screws

How to order: 40H lever sets

40HLS	14	626	
Series	**Kit Number**	**Finishes**	**Options**
40HLS– lever set	**Standard Levers:** 3– solid tube/ return 12– solid tube/ no return 14– curved return 15– contour/ angle return 16– curved/ no return 17RH– gull wing-right hand 17LH– gull wing-left hand **Knobs:** 4– round Decorative & special order levers: pages 12-14 page 5	605 606 611 612 613 618 619 622 625 626 629 630 690 page 3	Thick Door– (specify thickness if other than 1-3/4") SH– security head screws VT– vandal trim

How to order: 40H Faceplate Kits

40HFP	3		626	
Series	**Kit Number**		**Finishes**	**Options**
40HFP– faceplate kit	0– AB 1– BW, TD, H, HJ 2– A 3– AT, D, C, INL, NX, R, W 4– N, LT 5– AD, RD, YD, WD page 5	6– blank 7– BA, S, TA 8– B, G, IND, L, LB, T 9– CHB, RHB 10– blank (without logo)	605 606 611 612 613 618 619 622 625 626 629 630 690 page 3	Thick Door– (specify thickness if other than 1-3/4") 7/8LTC– 7/8" lip-to-center strike SH– security head screws

How to order: 40H Replacement Spindles

40HRS	2	
Series	**Function Code**	**Options**
40HRS – replacement spindle kits	2– 40H split spindle (standard) 4– 40H hook spindle* page 5	Thick Door– (specify thickness if other than 1-3/4")

*Hook spindle is available for 1 3/4" thick door only.

How to order: 40H Vandal Trim Retrofit Kit

40HSK	14	626					
Series	**Kit Number**	**Finishes**					**Options**
40HVTK – vandal trim	**Standard Levers:** ♿ 14*– curved return ♿ 15– contour/ angle return	605 619 690	606 622	611 625	612 626	613 629	618 630	Thick Door– (specify thickness if other than 1-3/4")

*Complies with California Building Code Title 10 and Title 24, part 12

How to order: 40H Screw Kits

40HSK	1	626	
Series	**Kit Number**	**Finishes**	**Options**
40HSK – screw kits	1– H, R. S, J trim screw kit 2– M, N trim screw kit 3– special purpose fasteners screw kit 4– surface mounted trim screw kit 5– VIN trim screw kit page 5	606 612 613 622 626 page 3	Thick Door– (specify thickness if other than 1-3/4") SH– security head screws

How to order: 40H Visual Indicator Laminate & Thumb-turn

Part Description	Part Number
Indicator Laminate	86329
Thumb-turn Indicator Kit	86829
Thumb-turn Escutcheon Indicator Kit	

Series	Trim Style	Finishes	Options
Indicator Thumb-turn **40HVIT**	H– 2 3/4" Dia. R– 2 3/4" Dia. S– 3 1/2" Dia. M– forged J– wrought	605 606 611 612 613 618 619 622 625 626 629 630 690 626AM 630AM	Thick Door– (specify thickness if other than 1-3/4")

Special Features

Lead Lined Feature

The 40H mortise lock can be lead lined to protect against x-rays. Since the majority of lead lined doors contain the lead in the surface of the door, the 40H provides lead lining for the holes cut in the door when preparing the door for the trim. The cylinder hole is lead lined.

To order: designate "LL" on order procedure (page 6-7)

Security Head Screws

Security head screws.

To order: designate "SH" on 45H/47H in order procedure (page 6-7).

Tactile Feature Knob/Lever

This option is for use in applications where special notice is needed to warn the blind about safety or accessibility environments. Depending on the style ordered, the knob or lever will receive either grooves or knurling as the tactile feature.

To order: designate "TL" on 45H/47H knobs/levers in order procedure (page 6-7).

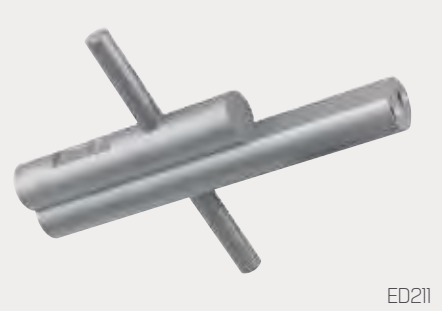
Visual Indicator Feature

This option adds a visual indicator for certain functions that visually reflects whether the lockset is in the locked or unlocked state. This option is available for the following functions: TD– Dormitory, IND– Intruder, INL– Intruder, L– Privacy, LT– Privacy, S– Storeroom. Visual indicator feature is standard on the H– Hotel function (page 2).

Vandal Trim

VT–Vandal trim is available in standard finish for H, J, M, N, R, and S trims in either #14 or #15 levers.

Note: Not available in single or dummy trim functions. If compliance to California Building Code Title 19 & 24 is required, the #14 lever design must be specified.



ED211

ED212

KD316

Service Equipment

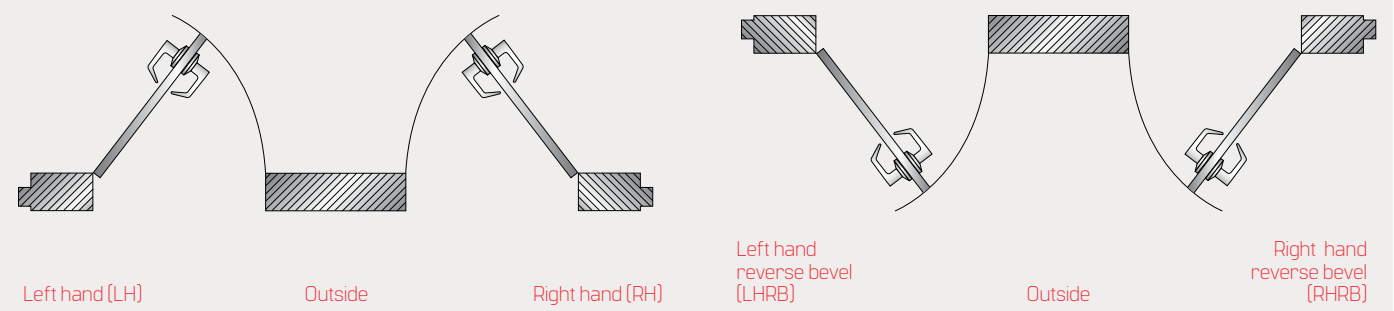
ED211 Mortise Cylinder Wrench
The BEST mortise cylinder wrench and test handle is an essential dual-purpose tool. It is used primarily to install or remove BEST mortise cylinders without marring the cylinder surface finish. The single end may be used to test the lock operation, as well as aligning the throw pins.
To order specify: ED211 mortise cylinder wrench.

ED212 Mortise Cylinder Cam Assembly Tool
Mortise cylinder cams are quickly changed with the use of this tool. Approx. length 1-3/4".
To order specify: ED212 assembly tool.

ED221 Mortise Cylinder Thread Repair Die
Tool for rethreading 1-5/32" diameter cylinders. To order specify: ED221 thread repair die. ED225 Hole Tap for 1-5/32" Mortise Cylinder Tap tool used to rethread housing threads for 1E Mortise Cylinders.
To order specify: ED225 hole tap.

KD316 Spanner Wrench (C54466)
All "H" locksets require the use of the KD316 spanner wrench for door mounting. This tool is include with every (10) locksets ordered.
To order specify: KD316 spanner wrench.

Hand of Door



Mortise Sample Specifications

A. Locksets and Latchsets:
[BEST] - [_____] [_____]

1. Base Specification: BEST components as listed in Hardware Schedule per Article 3.05.
2. Locksets and latchsets of other acceptable manufacturers must conform to the requirements of Subparagraphs 3 and 4.
3. Mortise Type:

A. Locksets shall be tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C

B. Locksets shall be mortise type with solid 3/4 inch throw one-piece radiused latchbolt made of self-lubricating stainless steel. Deadbolt functions shall be one inch projection stainless steel construction. Both deadbolt and latchbolt to extend into lock case with reinforcing a minimum of 3/8 inch when fully extended.

C. Knobs to be [_____] design.
Levers to be [_____] design.

D. Furnish locksets and latchsets with sufficient strike lip to protect door trim.

E. Provide locksets with 7 pin [BEST] interchangeable core cylinders. [All mortise cylinders shall have a concealed internal set screw for securing the cylinder to the lockset. The internal set screw will be accessible only by removing the core from the cylinder body with a control key]

F. All mortise locksets and latchsets must conform to ANSI A156.13, Series 1000, Operational Grade 1 [Security Grade 2 for locksets in security areas] and be listed by UL. [High Security Option: All mortise locksets must conform to ANSI A156.13, Series 1000, Operational Grade 1, Security Grade 1 and listed by UL, and must include interchangeable core cylinders which conform to High Security Cylinder requirements of UL 437.]

G. Locksets must fit ANSI A115.1 door preparation.

H. Locksets and latchsets to have self-aligning through-bolted trim.

I. Locksets and latchsets must have the ability to change handing without opening case.

J. Auxiliary latch to be made of one-piece self-lubricating stainless steel.

K. Locksets must be available with tactile or knurled knobs or levers for identification of hazardous areas.

L. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1.

Subparagraphs m through r describe quality features of BEST mortise locksets which may or may not be available from other lock manufacturers. Edit accordingly.

M. [Spindle to be such that if forced it will twist first, then break, thus preventing forced entry.]

N. [Knobs and levers to be operated with a roller bearing spindle hub mechanism.]

O. [Permanent core face must be the same finish as the lockset finish.]

P. Cylinder retaining screw, auxiliary latch, and strike must be non-handed.]

Q. [Locking toggle on face of door must clearly indicate whether mortise lock is in the "locked" or "unlocked" state.]

R. [Cover and armored front must interlock at the latch, preventing the cover from spreading or bowing while under duress.]

Subparagraphs s through x describe quality features of BEST mortise locksets which may or may not be available from other lock manufacturers. Subparagraphs s, t, and u should remain as a group, and subparagraphs v, w, and x should remain as a group. Choose either s-u or v-x, but not both groups.

S. [Mortise lock to offer a complete lock (including trim) with the ability to be configured in the field to any of the following ANSI functions: F01, F04, F05, F07, F31.]

T. [Mortise lock to offer a complete lock (including trim) with the ability to be configured in the field to any of the following ANSI functions: F19, F13]

U. [Mortise lock to offer a complete lock (including trim) with the ability to be configured in the field to any of the following ANSI functions: F12, F20]

V. [Mortise lock to offer a multi-function case with the ability to be configured in the field to any of the following ANSI functions: F01, F04, F05, F07, F09, F30, F31, F32.]

W. [Mortise lock to offer a multi-function case with the ability to be configured in the field to any of the following ANSI functions: F13, F19, F33.]

X. [Mortise lock to offer a multi-function case with the ability to be configured in the field to any of the following ANSI functions: F12, F15, F20]

40H Series - Standard Knob & Trims

Knob- 4
Rose - H

Knob- 4
Rose - R

Knob- 4
Rose - S

Knob- 4
Escutcheon - J

Knob- 4
Escutcheon - N

40H Series - Standard Lever & Trims

Lever- 3
Rose - H

Lever- 12
Rose - H

Lever- 14
Rose - H

Lever- 15
Rose - H

Lever- 16
Rose - H

Lever- 17
Rose - H

Lever- 3
Rose - R

Lever- 12
Rose - R

Lever- 14
Rose - R

Lever- 15
Rose - R

Lever- 16
Rose - R

Lever- 17
Rose - R

Lever- 3
Rose - S

Lever- 12
Rose - S

Lever- 14
Rose - S

Lever- 15
Rose - S

Lever- 16
Rose - S

Lever- 17
Rose - S

40H Series - Standard Lever & Trims

Lever- 3
Escutcheon - J

Lever- 12
Escutcheon - J

Lever- 14
Escutcheon - J

Lever- 15
Escutcheon - J

Lever- 16
Escutcheon - J

Lever- 17
Escutcheon - J

Lever- 3
Escutcheon - M

Lever- 12
Escutcheon - M

Lever- 14
Escutcheon - M

Lever- 15
Escutcheon - M

Lever- 16
Escutcheon - N

Lever- 17
Escutcheon - N

40H Series - Standard Lever & Trims

#50

#51

#52

#53

#55

#60

#62

#63

#65

#69

#75

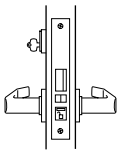
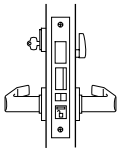
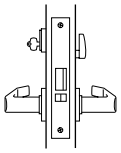
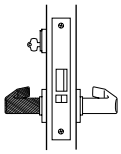
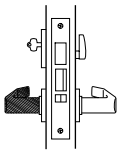
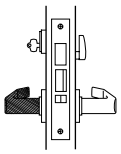
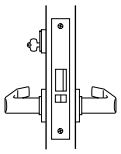
#79

#80

#81

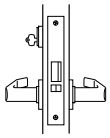
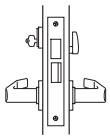
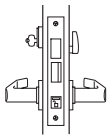
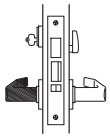
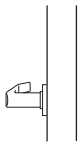
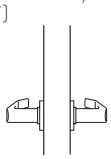
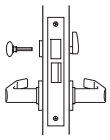
#89

Functions

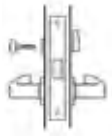
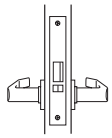
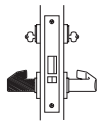
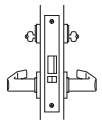
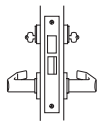
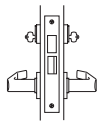
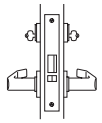
	Description		Outside Lever or Knob		Inside Knob/Lever	
Function & Diag (ANSI No.)	Latch operated by	Deadbolt operated by	Locked by	Unlocked by	Locked by	Unlocked by
Single keyed						
Office (A) F04 	Rotating inside lever Rotating outside lever– only when locking toggle is in unlocked position Turning key in outside cylinder.	N/A	Placing locking toggle in locked position	Placing locking toggle in unlocked position	Cannot be locked	Always unlocked
Office (AB) F20 	Rotating inside lever, Rotating outside lever– only when locking toggle is in unlocked position, Turning key in outside cylinder.	Turning key in outside cylinder Inside turn lever Inside lever retracts deadbolt and latch simultaneously.	Placing locking toggle in locked position, Projecting dead-bolt by key or turning inside turn lever.	Turning key in outside cylinder and placing locking toggle in unlocked position	Cannot be locked	Always unlocked
Office (AT) F04 	Rotating inside lever, Rotating outside lever only when unlocked by key or turn lever, Turning key in outside cylinder.	N/A	Turning inside turn lever Turn key in outside cylinder.	Turning inside turn lever Turning key in outside cylinder	Cannot be locked	Always unlocked
Storeroom (D) F07 	Rotating inside lever Turning key in outside cylinder.	N/A	Always locked	Cannot be unlocked	Cannot be locked	Always unlocked
Hotel (H) F15 	Rotating inside lever, Turning key in outside cylinder.	Turning inside turn lever Turning emergency key in O/S cylinder. (Rotating inside lever retracts deadbolt and latch simultaneously.)	Always locked	Cannot be unlocked	Cannot be locked	Always unlocked
Hotel (HJ) F15 	Rotating inside lever Turning key in outside cylinder.	Turning inside turn lever Turning emergency key in O/S cylinder. (Rotating inside lever retracts deadbolt and latch simultaneously.)	Always locked	Cannot be unlocked	Cannot be locked	Always unlocked
Classroom (R) F05 	Rotating inside lever Rotating outside lever only when unlocked by key Turning key in outside cylinder.	N/A	Turning key in outside cylinder	Turning key in outside cylinder	Cannot be locked	Always unlocked

NOTE: The latchbolt is deadlocked with an auxiliary deadlatch. (H) F15 & (HJ) F15 - Throwing deadbolt blocks out all keys except "ER" key.

Functions

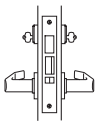
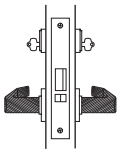
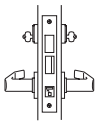
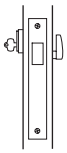
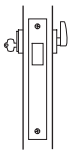
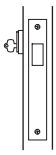
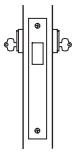
Function & Diag. (ANSI No.)	Description: Latch operated by	Description: Deadbolt operated by	Outside Lever or Knob: Locked by	Outside Lever or Knob: Unlocked by	Inside Knob/Lever: Locked by	Inside Knob/Lever: Unlocked by
Single keyed (continued)						
Classroom Holdback (RHB) F06 	Rotating inside lever Turning key in outside cylinder O/S lever except when locked by outside key Latchbolt held retracted by turning O/S key while holding up I/S lever. The latchbolt is deadlocked with an auxiliary deadlatch	N/A	Turning key in outside cylinder	Turning key in outside cylinder	Cannot be locked	Always unlocked
Dormitory (T) F13 	Rotating inside lever Rotating outside lever—only when deadbolt is retracted Turning key in out side cylinder.	Turning key in outside cylinder, Inside turn lever Inside lever retracts deadbolt and latch simultaneously.	Turning key in outside cylinder Turning inside turn lever.	Turning key in outside cylinder Turning inside turn lever. Rotating inside lever	Cannot be locked	Always unlocked
Dormitory (TA) F12 	Rotating inside lever Rotating O/S lever only when locking toggle is in unlocked position and deadbolt is retracted, Turning key in outside cylinder	Turning key in outside cylinder Turning inside turn lever. (Rotating inside lever retracts deadbolt and latch simultaneously.)	Placing locking toggle in locked position Projecting deadbolt by key or turning inside turn lever.	Turning key in outside cylinder and placing locking toggle in unlocked position	Cannot be locked	Always unlocked
Dormitory (TD) 	Rotating inside lever Turning key in outside cylinder. The latchbolt is deadlocked with an auxiliary deadlatch	Turning inside turn lever Rotating inside lever retracts deadbolt and latch simultaneously.) Turning key in outside cylinder.	Always locked	Cannot be unlocked	Cannot be locked	Always unlocked
Non-keyed						
Single Dummy Trim (1DT) 	This is a single, surface-mounted lever for an inactive door or a non-latching door					
Double Dummy Trim (2DT) 	This is a through bolt mounted pair of matching levers for an inactive door or a non-latching door					
L-Privacy (F19) 	Rotating inside lever Rotating outside lever only when deadbolt is retracted.	Turning the emergency key, Turning inside turn lever. (Rotating inside knob/lever retracts deadbolt and latch simultaneously.)	Turning inside turn lever Turning the emergency key.	Turning inside turn lever Rotating inside lever retracts latch and dead-bolt simultaneously Turning the emergency key.	Cannot be locked	Always unlocked

Functions

	Description		Outside Lever or Knob		Inside Knob/Lever	
Function & Diag. (ANSI No.)	Latch operated by	Deadbolt operated by	Locked by	Unlocked by	Locked by	Unlocked by
Non-keyed (continued)						
LT-Privacy 	Rotating inside lever Rotating outside lever—only when turn knob is unlocked	N/A	Turning inside turn lever Turning the emergency key.	Turning inside turn lever, Rotating inside lever, Turning the emergency key.	Cannot be locked	Always unlocked
N-Passage (F01) 	Rotating inside or outside lever	N/A	Cannot be locked	Cannot be unlocked	Cannot be locked	Cannot be locked
NX-Exit (F31)	Rotating inside lever The latchbolt is deadlocked with an auxiliary deadlatch	N/A	Always Fixed	Cannot be locked	Cannot be locked	Always unlocked
Double keyed						
Entrance (*C-Public) F09 	Rotating inside lever, Rotating outside lever only when unlocked by key in inside cylinder Turning key in outside cylinder only. The latchbolt is deadlocked with an auxiliary deadlatch. When required, inside cylinder may be combinated to operate by master key only	N/A	Turning key in inside cylinder	Turning key in inside cylinder	Cannot be locked	Always unlocked
Holdback (CHB) 	Turning outside key, Rotating outside lever only when unlocked by key in inside cylinder Inside lever Latchbolt held retracted by turning inside key while holding up on inside lever. The latchbolt is deadlocked with an auxiliary deadlatch	N/A	Turning key in inside cylinder	Turning key in inside cylinder	Cannot be locked	Always unlocked
Communicating (G) F14 	Latch operated from either side only when the deadbolt is retracted.	Turning key in outside or inside cylinder	Turning key in inside or outside cylinder	Turning key in inside or outside cylinder	Turning key in inside or outside cylinder	Turning key in inside or outside cylinder
Intruder (IND) F33 	Turning key in inside or outside cylinder Rotating outside lever when deadbolt is retracted Rotating inside lever.	Turning key in outside or inside cylinder Rotating inside lever (Retracts the deadbolt and latch simultaneously).	Extending the deadbolt by turning key in inside or outside cylinder	Retracting the deadbolt by turning key in inside or outside cylinder Rotating inside lever (Retracts the deadbolt and latch simultaneously).	Cannot be locked	Always unlocked
Intruder (INL) F32 	Rotating inside lever Rotating outside lever only when unlocked by inside or outside key Turning key in inside or outside cylinder. The latchbolt is deadlocked with an auxiliary deadlatch. When required, inside cylinder may be combinated to operate by master key only.	N/A	Turning key in inside or outside cylinder	Turning key in inside or outside cylinder	Cannot be locked	Always unlocked

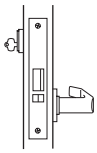
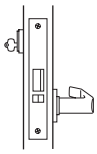
*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code®. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

Functions

	Description		Outside Lever or Knob		Inside Knob/Lever	
Function & Diag. (ANSI No.)	Latch operated by	Deadbolt operated by	Locked by	Unlocked by	Locked by	Unlocked by
Double keyed (continued)						
Intruder (INA) F34 	Turning key in inside or outside cylinder; Rotating outside lever when deadbolt is retracted, Rotating inside lever	Turning key in outside or inside cylinder Rotating inside lever (Retracts the deadbolt and latch simultaneously).	Extending the deadbolt by turning key in inside or outside cylinder	Retracting the deadbolt by turning key in inside or outside cylinder Rotating inside lever (Retracts the deadbolt and latch simultaneously).	Cannot be locked	Always unlocked
	The latchbolt is deadlocked with an auxiliary deadlatch. When required, inside cylinder may be combinated to operate by master key only.					
Storeroom (*W) F30 	Turning key in inside or outside cylinder	N/A	Always locked	Cannot be locked	Always unlocked	Cannot be locked
	The latchbolt is deadlocked with an auxiliary deadlatch. When required, inside cylinder may be combinated to operate by master key only.					
Storeroom (*S) F35 	Rotating inside lever Rotating outside lever only when locking toggle is in unlocked position and deadbolt is retracted, Turning key in inside or outside cylinder.	Turning key in inside or outside cylinder	Placing locking toggle in locked position	Turning key in outside cylinder or inside cylinder and placing locking toggle in unlocked position	Extending the deadbolt	Retracting the deadbolt
Deadlocks						
Deadlock (AD) F17 	N/A	Turning key in outside cylinder Turning inside turn lever.	N/A	N/A	N/A	N/A
Classroom Deadlock (RD) F29 	N/A	Turning key in outside cylinder Turning inside turn lever.*	N/A	N/A	N/A	N/A
	*Function RD–the inside turn knob retracts deadbolt but will not project it. (Specify hand of door.) Only for 1 - 3/4" doors.					
YD-Deadlock F18 	N/A	Turning key in outside cylinder only	N/A	N/A	N/A	N/A
WD-Deadlock F16 	N/A	Turning key in outside or inside cylinder	N/A	N/A	N/A	N/A
	The latchbolt is deadlocked with an auxiliary deadlatch. When required, inside cylinder may be combinated to operate by master key only.					

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code®. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

Functions

	Description		Outside Lever or Knob		Inside Knob/Lever	
Function & Diag. (ANSI No.)	Latch operated by	Deadbolt operated by	Locked by	Unlocked by	Locked by	Unlocked by
Special						
Classroom (XR) 	Rotating inside lever Turning key in outside cylinder.	N/A	N/A	N/A	Cannot be locked	Always unlocked
Classroom Holdback (*XRHB)F09 	Rotating inside lever, Turning key in outside cylinder. Latchbolt held retracted by turning O/S key while holding up I/S lever The latchbolt is deadlocked with an auxiliary deadlatch	N/A	N/A	N/A	Cannot be locked	Always unlocked
Storeroom (*ZD)	Turning key in outside cylinder The latchbolt is deadlocked with an auxiliary deadlatch	N/A	Always locked	Cannot be unlocked	N/A	N/A

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code®. In an emergency exit situation, failure to quickly unlock the inside lever could be hazardous or even fatal.

48H/49H Series-Mortise Deadlocks

Specifications

Case: 0.095" cold rolled steel, 3-3/8" x 4-3/16" x 1". Steel is zinc dichromate plated for corrosion protection.

Faceplate: Brass or bronze material, 5-3/8" x 1-3/16" x 7/32" .

Strike: Brass, bronze, or stainless steel base material.
48HS1: Flat strike supplied standard, 3-1/2" x 1-1/8" x 3/32"
Fits standard door frame cut-out as specified in ANSI A115.5.
48HS2: Lipped strike supplied as option, 4-7/8" x 1-1/4" x 3/32". Fits standard door frame cut-out as specified in ANSI A115.1.

Backset: 2 3/4"

Door Thickness: Standard lock configuration designed for doors 1-3/4" thick. Thick door configuration available for doors up to 3" thick (specify thickness when ordering).

NOTE: "R" function not available for thick door.

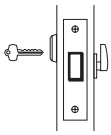
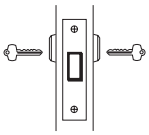
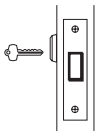
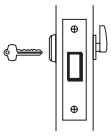
Deadbolt: Stainless steel, 1" throw

Trim:
48H: Cylinder and trim ring only.
49H: M escutcheon supplied; refer to 47H specification for dimensions.

Finishes:
48H: Available in all finishes offered for 45H.
49H: Available in 626 only.

48H Series 49H Series

48H/49H Function Chart

Function & Diag. BHMA#	Description: Deadbolt operated by	Function & Diag. BHMA#	Deadbolt operated by
Special			
*K-Cylinder Deadlock  E06071	Rotating the inside thumb turn rosette, Turning the outside key.	*M-Cylinder Deadlock  E06061	Turning the outside or inside key
*L-Cylinder Deadlock  E06081	Turning the outside key	*R-Cylinder Deadlock  E06091	Turning the outside key Rotating the inside thumb turn cylinder assembly retracts the deadbolt, but will not project it.

*ATTENTION: Locksets that secure both sides of the door are controlled by building codes and the Life Safety Code®. In an emergency exit situation, failure to quickly retract the deadbolt could be hazardous or even fatal.
NOTE: Specify the hand of door when ordering. The R function deadlock can only be used on 1 3/4" thick doors.

How to Order - 48H/49H Series

48H	7	K	S1	626
Series	**Core Housing**	**Function Code**		**Standard Finishes** / **Options**
48H– standard **49H**– high security	0–less cylinder (48H only) 7–7-pin housing 48H accepts all BEST cores; 49H only 5C cores; 49H– 626 ONLY	K– cylinder x turn L– cylinder only M– double cylinder R– classroom cylinder x turn	S1– flat strike (default) S2– ANSI strike	**48H** 605 606 611 612 613 618 619 625 626 690 **49H** 626 ONLY **Options:** 48H: SH– security head 49H: K– non UL cylinder

**Must specify key mark and number of keys or designate L/C for less core.

Standard Mortise Cylinder

Standard 1E74 Mortise Cylinder

Designed for standard security applications, BEST® offers the 45H/48H mortise locksets, utilizing the 1E74 mortise cylinder and special interchangeable core. Special cylinder variations are available for most applications. BEST cylinders are machined from solid brass or bronze bar stock. Additional security is provided by a set screw that mounts diagonally into the cylinder wall. This set screw prevents unauthorized removal of the cylinder without use of the control key.

1E74 Standard Mortise Cylinder

1E74 Cylinder Specifications

Diameter: 1-5/32". 1.150-32 (NS-2A) threaded mortise cylinder.

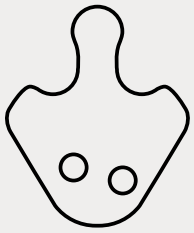
Length: 1-1/4"

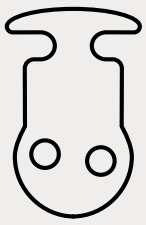
Material: Brass or bronze.

Finish: Supplied to match mortise lockset trim (see specifications, page 3).

Cylinder Ring: Wrench resistant ring with tension spring, machined from all brass or bronze. Proper length automatically provided with lockset. For more ring information see cylinder catalog.

Cam: Proper cam provided for cylinder as required by designated function on order. Special cams available; see cylinder catalog section.


Standard C258 Cam All functions except O/S C and CHB


C293 Cam O/S c and CHB Functions only

High Security Cylinder

1EJ7J4 High Security rCylinder

Designed for high security applications, BEST® offers the 47H/49H mortise locksets, utilizing the 1EJ7J4 high security cylinder and special 5C interchangeable core. This special cylinder is listed by Underwriters Laboratories as conforming to Standard UL437 for high security cylinders. The patented cylinder provides additional strength through a hardened stainless steel alloy ring, face and keyway disc. It is available in most keyed functions (All functions are certified to ANSI A156.13 Security Grade 1.) and is supplied only with "M" trim. Cylinder also conforms to ANSI A156.5 Mortise Cylinder, Grade 1A.

NOTE: 1EJ7J4 must be combinated at factory to comply to UL437. 1EK7K4 is combinated in the field and may be ordered less core.

1EJ7J4 High Security Cylinder

1EJ7J4 Cylinder Specifications

Diameter: 1-5/32". 1.150-32 (NS-2A) threaded mortise cylinder.

Length: 1-1/16"

Materials: Brass and stainless steel.

Finish: Stainless steel base plated to match 626 finish.

Cylinder Ring: High security wrench resistant, machined from stainless steel, hardened. Proper length automatically provided with lockset. Special door preparation required. Diameter of hole 1-3/4".

Cylinder Face, Keyway Disc: Stainless steel, hardened.

Cam: Proper cam provided for cylinder as required by designated function order.

NOTE: 1EJ7J4 must be combinated at factory to comply to UL437. 1EK7K4 is combinated in the field and may be ordered less core.

47H Mortise Lock with #4 knob

47H Mortise Lock with #14 lever

BEST
dormakaba Group

CORPORATE HEADQUARTERS
6161 EAST 75TH STREET
INDIANAPOLIS, IN 46250 USA

Phone 855-365-2407

bestaccess.com

For questions about ordering and to be sure you get the right configuration for your needs, contact your BEST dormakaba sales representative.
6161 East 75th Street, Indianapolis, IN 46250 USA | **855-365-2407** | **bestaccess.com**

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dormakaba

BA-0012 06-23

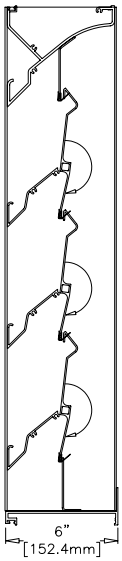
EAC-601

Combination Louver/Damper, Drainable Blade

Extruded Aluminum

Camp Muir
Louvers

Fame	Heavy gauge extruded 6063-T5 aluminum, 6 in. (152 mm) x 0.125 in. (3 mm) nominal wall thickness
Blades	Drainable design, heavy gauge extruded 6063-T5 aluminum, 0.081 in. (2 mm) nominal wall thickness, positioned 45º on approximately 6.5 in. (165 mm) centers
Seals	Dual-durometer extruded vinyl blade seals, compressible stainless steel jamb seals
Temperature Restrictions	(-20º F) - (+180º F) (-29º C) - (+82º C)
Linkage	Side linkage, out of airstream (concealed in frame)
Bearings	Synthetic sleeve type
Axles	1/2 in. (13 mm) dia. zinc plated steel
Louver Depth	6 in. (152 mm)
Construction	Mechanically fastened
Finish	Mill
Minimum Size	12 in. W x 16 in. H (305 mm W x 406 mm H)
Maximum Single Section Size	60 in. W x 96 in. H (1524 mm W x 2438 mm H)
Wind Load	25 PSF (1.2 kPa)



Performance Ratings

Greenheck Fan Corporation certifies that the EAC-601 louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to Water Penetration and Air Performance ratings.

Louvers were tested in accordance with AMCA Standard 500-L.

Performance of 48 in. x 48 in. (1219 mm x 1219 mm) Louver

Free Area	
Area	7.41 sq. ft. (0.688 sq. m)
Percent	46.3%
Performance at Beginning Point of Water Penetration	
Free Area Velocity	1024 fpm (5.202 m/s)
Max Intake Volume	7588 cfm (3.581 m³/s)
Performance at 6,000 CFM (2.832 m³/s) Intake	
Pressure Drop	0.082 in. wg (0.020 kPa)

Options and Accessories

- Actuators
- Bird Screen
- Extended Sill
- Filter Rack/Filter
- Flange Frame
- Glazing Frame
- Insect Screen
- Mounting Angles
- Security Bars
- Stainless Steel Axles and Bearings
- Variety of Architectural Finishes

Product Details

EAC-601 Leakage Chart

EAC-601 Standard Details

Structural reinforcing members may be required to adequately support and install multiple louver sections within a large opening. Structural reinforcing members along with any associated installation hardware is not provided by Greenheck unless indicated otherwise by Greenheck. Options and accessories including, but not limited to, screens, filter racks, louver doors, and blank off panels are not subject to structural analysis unless indicated otherwise by Greenheck.

Free Area Chart

Free Area Chart shows free area in square feet and square meters.

Louver Height Inches (Meters)	Louver Width in Inches (Meters)													
	12	**15**	**18**	**21**	**24**	**27**	**30**	**33**	**36**	**39**	**42**	**48**	**54**	**60**
	0.30	0.38	0.46	0.53	0.61	0.69	0.76	0.84	0.91	0.99	1.07	1.22	1.37	1.52
16	**0.23**	**0.30**	**0.38**	**0.45**	**0.53**	**0.60**	**0.68**	**0.75**	**0.83**	**0.90**	**0.98**	**1.13**	**1.27**	**1.42**
0.41	0.02	0.03	0.04	0.04	0.05	0.06	0.06	0.07	0.08	0.08	0.09	0.10	0.12	0.13
21	**0.49**	**0.64**	**0.80**	**0.96**	**1.12**	**1.28**	**1.43**	**1.59**	**1.75**	**1.91**	**2.07**	**2.38**	**2.70**	**3.01**
0.53	0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.15	0.16	0.18	0.19	0.22	0.25	0.28
24	**0.49**	**0.64**	**0.80**	**0.96**	**1.12**	**1.28**	**1.43**	**1.59**	**1.75**	**1.91**	**2.07**	**2.38**	**2.70**	**3.01**
0.61	0.05	0.06	0.07	0.09	0.10	0.12	0.13	0.15	0.16	0.18	0.19	0.22	0.25	0.28
30	**0.74**	**0.99**	**1.23**	**1.47**	**1.71**	**1.95**	**2.19**	**2.43**	**2.67**	**2.92**	**3.16**	**3.64**	**4.12**	**4.60**
0.76	0.07	0.09	0.11	0.14	0.16	0.18	0.20	0.23	0.25	0.27	0.29	0.34	0.38	0.43
33	**1.00**	**1.33**	**1.65**	**1.97**	**2.30**	**2.62**	**2.95**	**3.27**	**3.60**	**3.92**	**4.25**	**4.90**	**5.55**	**6.19**
0.84	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.39	0.46	0.52	0.58
39	**1.00**	**1.33**	**1.65**	**1.97**	**2.30**	**2.62**	**2.95**	**3.27**	**3.60**	**3.92**	**4.25**	**4.90**	**5.55**	**6.19**
0.99	0.09	0.12	0.15	0.18	0.21	0.24	0.27	0.30	0.33	0.36	0.39	0.46	0.52	0.58
42	**1.26**	**1.67**	**2.07**	**2.48**	**2.89**	**3.30**	**3.71**	**4.11**	**4.52**	**4.93**	**5.34**	**6.15**	**6.97**	**7.78**
1.07	0.12	0.16	0.19	0.23	0.27	0.31	0.34	0.38	0.42	0.46	0.50	0.57	0.65	0.72
48	**1.51**	**2.01**	**2.50**	**2.99**	**3.48**	**3.97**	**4.46**	**4.95**	**5.44**	**5.94**	**6.43**	**7.41**	**8.39**	**9.38**
1.22	0.14	0.19	0.23	0.28	0.32	0.37	0.41	0.46	0.51	0.55	0.60	0.69	0.78	0.87
51	**1.51**	**2.01**	**2.50**	**2.99**	**3.48**	**3.97**	**4.46**	**4.95**	**5.44**	**5.94**	**6.43**	**7.41**	**8.39**	**9.38**
1.30	0.14	0.19	0.23	0.28	0.32	0.37	0.41	0.46	0.51	0.55	0.60	0.69	0.78	0.87
60	**2.03**	**2.69**	**3.34**	**4.00**	**4.66**	**5.32**	**5.98**	**6.63**	**7.29**	**7.95**	**8.61**	**9.92**	**11.24**	**12.56**
1.52	0.19	0.25	0.31	0.37	0.43	0.49	0.56	0.62	0.68	0.74	0.80	0.92	1.04	1.17
66	**2.29**	**3.03**	**3.77**	**4.51**	**5.25**	**5.99**	**6.73**	**7.47**	**8.22**	**8.96**	**9.70**	**11.18**	**12.66**	**14.15**
1.68	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.69	0.76	0.83	0.90	1.04	1.18	1.31
78	**2.54**	**3.37**	**4.19**	**5.02**	**5.84**	**6.67**	**7.49**	**8.31**	**9.14**	**9.96**	**10.79**	**12.44**	**14.09**	**15.74**
1.98	0.24	0.31	0.39	0.47	0.54	0.62	0.70	0.77	0.85	0.93	1.00	1.16	1.31	1.46
84	**2.80**	**3.71**	**4.62**	**5.52**	**6.43**	**7.34**	**8.25**	**9.16**	**10.06**	**10.97**	**11.88**	**13.69**	**15.51**	**17.33**
2.13	0.26	0.34	0.43	0.51	0.60	0.68	0.77	0.85	0.93	1.02	1.10	1.27	1.44	1.61
96	**3.31**	**4.39**	**5.46**	**6.54**	**7.61**	**8.69**	**9.76**	**10.84**	**11.91**	**12.98**	**14.06**	**16.21**	**18.36**	**20.51**
2.44	0.31	0.41	0.51	0.61	0.71	0.81	0.91	1.01	1.11	1.21	1.31	1.51	1.71	1.91

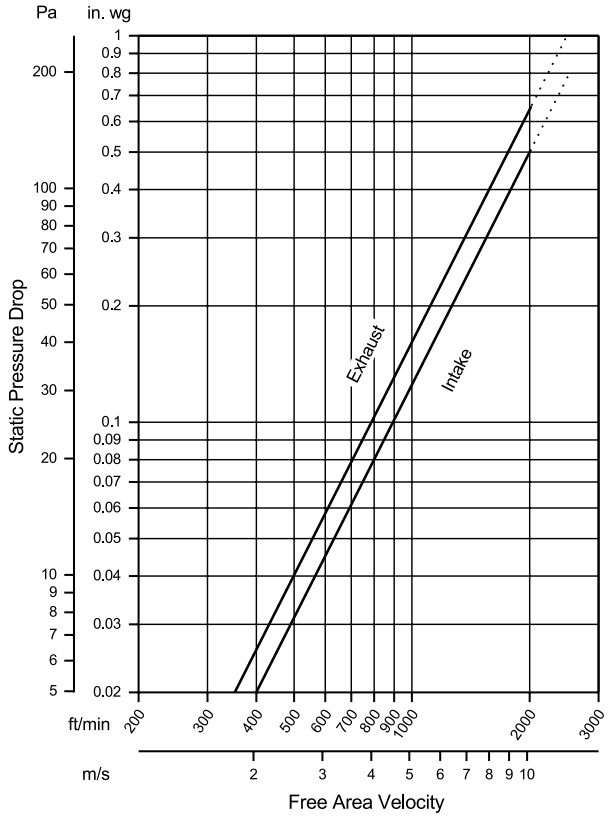
Document Links

- EAC-601 Specification
- Louver Finishes & Colors
- Louver Product Selection Guide
- Louver Products Catalog
- Louver Warranty Statement

Airflow Resistance

Standard Air - 0.075 lb/ft³ (1.2 kg/m³)

Test size 48 in. x 48 in. (1219 mm x 1219 mm)

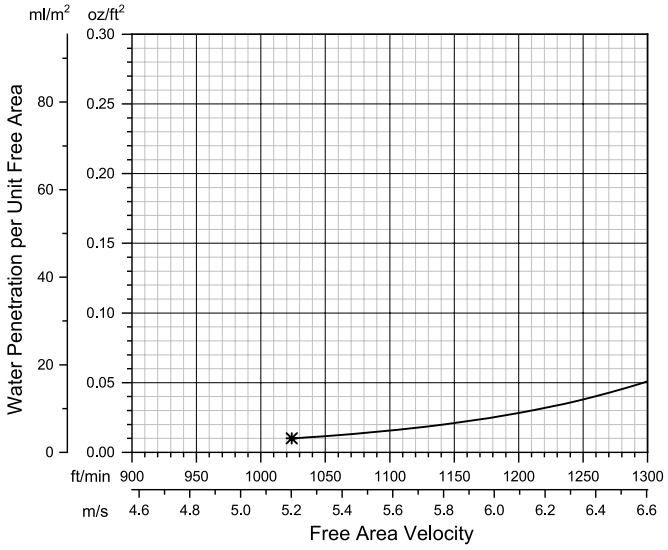


Model EAC-601 resistance to airflow (pressure drop) varies depending on louver application (air intake or air exhaust). Free area velocities (shown) are higher than average velocity through the overall louver size. See louver selection information. (Test Figure 5.5-6.5)

Water Penetration

Standard Air - 0.075 lb/ft³ (1.2 kg/m³)

Test size 48 in. x 48 in. (1219 mm x 1219 mm) Test duration of 15 min.



The AMCA Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The beginning point of water penetration is defined as that velocity where the water penetration curve projects through 0.01 oz. (3 g) of water (penetration) per sq. ft. (m²) of louver free area. ⋆**The beginning point of water penetration for Model EAC-601 is 1024 fpm (5.202 m/s) free area velocity.** These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors including good engineering judgement in selecting louvers.

GREENHECK

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Greenheck Fan Corporation reserves the right to make product changes without notice.

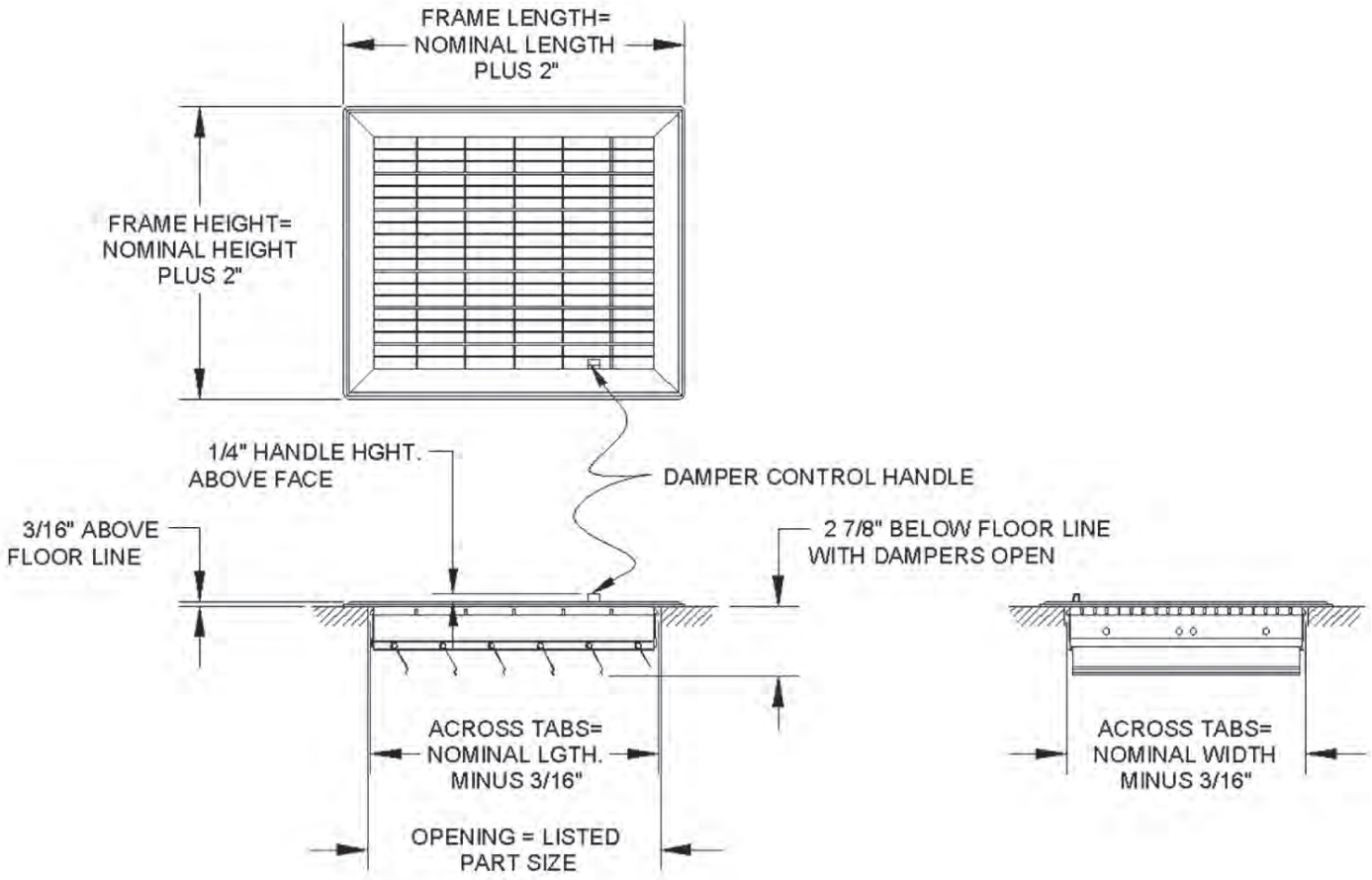
Series F20

Heavy Duty Floor Register

Market	Material	Origin
R	S	

- ❑ Bar face
- ❑ Smooth surface
- ❑ Multi-shutter damper
- ❑ Extremely rigid
- ❑ Available widths: 4", 6", 8", 9", 10", 12", 14"
- ❑ Golden Brown finish
- ❑ Made in the U.S.A.

Dimensional Drawings



info@continentalindustries.com

Performance Data, Series F20

Unit Size (in.)	Overall Size (in.)	Face Velocity	300	400	500	600	700	800	900	1000
		Pressure Loss	.006	.010	.016	.022	.031	.040	.050	.062
6 x 10 Ak .313	8 x 12	Cfm	91	125	157	188	219	250	282	313
		Throw	10	14	17	21	24	27	31	34
6 x 12 Ak .368	8 x 14	Cfm	110	147	184	221	258	294	331	368
		Throw	12	15	19	23	26	30	34	38
6 x 14 Ak .431	8 x 16	Cfm	129	172	216	259	302	345	388	431
		Throw	13	16	20	24	28	32	36	41
8 x 8 Ak .320	10 x 10	Cfm	96	128	160	192	224	256	288	320
		Throw	10	14	17	21	24	27	31	34
8 x 10 Ak .424	10 x 12	Cfm	127	170	212	254	297	339	382	424
		Throw	12	15	18	24	28	32	37	41
8 x 12 Ak .493	10 x 14	Cfm	148	197	247	296	345	394	444	493
		Throw	12	17	21	26	32	37	43	48
8 x 14 Ak .569	10 x 16	Cfm	171	228	285	341	398	455	512	569
		Throw	14	20	24	29	34	39	44	50
9 x 12 Ak .587	11 x 14	Cfm	176	235	294	352	411	470	528	587
		Throw	14	20	24	29	34	39	44	50
10 x 12 Ak .611	12 x 14	Cfm	183	244	306	367	428	489	550	611
		Throw	14	18	24	30	35	41	46	51
10 x 14 Ak .729	12 x 16	Cfm	219	292	365	438	510	583	656	729
		Throw	14	21	28	34	40	46	51	56
12 x 12 Ak .736	14 x 14	Cfm	221	294	365	438	510	583	656	729
		Throw	14	21	28	34	40	46	51	56
12 x 14 Ak .822	14 x 16	Cfm	247	329	411	493	575	658	740	822
		Throw	18	24	30	37	43	50	56	62

Terminal velocity is 50 fpm.

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Panel Signage

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Fax 800.345.7819 Email submittals@seton.com
P.O. Box 458, Buffalo, NY 14240-0458

PRODUCT DATA SHEET

Etched Equipment Nameplates

Description:	25 gauge etched equipment nameplates with custom lettering and numbering.
Use:	Permanently identify your manufactured items, machinery, and panels. These tough plates withstand harsh environments, abrasion, dirt and chemicals.
Standard Legend Colors:	Natural metal
Standard Background Colors:	Black, blue, green, red or natural metal.
Thickness:	25 gauge
Mounting:	Holes, 3M 467 adhesive or both
Mounting Method:	Two mounting holes; four Mounting holes (for size 6"W x 3"H only) or adhesive
Standard Sizes/ Max Number of Lines:	**Size** 2-1/2" x 3/4" 3" x 1-1/2" 3-1/2" x 2" 4" x 1-1/2" 6" x 3" 3" x 1" 3-1/8" x 2-1/4" 4" x 1-1/2" 4" x 2"
Service Temperature:	Up to 1000°F (Stainless Steel) and up to 400°F (Aluminum)
Average Outdoor Durability:	2-3 years

Brass Etched Equipment Nameplates

Material:	.020 Brass
Durability:	Up to 20 years (Average expected life of product will depend on user definition of failure, climatic conditions, mounting techniques, and material color). Scratch resistant.

Aluminum Etched Equipment Nameplates

Material:	.020 Aluminum
Durability:	Up to 20 years (Average expected life of product will depend on user definition of failure climatic conditions, mounting techniques, and material color). Soft, pliable metal (not scratch resistant).

Stainless Steel Etched Equipment Nameplates

Material:	.020 Stainless Steel
Durability:	Up to 20 years (Average expected life of product will depend on user definition of failure climatic conditions, mounting techniques, and material color). Can be used in extreme environments - resistant to corrosion, moisture, chemicals and harsh abrasions

Date: _____ / _____ / _____ Job: _____

Contractor _____

Camp Muir Climbing Shelter
Fire Extinguishers

KIDDE

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Smoke Alarms | Carbon Monoxide Alarms | Fire Extinguishers | Escape Ladders | Kits & Accessories | Key Safes | Support

Home / Fire Extinguishers / Kidde Pro 210 4 lb ABC Fire Extinguisher w/ Wall Hook (Rechargeable)

Kidde Pro 210 4 lb ABC Fire Extinguisher w/ Wall Hook (Rechargeable)

- Multipurpose dry chemical; fights all types of fire (trash, wood, paper, liquids, electrical equipment)
- Aluminum cylinder
- Tough aluminum valve assembly
- Pressure gauge allows for immediate pressure status check
- Rechargeable unit
- 6 year warranty
- UL rated 2-A 10-B:C
- UL approved wall hanger
- Coast Guard approved when fitted with optional mounting
- Optional metal strap bracket Pt # 466400

Contact us!

Item No.: _____
Project No.: _____
S.I.S. No.: _____

Profit from the Eagle Advantage®

Specification Sheet

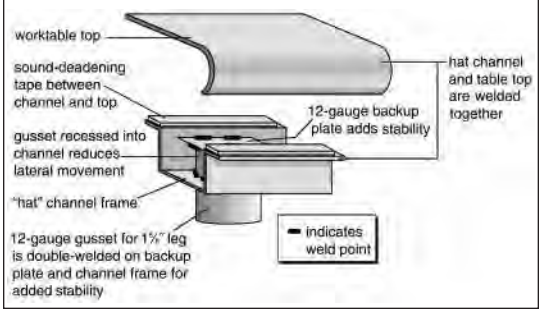
Worktables with Backsplash and Stainless Steel Base with Undershelf —Spec-Master® Series

Short Form Specifications

Eagle worktables, Spec-Master® series, model _____. Top constructed of 14 gauge 300 series stainless steel with 1½″ roll on front, 4½″ backsplash, and sides turned down 90˚. Adjustable undershelf constructed of 18 gauge 300 series stainless steel with marine edge. Top reinforced with stainless steel hat channels and sound deadened. Constructed with uni-lok® patented gusset system with the gussets recessed into the hat channels to reduce lateral movement. 1⅝″-diameter stainless steel legs, with stainless steel gussets and 1″ stainless steel adjustable bullet feet.

worktable with backsplash and adjustable undershelf

Patented uni-lok® System
(Patent No. 5,165,349)



MODELS:

❑ *T2424SE-BS*	❑ *T24108SE-BS*	❑ *T3072SE-BS*	❑ *T3660SE-BS*
❑ *T2430SE-BS*	❑ *T24120SE-BS*	❑ *T3084SE-BS*	❑ *T3672SE-BS*
❑ *T2436SE-BS*	❑ *T24132SE-BS*	❑ *T3096SE-BS*	❑ *T3684SE-BS*
❑ *T2448SE-BS*	❑ *T24144SE-BS*	❑ *T30108SE-BS*	❑ *T3696SE-BS*
❑ *T2460SE-BS*	❑ *T3030SE-BS*	❑ *T30120SE-BS*	❑ *T36108SE-BS*
❑ *T2472SE-BS*	❑ *T3036SE-BS*	❑ *T30132SE-BS*	❑ *T36120SE-BS*
❑ *T2484SE-BS*	❑ *T3048SE-BS*	❑ *T30144SE-BS*	❑ *T36132SE-BS*
❑ *T2496SE-BS*	❑ *T3060SE-BS*	❑ *T3648SE-BS*	❑ *T36144SE-BS*

Tabletop
- Patented uni-lok® gusset system (patent #5,165,349): gussets are recessed into hat channel, reducing lateral movement.
- Top reinforced with welded-on hat channel.
- Sound-deadened between top and channels.
- 4½″ (114mm)-high 90˚ backsplash with 1″ (25mm) turn at 90˚.
- 1½″ (38mm)-diameter 180˚ rolled edge on front. Ends are turned down 90˚, providing for flush installations when required.
- 14 gauge 300 series polished stainless steel.

Adjustable Undershelf
- Heavy gauge stainless steel.
- Gusset welded to each corner.
- Heavy duty marine edge design.

Legs—1⅝″ (41mm)-diameter
- Tables 96″ (2438mm) and longer come with six legs or more.
- Heavy gauge stainless steel.
- 1″ (25mm) adjustable stainless steel feet.

Options / Accessories
- ❑ Drawer
- ❑ Lock
- ❑ Casters
- ❑ Stainless steel bullet feet
- ❑ Overshelves
- ❑ Power strip (for material handling)
- ❑ Duplex receptacles
- ❑ Pot rack
- ❑ Sink
- ❑ Additional undershelf
- ❑ Stabilizer Bar (for 30″- and 36″-wide tables)

Certifications / Approvals

NSF

AUTOQUOTES

KCL

EAGLE GROUP
100 Industrial Boulevard, Clayton, DE 19938-8903 USA
Phone: 302-653-3000 • Fax: 302-653-2065
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MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB® Division.**
Phone: 302-653-3000 • Fax: 302-653-2065 • e-mail: quotes@eaglegrp.com

Spec sheets available for viewing, printing or downloading from our online literature library at *www.eaglegrp.com*

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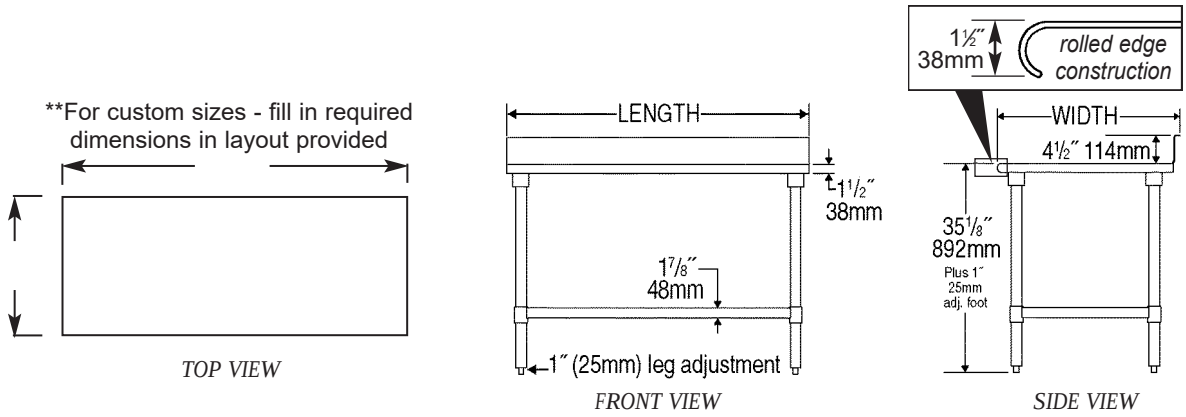
Profit from the Eagle Advantage®

Item No.: _____
Project No.: _____
S.I.S. No.: _____

Worktables with Backsplash and Stainless Steel Base with Undershelf—Spec-Master® Series



model #	# of legs	width in.	width mm	length in.	length mm	weight lbs.	weight kg
T2424SE-BS	4	24″	610	24″	610	47	21.3
T2430SE-BS	4	24″	610	30″	762	53	24.0
T2436SE-BS	4	24″	610	36″	914	58	26.3
T2448SE-BS	4	24″	610	48″	1219	69	31.3
T2460SE-BS	4	24″	610	60″	1524	80	36.3
T2472SE-BS	4	24″	610	72″	1829	94	42.6
T2484SE-BS	4	24″	610	84″	2134	107	48.5
T2496SE-BS	6	24″	610	96″	2438	125	56.7
T24108SE-BS	6	24″	610	108″	2743	156	70.3
T24120SE-BS	6	24″	610	120″	3048	169	76.7
T24132SE-BS	8	24″	610	132″	3353	183	83.0
T24144SE-BS	8	24″	610	144″	3658	196	88.9
T3030SE-BS	4	30″	762	30″	762	55	24.9
T3036SE-BS	4	30″	762	36″	914	58	26.3
T3048SE-BS	4	30″	762	48″	1219	77	34.9
T3060SE-BS	4	30″	762	60″	1524	89	40.4
T3072SE-BS	4	30″	762	72″	1829	103	46.3
T3084SE-BS	4	30″	762	84″	2134	119	54.0
T3096SE-BS	6	30″	762	96″	2438	143	64.9
T30108SE-BS	6	30″	762	108″	2743	165	74.4
T30120SE-BS	6	30″	762	120″	3048	187	84.8
T30132SE-BS	8	30″	762	132″	3353	207	93.9
T30144SE-BS	8	30″	762	144″	3658	228	103.4
T3648SE-BS	4	36″	914	48″	1219	85	38.6
T3660SE-BS	4	36″	914	60″	1524	99	44.9
T3672SE-BS	4	36″	914	72″	1829	117	53.1
T3684SE-BS	4	36″	914	84″	2134	135	61.2
T3696SE-BS	6	36″	914	96″	2438	145	65.8
T36108SE-BS	6	36″	914	108″	2743	186	84.4
T36120SE-BS	6	36″	914	120″	3048	211	95.7
T36132SE-BS	8	36″	914	132″	3353	238	108.0
T36144SE-BS	8	36″	914	144″	3658	263	119.3

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Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

Item #: 421SSPAN47 Project: _____

Qty: _____ Date: _____ Approval: _____

N47 48" x 84" Stainless Steel Wall Panel

Item #421SSPAN47

Technical Data

Features	Made in America
Type	Wall Panels

Camp Muir Climbing Shelter
Wall protection above counters

Features

- 48" wide x 84" tall
- Provides fire protection for walls made from materials with limited combustibility
- Provides smooth, wipeable surface for health code compliance
- Each order includes 2 end caps; 1 seam strip included for each panel ordered after first
- Extra-wide design for safety

Certifications

Made in America

© 2025 Halifax

FIRST ALERT

USER'S MANUAL

SMOKE & CARBON MONOXIDE ALARM

BATTERY POWERED WITH WIRELESS INTERCONNECT AND VOICE & LOCATION

Model SMCO500V

IMPORTANT! PLEASE READ CAREFULLY AND SAVE.

The warnings/limitations card and manual contains important information about your Smoke Alarm's operation. If you are installing this Alarm for use by others, you must leave this manual—or a copy of it—with the end user.

Para el manual del usuario en español, por favor visite firstalert.com

01 INTRODUCTION

Thank you for choosing First Alert® for your Smoke and Carbon Monoxide Alarm needs. You have purchased a state-of-the-art Smoke & Carbon Monoxide Alarm designed to help provide you with early warning of a smoke and/or carbon monoxide danger. Please take the time to read this manual and make the Smoke & Carbon Monoxide Alarm an integral part of your family's safety plan.

BASIC SAFETY INFORMATION

IMPORTANT!

- Dangers, Warnings, and Cautions alert you to important operating instructions or to potentially hazardous situations. Pay special attention to these items.
- This Smoke/CO Alarm is approved for use in single-family residences. It is **NOT** designed for marine or RV use.

⚠ CAUTION!

- This combination Smoke/Carbon Monoxide Alarm has two separate Alarms. The CO Alarm is not designed to detect fire or any other gas. It will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas. The Smoke Alarm will only indicate the presence of smoke that reaches the sensor. The Smoke Alarm is not designed to sense gas, heat or flames.

⚠ WARNING!

- This Carbon Monoxide Alarm is designed to detect carbon monoxide gas from **ANY** source of combustion. It is **NOT** designed to detect smoke, fire or any other gas, unless the product has been investigated and determined to comply with the applicable requirements.
- This Smoke/CO Alarm cannot operate without working batteries. Removing the batteries for any reason, or failing to replace the batteries at the end of their service life, removes your protection.
- **NEVER** ignore any Alarm. See "If Your Smoke/CO Alarm Sounds" for more information on how to respond to an Alarm. Failure to respond can result in injury or death.
- The Silence Features are for your convenience only and will not correct a problem. See "Using the Silence Features" for details. Always check your home for a potential problem after any Alarm. Failure to do so can result in injury or death.
- Test this Smoke/CO Alarm once a week. If the Alarm ever fails to test correctly, have it replaced immediately! If the Alarm is not working properly, it cannot alert you to a problem.
- This product is intended for use in ordinary indoor locations of family living units. It is not designed to measure CO levels in compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards. Individuals with medical conditions that may make them more sensitive to carbon monoxide may consider using warning devices which provide audible and visual signals for carbon monoxide concentrations under 30 ppm. For additional information on carbon monoxide and your medical condition contact your physician.

02 ABOUT SMOKE ALARMS

TYPES OF ALARMS

All these Smoke Alarms are designed to provide early warning of fires if located, installed and cared for as described in the user's manual, and if smoke reaches the Alarm. If you are unsure which type of Smoke Alarm to install, refer the National Fire Protection Association (NFPA) Standard 72 (National Fire Alarm and Signaling Code) and NFPA 101 (Life Safety Code). National Fire Protection Association, One Batterymarch Park, Quincy, MA 02269-9101. Local building codes may also require specific units in new construction or in different areas of the home.

Battery (DC) operated Smoke Alarms: Provide protection even when electricity fails, provided the batteries are fresh and correctly installed. Units are easy to install, and do not require professional installation. They do not, however, provide interconnected functionality.

AC powered Smoke Alarms: Can be interconnected so if one unit senses smoke, all units Alarm. They do not operate if electricity fails.

AC with battery (DC) back-up: will operate if electricity fails, provided the batteries are fresh and correctly installed. AC and AC/DC units must be installed by a qualified electrician.

Wireless Interconnected Alarms: Offer the same interconnected functionality as with hardwired Alarms, without wires. Units are easy to install and do not require professional installation. They provide protection even when electricity fails, provided the batteries are fresh and correctly installed.

Smoke Alarms for solar or wind energy users and battery backup power systems: AC powered Smoke Alarms should only be operated with true or pure sine wave inverters. Operating this Smoke Alarm with most batterypowered UPS (uninterruptible power supply) products or square wave or "quasi sine wave" inverters **will damage the Alarm.** If you are not sure about your inverter or UPS type, please consult with the manufacturer to verify.

Smoke Alarms for the hearing impaired: Special purpose Smoke Alarms should be installed for the hearing impaired. They include a visual Alarm and an audible Alarm horn, and meet the requirements of the Americans With Disabilities Act. These units can be interconnected so if one unit senses smoke, all units Alarm.

Smoke Alarms are not to be used with detector guards unless the combination has been evaluated and found suitable for that purpose.

All First Alert® Smoke Alarms conform to regulatory requirements, including UL217 and are designed to detect particles of combustion. Smoke particles of varying number and size are produced in all fires.

Ionization technology is generally more sensitive than photoelectric technology at detecting small particles, which tend to be produced in greater amounts by flaming fires, which consume combustible materials rapidly and spread quickly. Sources of these fires may include paper burning in a wastebasket, or a grease fire in the kitchen.

Photoelectric technology is generally more sensitive than ionization technology at detecting large particles, which tend to be produced in greater amounts by smoldering fires, which may smolder for hours before bursting into flame. Sources of these fires may include cigarettes burning in couches or bedding.

For maximum protection, use both types of Smoke Alarms on each level and in every bedroom of your home.

03 INSTALLATION

WHERE TO INSTALL THIS ALARM

Minimum coverage for Smoke Alarms, as recommended by the National Fire Protection Association (NFPA), is one Smoke Alarm on every floor, in every sleeping area, and in every bedroom (See "Regulatory Information For Smoke Alarms" for details on the NFPA recommendations).

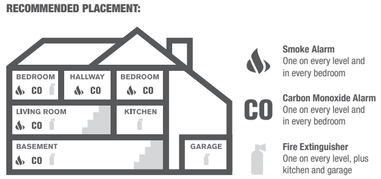
For CO Alarms, the National Fire Protection Association (NFPA) recommends that a CO Alarm should be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms. For added protection, install additional CO Alarms in each separate bedroom, and on every level of your home.

NOTE: For added protection, install an additional Smoke/CO Alarm at least 15 feet (4.6 meters) away from the furnace or fuel burning heat source where possible. In smaller homes or in manufactured homes where this distance cannot be maintained, install the Alarm as far away as possible from the furnace or other fuel burning source. Installing the Alarm closer than 15 feet (4.6 meters) will not harm the Alarm, but may increase the frequency of unwanted Alarms.

IN GENERAL, INSTALL COMBINATION SMOKE AND CARBON MONOXIDE ALARMS:

- On every level of your home, including finished attics and basements.
- Inside every bedroom, especially if people sleep with the door partly or completely closed.
- In the hall near every sleeping area. If your home has multiple sleeping areas, install a unit in each. If a hall is more than 40 feet (12 meters) long, install a unit at each end.
- At the top of first-to-second floor stairs.
- At the bottom of the basement stairs.
- For additional coverage, install Alarms in all rooms, halls, and storage areas, where temperatures normally remain between 40˚ F and 100˚ F (4.4˚ C and 37.8˚ C).

RECOMMENDED PLACEMENT:



- When installing on the wall, the top edge of Smoke Alarms should be placed between 4 inches (102 mm) and 12 inches (305 mm) from the wall/ceiling line.
- When installing on the ceiling, place the Alarm as close to the center as possible.
- In either case, install at least 4 inches (102 mm) from where the wall and ceiling meet. See "Avoiding Dead Air Spaces" for more information.

NOTE: For any location, make sure no door or other obstruction could keep carbon monoxide or smoke from reaching the Alarm.

WHERE NOT TO INSTALL THIS ALARM

FOR BEST PERFORMANCE, IT IS RECOMMENDED YOU AVOID INSTALLING SMOKE/CO ALARMS IN THESE AREAS:

- In garages, furnace rooms, crawl spaces and unfinished attics. Avoid extremely dusty, dirty or greasy areas.
- Where combustion particles are produced. Combustion particles form when something burns. Areas to avoid include poorly ventilated kitchens, garages, and furnace rooms. Keep units at least 20 feet (6 meters) from the sources of combustion particles (stove, furnace, water heater, space heater) if possible. In areas where a 20-foot (6 meter) distance is not possible – in modular, mobile, or smaller homes, for example – it is recommended the Smoke Alarm be placed as far from these fuel-burning sources as possible. The placement recommendations are intended to keep these Alarms at a reasonable distance from a fuel-burning source, and thus reduce "unwanted" Alarms. Unwanted Alarms can occur if a Smoke Alarm is placed directly next to a fuel-burning source. Ventilate these areas as much as possible.
- Within 5 feet (1.5 meters) of any cooking appliance. In air streams near kitchens. Air currents can draw cooking smoke into the smoke sensor and cause unwanted Alarms.
- In extremely humid areas. This Alarm should be at least 10 feet (3 meters) from a shower, sauna, humidifier, vaporizer, dishwasher, laundry room, utility room, or other source of high humidity.
- In direct sunlight.
- In turbulent air, like near ceiling fans or open windows. Blowing air may prevent CO or smoke from reaching the sensors.
- In areas where temperature is colder than 40˚ F (4.4˚ C) or hotter than 100˚F (37.8˚ C). These areas include non-air conditioned crawl spaces, uninfinished attics, uninsulated or poorly insulated ceilings, porches, and garages.
- In insect infested areas. Insects can clog the openings to the sensing chamber.
- Less than 12 inches (305 mm) away from fluorescent lights. Electrical "noise" can interfere with the sensor.
- In "dead air" spaces.

AVOIDING DEAD AIR SPACES

"Dead air" spaces may prevent smoke from reaching the Smoke Alarm. To avoid dead air spaces, follow installation recommendations below.

On ceilings, install Smoke Alarms as close to the center of the ceiling as possible. If this is not possible, install the Smoke Alarm at least 4 inches (102 mm) from the wall or corner.

For wall mounting (if allowed by building codes), the top edge of Smoke Alarms should be placed between 4 inches (102 mm) and 12 inches (305 mm) from the wall/ceiling line, below typical "dead air" spaces.

On a peaked, gabled, or cathedral ceiling, install first Smoke Alarm within 3 feet (0.9 meters) of the peak of the ceiling, measured horizontally. Additional Smoke Alarms may be required depending on the length, angle, etc. of the ceiling's slope. Refer to NFPA 72 for details on requirements for sloped or peaked ceilings.

WIRELESS OPERATION

First Alert® Wireless Interconnect Technology is the easy, cost-effective way to provide your family with whole-home safety. Compatible Wireless Interconnect Alarms communicate with each other without wires or connectors. When one Alarm sounds, they all sound. This provides your family with an earlier warning of potential danger, and gives you more time to react.

The communication distance (range) between any two compatible Wireless Interconnect Alarms is typically 100 feet (30 meters) inside of a home. Some features of a home, such as the number of levels, number/size of rooms, furniture and types of building materials used may reduce the range of the Alarms. Examples include: suspended ceilings, ductwork, large metallic appliances (refrigerators) and metal studs. A feature of Wireless Interconnect Alarms is that they operate as a mesh network. All Alarms will repeat any Alarm signal that is received to all other Wireless Interconnect Alarms. Interference from structural conditions can be overcome by adding additional Alarms to route the wireless signal around obstructions. A maximum of 18 compatible units may be interconnected (Maximum of 12 Smoke Alarms). Compatible Wireless Interconnect Alarms: SMCO500V, SM500V.

IMPORTANT!

- The range and proper operation of any wireless device will vary depending on its surroundings. It is very important that each Alarm is tested individually before and after installation to make sure that all Alarms respond properly.
- The Wireless Interconnect Alarms are not to be used outdoors or to transmit between buildings. The Alarms will not communicate properly under these conditions.
- Metal objects and metallic wallpaper may interfere with signals from wireless Alarms. Alarms should be tested after changes to your home such as remodeling, moving furniture, and with metal doors opened and closed.

Your First Alert® Wireless Interconnect Smoke/CO Alarm will automatically communicate potential fires with all other compatible First Alert® Wireless Interconnect Smoke/CO Alarms.

HOW TO INSTALL THIS ALARM

IMPORTANT!

- **This combination Smoke/CO Alarm was designed to be mounted on the ceiling or wall. It is not a tabletop device. You must install this device on the ceiling or wall as outlined below. Read "Where To Install This Alarm" before starting.**

⚠ CAUTION!

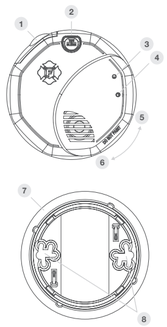
- **Do not connect this unit to any other Alarm or auxiliary device. It is a single-station unit that cannot be linked to other devices. Connecting anything else to this unit may prevent it from working properly.**
- **Do not install this unit over an electrical junction box. Air currents around junction boxes can prevent smoke from reaching the sensing chamber and prevent the unit from Alarming. Only AC powered units are intended for installation over junction boxes.**

This unit is designed to be mounted on the ceiling, or on the wall if necessary.

Tools you will need: pencil, drill with 3/16" (5 mm) drill bit, standard flathead screwdriver, hammer

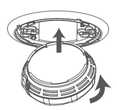
THE PARTS OF THIS SMOKE/CO ALARM

1. Battery compartment, install batteries here
2. Test/Silence button
3. CO Alarm LED
4. Power/Smoke Alarm LED
5. Turn this way to remove
6. Turn this way to attach
7. Mounting bracket
8. Mounting slots



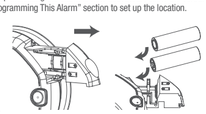
FOLLOW THESE SIMPLE STEPS

1. Choose a location. See "Where to Install This Alarm" for reference.
   WARNING! Do not install this Alarm over an existing electrical box. Only AC powered units are intended for installation over electrical boxes.
2. Hold the mounting bracket against the ceiling (or wall) so the vertical mounting slot is aligned in the 12 o'clock position and trace around the inside of the mounting slots (vertical and horizontal mounting).
3. Put the unit where it won't get covered with dust when you drill the mounting holes.
4. Using a 3/16" (5 mm) drill bit, drill a hole through the center of the oval outlines you traced.
5. Insert the plastic screw anchors (in the plastic bag with screws) into the holes. Tap the screw anchors gently with a hammer, if necessary, until they are flush with the ceiling or wall.
6. Line the mounting bracket up over the plastic screw anchors. Screw the mounting bracket to the ceiling or wall through the mounting slots using the two screws provided.
7. Install the batteries. First install the battery closest to the outside of the Alarm and then the battery which is closer to the inside of the Alarm. Match the + and – orientation to that shown on the Alarm. Push the batteries in until they snap securely. If the batteries are not snapped in completely, the unit cannot receive battery power.
   NOTE: After you install the batteries, there will be LED and horn activation prompts.
8. Position the base of the Alarm over the mounting bracket and turn. Turn the Alarm clockwise until the unit is in place.
9. Test the Alarm. See "Weekly Testing."



ADDING AND LINKING ADDITIONAL WIRELESS INTERCONNECT ALARMS

1. Pick a unit to be the "Primary" unit. On that unit, insert the batteries into the battery drawer, then close the drawer. You will hear a short chirp indicating the alarm is now activated. Follow the verbal instructions or "Step by Step Guide To Programming This Alarm" section to set up the location.
2. Prep the "Secondary" units (all the other detectors, minus the "Primary" unit). Insert the batteries but KEEP THE DRAWER OPEN. Press and hold test button and close drawer at the same time. Continue to hold the test button until you hear a short chirp. The LED on the alarm should now be blinking green.



3. Press and hold down the test button on the "Primary" unit. You should then hear the "Secondary" units chirp or start talking. This will indicate they are paired.
4. If the unit has voice & location, follow the verbal instructions or "Step by Step Guide To Programming This Alarm" section to set up the location.
5. Repeat steps 2-3 to link additional wireless interconnect alarms.
6. Press and hold the test button on any unit to test them. If you paired them successfully, they should all start to test. Make sure you hold the test button down until each chirp or say "Testing" (voice units only).

STEP BY STEP GUIDE TO PROGRAMMING THIS ALARM

For First Time and When Changing Batteries

Action	Alarm Will Say
Insert batteries (2, AA batteries)	"Welcome, First Alert Carbon Monoxide and Smoke Alarm." "No location programmed" if first time or "[Location, example: "Basement"] location programmed" when changing batteries. "To select location, press and hold test button now."
Press & hold test button if you would like to program the location or change the location of the Alarm. Release button after Alarm responds.	"To save location, press and hold test button after location is heard." Alarm will speak list of locations (see below).
After you hear the location of where you are placing the Alarm, press & hold the test button.	"[Location, example: "Basement"] location saved." If no location is chosen: "No location saved."

Your Alarm has now been programmed for the location of your choice.

Available Locations: Basement, Hallway, Office, Child's Bedroom, Kitchen, Utility Room, Dining Room, Living Room, Family Room, Master Bedroom, Guest Bedroom, No Location.

Action	What You Will See & Hear
Under Normal Operations	**Voice:** Silent; **Horn:** Silent; **Power/Smoke LED:** Flashes Green once approximately every 45 seconds; **CO Led:** Off
When You Test the Alarm	**Horn:** Chirp; **Voice:** Testing; For 12 seconds: **Horn:** 3 beeps, pause, repeats 2 more times; **Power/Smoke LED:** Flash Green THEN **Horn:** 3 beeps, pause, 3 beeps; **Power/Smoke LED:** Red in sync with horn; **Voice:** "Warning, evacuate smoke in [Location]. Evacuate." **Horn:** 4 fast beeps, pause, 4 fast beeps; **Voice:** "Warning, evacuate carbon monoxide in [Location, example: "Basement"]. Evacuate." Pause. "Highest carbon monoxide level was [CO level example: _0_ ppm]."; **Power/Smoke LED:** Off; **CO LED:** Flashes Red in sync with the horn pattern
If Battery Becomes Low	**Voice:** "Replace battery in [Location, example "Hallway"]." Repeated every 5 hours; **Horn:** chirps approximately every 45 seconds; **Power/Smoke LED:** Flashes Green approximately every 45 seconds; **CO LED:** Off
If Alarm is Not Operating Properly	**Voice:** "Detector error in [Location, example "Hallway"], please see manual." Repeated every 5 hours; **Horn:** 3 chirps approximately every 45 seconds; **Power/Smoke LED:** Flashes Green in sync with horn; **CO LED:** Off
Alarm has reached its End of Life	**Voice:** "Detector error in [Location, example "Basement"], please see manual." Repeated every 5 hours; **Horn:** 5 chirps approximately every 45 seconds; **Power/Smoke LED:** Flashes Green in sync with horn; **CO LED:** Off
Alarm Levels of CO are Detected	**Voice:** "Warning, evacuate carbon monoxide in [Location]. Evacuate."; **Horn:** 4 beeps, pause, 4 beeps, repeat. Voice; **Power/Smoke LED:** Steady Green for first 12 seconds, then flashes Green once approximately every 45 seconds; **CO LED:** Red in sync with horn
Smoke is Detected	For 12 seconds: **Horn:** 3 beeps, pause, repeats 2 more times; **Power/Smoke LED:** Flashes Green THEN **Horn:** 3 beeps, pause, 3 beeps.; **Power/Smoke LED:** Red in sync with horn; **Voice:** "Warning, evacuate smoke in [Location]. Evacuate."
Smoke Alarm is Silenced	**Voice:** "Horn silenced. Detector active."; **Horn:** Silent (for up to 15 minutes); **Power/Smoke LED:** Flashes Red 2 sec On/ 2 sec Off; **CO LED:** Off
CO Alarm is Silenced	**Voice:** "Horn silenced. Detector active."; **Horn:** Silent (for up to 4 minutes); **Power/Smoke LED:** Off; **CO LED:** Flashes Red

04 ALARM FEATURES

- **Early Warning Interconnect:** When one Alarm sounds, all compatible Alarms sound.
- **Voice & Location Alerts:** Friendly voice tells you what the danger is and its location.
- **End of Life Warning:** Lets you know when it's time to replace.

LATCHING FEATURE

Alarm Latch is activated after an Alarm is exposed to Alarm levels of smoke or carbon monoxide. After smoke or CO levels drop below Alarm levels, the Red Smoke/Power LED and/or the CO LED will begin to flash red On for 2 seconds/Off for 2 seconds. It will continue to flash or "latch" for about 15 minutes, to give you time to determine which unit initiated the Alarm.

Low Battery Latch is activated when the Alarm is in the "low battery condition". When this occurs, the Smoke/Power LED flashes 2 seconds Green On for 2 seconds/Off for 2 seconds for about 15 minutes. This feature is designed to help you identify which Alarm needs to have the battery replaced. Although, the Alarm will sound the low battery chirp approximately once every minute, sometimes during the initial stages of "low battery", the Alarm will chirp in greater intervals than one minute, sometimes up to several hours, until the battery reaches a steady low battery level. This innovative feature eliminates the frustration of waiting for and/or identifying which unit is chirping.

TO LOCK THE BATTERY COMPARTMENT

Do not lock the battery compartment until you have installed the battery and tested the Alarm.

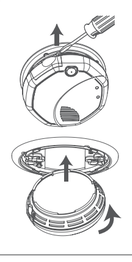
IMPORTANT!

If the unit does not Alarm during testing, DO NOT lock the battery compartment! Install a new battery and test again. If the Alarm still does not Alarm, replace it immediately.

1. Using needle-nose pliers, detach one locking pin from the mounting bracket.
2. After batteries are inserted, push the locking pin through the hole near the battery door latch on the back of the Alarm.

TO UNLOCK THE BATTERY COMPARTMENT

1. Remove the Alarm from the mounting bracket. If the unit is locked to the bracket, see the section "To Unlock the Mounting Bracket."
2. Insert a flathead screwdriver under the head of the locking pin, and gently pry it out of the battery compartment lock. (If you plan to relock the battery compartment, save the locking pin.)
3. To relock the battery compartment, close the battery door and reinsert locking pin in lock.
4. Reattach the Alarm to the mounting bracket.



IMPORTANT!

When replacing the batteries, always test the Alarm before relocking the battery compartment.

OPTIONAL LOCKING FEATURE

The optional locking feature is designed to prevent unauthorized removal of the Alarm. It is not necessary to activate the lock in single-family households where unauthorized Alarm removal is not a concern.

Tools you will need: Needle-nose pliers or utility knife, standard flathead screwdriver

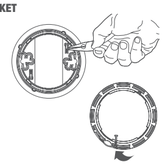
The feature uses a locking pin which is molded into the mounting bracket. Remove locking pin by using needle-nose pliers or a utility knife.

IMPORTANT!

To permanently remove the locking pin, insert a flathead screwdriver between the locking pin and the lock and pry the pin out of the lock.

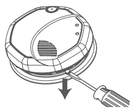
TO LOCK THE MOUNTING BRACKET

1. Using needle-nose pliers, detach the pin from the mounting bracket.
2. Insert the locking pin through the hole on the back of the Smoke Alarm as shown in the diagram.
3. When you attach the Alarm to the mounting bracket the locking pin's head will fit into a notch on the bracket.



TO UNLOCK THE MOUNTING BRACKET

1. Insert a flathead screwdriver in between the mounting bracket and the locking pin.
2. Pry the Alarm away from the bracket by pushing up the screwdriver and turning the Alarm counterclockwise (left) at the same time.



05 TESTING & MAINTENANCE

WEEKLY TESTING

⚠ WARNING!

- **NEVER** use an open flame of any kind to test this unit. You might accidentally damage or set fire to the unit or to your home. **NEVER** use vehicle exhaust! Exhaust may cause permanent damage to vinyls your warranty.
- **DO NOT** stand close to the Alarm when the horn is sounding. Exposure at close range may be harmful to your hearing. When testing, step away when horn starts sounding.

⚠ CAUTION!

It is important to test this unit every week to make sure it is working properly. Using the test button is the recommended way to test this Smoke/CO Alarm.

You can test this Smoke/CO Alarm by pressing and holding the Test/Silence button on the Alarm cover until Alarm voice says "Testing" (typically 3-5 seconds).

If the unit does not Alarm, make sure the batteries are correctly installed, and test again. If the unit still does not Alarm, replace it immediately.

REGULAR MAINTENANCE

This unit has been designed to be as maintenance free as possible, but there are a few simple things you must do to keep it working properly.

- Test it at least once a week.
- Clean the Smoke/CO Alarm at least once a month; gently vacuum the outside of the Smoke/CO Alarm using your household vacuum's soft brush attachment. A can of clean compressed air (sold at computer or office supply stores) may also be used. Follow manufacturer instructions for use. Test the Smoke/CO Alarm. Never use water, cleaners or solvents since they may damage the unit.
- If the Smoke/CO Alarm becomes contaminated by excessive dirt, dust and/or grime, and cannot be cleaned to avoid unwanted Alarms, replace the unit immediately.
- Relocate the unit if it sounds frequent unwanted Alarms. See "Where This Alarm Should Not Be Installed" for details.
- Protect or cover the alarm when doing any maintenance to home i.e. sanding floors, painting, drywall patching, etc. to prevent contamination.

CHOOSING A REPLACEMENT BATTERY:

Your Smoke/CO Alarm requires two standard AA batteries. The following batteries are acceptable as replacements: Eveready Energizer E91 or Duracell MN1500. These batteries are available at many local retail stores.

⚠ WARNING!

- Always use the exact batteries specified by this User's Manual. **DO NOT** use rechargeable batteries. Clean the battery contacts and also those of the device prior to battery installation. Install batteries correctly with regard to polarity (+ and -).
- Please dispose of or recycle used batteries properly, following any local regulations. Consult your local waste management authority or recycling organization to find an electronics recycling facility in your area. **DO NOT DISPOSE OF BATTERIES IN FIRE. BATTERIES MAY EXPLODE OR LEAK.**

⚠ WARNING!

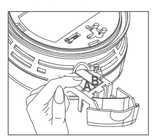
- Keep battery out of reach of children. In the event a battery is swallowed, immediately contact your poison control center, your physician, or the National Battery Ingestion hotline at 202-625-3333 as serious injury may occur.

IMPORTANT!

Actual battery service life depends on the Smoke/C0 Alarm and the environment in which it is installed. All the batteries specified above are acceptable replacement batteries for this unit. Regardless of the manufacturer's suggested battery life, you **MUST** replace the battery immediately once the unit starts "chirping" (the "low battery warning").

To replace the batteries (without removing Alarm from the ceiling or wall):

1. Open the battery compartment.
2. Press tabs A and B as shown in the diagram and remove each battery.
3. Insert the new batteries, making sure they snap completely into the battery compartment. Match the terminals on the ends of the batteries with the terminals on the unit.
4. Close the battery compartment, and then test the unit by pressing the Test/ Silence button.



TROUBLESHOOTING GUIDE

IF THE ALARM…	PROBLEM…	YOU SHOULD…
Horn "chirps" about once every 45 seconds. **Voice:** "Replace battery in [Location]" every 5 hours **Power/Smoke LED:** Flashes Green 2 sec on/ 2 sec off	Low battery warning.	Install two new AA batteries*.
Horn sounds three "chirps" approximately every 45 seconds; **Voice:** "Detector error in [Location, example "Hallway"], please see manual" repeated every 5 hours; **Power/Smoke LED:** Flashes Green in sync with horn	**MALFUNCTION SIGNAL.** Device is not working properly, and needs to be replaced.	If unit is under warranty, contact Consumer Support to process a warranty replacement.
Horn: "chirps" 5 times approximately every 45 seconds; **Voice:** "Detector error in [Location, example "Basement"], please see manual." Repeated every 5 hours.; **Power/Smoke LED:** Flashes Green in sync with horn	**END OF LIFE SIGNAL.** Alarm needs to be replaced.	Immediately replace the Alarm.
The Alarms are linked but do not communicate with each other.	Possible interference. Reference the **Wireless Operation** section of this manual.	Move Alarms to different locations. Add an additional Alarm between the unresponsive Alarms to route the signal around obstructions.

CARBON MONOXIDE ALARM ONLY

CO Alarm goes back into Alarm 4 minutes after you Silence it.	CO levels indicate a potentially dangerous situation.	IF YOU ARE FEELING SYMPTOMS OF CO POISONING, EVACUATE your home and call 911 or the Fire Department. Refer to "If The CO Alarm Sounds" for details.
CO Alarm sounds frequently even though no high levels of CO are revealed in an investigation.	The CO Alarm may be improperly located. Refer to "Where to Install This Alarm" for details.	Relocate your Alarm. If frequent Alarms continue, have home rechecked for potential CO problems. You may be experiencing an intermittent CO problem.

SMOKE ALARM ONLY

Smoke Alarm sounds when no smoke is visible.	Unwanted Alarm may be caused by non-emergency source	Silence Alarm using Test/ Silence button; clean the Alarm's cover with a soft, clean cloth. If frequent unwanted Alarms continue, relocate your Alarm. Alarm may be too close to a kitchen, cooking appliance, or steamy bathroom.

*For a list of acceptable replacement batteries, see "Regular Maintenance."

If you have questions that cannot be answered by reading this manual, call the Consumer Support Team at 1-800-323-9005.

FIRE SAFETY TIPS

Follow safety rules and prevent hazardous situations: 1) Use smoking materials properly. Never smoke in bed. 2) Keep matches or lighters away from children; 3) Store flammable materials in proper containers; 4) Keep electrical appliances in good condition and don't overload electrical circuits; 5) Keep stoves, barbecue grills, fireplaces and chimneys grease- and debris-free; 6) Never leave anything cooking on the stove unattended; 7) Keep portable heaters and open flames, like candles, away from flammable materials; 8) Don't let rubbish accumulate. Keep Alarms clean, and test them weekly. Replace Alarms immediately if they are not working properly. Smoke Alarms that do not work cannot alert you to a fire. Keep at least one working fire extinguisher on every level, and an additional one in the kitchen. Have fire escape ladders or other reliable means of escape from an upper level in case stairs are blocked; 9) Have an escape plan and practice it regularly.

06 IF YOUR SMOKE/CO ALARM SOUNDS

WHAT TO DO FIRST–IDENTIFY THE TYPE OF ALARM SIGNAL

Type of Alarm	What You See and Hear
Carbon Monoxide (CO)	**Voice:** "Warning, evacuate carbon monoxide in [Location, example: "Hallway"]. Evacuate." "___ ppm."; **Horn:** 4 beeps, pause, 4 beeps, voice; **LED:** Flashes Red
Smoke	**Voice:** "Warning, evacuate smoke in [Location, example: "Hallway"]. Evacuate."; **Horn:** 3 beeps, pause, 3 beeps, voice; **LED:** Flashes Red

IF THE CO ALARM SOUNDS

"ALARM-MOVE TO FRESH AIR"

If you hear the CO Alarm horn and the CO red light is flashing, move everyone to a source of fresh air. DO NOT remove the batteries!

⚠ WARNING!

Actuation of your CO Alarm indicates the presence of carbon monoxide (CO) which can kill you. In other words, when your CO Alarm sounds, you must not ignore it!

IF THE CO ALARM SIGNAL SOUNDS:

1. Press the Test/Silence button.
2. Call your emergency services, fire department or 911. Write down the number of your local emergency service here:
   _____
3. Immediately move to fresh air—outdoors or by an open door or window. Do a head count to check that all persons are accounted for. Do not re-enter the premises, or move away from the open door or window until the emergency services responder has arrived, the premises have been aired out, and your CO Alarm remains in its normal condition.
4. After following steps 1-3, if your CO Alarm reactivates within a 24-hour period, repeat steps 1-3 and call a qualified appliance technician to investigate for sources of CO from fuel-burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection have the equipment serviced immediately. Note any combustion equipment not inspected by the technician, and consult the manufacturers' instructions, or contact the manufacturers directly, for more information about CO safety and this equipment. Make sure that motor vehicles are not, and have not, been operating in an attached garage or adjacent to the residence. Write down the number of a qualified appliance technician here:
   _____

NOTE: A qualified appliance technician is defined as "a person, firm, corporation, or company that either in person or through a representative, is engaged in and responsible for the installation, testing, servicing, or replacement of heating, ventilation, air conditioning (HVAC) equipment, combustion appliances and equipment, and/or gas fireplaces or other decorative combustion equipment."

AFTER AN ALARM

After the emergency responders arrive, the premises aired out, and your CO Alarm remains in its normal condition, you can check what the highest carbon monoxide level sensed was:

Action	Alarm Will Say
Press & Hold Test button	"Highest carbon monoxide level was ___ ppm. Please see manual." "To clear highest carbon monoxide level, press and hold test button now."
Press & Hold Test button, if you would like to clear the highest level sensed. If you would like to keep the highest level in memory, do not press anything.	"Highest carbon monoxide level cleared." Alarm will say nothing.

"SMART INTERCONNECT" FEATURE

This Alarm includes "Smart Interconnect" which enables the Alarm to be interconnected with other First Alert® Smoke, Heat and "Smart Interconnect" CO Alarms. When smoke is detected, all Alarms will sound the smoke horn pattern. When CO is detected, "Smart Interconnect" Alarms will sound the CO horn pattern. Alarms that do not have the "Smart Interconnect" feature will remain silent during a CO Alarm.

IF THE SMOKE ALARM SOUNDS:

RESPONDING TO AN ALARM

⚠ WARNING!

- If the unit Alarms and you are not testing the unit, it is warning you of a potentially dangerous situation that requires your immediate attention. NEVER ignore any Alarm. Ignoring the Alarm may result in injury or death.
- Never remove the batteries from a battery operated Smoke/CO Alarm to stop an unwanted Alarm (caused by cooking smoke, etc.). Removing batteries disables the Alarm so it cannot sense smoke, and removes your protection. Instead open a window or fan the smoke away from the unit. The Alarm will reset automatically.
- If the unit Alarms get everyone out of the house immediately.

WHAT TO DO IN CASE OF FIRE

- Don't panic; stay calm. Follow your family escape plan.
- Get out of the house as quickly as possible. Don't stop to get dressed or collect anything.
- Feel doors with the back of your hand before opening them. If a door is cool, open it slowly. Don't open a hot door. Keep doors and windows closed, unless you must escape through them.
- Cover your nose and mouth with a cloth (preferably damp). Take short, shallow breaths.
- Meet at your planned meeting place outside your home, and do a head count to make sure everybody got out safely.
- Call the Fire Department as soon as possible from outside. Give your address, then your name.
- Never go back inside a burning building for any reason.
- Contact your Fire Department for ideas on making your home safer.

⚠ WARNING!

Alarms have various limitations. See "General Limitations of Smoke/CO Alarms" for details.

07 USING THE SILENCE FEATURES

⚠ WARNING!

Never remove the batteries to quiet an unwanted Alarm. Removing the batteries disables the Alarm and removes your protection.

The Silence Feature is intended to temporarily silence the horn while you identify and correct the problem. Do not use the Silence Feature in emergency situations. It will not correct a CO problem or extinguish a fire.

The Silence Feature can temporarily quiet an unwanted Alarm for several minutes. You can silence this Smoke/CO Alarm by pressing the Test/ Silence button on the Alarm cover for at least 3-5 seconds. After the Test/Silence button is released, the Red LED blinks during the silence mode. Activate the Alarm test, reset or silence function by use of a finger or thumb. Use of any other instrument is strictly prohibited.

When the Smoke Alarm is Silenced	When the CO Alarm is Silenced
The Smoke Alarm will remain silent for up to 15 minutes, then return to normal operation. If the smoke has not cleared–or continues to increase–the device will go back into Alarm.	The CO Alarm will remain silent for up to 4 minutes. After 4 minutes, if CO levels remain potentially dangerous the horn will start sounding again.

SILENCING THE LOW BATTERY WARNING

This Silence Feature can temporarily quiet the low battery warning "chirp" for up to 8 hours. You can silence the low battery warning "chirp" by pressing the Test/Silence button on the Alarm cover.

Once the low battery warning "chirp" Silence Feature is activated, the unit continues to flash the Green light approximately every 45 seconds for 8 hours. After 8 hours, the low battery "chirp" will resume. Replace the batteries as soon as possible; this unit will not operate without battery power!

To deactivate this feature: Press the Test/Silence button again. The unit will go into Test Mode and the low battery warning will resume (LED flashes and unit sounds "chirp" approximately every 45 seconds).

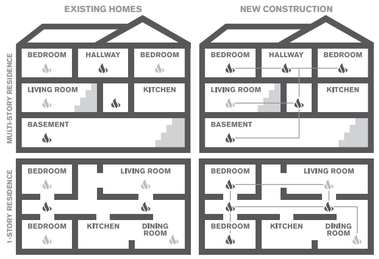
SILENCING THE END OF LIFE SIGNAL

This Silence Feature can temporarily quiet the End of Life warning "chirp" for up to 2 days, up to a total of 14 days. You can silence the End of Life warning "chirp" by pressing the Test/Silence button. The horn will chirp, acknowledging that the End of Life Silence Feature has been activated. After approximately 2 days, the End of Life "chirp" will resume.

08 WHAT YOU NEED TO KNOW ABOUT CO

WHAT IS CO?

CO is an invisible, odorless, tasteless gas produced when fossil fuels do not burn completely, or are exposed to heat (usually fire). Electrical app



Smoke Alarms For minimum protection

Additional Smoke Alarms For better coverage

Interconnected AC or AC/DC Smoke Alarms

11 REGULATORY INFORMATION FOR CO ALARMS

WHAT LEVELS OF CO CAUSE AN ALARM?

Underwriters Laboratories Inc. Standard UL2034 requires residential CO Alarms to sound when exposed to levels of CO and exposure times as described below. They are measured in parts per million (ppm) of CO over time (in minutes).

UL2034 Required Alarm Points*:

- If the Alarm is exposed to 400 ppm of CO, IT MUST ALARM BETWEEN 4 and 15 MINUTES.
- If the Alarm is exposed to 150 ppm of CO, IT MUST ALARM BETWEEN 10 and 50 MINUTES.
- If the Alarm is exposed to 70 ppm if CO, IT MUST ALARM BETWEEN 60 and 240 MINUTES.

* Approximately 10% COHb exposure at levels of 10% to 95% Relative Humidity (RH).

The unit is designed not to Alarm when exposed to a constant level of 30 ppm for 30 days.

IMPORTANT!
CO Alarms are designed to Alarm before there is an immediate life threat. Since you cannot see or smell CO, never assume it's not present.

- An exposure to 100 ppm of CO for 20 minutes may not affect average, healthy adults, but after 4 hours the same level may cause headaches.
- An exposure to 400 ppm of CO may cause headaches in average, healthy adults after 35 minutes, but can cause death after 2 hours.

Standards: Underwriters Laboratories Inc. Single and Multiple Station Carbon Monoxide Alarms UL2034.

According to Underwriters Laboratories Inc. UL2034, Section 1-1. 2: "Carbon monoxide Alarms covered by these requirements are intended to respond to the presence of carbon monoxide from sources such as, but not limited to, exhaust from internal-combustion engines, abnormal operation of fuel-fired appliances, and fireplaces. CO Alarms are intended to Alarm at carbon monoxide levels below those that could cause a loss of ability to react to the dangers of carbon monoxide exposure. " This CO Alarm monitors the air at the Alarm, and is designed to Alarm before CO levels become life threatening. This allows you precious time to leave the house and correct the problem. This is only possible if Alarms are located, installed, and maintained as described in this manual.

Gas Detection at Typical Temperature and Humidity Ranges: The CO Alarm is not formulated to detect CO levels below 30 ppm typically. UL tested for false Alarm resistance to Methane (500 ppm), Butane (300 ppm), Heptane (500 ppm), Ethyl Acetate (200 ppm), Isopropyl Alcohol (200 ppm) and Carbon Dioxide (5000 ppm). Values measure gas and vapor concentrations in parts per million.

Audible Alarm: 85 dB minimum at 10 feet (3 meters).

12 AGENCY PLACEMENT RECOMMENDATIONS

Standards: Underwriters Laboratories Inc. Single and Multiple Station Smoke Alarms 217.

NFPA 72 CHAPTER 29 "FOR YOUR INFORMATION, THE NATIONAL FIRE ALARM AND SIGNALING CODE, NFPA 72, READS AS FOLLOWS:"

29.5.1* Required Detection.

29.5.1.1* Where required by other governing laws, codes, or standards for a specific type of occupancy, approved single and multiple-station Smoke Alarms shall be installed as follows:

1. *In all sleeping rooms and guest rooms
2. *Outside of each separate dwelling unit sleeping area, within 21 ft (6.4 m) of any door to a sleeping room, with the distance measured along a path of travel
3. On every level of a dwelling unit, including basements
4. On every level of a residential board and care occupancy (small facility), including basements and excluding crawl spaces and unfinished attics
5. *In the living area(s) of a guest suite
6. In the living area(s) of a residential board and care occupancy (small facility)

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CALIFORNIA STATE FIRE MARSHAL (CSFM)

Early warning detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household as follows: A Smoke Alarm installed in each separate sleeping area (in the vicinity, but outside bedrooms), and Heat or Smoke Alarms in the living rooms, dining rooms, bedrooms, kitchens, hallways, finished attics, furnace rooms, closets, utility and storage rooms, basements, and attached garages.

13 SPECIAL COMPLIANCE CONSIDERATIONS

This Smoke Alarm is suitable for use in apartments, condominiums, townhouses, hospitals, day care facilities, health care facilities, boarding houses, group homes and dormitories provided a primary fire detection system already exists to meet fire detection requirements in common areas like lobbies, hallways, or porches. Using this Smoke Alarm in common areas may not provide sufficient warning to all residents or meet local fire protection ordinances/regulations.

This Smoke Alarm alone is not a suitable substitute for complete fire detection systems in places housing many people—like apartment buildings, condominiums, hotels, motels, dormitories, hospitals, health care facilities, nursing homes, day care facilities, or group homes of any kind. It is not a suitable substitute for complete fire detection systems in warehouses, industrial facilities, commercial buildings, and special-purpose non-residential buildings which require special fire detection and Alarm systems. Depending on the building codes in your area, this Smoke Alarm may be used to provide additional protection in these facilities.

In new construction, most building codes require the use of AC or AC/DC powered Smoke Alarms only. In existing construction, AC, AC/DC, or DC powered Smoke Alarms can be used as specified by local building codes. THIS EQUIPMENT SHOULD BE INSTALLED IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION'S STANDARD 72 (National Fire Protection Association, Batterymarch Park, Quincy, MA 02269). Refer to NFPA 101 (Life Safety Code), local building codes, or consult your Fire Department for detailed fire protection requirements in buildings not defined as "households".

HUD MAP PROGRAM

Certain HUD battery powered Smoke Alarm applications, especially those that fall under HUD 223(f) MAP (Multi-family Accelerated Processing), may require a 10 Year sealed tamper resistant battery. This Alarm does not meet that requirement. Substitute First Alert SA340B.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer or an experienced radio or TV technician for help.

⚠ WARNING!
Changes or modifications to the product, not expressly approved by First Alert, could void the user's authority to operate the equipment.

FCC ID: M7U-500V
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

14 GENERAL LIMITATIONS OF SMOKE/CO ALARMS

This Smoke/CO Alarm is intended for residential use. It is not intended for use in industrial applications where Occupational Safety and Health Administration (OSHA) requirements for Carbon Monoxide Alarms must be met. The Smoke Alarm portion of this device is not intended to alert hearing impaired residents. Special purpose Smoke Alarms should be installed for hearing impaired residents (CO Alarms are not yet available for the hearing impaired).

Smoke/CO Alarms may not waken all individuals. Practice the escape plan at least twice a year, making sure that everyone is involved – from kids to grandparents. Allow children to master fire escape planning and practice before holding a fire drill at night when they are sleeping. If children or others do not readily waken to the sound of the Smoke/CO Alarm, or if there are infants or family members with mobility limitations, make sure that someone is assigned to assist them in fire drill and in the event of an emergency. It is recommended that you hold a fire drill while family members are sleeping in order to determine their response to the sound of the Smoke/CO Alarm while sleeping and to determine whether they may need assistance in the event of an emergency.

Smoke/CO Alarms cannot work without power. Battery operated units cannot work if the batteries are missing, disconnected or dead, if the wrong type of batteries are used, or if the batteries are not installed correctly. AC units cannot work if the AC power is cut off for any reason (open fuse or circuit breaker, failure along a power line or at a power station, electrical fire that burns the electrical wires, etc.). If you are concerned about the limitations of battery or AC power, install both types of units.

This Smoke/CO Alarm will not sense smoke or CO that does not reach the sensors. It will only sense smoke or CO at the sensor. **Smoke or CO may be present in other areas.** Doors or other obstructions may affect the rate at which CO or smoke reaches the sensors. If bedroom doors are usually closed at night, we recommend you install an Alarm device (Combination CO and Smoke Alarm, or separate CO Alarms and Smoke Alarms) in each bedroom and in the hallway between them.

This Smoke/CO Alarm may not sense smoke or CO on another level of the home. Example: This Alarm device, installed on the second floor, may not sense smoke or CO in the basement. For this reason, one Alarm device may not give adequate early warning. Recommended minimum protection is one Alarm device in every sleeping area, every bedroom, and on every level of your home. Some experts recommend battery powered smoke and CO Alarms be used in conjunction with interconnected AC powered Smoke Alarms. For details, see "About Smoke Alarms" for details.

Smoke/CO Alarms may not be heard. The Alarm horn loudness meets or exceeds current UL standards of 85 dB at 10 feet (3 meters). However, if the Smoke/CO Alarm is installed outside the bedroom, it may not wake up a sound sleeper or one who has recently used drugs or has been drinking alcoholic beverages. This is especially true if the door is closed or only partly open. Even persons who are awake may not hear the Alarm horn if the sound is blocked by distance or closed doors. Noise from traffic, stereo, radio, television, air conditioner, or other appliances may also prevent alert persons from hearing the Alarm horn. This Smoke/CO Alarm is not intended for people who are hearing impaired.

The Alarm may not have time to Alarm before the fire itself causes damage, injury, or death, since smoke from some fires may not reach the unit immediately. Examples of this include persons smoking in bed, children playing with matches, when a person's clothing catches fire while cooking, fires caused by violent explosions resulting from escaping gas, or incendiary fires where the fire grows so rapidly that an occupant's egress is blocked even with properly located Smoke Alarms.

This Smoke/CO Alarm is not a substitute for life insurance. Though this Smoke/CO Alarm warns against increasing CO levels or the presence of smoke, First Alert does not warrant or imply in any way that they will protect lives. Homeowners and renters must still insure their lives.

This Smoke/CO Alarm has a limited life. Although this Smoke/CO Alarm and all of its parts have passed many stringent tests and are designed to be as reliable as possible, any of these parts could fail at any time. Therefore, you must test this device weekly. The unit should be replaced immediately if it is not operating properly.

This Smoke/CO Alarm is not foolproof. Like all other electronic devices, this Smoke/CO Alarm has limitations. It can only detect smoke or CO that reaches the sensors. It may not give early warning of the source of smoke or CO is in a remote part of the home, away from the Alarm device.

15 LIMITED WARRANTY

First Alert® brand products warrants that for a period of ten years from the date of purchase, this product will be free from defects in material and workmanship. First Alert, at its option, will repair or replace this product or any component of the product found to be defective during the warranty period. Replacement will be made with a new or remanufactured product or component. If the product is no longer available, replacement may be made with a similar product of equal or greater value. This is your exclusive warranty.

This warranty is valid for the original retail purchaser from the date of initial retail purchase and is not transferable. Keep the original sales receipt. Proof of purchase is required to obtain warranty performance. First Alert dealers, service centers, or retail stores selling First Alert products do not have the right to alter, modify or any way change the terms and conditions of this warranty.

This warranty does not cover normal wear of parts or damage resulting from any of the following: negligent use or misuse of the product, use on improper voltage or current, use contrary to the operating instructions, disassembly, repair or alteration by anyone other than First Alert or an authorized service center. Further, the warranty does not cover Acts of God, such as fire, flood, hurricanes and tornadoes or any batteries that are included with this unit.

First Alert shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Except to the extent prohibited by applicable law, any implied warranty of merchantability or fitness for a particular purpose is limited in duration to the duration of the above warranty. Some states, provinces or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state or province to province.

HOW TO OBTAIN WARRANTY SERVICE

Service: If service is required, do not return the product to your retailer. In order to obtain warranty service, contact the Consumer Support Team at 1-800-323-9005. To assist us in serving you, please have the model number and date of purchase available when calling.

Battery: First Alert make no warranty, express or implied, written or oral, including that of merchantability or fitness for any particular purpose with respect to battery.

Disposal: Please follow local guidelines regarding the disposal or recycling of batteries and/or electronics.

For your records, please record:

Date Purchased: _____

Where Purchased: _____

Date Installed: _____/_____ **Month/Year**

Replace Alarm 10 years after installation.

Please write the date in the space provided:_____/_____ **Month/Year**

The Alarm will also provide an audible End-of-Life Signal approximately 10 years after installation to remind you to replace the unit.

The End-of-Life Signal can be silenced for up to 2 days. Do not unplug or deactivate the Alarm until you get replacement.

Printed in Mexico | M08-0606-000 03/23

CONFORMS TO UL STD 217 AND UL STD 2034

firstalert.com

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USER'S MANUAL
WIRELESS INTERCONNECT BATTERY OPERATED CARBON MONOXIDE ALARM

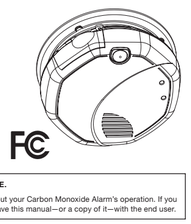
First Alert®

WIRELESS INTERCONNECT Enabled

Voice with Programmable Location

Two Latching Features

Two Silence Features



Exclusive! Voice Warning! WITH LOCATION™

IMPORTANT! PLEASE READ CAREFULLY AND SAVE.

This user's manual contains important information about your Carbon Monoxide Alarm's operation. If you are installing this Alarm for use by others, you must leave this manual—or a copy of it—with the end user.

Printed in Mexico
M08-152706-CO511-US **K1** 8/16

CONFORMS TO UL STD 2034

Model CO511

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INTRODUCTION

Thank you for choosing First Alert® for your Carbon Monoxide Alarm needs. You have purchased a state-of-the-art Alarm designed to provide you with early warning of a carbon monoxide danger. ***Key features include:***

WIRELESS INTERCONNECT Enabled. Alarm automatically communicates with other WIRELESS INTERCONNECT enabled alarms when installed.

Exclusive Voice Warning with Location will tell you the preprogrammed location of the initiating unit and danger detected. Programmable up to 11 locations (ex. "basement"). When alarms sounds, if programmed for basement it will say "Warning, evacuate, carbon monoxide in basement" along with all other installed WIRELESS INTERCONNECT Voice alarms.

Spread Spectrum Horn Tone. Lower and varying horn frequency makes it easier for elderly with normal age related hearing loss to hear horn. Sweeps through the 2200 – 3400 Hz range.

RF Interconnect. Reliable and secure radio frequency communication between alarms. 915MHz frequency with 65,000 security codes and 3 channel frequency hopping.

Single Button Test/Silence eliminates confusion. Depending on what mode the alarm is in, pushing the button provides different functions such as testing the alarm, silencing the alarm, re-testing the alarm when in silence and clearing the Latching features.

Two Silence Features. Temporarily silence low battery chirp for up to eight hours before replacing low battery or silence an unwanted alarm for several minutes.

Two Latching Features. Alarm Latch: Easily identifies initiating alarm even after alarm condition has subsided. Low Battery Latch: Identifies which unit is in low battery condition.

Perfect Mount System includes a gasketless base for easy installation and a mounting bracket that keeps the alarm secure over a wide rotation range to allow for perfect alignment.

End of Life Signal. Provides audible confirmation alarm needs to be replaced.

BASIC SAFETY INFORMATION

IMPORTANT!

- **Dangers, Warnings, and Cautions alert you to important operating instructions or to potentially hazardous situations. Pay special attention to these items.**
- **This CO Alarm is approved for use in single-family residences.**

⚠CAUTION!

- **The CO Alarm is not designed to detect fire or any other gas. It will only indicate the presence of carbon monoxide gas at the sensor. Carbon monoxide gas may be present in other areas.**

⚠WARNING!

- **This CO Alarm cannot operate without working batteries. Removing the batteries for any reason, or failing to replace the batteries at the end of their service life, removes your protection.**
- **NEVER ignore any alarm. See "If Your CO Alarm Sounds" for more information on how to respond to an alarm. Failure to respond can result in injury or death.**
- **The Silence Features are for your convenience only and will not correct a problem. See "Using the Silence Features" for details. Always check your home for a potential problem after any alarm. Failure to do so can result in injury or death.**
- **Test this CO Alarm once a week. If the Alarm ever fails to test correctly, have it replaced immediately! If the Alarm is not working properly, it cannot alert you to a problem.**
- **This product is intended for use in ordinary indoor locations of family living units. It is not designed to measure CO levels in compliance with Occupational Safety and Health Administration (OSHA) commercial or industrial standards. Individuals with medical conditions that may make them more sensitive to carbon monoxide may consider using warning devices which provide audible and visual signals for carbon monoxide concentrations under 30 ppm. For additional information on carbon monoxide and your medical condition contact your physician.**

WIRELESS OPERATION

First Alert® WIRELESS INTERCONNECT Technology is the easy, cost-effective way to provide your family with whole-home safety. All WIRELESS INTERCONNECT Alarms communicate with each other without wires or connectors. When one Alarm sounds, they all sound. This provides your family with an earlier warning of potential danger, and gives you more time to react.

The communication distance (range) between any two WIRELESS INTERCONNECT Alarms is typically 50 feet (15 meters) inside of a home. Some features of a home, such as the number of floors, number/size of rooms, furniture and types of building materials used may reduce the range of the Alarms. Examples include: suspended ceilings, ductwork, large metallic appliances (refrigerators) and metal studs. A feature of WIRELESS INTERCONNECT Alarms is that they operate as a mesh network. All Alarms will repeat any alarm signal that is received to all other WIRELESS INTERCONNECT Alarms. Interference from structural conditions can be overcome by adding additional Alarms to route the wireless signal around obstructions.

IMPORTANT!

- **The range and proper operation of any wireless device will vary depending on its surroundings. It is very important that each Alarm is tested individually before and after installation to make sure that all Alarms respond properly.**
- **The WIRELESS INTERCONNECT Alarms are not to be used outdoors or to transmit between buildings. The Alarms will not communicate properly under these conditions.**
- **Metal objects and metallic wallpaper may interfere with signals from wireless Alarms. Alarms should be tested after changes to your home such as remodeling, moving furniture, and with metal doors opened and closed.**

Your First Alert® WIRELESS INTERCONNECT CO Alarm will automatically communicate both potential fires and carbon monoxide presence with all other First Alert® WIRELESS INTERCONNECT Smoke/CO Alarms.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that of the receiver.
- Consult the dealer or an experienced radio or TV technician for help.

⚠WARNING!

Changes or modifications to the product, not expressly approved by First Alert / BRK Brands, Inc., could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. FCC ID: M7U5001L

⚠CAUTION!

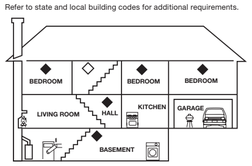
Changes or modifications not expressly approved by BRK Brands, Inc. could void the user's authority to operate the equipment.

INSTALLATION
WHERE TO INSTALL CO ALARMS

The National Fire Protection Association (NFPA) recommends that a CO Alarm should be centrally located outside of each separate sleeping area in the immediate vicinity of the bedrooms. For added protection, install additional CO Alarms in each separate bedroom, and on every level of your home.

If your bedroom hallway is longer than 40 feet (12 meters), install a CO Alarm at BOTH ends of the hallway.

Refer to state and local building codes for additional requirements.



◇ **REQUIRED TO MEET NFPA RECOMMENDATIONS**

◆ **SUGGESTED AREAS FOR INSTALLING ADDITIONAL CO ALARMS**

IN A SINGLE-LEVEL HOME:

- Install at least one CO Alarm near or within each separate sleeping area.
- For added protection, install an additional CO Alarm at least 20 feet (6 meters) away from the furnace or fuel burning heat source.

IN A MULTI-LEVEL HOME:

- Install at least one CO Alarm near or within each separate sleeping area.
- For added protection, install at least one CO Alarm on each level of the home. If you have a basement, install that CO Alarm at the top of the basement stairs.
- For added protection, install an additional CO Alarm at least 20 feet (6 meters) away from the furnace or fuel burning heat source.

IN MOBILE HOMES:

- Install CO Alarms on inside walls ONLY. Uninsulated outside walls and roofs of mobile homes often transfer heat and cold from outdoors.

WHERE CO ALARMS SHOULD NOT BE INSTALLED

DO NOT LOCATE THIS CO ALARM:

- In garages, kitchens, furnace rooms, or in any extremely dusty, dirty or greasy areas.
- Closer than 15 feet (4.6 meters) from a furnace or other fuel burning heat source, or fuel burning appliances like a water heater.
- Within 5 feet (1.5 meters) of any cooking appliance.
- In areas where temperature is colder than 40° F (4.4° C) or hotter than 100° F (37.8° C). These areas include non-airconditioned crawl spaces, unfinished attics, uninsulated or poorly insulated ceilings, porches, and garages.
- In turbulent air, like near ceiling fans, heat vents, air conditioners, fresh air returns, or open windows. Blowing air may prevent CO from reaching the sensors.
- In direct sunlight.

⚠WARNING!

- **This CO Alarm is designed for use inside a single-family home or apartment. It is not meant to be used in common lobbies, hallways, or basements of multi-family buildings unless working CO Alarms are also installed in each family living unit. CO Alarms in common areas may not be heard from inside individual family living units.**
- **This CO Alarm alone is not a suitable substitute for complete detection systems in places which house many people, like hotels or dormitories, unless a CO Alarm is also placed in each unit.**
- **DO NOT use this CO Alarm in warehouses, industrial or commercial buildings, special-purpose non-residential buildings, RVs, boats, or airplanes. This CO Alarm is specifically designed for residential use, and may not provide adequate protection in non-residential applications.**

HOW TO INSTALL THIS ALARM

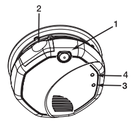
For quick installation instructions see the "Quick Installation Instructions" included.

IMPORTANT!

This CO Alarm was designed to be mounted on the ceiling or wall. It is not a tabletop device. You must install this device on the ceiling or wall as outlined below. Read "Where To Install CO Alarms" before starting.

PARTS OF THIS CO ALARM

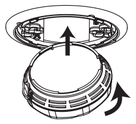
1. Test/Silence Button
2. Battery Compartment
3. Power LED
4. CO Alarm LED



Tools you will need: pencil, drill with 3/16" (5mm) drill bit, Phillips screwdriver, hammer.

1. Hold the mounting bracket against the ceiling (or wall) so the vertical mounting slot is aligned in the 12 o'clock position and trace around the inside of the mounting slots (vertical and horizontal mounting).
2. Put the unit where it won't get covered with dust when you drill the mounting holes.
3. Using a 3/16" (5 mm) drill bit, drill a hole through the center of the oval outlines you traced.
4. Insert the plastic screw anchors (in the plastic bag with screws) into the holes. Tap the screw anchors gently with a hammer, if necessary, until they are flush with the ceiling or wall.
5. Line the mounting bracket up over the plastic screw anchors.
6. Screw the mounting bracket to the ceiling or wall through the mounting slots using the two screws provided.
7. Attach the CO Alarm to the mounting bracket. Line up the guides on the alarm's base with the guides on the mounting bracket. When guides are lined up, turn the base clockwise (right) until it snaps into place.

   NOTE: Once the Alarm is snapped onto the mounting bracket, you can rotate the Alarm to adjust the alignment.



8. Test the CO Alarm. See "Weekly Testing" for details.

STEP BY STEP GUIDE TO PROGRAMMING THIS ALARM

FOR FIRST TIME AND WHEN CHANGING BATTERIES

Action:	Alarm Will Say:
1. Insert batteries (2, AA batteries).	"Welcome, First Alert Carbon Monoxide Alarm." "No location programmed" if ***first time*** or "[Location, example: "Basement"] location programmed" when changing batteries. "To select location, press and hold test button now."
2. Press & Hold Test Button if you would like to program the location or change the location of the Alarm. Release button after Alarm responds.	"To save location, press and hold test button after location is heard." Alarm will speak list of locations (see below).
3. After you hear the location of where you are placing the Alarm, Press & Hold the Test Button.	"[Location, example: "Basement"] location saved." If no location is chosen: "No location saved."

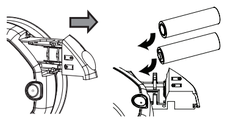
Your Alarm has now been programmed for the location of your choice. Available locations:

Basement	Kitchen	Child's Bedroom
Living Room	Dining Room	Master Bedroom
Family Room	No Location	Guest Bedroom
Office	Hallway	Utility Room

ADDING AND LINKING ADDITIONAL WIRELESS INTERCONNECT ALARMS

NOTE: Steps 1 through 3 need to be completed within two minutes. If more than two minutes pass, the Green power LED will stop blinking. Simply open the battery drawer of the second Alarm and repeat steps 1 through 3.

1. Insert the batteries into the battery drawer of the **next** Alarm. DO NOT CLOSE THE DRAWER.
2. Press and hold the test button and then close the battery drawer.
3. Once you hear the unit chirp, release the test button. The Green power LED will start to blink indicating the WIRELESS INTERCONNECT Alarm is waiting for program data from one of the other setup WIRELESS INTERCONNECT Alarms.



4. Press and hold the test button on the first Alarm, until the second Alarm chirps and its Green power LED stops blinking. Then release the test button.
5. If you have purchased the hardwired battery back-up WIRELESS INTERCONNECT Alarm, you can now connect the hardwired Alarm by installing the three-wire connector on the ceiling to the Alarm.
6. Repeat steps 1-5 for additional WIRELESS INTERCONNECT Alarms.

You have now successfully linked your new WIRELESS INTERCONNECT Alarms. To add additional Alarms at a later time, follow steps 1 through 5.

WEEKLY TESTING

⚠WARNING!

- **Test the CO Alarm once a week. If the CO Alarm ever fails to test properly, have it replaced immediately! If the CO Alarm is not working properly, it cannot alert you to a problem.**
- **DO NOT stand close to the Alarm when the horn is sounding. Exposure at close range may be harmful to your hearing. When testing, step away when horn starts sounding.**

⚠CAUTION!

It is important to test this unit every week to make sure it is working properly. Using the test button is the recommended way to test this CO Alarm.

You can test this CO Alarm by pressing and holding the Test/Silence button on the Alarm cover (typically 3-5 seconds).

During testing, you will see and hear the following sequence:

- The **Horn** will sound 4 beeps, pause, 4 beeps. The **Power LED** will be Off and the **CO LED** flashes Red.

If the unit does not alarm, make sure the batteries are correctly installed, and test again. If the unit still does not alarm, replace it immediately.

OPTIONAL LOCKING FEATURES

The optional locking features are designed to prevent unauthorized removal of the battery or alarm. It is not necessary to activate the locks in single-family households where unauthorized battery or alarm removal is not a concern.

These CO Alarms have two separate locking features: one to lock the battery compartment, and the other to lock the CO Alarm to the mounting bracket. You can choose to use either feature independently, or use them both.

Tools you will need: • Needle-nose pliers • Standard flathead screwdriver.

Both locking features use locking pins, which are molded into the mounting bracket. Depending on which locking features you use, remove one or both pins from the mounting bracket using needle-nose pliers.

IMPORTANT!

To permanently remove either locking pin, insert a flathead screwdriver between the locking pin and the lock, and pry the pin out of the lock.

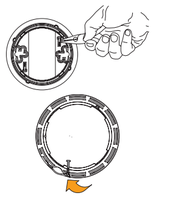
TO LOCK THE BATTERY COMPARTMENT

Do not lock the battery compartment until you install the batteries and test the CO Alarm.

IMPORTANT!

If the unit does not alarm during testing, DO NOT lock the battery compartment! Install new batteries and test again. If the CO Alarm still does not alarm, replace it immediately.

1. Using needle-nose pliers, detach one locking pin from the mounting bracket.
2. After batteries are inserted, then push the locking pin through the hole near the battery door latch on the back of the CO Alarm.

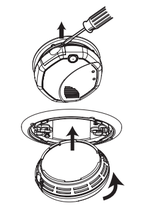


TO LOCK THE MOUNTING BRACKET

1. Using needle-nose pliers, detach one locking pin from the mounting bracket.
2. Insert the locking pin through the hole on the back of the CO Alarm as shown in the diagram.
3. When you attach the CO Alarm to the mounting bracket, the locking pin's head will fit into a notch on the bracket.

TO UNLOCK THE BATTERY COMPARTMENT

1. Remove the CO Alarm from the mounting bracket. If the unit is locked to the bracket, see the section "To Unlock the Mounting Bracket."
2. Insert a flathead screwdriver under the head of the locking pin, and gently pry it out of the battery compartment lock. (If you plan to relock the battery compartment, save the locking pin.)
3. To relock the battery compartment, close the battery door and reinsert locking pin in lock.
4. Reattach the CO Alarm to the mounting bracket.



IMPORTANT!

When replacing the batteries, always test the Alarm before relocking the battery compartment.

TO UNLOCK THE MOUNTING BRACKET

1. Insert a flathead screwdriver into the rectangular cut-out on the mounting bracket nearest to the locking pin.
2. Pry the CO Alarm away from the bracket by pushing up on the screwdriver and turning the CO Alarm counterclockwise (left) at the same time.

WHAT YOU WILL SEE AND HEAR WITH THIS ALARM

UNDER NORMAL OPERATIONS	**Voice:** Silent **Horn:** Silent **Power LED:** Flashes Green once/minute
WHEN YOU TEST THE ALARM	**Voice:** "Testing." **Horn:** 4 fast beeps, pause, 4 fast beeps; **Voice:** "Warning, evacuate carbon monoxide in [Location, example: "Basement"]. Evacuate." Pause. "Highest carbon monoxide level was [CO level example: _0_ ppm]". **CO LED:** Flashes Red in sync with the horn pattern
IF BATTERY BECOMES LOW OR IS MISSING	**Voice:** "Replace battery in [Location, example "Basement"]." Repeated every 5 hours **Horn:** chirps once a minute **Power LED:** Flashes Green On for 2 seconds/Off for 2 seconds. Low Battery Latch is now engaged.
IF ALARM IS NOT OPERATING PROPERLY (MALFUNCTION SIGNAL)	**Voice:** "Detector error in [Location, example "Basement"], please see manual." Repeated every 5 hours **Horn:** 3 chirps every minute **CO LED:** 3 Flashes approximately once a minute
ALARM HAS REACHED ITS END OF LIFE	**Voice:** "Detector error in [Location, example "Basement"], please see manual." Repeated every 5 hours **Horn:** 5 chirps every minute **CO LED:** 5 Flashes approximately once a minute
ALARM LEVELS OF CO ARE DETECTED	**Horn:** 4 fast beeps, pause, 4 fast beeps, pause* **Voice:** "Warning, evacuate carbon monoxide in [Location, example: "Basement"]. Evacuate." Pause. "Highest carbon monoxide level was [CO level example: ___ ppm]". **Horn:** 4 beeps, pause, 4 beeps, pause repeating 2 times followed by Voice Warning above. **CO LED:** During Alarm: Flashes Red in sync with the horn pattern. After Alarm: Flashes Red On for 2 seconds/Off for 2 seconds. CO Alarm Latch is now engaged. ***NOTE:** If unit goes into CO alarm, the regular 4 beeps/ brief pause cycle will repeat for fifteen minutes. After fifteen minutes, the pause will increase to one minute.
CO ALARM IS SILENCED	**Horn:** Off **CO LED:** Flashes Red

IF YOUR CO ALARM SOUNDS

What You See and Hear

Refer to section "What You Will See and Hear With This Alarm".

⚠WARNING!

Actuation of your CO Alarm indicates the presence of carbon monoxide (CO) which can kill you. In other words, when your CO Alarm sounds, you must not ignore it!

IF THE ALARM SIGNAL SOUNDS

1. Operate the Test/Silence button.
2. Call your emergency services, fire department or 911. Write down the number of your local emergency service here:

   _____

3. Immediately move to fresh air—outdoors or by an open door or window. Do a head count to check that all persons are accounted for. Do not re-enter the premises, or move away from the open door or window until the emergency services responder has arrived, the premises have been aired out, and your CO Alarm remains in its normal condition.
4. After following steps 1-3, if your CO Alarm reactivates within a 24-hour period, repeat steps 1-3 and call a qualified appliance technician to investigate for sources of CO from fuel-burning equipment and appliances, and inspect for proper operation of this equipment. If problems are identified during this inspection have the equipment serviced immediately. Note any combustion equipment not inspected by the technician, and consult the manufacturers' instructions, or contact the manufacturers directly, for more information about CO safety and this equipment. Make sure that motor vehicles are not, and have not, been operating in an attached garage or adjacent to the residence. Write down the number of a qualified appliance technician here:

   _____

⚠WARNING!

Alarms have various limitations. See "General Limitations of CO Alarms" for details.

"ALARM—MOVE TO FRESH AIR"

If you hear the CO alarm horn and the CO red light is flashing, move everyone to a source of fresh air. DO NOT remove the batteries!

USING THE SILENCE FEATURES

⚠WARNING!

Never remove the batteries to quiet an unwanted alarm. Removing the batteries disables the alarm and removes your protection.

The Silence Feature is intended to temporarily silence the horn while you identify and correct the problem. Do not use the Silence Feature in emergency situations. It will not correct a CO problem.

The Silence Feature can temporarily quiet an unwanted alarm for several minutes. You can silence this Alarm by pressing the Test/Silence button on the alarm cover for at least 3-5 seconds.

After the Test/Silence button is released, the Red LED blinks during the silence mode.

When the CO Alarm is Silenced the CO Alarm will remain silent for up to 4 minutes. After 4 minutes, if CO levels remain potentially dangerous the horn will start sounding again.

SILENCING THE LOW BATTERY WARNING

This silence feature can temporarily quiet the low battery warning "chirp" for up to 8 hours. You can silence the low battery warning "chirp" by pressing the Test/Silence button on the alarm cover.

Once the low battery warning "chirp" silence feature is activated, the unit continues to flash the Green light twice a minute for 8 hours. After 8 hours, the low battery "chirp" will resume. **Replace the batteries as soon as possible; this unit will not operate without battery power!**

To deactivate this feature: Press the Test/Silence button again. The unit will go into Test Mode and the low battery warning will resume (LED flashes and unit sounds "chirp" once a minute).

SILENCING THE END OF LIFE SIGNAL

This silence feature can temporarily quiet the End of Life warning "chirp" for up to 2 days. You can silence the End of Life warning "chirp" by pressing the Test/Silence button. The horn will chirp, acknowledging that the End of Life silence feature has been activated.

After approximately 2 days, the End of Life "chirp" will resume.

LATCHING FEATURES

Alarm Latch is activated after an Alarm is exposed to alarm levels of carbon monoxide. After CO levels drop below alarm levels, the **"CO"** Red LED will begin to flash On for 2 seconds/Off for 2 seconds. It will continue to flash or "latch" for about 15 minutes, to give you time to determine which unit initiated the alarm.

Low Battery Latch is activated when the Alarm is in the "low battery condition". When this occurs, the **Power** LED flashes Green On for 2 seconds/ Off for 2 seconds for about 15 minutes. This feature is designed to help you identify which Alarm needs to have the battery replaced. Although, the Alarm will sound the low battery chirp approximately once every minute, sometimes during the initial stages of "low battery", the Alarm will chirp in greater intervals than one minute, sometimes up to several hours, until the battery reaches a steady low battery level. This innovative feature eliminates the frustration of waiting for and/or identifying which unit is chirping.

REGULAR MAINTENANCE

This unit has been designed to be as maintenance-free as possible, but there are a few simple things you must do to keep it working properly.

- Test it at least once a week.
- Clean the CO Alarm at least once a month; gently vacuum the outside of the CO Alarm using your household vacuum's soft brush attachment. A can of clean compressed air (sold at computer or office supply stores) may also be used. Follow manufacturer instructions for use. Test the CO Alarm. Never use water, cleaners or solvents since they may damage the unit.
- If the CO Alarm becomes contaminated by excessive dirt, dust and/or grime, and cannot be cleaned to avoid unwanted alarms, replace the unit immediately.
- Relocate the unit if it sounds frequent unwanted alarms. See "Where CO Alarms Should Not Be Installed" for details.

CHOOSING A REPLACEMENT BATTERY:

Your CO Alarm requires two standard AA batteries. The following batteries are acceptable as replacements: Duracell MN1500. **These batteries are available at many local retail stores.**

⚠WARNING!

- **Always use the exact batteries specified by this User's Manual. DO NOT use rechargeable batteries. Clean the battery contacts and also those of the device prior to battery installation. Install batteries correctly with regard to polarity (+ and -).**
- **Please dispose of or recycle used batteries properly, following any local regulations. Consult your local waste management authority or recycling organization to find an electronics recycling facility in your area. DO NOT DISPOSE OF BATTERIES IN FIRE. BATTERIES MAY EXPLODE OR LEAK.**

⚠WARNING!

- **Keep battery out of reach of children. In the event a battery is swallowed, immediately contact your poison control center, your physician, or the National Battery Ingestion hotline at 202-625-3333 as serious injury may occur.**

IMPORTANT!

Actual battery service life depends on the CO Alarm and the environment in which it is installed. All the batteries specified above are acceptable replacement batteries for this unit. Regardless of the manufacturer's suggested battery life, you MUST replace the battery immediately once the unit starts "chirping" (the "low battery warning").

To replace the batteries (without removing Alarm from the ceiling or wall):

1. Open the battery compartment.
2. Press tabs A and B as shown in the diagram and remove each battery.
3. Insert the new batteries, making sure they snap completely into the battery compartment. Match the terminals on the ends of the batteries with the terminals on the unit.
4. Close the battery compartment, and then test the unit by pressing the Test/Silence button.

WHAT YOU NEED TO KNOW ABOUT CO

WHAT IS CO?

CO is an invisible, odorless, tasteless gas produced when fossil fuels do not burn completely, or are exposed to heat (usually fire). Electrical appliances typically do not produce CO.

These fuels include: Wood, coal, charcoal, oil, natural gas, gasoline, kerosene, and propane.

Common appliances are often sources of CO. If they are not properly maintained, are improperly ventilated, or malfunction, CO levels can rise quickly. CO is a real danger now that homes are more energy efficient. "Air-tight" homes with added insulation, sealed windows, and other weatherproofing can "trap" CO inside.

SYMPTOMS OF CO POISONING

These symptoms are related to CO POISONING and should be discussed with ALL household members.

Mild Exposure: Slight headache, nausea, vomiting, fatigue ("flu-like" symptoms).

Medium Exposure: Throbbing headache, drowsiness, confusion, fast heart rate.

Extreme Exposure: Convulsions, unconsciousness, heart and lung failure. Exposure to Carbon Monoxide can cause brain damage, death.

⚠CAUTION!

Some individuals are more sensitive to CO than others, including people with cardiac or respiratory problems, infants, unborn babies, pregnant mothers, or elderly people can be more quickly and severely affected by CO. Members of sensitive populations should consult their doctors for advice on taking additional precautions.

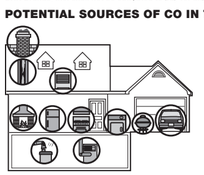
FINDING THE SOURCE OF CO AFTER AN ALARM

Carbon monoxide is an odorless, invisible gas, which often makes it difficult to locate the source of CO after an alarm. These are a few of the factors that can make it difficult to locate sources of CO:

- House well ventilated before the investigator arrives.
- Problem caused by "backdrafting."
- Transient CO problem caused by special circumstances.

Because CO may dissipate by the time an investigator arrives, it may be difficult to locate the source of CO. **BRK Brands, Inc. shall not be obligated to pay for any carbon monoxide investigation or service call.**

POTENTIAL SOURCES OF CO IN THE HOME



Fuel-burning appliances like: portable heater, gas or wood burning fireplace, gas kitchen range or cooktop, gas clothes dryer.

Damaged or insufficient venting: corroded or disconnected water heater vent pipe, leaking chimney pipe or flue, or cracked heat exchanger, blocked or clogged chimney opening.

Improper use of appliance/ device: operating a barbecue grill or vehicle in an enclosed area (like a garage or screened porch).

Transient CO Problems: "transient" or on-again-off-again CO problems can be caused by outdoor conditions and other special circumstances.

The following conditions can result in transient CO situations:

1. Excessive spillage or reverse venting of fuel appliances caused by outdoor conditions such as:
   - Wind direction and/or velocity, including high, gusty winds. Heavy air in the vent pipes (cold/humid air with extended periods between cycles).
   - Negative pressure differential resulting from the use of exhaust fans.
   - Several appliances running at the same time competing for limited fresh air.
   - Vent pipe connections vibrating loose from clothes dryers, furnaces, or water heaters.
   - Obstructions in or unconventional vent pipe designs which can amplify the above situations.
2. Extended operation of unvented fuel burning devices (range, oven, fireplace).
3. Temperature inversions, which can trap exhaust close to the ground.
4. Car idling in an open or closed attached garage, or near a home.

These conditions are dangerous because they can trap exhaust in your home. Since these conditions can come and go, they are also hard to recreate during a CO investigation.

HOW CAN I PROTECT MY FAMILY FROM CO POISONING?

A CO Alarm is an excellent means of protection. It monitors the air and sounds a loud alarm before Carbon Monoxide levels become threatening for average, healthy adults.

A CO Alarm is not a substitute for proper maintenance of home appliances.

To help prevent CO problems and reduce the risk of CO poisoning:

- Clean chimneys and flues yearly. Keep them free of debris, leaves, and nests for proper air flow. Also, have a professional check for rust and corrosion, cracks, or separations. These conditions can prevent proper air movement and cause backdrafting. Never "cap" or cover a chimney in any way that would block air flow.
- Test and maintain all fuel-burning equipment annually. Many local gas or oil companies and HVAC companies offer appliance inspections for a nominal fee.
- Make regular visual inspections of all fuel-burning appliances. Check appliances for excessive rust and scaling. Also check the flame on the burner and pilot lights. The flame should be blue. A yellow flame means fuel is not being burned completely and CO may be present. Keep the blower door on the furnace closed. Use vents or fans when they are available on all fuel-burning appliances. Make sure appliances are vented to the outside. Do not grill or barbecue indoors, or in garages or on screen porches.
- Check for exhaust backflow from CO sources. Check the draft hood on an operating furnace for a backdraft. Look for cracks on furnace heat exchangers.
- Check the house or garage on the other side of shared wall.
- Keep windows and doors open slightly. If you suspect that CO is escaping into your home, open a window or a door. Opening windows and doors can significantly decrease CO levels.

In addition, familiarize yourself with all enclosed materials. Read this manual in its entirety, and make sure you understand what to do if your CO Alarm sounds.

REGULATORY INFORMATION FOR CO ALARMS
UNDERWRITERS LABORATORIES INC. UL2034

WHAT LEVELS OF CO CAUSE AN ALARM?

Underwriters Laboratories Inc. Standard UL2034 requires residential CO Alarms to sound when exposed to levels of CO and exposure times as described below. They are measured in parts per million (ppm) of CO over time (in minutes).

UL2034 Required Alarm Points*:

- If the Alarm is exposed to 400 ppm of CO, IT MUST ALARM BETWEEN 4 and 15 MINUTES.
- If the alarm is exposed to 150 ppm of CO, IT MUST ALARM BETWEEN 10 and 50 MINUTES.
- If the alarm is exposed to 70 ppm of CO, IT MUST ALARM BETWEEN 60 and 240 MINUTES.

* Approximately 10% COHb exposure at levels of 10% to 95% Relative Humidity (RH).

The unit is designed not to alarm when exposed to a constant level of 30 ppm for 30 days.

IMPORTANT!

CO Alarms are designed to alarm before there is an immediate life threat. Since you cannot see or smell CO, never assume it's not present.

- An exposure to 100 ppm of CO for 20 minutes may not affect average, healthy adults, but after 4 hours the same level may cause headaches.
- An exposure to 400 ppm of CO may cause headaches in average, healthy adults after 35 minutes, but can cause death after 2 hours.

IMPORTANT!

This CO Alarm measures exposure to CO over time. It alarms if CO levels are extremely high in a short period of time, or if CO levels reach a certain minimum over a long period of time. The CO Alarm generally sounds an alarm before the onset of symptoms in average, healthy adults.

Why is this important? Because you need to be warned of a potential CO problem while you can still react in time. In many reported cases of CO exposure, victims may be aware that they are not feeling well, but become disoriented and can no longer react well enough to exit the building or get help. Also, young children and pets may be the first affected. The average healthy adult might not feel any symptoms when the CO Alarm sounds. However, people with cardiac or respiratory problems, infants, unborn babies, pregnant mothers, or elderly people can be more quickly and severely affected by CO. If you experience even mild symptoms of CO poisoning, consult your doctor immediately!

Standards: Underwriters Laboratories Inc. Single and Multiple Station carbon monoxide alarms UL2034.

According to Underwriters Laboratories Inc. UL2034, Section 1-1.2: "Carbon monoxide alarms covered by these requirements are intended to respond to the presence of carbon monoxide from sources such as, but not limited to, exhaust from internal-combustion engines, abnormal operation of fuel-fired appliances, and fireplaces. CO Alarms are intended to alarm at carbon monoxide levels below those that could cause a loss of ability to react to the dangers of Carbon Monoxide exposure." This CO Alarm monitors the air at the Alarm, and is designed to alarm before CO levels become life threatening. This allows you precious time to leave the house and correct the problem. This is only possible if Alarms are located, installed, and maintained as described in this manual.

Gas Detection at Typical Temperature and Humidity Ranges: The CO Alarm is not formulated to detect CO levels below 30 ppm typically. UL tested for false alarm resistance to Methane (500 ppm), Butane (300 ppm), Heptane (500 ppm), Ethyl Acetate (200 ppm), Isopropyl Alcohol (200 ppm) and Carbon Dioxide (5000 ppm). Values measure gas and vapor concentrations in parts per million.

Audible Alarm: 85 dB minimum at 10 feet (3 meters).

GENERAL LIMITATIONS OF CO ALARMS

This CO Alarm is intended for residential use. It is not intended for use in industrial applications where Occupational Safety and Health Administration (OSHA) requirements for carbon monoxide detectors must be met.

CO alarms may not waken all individuals. If children or others do not readily waken to the sound of the CO alarm, or if there are infants or family members with mobility limitations, make sure that someone is assigned to assist them in the event of an emergency.

CO Alarms will not work without power. This alarm requires a two (2) AA batteries to operate.

CO Alarms for Solar or Wind Energy users and battery backup power systems: AC powered CO Alarms should only be operated with true or pure sine wave inverters. Operating this Alarm with most battery-powered UPS (uninterruptible power supply) products or square wave or "quasi sine wave" inverters **will damage the Alarm.** If you are not sure about your inverter or UPS type, please consult with the manufacturer to verify.

This CO Alarm will not sense carbon monoxide that does not reach the sensor. This CO Alarm will only sense CO at the sensor. CO may be present in other areas. Doors or other obstructions may affect the rate at which CO reaches the CO Alarm. For this reason, if bedroom doors are usually closed at night, we recommend you install a CO Alarm in each bedroom and in the hallway between them.

CO Alarms may not sense CO on another level of the home. For example, a CO Alarm on the second level, near the bedrooms, may not sense CO in the basement. For this reason, one CO Alarm may not give adequate warning. Complete coverage is recommended. Place CO Alarms on each level of the home.

CO Alarms may not be heard. The alarm horn loudness meets or exceeds current UL standards of 85 dB at 10 feet (3 meters). However, if the CO Alarm is installed outside the bedroom, it may not wake up a sound sleeper or one who has recently used drugs or has been drinking alcoholic beverages. This is especially true if the door is closed or only partly open. Even persons who are awake may not hear the alarm horn if the sound is blocked by distance or closed doors. Noise from traffic, stereo, radio, television, air conditioner, or other appliances may also prevent alert persons from hearing the alarm horn. This CO Alarm is not intended for people who are hearing impaired.

CO Alarms are not a substitute for a smoke alarm. Although fire is a source of carbon monoxide, this CO Alarm does not sense smoke or fire. This CO Alarm senses CO that may be escaping unnoticed from malfunctioning furnaces, appliances, or other sources. Early warning of fire requires the installation of smoke alarms.

CO Alarms are not a substitute for life insurance. Though these CO Alarms warn against increasing CO levels, BRK Brands, Inc. does not warrant or imply in any way that they will protect lives from CO poisoning. Homeowners and renters must still insure their lives.

CO Alarms have a limited life. Although the CO Alarm and all of its parts have passed many stringent tests and are designed to be as reliable as possible, any of these parts could fail at

MANUAL DEL USUARIO
DETECTOR DE MONÓXIDO DE CARBONO A BATERÍA INTERCONECTADO INALÁMBRICA

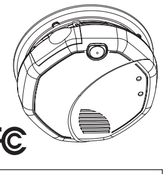
First Alert®

INTERCONECTADO INALÁMBRICA Permitió

Voz con ubicación programable

Dos características de bloqueo

Dos funciones de silencio



Exclusiva! Advertencia de voz con ubicación!

IMPORTANTE! LEA CUIDADOSAMENTE Y CONSERVE ESTAS INSTRUCCIONES.

Esta unidad viene con un manual del usuario que contiene importante información sobre su funcionamiento. Si se va a instalar esta unidad para que la usen otras personas, deje el manual o cuna copia de éste con los usuarios.

Impreso en México
M08-152706-CO511-US **K1** 8/16

CUMPLE CON LA NORMA UL 2034

Modelo CO511

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INTRODUCCIÓN

Gracias por escoger a First Alert® para satisfacer su necesidad de Detectores de Monóxido de Carbono. Usted ha adquirido un avanzado Detector de CO diseñado para proporcionarle advertencia temprana sobre la presencia de Monóxido de Carbono. ***Las características clave son:***

Activado con INTERCONECTADO INALÁMBRICA. El detector se comunica automáticamente con otros detectores activados con INTERCONECTADO INALÁMBRICA cuando se instala.

Exclusiva advertencia de voz con ubicación que le indicará la ubicación preprogramada de la unidad que inicia y el peligro detectado. Programable hasta 11 ubicaciones (p. ej. "sótano"). Cuando suena la alarma, si fue programada para el sótano, anunciará "Warning, evacuate, carbon monoxide in basement" (Advertencia, evacuar, monóxido de carbono en el sótano) junto con todas las demás alarmas de voz INTERCONECTADO INALÁMBRICA instaladas.

Tono de bocina de espectro expandido. La frecuencia más baja y variable de la bocina facilita su audición por parte de las personas mayores con pérdidas auditivas normales relacionadas con la edad. Barre el rango de 2200 - 3400 Hz.

RF Interconnect. Comunicación de radiofrecuencia confiable y segura entre los detectores. Frecuencia de 915 MHz con 65,000 códigos de seguridad y saltos de frecuencia en 3 canales.

Un único botón para Prueba/Silencio elimina cualquier confusión. Dependiendo del modo en que se encuentre el detector, el oprimir el botón permite diferentes funciones tales como prueba del detector, silenciamiento de la alarma, volver a probar el detector en condición de silencio y reposicionar las características de bloqueo.

Dos funciones de silencio. Silencie temporalmente el chirrido de batería baja por hasta ocho horas antes de reemplazar la batería con baja carga o silencie una alarma no deseada por varios minutos.

Dos características de bloqueo. Bloqueo del detector: Identifica fácilmente el detector iniciador incluso después de haber cesado la condición de alarma. Bloqueo de batería baja: Identifica qué unidad está en condición de baja carga de batería.

El Perfecto Sistema de Montaje incluye una base sin arandelas para una fácil instalación y un nuevo soporte de montaje que mantiene el detector seguro sobre un amplio rango de rotación para permitir una alineación perfecta.

Señal de fin de vida útil. Proporciona una confirmación audible de que es necesario reemplazar el detector.

INFORMACIÓN BÁSICA DE SEGURIDAD

¡IMPORTANTE!

- **Los Peligros, Advertencias y Precauciones lo alertan sobre instrucciones de funcionamiento importantes o acerca de situaciones potencialmente peligrosas. Preste atención especial a estos artículos.**
- **Este detector de CO está aprobado para usarse en residencias de una sola familia.**

¡PRECAUCIÓN!

- **El detector CO no está diseñado para detectar incendios ni otro tipo de gas. Sólo indicará la presencia de gas de monóxido de carbono en el sensor. Puede que haya presencia de monóxido de carbono en otras áreas.**

¡ADVERTENCIA!

- **Este detector de CO no funciona sin baterías activas. Si se retiran las baterías por algún motivo o no se las reemplaza al terminar su vida útil, se anula la protección.**
- **NUNCA ignore su detector si se activa la alarma. Consulte "Si su detector activa la alarma" para obtener más información. No hacerlo podría causar lesiones o la muerte.**
- **Las funciones de silencio están sólo destinadas a su comodidad y no corrigen problemas. Consulte "Uso de la características de silencio" para obtener detalles. Inspeccione siempre su casa para detectar un problema potencial después de cualquier alarma. No hacerlo podría causar lesiones o la muerte.**
- **Haga una prueba del detector una vez por semana. Si el detector falla al hacer la prueba correctamente, ¡hágalo reemplazar inmediatamente! Si el detector no funciona correctamente, no puede alertarlo sobre algún problema.**
- **Este producto se ha fabricado para su uso en el interior, en lugares comunes de viviendas familiares. No está diseñado para medir el acatamiento con las normas comerciales o industriales de la Administración de salud y seguridad ocupacional (OSHA). Individuos con condiciones medicas que pudieran hacerlos mas sensitivos al monoxido de carbono, podrian considerar usar un dispositivo de señal el cual provee señales audibles y visuales de monoxido de carbono en concentraciones abajo de 30 ppm. Para informacion adicional sobre monoxido de carbono y su condicion medica, consulte a su medico.**

FUNCIONAMIENTO INALÁMBRICO

El uso de la tecnología First Alert® INTERCONECTADO INALÁMBRICA es la manera fácil y económica de brindarle a su familia seguridad integral en el hogar. Todos los detectores INTERCONECTADO INALÁMBRICA e comunican entre sí sin la necesidad de cables o conectores. Cuando un detector suena, todos comienzan a sonar. Esto le advierte rápidamente a su familia sobre potenciales peligros y le da más tiempo de reacción.

La distancia (alcance) de comunicación entre dos alarmas INTERCONECTADO INALÁMBRICA es tipicamente 15 metros (50 pies) en el interior de una vivienda. Algunas características de la vivienda, tales como la cantidad de pisos, la cantidad y el tamaño de los cuartos, el mobiliario y los tipos de materiales de construcción pueden reducir el alcance de las alarmas. Se incluyen como ejemplo: Cielos rasos suspendidos, sistemas de conductos, artefactos metálicos grandes (refrigeradores) y traveseños metálicos. Una característica de las alarmas INTERCONECTADO INALÁMBRICA es que actúan como red tipo malla. Todas ellas repetirán las señales de alarma que reciban a todas las demás alarmas INTERCONECTADO INALÁMBRICA. La interferencia de las condiciones estructurales se puede superar agregando alarmas adicionales para encaminar la señal inalámbrica alrededor de los obstáculos.

¡IMPORTANTE!

- **El rango y capacidad de operación de cualquier dispositivo inalámbrico variará dependiendo del entorno. Es muy importante que cada detector sea probado individualmente antes y después de la instalación para asegurar que todos los detectores respondan apropiadamente.**
- **Los detectores de humo INTERCONECTADO INALÁMBRICA no son para usar a la intemperie o para transmitir entre edificios. Los detectores no se comunican correctamente en estas condiciones.**
- **Los objetos de metal y el empapelado de pared metálico pueden interferir con las señales de los detectores inalámbricos. Los detectores deben ser probados luego de haber introducido cambios en su hogar tales como remodelaciones, traslado de muebles y con puertas metálicas abiertas y cerradas.**

Su detector de CO First Alert® INTERCONECTADO INALÁMBRICA le comunicará automáticamente ambas cosas, posibilidad de incendio y presencia de monóxido de carbono a todos los demás detectores de Humo/CO First Alert® INTERCONECTADO INALÁMBRICA.

AVISO CUMPLIMIENTO CON LA FCC

Este equipo ha sido probado y se ha encontrado que opera dentro de los límites para un dispositivo digital Clase B, según la Parte 15 de las reglas de la FCC. Esos límites están diseñados para proporcionar una protección razonable de la interferencia perjudicial en instalaciones residenciales. Este equipo genera, usa y puede irradiar energía de radiofrecuencia y, si no se instala y se usa de acuerdo con las instrucciones, puede causar interferencia perjudicial a las comunicaciones de radio.

Sin embargo, no hay ninguna garantía de que la interferencia no ocurra en una instalación particular. Si este equipo crea una interferencia perjudicial a la recepción de radio o televisión, la cual se puede determinar encendiendo y apagando el equipo, se le alienta al usuario a intentar corregir la interferencia por medio de las siguientes medidas:

- Reorientar o recolocar la antena de recepción.
- Incrementar la distancia entre el equipo y el receptor.
- Conectar el equipo en una toma de un circuito diferente al del receptor.
- Consulte con el concesionario o un técnico de radio o televisión para ayuda.

¡ADVERTENCIA!

Los cambios o las modificaciones al producto, no expresamente aprobados por First Alert / BRK Brands, Inc., pueden anular la autorización del usuario de operar el equipo.

Este dispositivo cumple con la Parte 15 de las Reglas de la FCC. La operación está sujeta a las siguientes dos condiciones: (1) este dispositivo no debe causar interferencia perjudicial, y (2) este dispositivo debe de aceptar cualquier interferencia recibida, incluyendo interferencia que pueda causar una operación no deseada. FCC ID: M7U5001L

¡PRECAUCIÓN!

Cualquier cambio o modificación que no estuviera expresamente aprobado por BRK Brands, Inc. podría invalidar la autorización del usuario para operar el equipo.

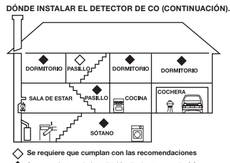
INSTALACIÓN
DÓNDE INSTALAR EL DETECTOR DE CO

La Asociación Nacional de Protección Contra Incendios (NFPA) recomienda ubicar el detector de CO en la parte central, fuera de cada área separada de dormitorios e inmediatamente cercana a los dormitorios. Para obtener mayor protección, instale detectores adicionales en cada dormitorio, y en cada nivel de su vivienda.

Instale un detector de CO en AMBOS extremos de cualquier pasillo de los dormitorios que tenga 12 metros (40 pies) o más de longitud.

Para conocer los requisitos adicionales, consulte los códigos de construcción estatales y locales.

DÓNDE INSTALAR EL DETECTOR DE CO (CONTINUACIÓN)...



◇ **Se requiere que cumplan con las recomendaciones**

◆ **Sugerencia para la instalación de detectores de CO**

VIVIENDA DE UN SOLO NIVEL:

- Instale, al menos, un detector de CO cerca o dentro de cada dormitorio.
- Para obtener mayor protección, instale un detector adicional por lo menos a 6 metros (20 pies) de un horno o de una fuente de calor que consuma combustible.

VIVIENDA DE VARIOS NIVELES:

- Instale, al menos, un detector de CO cerca o dentro de cada dormitorio.
- Para mayor protección, instale al menos un detector en cada nivel de la vivienda. Si tiene un sótano, instale el detector en la parte superior de las escaleras del mismo.
- Para obtener mayor protección, instale un detector adicional por lo menos a 6 metros (20 pies) de un horno o de una fuente de calor que consuma combustible.

EN CASILLAS RODANTES:

- Instale detectores de CO SÓLO en las paredes interiores. Las paredes exteriores y techos no aislados de los casillas rodantes muchas veces transmiten el frío y el calor desde el exterior.

DÓNDE NO DEBEN SER INSTALADOS LOS DETECTORES DE CO

NO INSTALE ESTE DETECTOR:

- En garajes, cocinas o salas de horno, o en toda área con mucho polvo, mugre o grasa.
- A menos de 4,6 metros (15 pies) de distancia de un horno, de otra fuente de calor, o de artefactos que consumen combustible tales como calentadores de agua.
- A 1,5 metros (5 pies) de cualquier artefacto de cocina.
- En áreas dónde la temperatura es menor de 4,4° C (40° F) o mayor de 37,8° C (100° F). Estas áreas incluyen espacios angostos no terminados, áticos no terminados, cielos con pobre aislación o sin aislación, terrazas, y garages.
- En áreas de aire turbulento como ventiladores de cielo raso cercanos, rejillas de calefacción acondicionadores de aire, retornos de aire fresco, o ventanas abiertas. Es posible que el aire disperse el CO antes de que el detector lo pueda detectar.
- Bajo luz solar directa.

¡ADVERTENCIA!

- **Este detector de CO ha sido diseñado para ser usado dentro de una vivienda para una sola familia o apartamento. No ha sido diseñado para ser usado en espacios comunes, pasillos, o sótanos de edificios para varias familias a menos que se haya instalado un detector de CO en la unidad de cada familia. Los detectores de CO en áreas comunes pueden no ser escuchados desde el interior de las unidades individuales de cada familia.**
- **Este detector solo no es un sustituto de un sistema completo de detección en lugares donde viven muchas personas, como hoteles o residencias estudiantiles o pensionados, a menos que se instale un detector de CO en cada unidad.**
- **NO use este detector de CO en almacenes, edificios industriales o comerciales, edificios no residenciales para propósitos especiales, vehículos para recreación, lanchas o aeronaves. Este detector ha sido diseñado específicamente para uso residencial, y puede no ofrecer una protección adecuada en aplicaciones que no sean residenciales.**

CÓMO INSTALAR EL DETECTOR

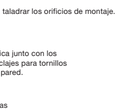
Para las instrucciones de instalación rápidas vea "Instrucciones rápidas de instalación", incluidas.

¡IMPORTANTE!

El detector de CO está disenado para montarse en cielos rasos o en paredes. No sirve para instalarse en superficies de mesa. La unidad debe montarse de la siguiente manera. Consulte la sección "Dónde instalar el detector de CO" antes de comenzar.

PARTES DE ESTE DETECTOR DE CO

1. Botón Test/Silence
2. Compartimiento de batería
3. LED indicador de Corriente
4. LED Indicador de Alarma de CO



Herramientas necesarias para la instalación: lápiz, taladro con una mecha de 3/16 de pulgada o 5 mm, destornillador de cabeza Phillips, martillo.

1. Sostenga el soporte de montaje contra el cielo raso (o pared) y trace el contorno interno de las dos ranuras de montaje.
2. Coloque la unidad dónde no quede cubierta por el polvo que saldrá al taladrar los orificios de montaje.
3. Con una broca de 5 mm (3/16 pulg.), taladre orificio en cada centro marcado que dibujó en el cielo raso (o la pared).
4. Inserte los anclajes plásticos para tornillos (incluidos en la bolsa plástica junto con los tornillos) en los orificios. En caso de que sea necesario, golpee los anclajes para tornillos suavemente con un martillo, hasta que queden a ras con el techo o la pared.
5. Alinee el soporte de montaje con las cuñas plásticas de los tornillos.
6. Atornille el soporte de montaje en el cielo raso o la pared a través de las ranuras de montaje, utilizando los dos tornillos incluidos.
7. Conecte el detector de CO al soporte de montaje. Alinee las guías de la base de la alarma con las guías del soporte de montaje. Cuando las guías están alineadas, gire la base hacia la derecha hasta que se enganche en posición.

   NOTA: Una vez que el detector de CO quede enganchado en el soporte de montaje, puede girar el detector de CO para ajustar la alineación.
8. Probar el detector de CO. Para obtener mayor información, consulte la sección "Prueba semanal."

GUÍA PASO A PASO PARA PROGRAMAR ESTE DETECTOR

LA PRIMERA VEZ Y CUANDO CAMBIE BATERÍAS

Acción:	El detector dirá:
1. Inserte las baterías (2 baterías AA).	"Bienvenido, detector de monóxido de carbono First Alert." "Ninguna ubicación programada" ***si es la primera vez*** o "Ubicación [por ejemplo: "Sótano"] programada" cuando se cambian las baterías. "Para seleccionar un lugar, mantenga presionado el botón de prueba ahora."
2. Pulse y mantenga presionado el botón de prueba si quisiera programar la ubicación o modificar la ubicación del Detector. Suelte el botón después de responder la alarma.	"Para guardar la ubicación, pulse y mantenga presionado el botón de prueba después de escuchar la ubicación" El detector recitará una lista de las ubicaciones (ver debajo).
3. Después de escuchar la ubicación donde usted está colocando el Detector, Pulse y mantenga presionado el botón de prueba.	"[Ubicación, "Sótano" por ejemplo] ubicación guardada." Si no elige una ubicación: "Ninguna ubicación guardada."

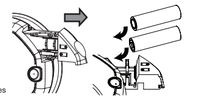
Ahora su detector se programó para la ubicación de su elección. Ubicaciones disponibles:

Sótano	Cocina	Dormitorio de los niños
Sala de estar	Comedor	Dormitorio principal
Estancia	Sin ubicación	Dormitorio de huéspedes
Oficina	Corredor	Cuarto de servicio

AGREGADO Y CONEXIÓN EN CADENA DE DETECTORES INTERCONECTADO INALÁMBRICA ADICIONALES

NOTA: Tiene dos minutos para completar los pasos 1 al 3. Si pasan más de dos minutos, el LED verde de encendido dejará de parpadear. Simplemente abra el cajón de baterías del segundo detector y repita los pasos 1 al 3.

1. Inserte las baterías en el cajón de baterías del **próximo** detector. NO CIERRE EL CAJÓN.
2. Pulse y mantenga presionado el botón de prueba y luego cierre el cajón de baterías.
3. Una vez que escuche el chirrido de la unidad, suelte el botón. El LED verde de encendido comenzará a parpadear indicando que el detector INTERCONECTADO INALÁMBRICA esta esperando datos de programación de uno de los otros detectores INTERCONECTADO INALÁMBRICA configurados.



4. Pulse y mantenga presionado el botón de prueba del primer detector hasta que el segundo detector emita un chirrido y su LED verde de encendido deje de parpadear. Luego suelte el botón de prueba.
5. Si ha comprado el detector cableado INTERCONECTADO INALÁMBRICA con batería de respaldo, puede ahora conectar el detector cableado enchufando el conector de tres conductores que está sobre el cielorraso al detector.
6. Repita los pasos 1 al 5 para los detectores INTERCONECTADO INALÁMBRICA adicionales.

Ahora, ha logrado enlazar con éxito sus nuevos detectores INTERCONECTADO INALÁMBRICA. Para agregar detectores adicionales en otro momento, siga los pasos 1 al 5.

PRUEBA SEMANAL

¡ADVERTENCIA!

- **Haga una prueba del detector una vez por semana. Si el detector falla al hacer la prueba correctamente, ¡hágalo reemplazar inmediatamente! Si el detector no funciona correctamente, no puede alertarlo sobre algún problema.**
- **NO permanezca cerca del detector cuando la bocina esté sonando. La exposición al detector a corta distancia puede ser dañina para su oído. Cuando esté llevando a cabo una prueba, aléjese en cuanto la unidad comience a sonar la bocina.**

¡PRECAUCIÓN!

Es importante probar esta unidad cada semana, para asegurarse de su correcto funcionamiento. La forma recomendada de probar el detector de CO, es mediante el uso del botón de prueba.

Puede probar el detector de CO de pulse y mantenga presionado el botón de Prueba/Silencio en la cubierta de el detector (normalmente entre 3 y 5 segundos).

Durante la prueba, podrá observar y escuchará la siguiente secuencia:

- La **Bocina** emitirá 4 pitidos, pausa, 4 pitidos. El **LED de Corriente** se encuentra Apagado, y el **LED de CO** destellará en rojo.

Si la unidad no alerta, verifique que las baterías estén correctamente instaladas y pruebe nuevamente. Si el detector sigue sin responder, remplace la unidad inmediatamente.

CARACTERÍSTICAS OPCIONALES DE BLOQUEO

Las características de cierre optativas opcionales se diseñan para prevenir el retiro desautorizado de la batería o del alarmar. No es necesario activar los bloqueos en casas unifamiliares donde no está una preocupación el retiro desautorizado de la batería o del alarmar.

Estos detectores de CO cuentan con dos trabas individuales; una para trabar el compartimiento de la batería, y la otra para sujetar la unidad al soporte de montaje. Las trabas pueden usarse juntas o en forma independiente.

Herramientas necesarias: • Pinzas con puntas de aguja • Destornillador de cabeza plana/estándar.

Ambas trabas tienen pasadores de cierre moldeados en el interior del soporte de montaje. Use las pinzas con puntas de aguja para retirar uno o ambos pasadores del soporte de montaje, según la cantidad de trabas que va a utiliza.

¡IMPORTANTE!

Para quitar permanentemente cualquier bloqueo inserte un destornillador de cabeza llana entre el contacto que bloquea y el bloqueo, y alzaprime el contacto fuera del bloqueo.

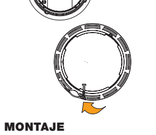
PARA BLOQUEAR EL COMPARTIMIENTO DE LA BATERÍA

No bloquee el compartimiento de la batería hasta que las baterías están instaladas y probado el detector de CO.

¡IMPORTANTE!

Si la unidad no emite una alarma durante la prueba, ¡NO bloquee el compartimento de la batería! Instale una nueva batería y pruebe nuevamente. Si el detector de CO aún no emite una alarma, reemplácelo de inmediato.

1. Usando pinzas de punta cónica de uso general, desconecte un pasador de bloqueo del soporte de montaje.
2. Después de que se inserten las baterías, empuje el pasador de bloqueo a través del orificio cerca del pestillo de la puerta de la batería en la carta posterior del detector de CO.



PARA BLOQUEAR EL SOPORTE DE MONTAJE

1. Usando pinzas de punta cónica, desconecte un pasador de bloqueo del soporte de montaje.
2. Inserte el pasador de bloqueo a través del orificio en la parte posterior del detector de CO, tal como se muestra en el diagrama.
3. Al conectar el detector de CO al soporte de montaje, la cabeza del pasador de bloqueo encajará en una muesca en dicho soporte.

PARA DESBLOQUEAR EL COMPARTIMIENTO DE LA BATERÍA

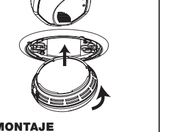
1. Retire el detector de CO del soporte de montaje. Si la unidad está bloqueada al soporte, consulte la sección "Para desbloquear el soporte de montaje".
2. Inserte un destornillador de cabeza plana debajo de la cabeza del pasador de bloqueo y haga palanca delicadamente para quitarlo del bloqueo del compartimento de la batería. (Si tiene la intención de volver a bloquear el compartimento de la batería, guarde el pasador de bloqueo.)
3. Para volver a bloquear el compartimento de la batería, cierre la puerta de la batería y vuelva a insertar el pasador de bloqueo en la cerradura.
4. Vuelva a conectar el detector de CO al soporte de montaje.

¡IMPORTANTE!

Al reemplazar la batería, siempre pruebe la alarma de CO antes de volver a bloquear el compartimento de la batería.

PARA DESBLOQUEAR EL SOPORTE DE MONTAJE

1. Inserte un destornillador de cabeza plana en el recorte rectangular del soporte de montaje más cercano al pasador de bloqueo.
2. Haga palanca para quitar el detector de CO del soporte empujando hacia arriba sobre el destornillador y girando simultáneamente el detector de CO hacia la izquierda.



LO QUE VERÁ Y ESCUCHARÁ CON ESTE DETECTOR

EN CONDICIONES DE OPERACIÓN NORMAL	**Voz:** Silencio **Bocina:** Silencio **LED indicador de Corriente:** Destella en verde una vez por minuto
CUANDO PRUEBA EL DETECTOR	**Voz:** "Probando". **Bocina:** 4 pitidos rápidas, pausa, 4 pitidos rápidas **Voz:** "Atención, evacue hay monóxido de carbono en [Ubicación, ejemplo: "Sótano"]. Evacue." Pausa. "El mayor nivel de monóxido de carbono detectado fue [Ejemplo de nivel de CO: _0_ ppm]". **LED de CO:** Destella en rojo en sincronismo la bocina
SI LA BATERÍA SE DESCARGA O FALTA	**Voz:** "Remplace la batería en [Ubicación, ejemplo "Sótano"]". Se repite cada 5 horas. **Bocina:** chirría una vez por minuto **LED indicador de Corriente:** Destella con luz verde, 2 segundos encendido y 2 segundos apagado. Continúa destellando o "enganchado" durante activado el bloqueo de batería baja.
SI EL DETECTOR NO FUNCIONA CORRECTAMENTE (AVISO DE FALLA)	**Voz:** "Error del detector en [Ubicación, ejemplo "Sótano"], por favor vea el manual". Se repite cada 5 horas. **Bocina:** 3 chirridos por minuto **LED indicador de CO:** Destella aproximadamente 3 veces por minuto
EL DETECTOR LLEGÓ AL FIN DE SU VIDA ÚTIL	**Voz:** "Error del detector en [Ubicación, ejemplo "Sótano"], por favor vea el manual". Se repite cada 5 horas. **Bocina:** 5 chirridos por minuto **LED indicador de CO:** Destella aproximadamente 5 veces por minuto
SE DETECTAN NIVELES DE CO	**Bocina:** 4 pitidos rápidas, pausa, 4 pitidos rápidas* **Voz:** "Atención, evacue hay monóxido de carbono en [Ubicación, por ejemplo: "Sótano"]. Evacuar." Pausa. "El mayor nivel de monóxido de carbono detectado fue [Ejemplo de nivel de CO: ___ ppm]". **Bocina: Horn:** 4 pitidos, pausa, 4 pitidos, pausa que se repiten 2 veces, seguidos por la advertencia de voz arriba indicada. **LED de CO:** Durante la alarma: Destella con luz roja en sincronismo con el patrón de la bocina. Después de la alarma: Destella con luz roja, 2 segundos encendido y 2 segundos apagado. De esta forma, queda activado el bloqueo del detector de CO. ***NOTA:** Si la unidad emite una alarma de CO, el ciclo de 4 pitidos normales y pausa breve se repetirá durante 15 minutos. A los 15 minutos, la pausa aumentará a un minuto.
DETECTOR DE CO SILENCIADO	**Bocina:** Apagada **LED de CO:** Destella en rojo

SI SU DETECTOR DE CO ACTIVA LA ALARMA

Qué usted ve y oye

Consulte la sección "lo que verá y escuchará con este detector".

¡ADVERTENCIA!

La actuación de su detector de CO indica la presencia de monóxido de carbono (CO), el cual puede ocasionar la muerte. En otras palabras, cuando su detector de CO suene, ¡no debe ignorarlo!

SI SUENA LA SEÑAL DE ALARMA:

1. Presione el botón de Test/Silence (Prueba/Silencio).
2. Llame a sus servicios de emergencia, departamento de bomberos o 911. Anote aquí el número de su servicio de emergencia:

   _____
3. Desplácese inmediatamente a donde haya aire fresco – saliendo al exterior o mediante una puerta o ventana abierta. Cuente a sus acompañantes para asegurarse de que no falte ninguna persona. No vuelva a entrar en las instalaciones ni se aleje de la puerta o ventana abierta, sino hasta que llegue la unidad de servicios de emergencia, las instalaciones hayan sido ventiladas y su detector de humo y CO retorne a su estado normal.
4. Después de seguir los pasos 1 a 3, si su detector de gas y CO se vuelve a activar en menos de 24 horas, repita los pasos 1 a 3 y llame a un experto en equipos domésticos para que investigue cuál de sus equipos y aparatos de combustión es la fuente de CO y asegúrese de que tales equipos funcionen correctamente. Si se identificaran problemas durante esta inspección, haga que reparen de inmediato el equipo. Tome nota de cualquier equipo de combustión que no haya sido inspeccionado por el técnico y consulte los instructivos del fabricante o bien, comuníquese directamente con el fabricante para obtener mayor información sobre seguridad en cuanto al CO y dicho equipo. Cerciórese de que no existan o hayan existido vehículos automotores en marcha en el garaje o junto a la residencia. Anote aquí el número de teléfono de un técnico experto en equipos domésticos:

   _____

¡ADVERTENCIA!

Los detectores tienen diversas limitaciones. Consulte "Limitaciones generales de los detectores de CO" para obtener detalles.

"ALARMA: ACUDA A UN LUGAR CON AIRE FRESCO"

Si oye la bocina del detector de CO y la luz roja de CO destella, traslade a todas las personas a una fuente de aire puro. ¡NO retire las baterías!

USO DE LA CARACTERÍSTICAS DE SILENCIO

¡ADVERTENCIA!

No retire nunca las baterías para silenciar una alerta no deseada. Al retirar las baterías deshabilita el detector dejándolo a Usted sin protección.

La característica de silenciamiento está diseñada para apagar temporalmente la unidad mientras se corrige el problema. No la use en situaciones de emergencia, ya que no solucionará el problema de CO.

La función de silencio del detector puede callar una alerta indeseada por varios minutos. Puede silenciar el detector de CO de presionando el botón Prueba/Silencio en la cubierta del detector, al menos durante 3 a 5 segundos.

Después de soltar el botón de Prueba/Silencio, el LED rojo parpadea durante el modo de silencio.

Cuando la alarma del detector de CO se ha silenciado el detector de CO permanecerá silenciado durante los primeros 4 minutos si disminuye el nivel de CO. Después de 4 minutos, si los niveles del CO siguen siendo potencialmente peligrosos, la bocina comenzará a sonar otra vez.

SILENCIAMIENTO DE LA ADVERTENCIA DE BATERÍA DESCARGADA

La función de silencio puede acallar automáticamente el "chirrido" de alerta de batería baja por hasta 8 horas. Puede silenciar el "chirrido" de advertencia de batería descargada de presionando el botón Test/Silence (Prueba/Silencio) en la tapa de la alarma.

Una vez que se activa la opción de silenciado del "chirrido" de alerta de batería baja, la unidad continúa destellando la luz verde dos veces por minuto durante 8 horas. Después de 8 horas, el "chirrido" de batería baja se reactivará. **¡Reemplace las baterías lo antes posible; esta unidad no funcionará sin baterías cargadas!**

Para desactivar esta característica: Presione el botón Test/Silence (Prueba/ Silencio). La unidad pasará al modo de prueba y se reanudará la advertencia de batería descargada (el LED parpadeará y la unidad emitirá un "chirrido" una vez por minuto).

CÓMO SILENCIAR LA SE—AL DE FIN DE VIDA ÚTIL

Esta función de silencio puede silenciar temporalmente el "chirrido" de advertencia de fin de vida útil durante hasta 2 días. Puede silenciar el "chirrido" de advertencia de fin de vida útil pulsando el botón Test/Silence. La bocina chirriará, indicando que se activó la función silencio de fin de vida útil.

Después de aproximadamente 2 días, se reanudará el "chirrido" de fin de vida útil.

CARACTERÍSTICAS DE BLOQUEO

Bloqueo del Detector se activa después de que un detector es expuesto a concentraciones de monóxido de carbono suficientes para dar la alarma. Una vez que las concentraciones de CO descienden por debajo de los niveles de alarma, el LED rojo indicador de **CO** empezará a destellar una vez 2 segundos encendido y 2 segundos apagado. Continúa destellando o "enganchado" durante aproximadamente 15 minutos, a fin de darle tiempo para determinar qué unidad inició la alarma.

El **bloqueo de batería baja** se activa cuando el detector está en la "condición de baja carga de batería". Cuando esto ocurre, el **LED de encendido** destella con luz verde, 2 segundos encendido y 2 segundos apagado. Esta característica está diseñada para ayudarle a identificar qué detector necesita que se reemplace la batería. Si bien la alarma suena con el chirrido de batería baja aproximadamente una vez por minuto, a veces durante las etapas iniciales de la condición de baja carga, la alarma emite el chirrido a intervalos mayores que un minuto, a veces de varias horas, hasta que la batería alcanza un bajo nivel de carga constante. Esta novedosa característica elimina la frustración de esperar y/o identificar qué unidad emite el chirrido.

MANTENIMIENTO REGULAR

Esta unidad está diseñada para requerir la menor cantidad de mantenimiento posible, sin embargo se deben seguir ciertos procedimientos dónde los requisitos de la Administración de la Salud y Seguridad Ocupacional (OSHA) deben ¡ser satisfechos.

No todas las personas se pueden despertar con los detectores de CO. Si los niños u otras personas no se despiertan rápidamente ante el sonido del detector de CO o si hay bebés o miembros de la familia con limitaciones de movilidad, asegúrese que se les asigne alguien para que les ayude en el caso de una emergencia.

Los detectores de CO no funcionarán sin alimentacion. Este detector de CO requiere dos baterías AA.

Detectores de CO para usuarios de energía solar o eólica y sistemas de alimentación con batería de respaldo: Use los detectores de CO alimentados por CA sólo con inversores auténticos de ondas sinusoidales. No use el detector con fuentes de alimentación ininterrumpible a baterías (UPS), ni con inversores de onda cuadrada o casisinusoide, **pues podría dañar el detector**. Si tiene dudas sobre el uso de algún tipo de inversor o UPS, solicite información al fabricante de estas unidades.

Los detectores de CO no detectarán monóxido de carbono que no llegue al detector. Este detector solamente detectará CO en el sensor del detector. Puede haber CO en otras áreas. Puertas u otras obstrucciones pueden afectar la velocidad a la que el CO llega al detector. Por esta razón, si las puertas del dormitorio están habitualmente cerradas durante la noche, se instale un detector de CO en cada habitación y en el corredor entre ellas.

Los detectores de CO pueden no detectar CO en otro piso de la casa. Por ejemplo, un detector en el segundo piso, cerca de los dormitorios, puede no detectar CO en el sótano. Por esta razón, un detector de CO puede no brindar la advertencia adecuada. Se recomienda la cobertura completa. Coloque detectores de CO en cada piso de su casa.

- Pruebe la unidad por lo menos una vez a la semana.
- Limpie el detector de CO por lo menos una vez al mes; aspire delicadamente la cara externa del detector de CO usando el aditamento de cepillo suave de la aspiradora. Se puede usar una lata de aire comprimido (vse venden en tiendas de computadoras o artculos para oficinas). Siga las instrucciones de empleo del fabricante. Pruebe el detector de CO No utilice nunca agua, limpiadores o solventes, ya que podrían dañar la unidad.
- Si el detector de CO se contamina por la suciedad excesiva, el polvo y/o el grime, y no se puede limpiar para evitar alarmar indeseados, reemplazar la unidad inmediatamente.
- Cambie la localización de la unidad si ésta emite alarmas indeseadas frecuentes. Encontrará más detalles al respecto en la sección "Dónde NO deben ser instalados los detectores de CO".

CÓMO ELEGIR UNA BATERÍA DE REPUESTO:

El detector de CO requiere dos baterías AA estándar. Se pueden usar las siguientes baterías como respuesto: Duracell MN1500. **Estas baterías se venden en tiendas al menudeo.**

¡ADVERTENCIA!

- **Siempre utilice las baterías exactas especificadas por este Manual de Usuario. NO use baterías recargables. Antes de instalar las baterías limpie los contactos de las baterías y también los del aparato. Instale baterías correctamente en cuanto a la polaridad (+ y -).**
- **Por favor, desechar o reciclar adecuadamente las baterías usadas, siguiendo todas las regulaciones locales. Consulte con su autoridad local de manejo de desechos o con una organización de reciclaje para encontrar un centro de reciclaje de productos electrónicos en su área. NO DESECHE LAS BATERÍAS EN EL FUEGO. LAS BATERÍAS PUEDEN EXPLOTAR O DERRAMARSE.**

¡ADVERTENCIA!

- **Mantenga las baterías fuera del alcance de los niños. En el caso de que una batería sea ingerida, contacte inmediatamente a su centro de toxicología, su médico, o a la línea de emergencia Nacional de Ingestión de Baterías al 202-625-3333 ya que pueden ocurrir daños graves.**

¡IMPORTANTE!

El tiempo de vida real depende de el tipo de detector y de el medio ambiente en donde esté instalado. Todas las baterías especificadas anteriormente son aceptables para uso en este detector. Independientemente de el tipo que especifique el fabricante, usted debe reemplazar la batería inmediatamente despues que comience el "chirrado" ("advertencia de baja potencia").

Para reemplazar las baterías (sin retirar el detector del cielorraso o la pared):

1. Abra el compartimiento de las baterías.
2. Presione las pestañas A y B como se muestra en el diagrama y retire cada batería.
3. Inserte las baterías nuevas, asegurándose de que encajen completamente en su compartimiento. Haga coincidir los terminales de los extremos de las baterías con los terminales de la unidad.
4. Cierre el compartimiento de las baterías y luego pruebe la unidad presionando el botón Test/Silence.

QUÉ NECESITA SABER SOBRE EL CO
¿QUÉ ES EL CO?

El CO es un gas invisible, sin olor ni sabor, se produce cuando cualquier tipo de combustible