--IMPORTANT--
PLEASE FILL OUT THE REGISTRATION CARD BELOW

THE REGISTRATION CARD BELOW MUST BE FILLED OUT COMPLETELY (please print clearly) AND FAXED OR EMAILED BACK TO RECEIVE FUTURE UPDATES OF THIS MANUAL.

IF THE CARD IS NOT RETURNED, YOU WILL NOT RECEIVE IMPORTANT INFORMATION REGARDING UPDATES.

RETURN ASAP TO BEHLEN MARKETING
FAX TO 204-725-4932
OR
SCAN AND EMAIL TO marketing@behlen.ca

REGISTRATION FORM
FRAMELESS TECHNICAL MANUAL - VR 1.0 July 2008

Date _____

Name _____

Company _____

Address _____

City _____ Province _____ Postal Code _____

Phone # _____ Fax # _____

Email _____

A GLOBAL LEADER
in Frameless Steel Buildings

Over the past 40 years, BEHLEN Industries LP has grown to be the largest manufacturer of steel building systems in Canada. We now serve customers worldwide through a growing network of authorized builders and continue to earn a reputation as a global leader in our industry.

Our success has come primarily through our commitment to quality, innovation and customer service. BEHLEN Frameless steel buildings are energy-efficient and long-lasting, and offer maximum creative flexibility for architects and builders. Our highly trained team and in-house engineering staff constantly strive to rise above our customers' expectations.

Here are some of our accomplishments:

- North America's first steel building manufacturer registered to ISO 9001
- Certified to CSA A660, the Canadian Quality standard for Steel Building Systems
- Manufacturer of the first frameless steel building system in Canada
- Manufacturer of the first frameless steel building to clear spans of 313' (95 m) wide
- Platinum Member of Canada's 50 Best Managed Private Companies
- Unanimously approved by the CISC as a Steel Fabricator CISC Member

1969
MANUFACTURED FIRST FRAMELESS STEEL BUILDING IN CANADA

1988
JOINED WGI WESTMAN GROUP INC

1995
REGISTERED TO ISO 9001

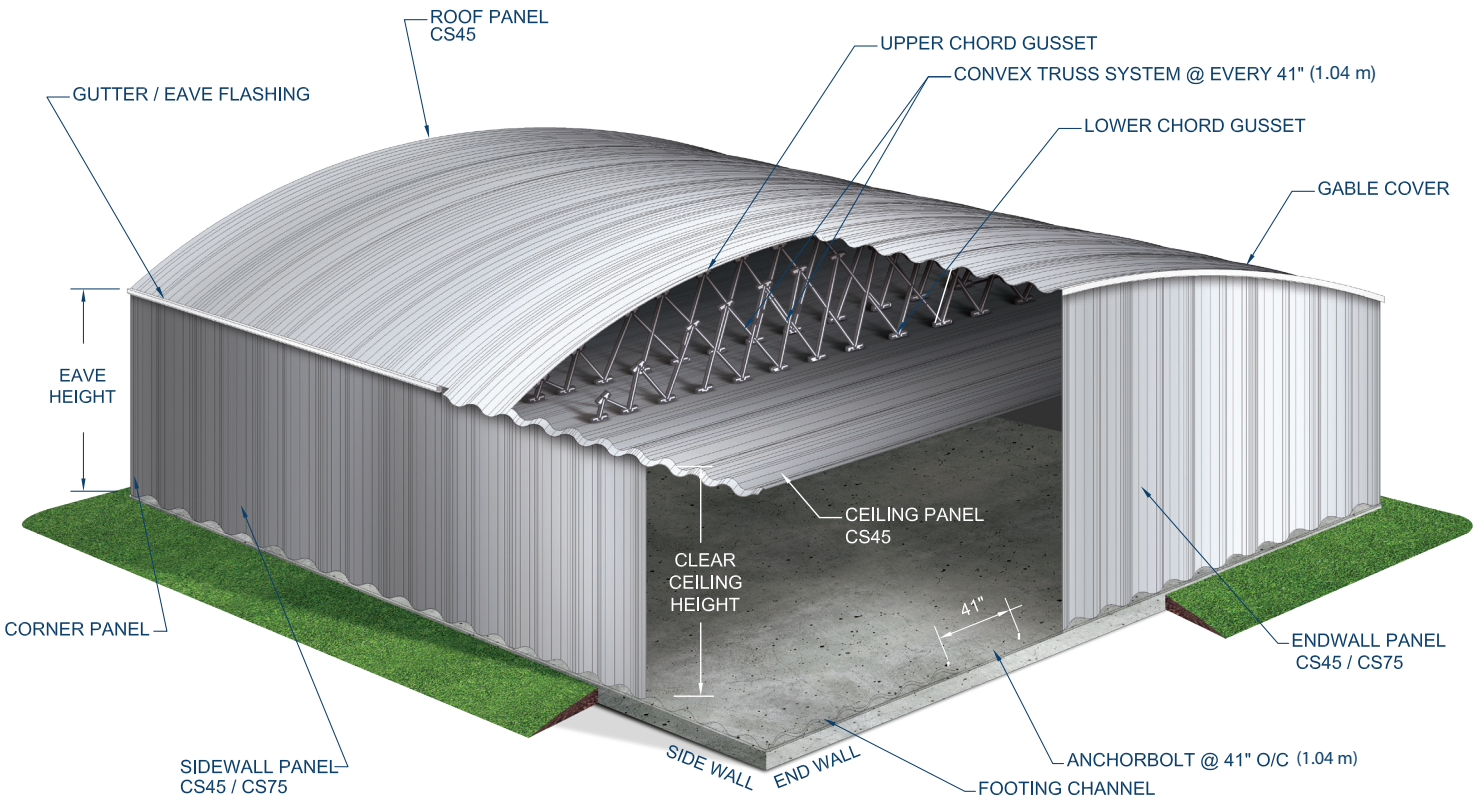
1997
ONE OF CANADA'S 50 BEST MANAGED COMPANIES

2003
PLATINUM MEMBER OF CANADA'S BEST MANAGED COMPANIES

2013
WORLD'S FIRST FRAMELESS BUILDING WITH CLEAR SPANS OF 313' (95 m) – CONVEX ROOF

2015
2015 Steel Fabricator Canadian Institute of Steel Construction Memeber

FRAMELESS STEEL BUILDING DETAILS



VERSATILE AND LOW COST

BEHLEN is proud to offer FRAMELESS steel building solutions, a unique steel building system that offers visual appeal, creative versatility and durability, while capitalizing on a construction technique that saves time, labour and materials.

FRAMELESS steel buildings are constructed with our engineered panel system, eliminating the need for structural steel. This unique system allows us to offer low-cost, energy-efficient solutions.

Our convex roof buildings can offer obstruction-free spans of up to 328’ (100m), completely independent of structural elements such as columns and rafters. This provides our customers with unparalleled flexibility.

ENERGY SAVINGS

The lack of structural steel helps give our buildings an insulation advantage. Inexpensive batt insulation is installed easily on the interior with insulation supports, which minimize energy loss caused by thermal bridging. The wall system also accepts a variety of types of insulation, including spray-on, strapping and batts.

ATTIC SYSTEM

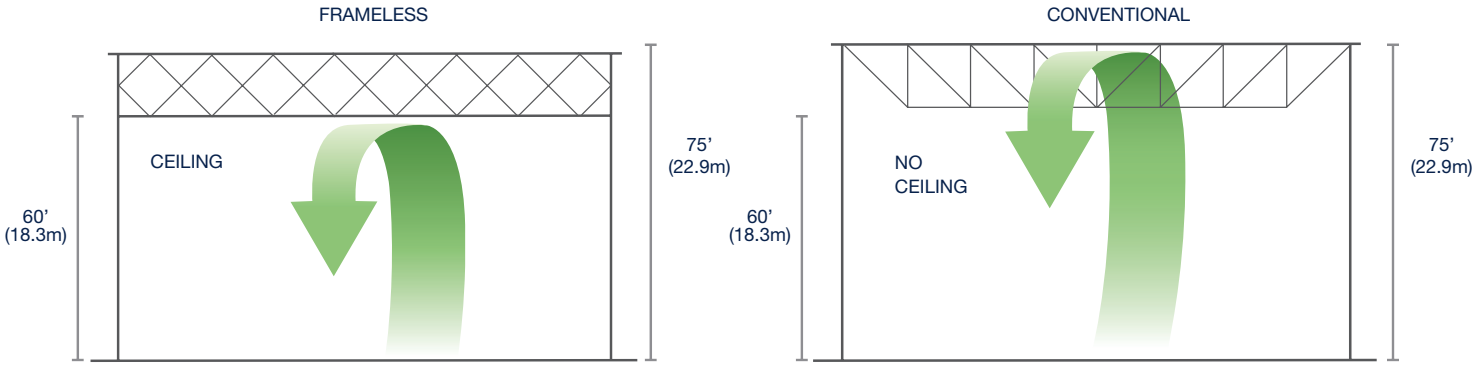
The attic cavity can easily accommodate inexpensive, blown-in insulation with an R-Value up to R60 which offers excellent protection against extreme heat or cold. Additionally, the ventilated attic helps deliver lower energy bills and eliminates the risk of wet, saturated insulation.

CEILING

Our obstruction-free interiors offer easy climate control with fast heating and cooling. Such energy efficiency leads to lower operating costs for customers.

CLEAN

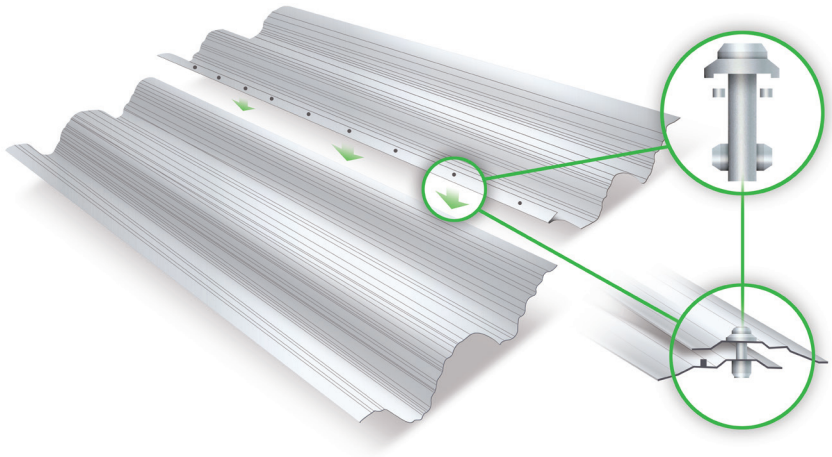
A natural ceiling provides a bright clean interior with no exposed roof trusses. This means fewer light units with higher reflectivity, in turn reducing lighting requirements and lower energy bills.



PANEL AND WALL SYSTEM

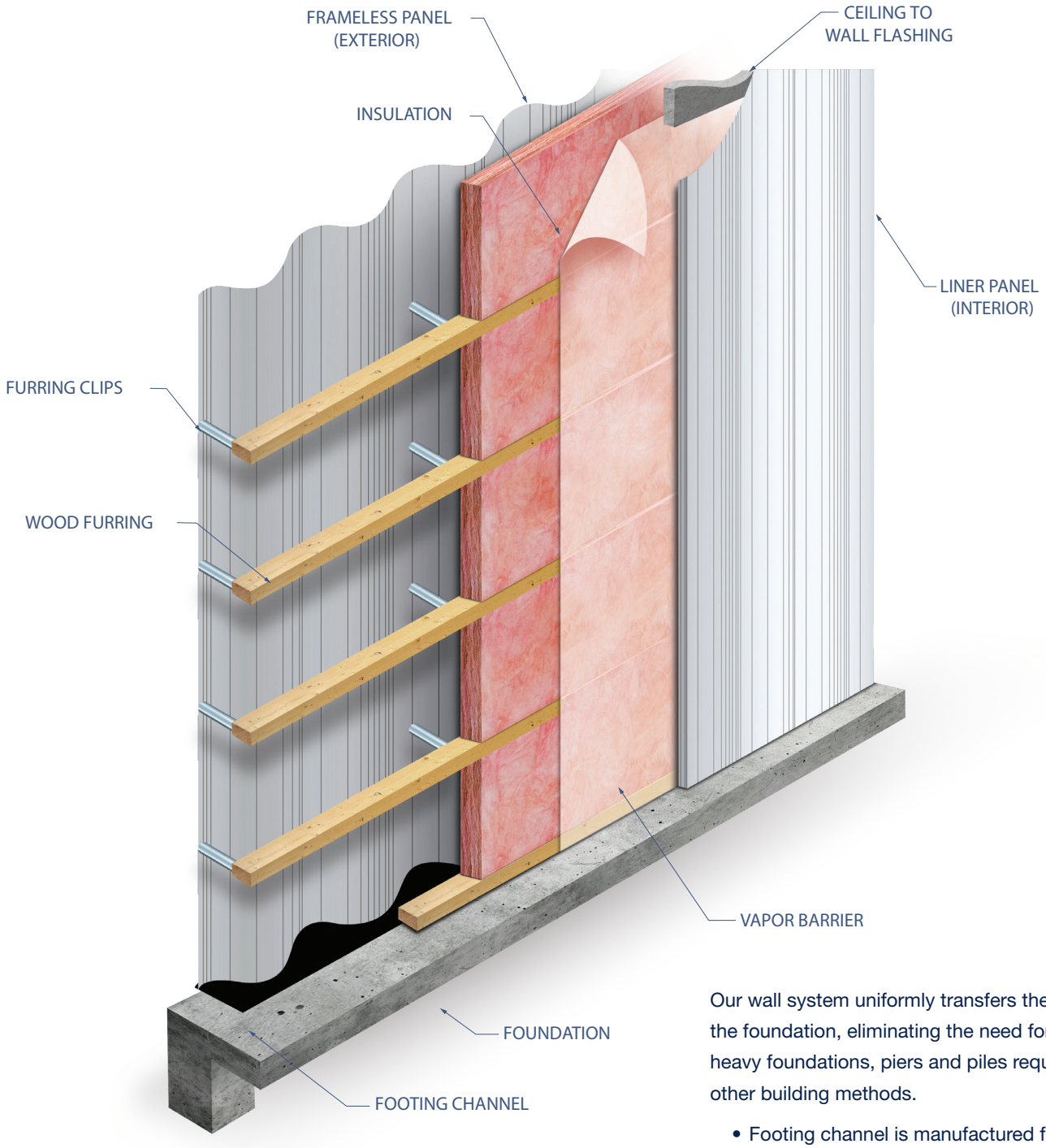
The entire building system is manufactured with heavy-gauge engineered steel panels, created using an exclusive roll form corrugation process that provides excellent structural integrity.

- 41" (1.04 m) wide panels are bolted together at 6" (152.4 mm) intervals on the seams with 3/8" (9.5 mm) plated or color matched bolts
- Wall and roof panels are manufactured from galvanized, galvalume or stainless steel, depending on requirements, and are available in a variety of colors in both 4 ½" (114.3 mm) and 7 ½" (190.5 mm) corrugation sizes
- No heavy lifting equipment is required, since there is no structural steel



PANEL DETAILS

WALL DETAILS



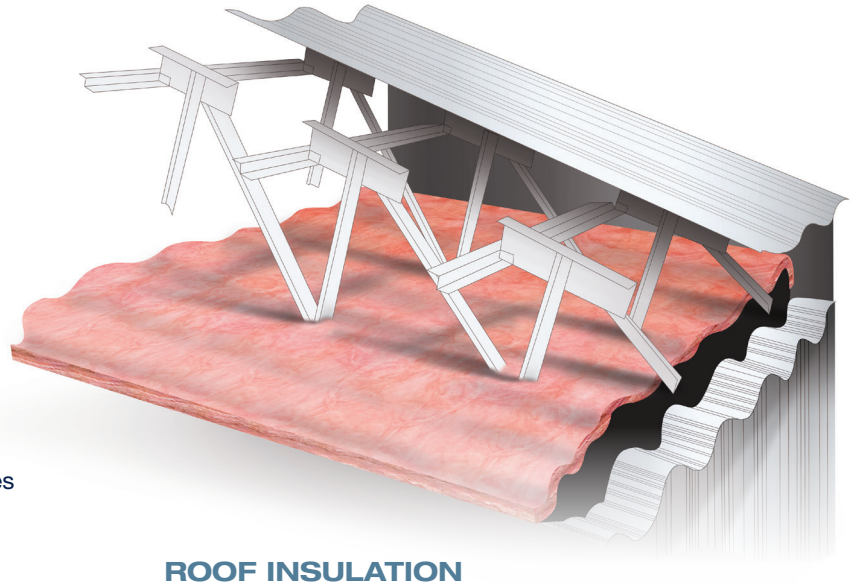
Our wall system uniformly transfers the load to the foundation, eliminating the need for expensive heavy foundations, piers and piles required with other building methods.

- Footing channel is manufactured from galvalume material, which eliminates the potential for corrosion
- System can incorporate windows, overhead doors, glass, wood, pre-cast masonry and cladding materials to provide creative design flexibility

ROOF AND CEILING SYSTEM

The FRAMELESS system can deliver lower energy costs because of its uniquely versatile roof system.

- Roof system consists of corrugated roof and ceiling panels, joined by a lightweight, bolt-together truss
- Roof system provides a ventilated attic that promotes lower energy costs and eliminates the potential for wet insulation caused by condensation or leaks in light-gauge roof cladding
- Air movement is supported by die-stamped louvers in end panels
- In more extreme environments, mechanical ventilation can be easily incorporated
- Attic cavity easily accommodates cost-effective blown-in insulation
- Sealer applied on ceiling panel seam lines creates a vapor barrier; on roof panel seam lines, sealer provides a weather tight system
- Cavity can also accommodate wiring and HVAC duct work and pipes
- Unlike with other construction methods, attic trusses can be designed for varying load by changing the gauges. This allows the roof system to accommodate heavy loading capacity roof equipment; there is no need to change the building's interior or exterior dimensions



ROOF INSULATION

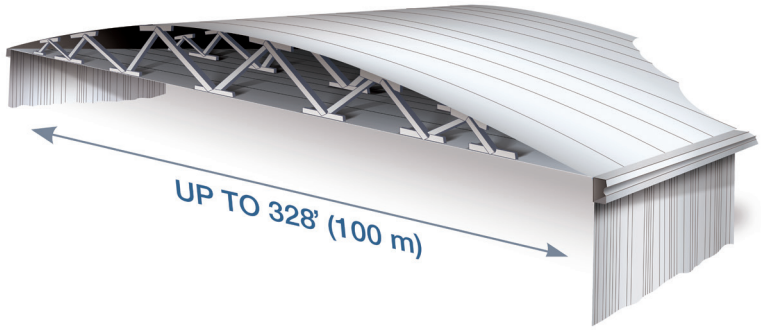
VENTILATED ATTIC

ROOF AND CEILING SYSTEM

CONVEX

This curved roof system provides clean, clear modern lines and offers up to 328’ (100 m) of obstruction-free interior space.

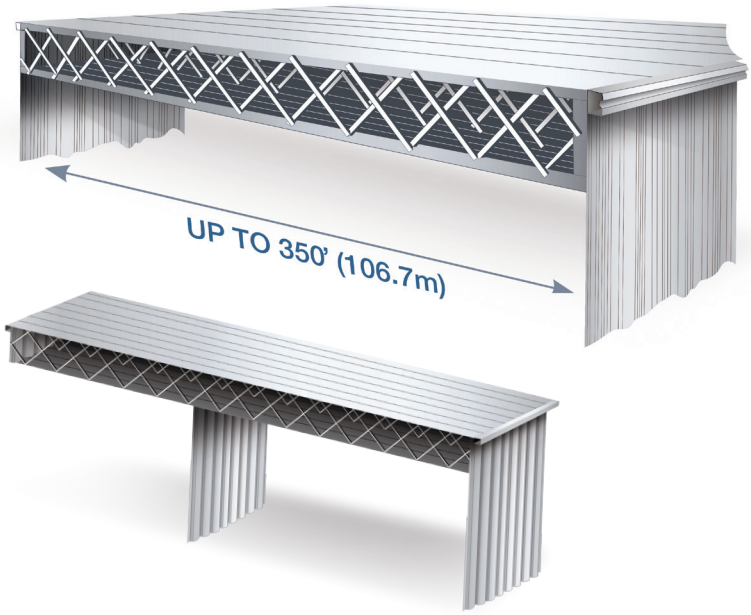
- Cost-effective design allows for low construction costs
- Energy-efficient attic
- Roof system can be designed and installed on other conventional load-bearing wall systems
- Roof can accommodate heavy roof equipment



DUBL-PANL AND DUBL-PANL CANTILEVER

Our flat-roof systems offer clear spans of up to 350’ (106.7 m), with the option of cantilevering up to half of the building’s width with no structural steel columns.

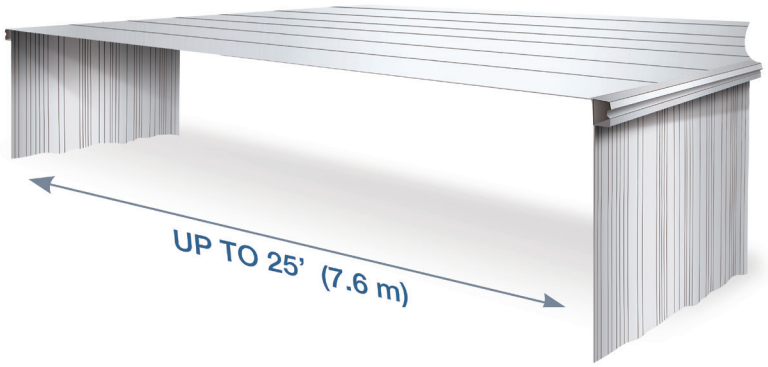
- Roof incorporates a slight slope to provide drainage
- Roof system can be designed and installed on other conventional load-bearing wall systems
- Roof system can accommodate HVAC and other roof equipment
- System can incorporate interior beams and columns to achieve greater building widths.



SINGLE PANEL

Our single-panel roof systems offer a low-cost option to span up to 25’ (7.6 m).

- Roof panel is supported by the FRAMELESS structural wall panel
- Can incorporate beams and columns to expand width of building



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INDEX

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SECTION 1
MASTER SPECIFICATION

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FRAMELESS BUILDING SYSTEM BY BEHLEN INDUSTRIES LP

The FRAMELESS building system is an all sheet steel system engineered to your specific design criteria. Modular in nature, FRAMELESS can be engineered to accomodate the loads and clearance needed for virtually any application.

Based upon the strength of steel and the stability of our exclusive compound corrugation profile FRAMELESS panels provide a complete building envelope without the use of intermediate columns. The result is a clear span capability of 300' or 91.4 metres.

Available in either a Convex, Single Panel or Dubl-Panl® (flat roof) models, FRAMELESS uses multiple struts and gussets to connect the ceiling panel to the roof creating a series of trusses which tie into, and bear upon the wall panels.

Loads are transferred through the structural wall panel and distributed uniformly along a simple perimeter foundation. Without concentrated point loads seen in other forms of steel construction, the complexity and cost of concrete foundations can be substantially reduced.

ROOF ONLY APPLICATIONS

The engineered FRAMELESS truss system can be easily combined with other load bearing wall systems such as masonry, cast concrete or a perimeter beam and column system.
The roof system is a rigid shear plate providing lateral support to the top of masonry wall.
The natural ceiling and ventilated attic space above provide a cost effective opportunity to build superior thermal efficiency into any building.

SUSTAINABLE CONSTRUCTION

The environment impact of construction is an increasingly important consideration in the design of any building. The steel industry has a long and enviable history of using recycled material. A FRAMELESS steel building system combines speed of construction with minimal concrete requirements and virtually no construction site waste. FRAMELESS is an adaptable structural system that can be designed to optimize the energy performance of HVAC systems. The result is a lesser environmental burden than other forms of construction.

We hope that this manual will provide members of the design community with sufficient data to acquaint themselves with the FRAMELESS building system by Behlen Industries LP, and be an aid in planning a structure utilizing the system to its fullest advantage.

CANADIAN SHEET STEEL BUILDING INSTITUTE

QUASAR ISO 9001

CWB

STEEL BUILDING SYSTEMS

PART 1 - GENERAL

SPEC NOTE: for 1.1 edit and list additional items from "Checklist of Items" in CSSBI 30M-06, Standard for Steel Building Systems.

1.1 Related Work

.1	Supply and setting of anchor bolts:	Section 03 [_____]
.2	Grouting:	Section 03 [_____]
.3	Concrete foundations, grade Beams & Floor Slabs:	Section 03 [_____]
.4	Structural Steel:	Section 05 [_____]
.5	Insulation:	Section 07 [_____]
.6	Doors:	Section 08 [_____]
.7	Windows:	Section 08 [_____]
.8	Door hardware	Section 08 [_____]
.9	Finish painting:	Section 09 [_____]

1.2 Reference Standards

.1 American Society for Testing and Materials (ASTM)

- .1 ASTM A653/653M, Steel Sheet, Zinc coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process, Structural (Physical) Quality
- .2 ASTM A792/792M, Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot Dip Process, General Requirements

.2 Canadian Sheet Steel Building Institute (CSSBI)

- .1 CSSBI 30M-06, Standard for Steel Building Systems
- .2 CSSBI S17-2005 Guide Specification for Steel Building Systems
- .3 CSSBI SSF 3, Care and Maintenance of Prefinished Sheet Steel Building Products

.3 Canadian Standards Association (CSA)

- .1 CSA S16-09, Limit States Design of Steel Structures
- .2 CSA S136-07, Cold Formed Steel Structural Members
- .3 CSA A660-10, Certification of manufacturers of Steel Building Systems
- .4 CSA W47.1-09, Certification of Companies for Fusion Welding of Steel Structures
- .5 W59-13, Welded Steel Construction (Metal Arc Welding)

1.3 System Description

.1 Type: Self-Framing [beam and column multi-span]
.2 Roof Slope: [Curved] Minimum [_____]
.3 Wall System: Lapped seam, single skin, corrugated panels.
.4 Roof System: Lapped seam, single skin, corrugated panels.
.5 Self-Framing Truss Type Roof System: Lapped seam [bow string truss] [parallel chord truss] type, consisting of corrugated roof and ceiling panels connected with diagonal web members.

1.4 Design Criteria

SPEC NOTE: Design to NBC or relevant codes, also conform to relevant CSSBI standards. Use 1.4.1 for every project, and edit following paragraphs to select optional criteria applicable for project conditions.

.1 Design steel building system to withstand dead loads and live loads including [ceiling], [sprinklers], [mechanical and electrical systems], [cranes], [material handling systems], [impact loads], as indicated.

.2 Maximum deflection:
.1 Roof cladding under full design load: [1/180] of clear span.
.2 Wall cladding under specified wind effects: [1/180] of clear span.

.3 Thermal resistance: minimum [_____] RSI for walls and minimum [_____] RSI for roof.

SPEC NOTE: for 1.4.3 insert minimum allowable RSI value.

.4 Design building walls and roof to allow for thermal movement of component materials caused by ambient temperature range of [_____] °C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

SPEC NOTE: For 1.4.4 insert expected temperature range for locality of building including allowance for skin temperature heat gain in sunlight on colored finish.

.5 Ensure total absence of condensation on interior surfaces under following minimum condition:
Interior: 22°C, 30% relative humidity (RH), still air.
Exterior: minus 23°C, 25 km/h wind.

.6 Building shall be weathertight.

.7 Design building enclosure elements to accommodate, by means of expansion joints, any movement in element itself and between element and building structure caused by structural movements without permanent distortion, damage to infills, racking of joints, breakage of seals, water penetration or glass breakage.

1.5 Quality Assurance

.1 Submit documentation that steel building systems manufacturer is certified to CSA A660.

1.6 Shop Drawings

SPEC NOTE: For 1.6 edit following paragraphs to select optional criteria applicable for project conditions.

.1 Submit shop drawings in accordance with Section 01 [_____] and bearing stamp and signature of a professional engineer registered in the [Province of _____].

.2 Submit the following drawings in accordance with CSSBI 30M-95:
- .1 Erection drawings, foundation loads and anchor bolt setting plans, connection and assembly details.

.3 Indicate plans and grid lines, structural membranes and connection details, bearing and anchorage details, framed openings, accessories, schedule of welds, sealant locations and details.

.4 Indicate on shop and erection details including cuts, copes, connections, holes, treaded fasteners, rivets and welds. Indicate welds by CSA welding symbols.

.5 Indicate on shop drawings related provisions required for mechanical, electrical, and other work.

1.7 Certification

.1 Submit following documents in accordance with CSSBI 30M-06

- .1 Certification that building is in accordance with contract requirements.
- .2 A structural analysis certification of building system.
- .3 Standard CSSBI Certificate of Design and Manufacturing Conformance bearing the stamp and signature of a professional engineer registered in the [Province of _____]

1.8 Protection

.1 Protect prefinished steel sheet during fabrication, transportation, site storage and installation in accordance with CSSBI Sheet Steel Facts #3.

.2 Handle and protect galvanized and galvalume materials from damage to coating. During storage, space surfaces of materials to permit free circulation of air.

PART 2 - PRODUCTS

2.1 Materials

.1 Structural steel: to CSA G40.20/G40.21, [shop primed] [hot dipped zinc coated to CSA G164 to [_____] g/m2] [unprotected].

.2 Bolts: to [ASTM A325] [ASTM A490] complete with nuts and washers.

.3 Welding materials: to CSA W59

.4 Shop primer paint: to CGSB 1-GP-40M.

.5 Spot primer for galvanized surfaces: to CGSB 1-GP-178Ma.

.6 Steel sheet, zinc-coated: to ASTM A653, structural quality, grade [275 MPa min] with [Z275 coating] [ZF001-ZF75 Satin Coat]

.7 Steel Sheet, aluminum-zinc coated: to ASTM A792, structural quality, grade [275 MPa min] with [AZ165] coating

.8 Paint system for sheet steel exposed to [Exterior] & [Interior].
[Pre-coat 8000 + series].
[Factory applied polyester coating in accordance with manufacturer's standard procedures]. [Factory electrostatic-applied polyester powder coating in accordance with manufacturer's standard procedures]. Minimum dry film thickness 38 microns. Colour [_____] [as indicted] [as selected by Engineer] [Consultant] from manufacturer's standard color range.

.9 Fasteners:

.1 Roof Panels: 10 mm diameter x 20mm long, SAE Grade 2, Indented [Hex] or [Truss Phillips] undercut washer head bolt, DT1500 plating system, c/w flanged nut and polyethylene washer.

.2 Ceiling Panels: 10mm diameter x 20mm long, SAE Grade 2, Indented [Hex]
[Truss Phillips] undercut washer head bolt, DT1500 plating system, c/w flanged nut and polyethylene washer.

.3 Wall Panels: 10mm diameter x 20mm long, SAE Grade 2, Indented [Hex] [Truss Phillips] undercut washer head bolt, DT1500 plating system, c/w flanged nut and polyethylene washer.

.4 Strut, Gusset connections - bow string truss: 12 mm diameter x 38 mm long, SAE Grade 8.2 hex head bolt, c/w serrated flanged nut.

.5 Strut, Gusset connections - parallel chord truss: 10 mm diameter x 20 mm long SAE Grade 2 bolt [as above]

.10 Thermal break and sealing tape: as recommended by steel building systems manufacturer.

.11 Sealant tape: 100% solids, polyisobutylene and butyl composition, Guertin Bros. GT1085 or approved substitution.

.12 Sealants: as recommended by both sealant and steel building systems manufacturers for intended uses. Ensure compatibility of sealants and primers proposed for use with materials they are to contact, including adhesive suitability, and freedom from staining and corrosiveness.

2.2 Fabrication

.1 Fabricate structural members in accordance with shop drawings and to CSA S16-09. Tolerance not to exceed those specified in CSSBI 30M-95.

.2 Provide holes for attachment of other work, as indicated.

.3 Reinforce openings to maintain design strength.

2.3 Shop Painting

.1 Clean, prepare surfaces and shop prime structural steel to CSA S16-09 [except where members are zinc or aluminum-zinc alloy coated, or are to be encased in concrete].

2.4 Wall System Components

SPEC NOTE: for 2.4.1 consult with steel building systems manufacturer and ensure that metal thickness required to meet design criteria will be acceptable from physical damage point of view. If necessary to upgrade specify "minimum [_____] mm base metal thickness" after word "sheet" in second line of 2.4.1

.1 Exterior sheet-wall: factory preformed steel sheet, [aluminum-zinc alloy coated] [zinc-coated] [pre-finished] [unpainted] from manufacturer's standard profiles. Include closures, gaskets, caulking, flashing and fasteners to effect weathertight installation. Cut ends of sheets square and clean.

.2 Exterior corners-wall: of material to match finish [and profile] of adjacent cladding material, shop cut and brake formed to correct angle.

.3 Accessories to exterior wall cladding, brake or bend to shape of material and finish to match wall cladding, comprising [cap flashings] [drip flashings] [internal corner flashings] [copings and closures for [head] [jamb] [sill] corners].

2.5 Roof System Components

SPEC NOTE: for 2.5.1 consult with steel building systems manufacturer and ensure that metal thickness required to meet design criteria will be acceptable from physical damage point of view. If necessary to upgrade specify "minimum [_____] mm base metal thickness" after word "sheet" in second line of 2.5.1.

.1 Exterior sheet-roof: factory preformed steel sheet minimum [_____] mm base metal thickness, [aluminum- zinc alloy coated] [zinc coated] [pre-finished] [unpainted] from manufacturer's standard profiles. Include closures, gaskets, caulking, flashing and fasteners to effect weathertight installation. Cut ends of sheets square and clean.

.2 Accessories to roof cladding: brake or bend to shape, of material and finish to match roof cladding or wall cladding where applicable, comprising [cap flashings] [drip flashings] [coping and closures for [corners] [fascia] soffit].

SPEC NOTE: include 2.5.3 to 2.5.5 only if 1.5.5 is specified.

.3 Interior sheet-ceiling: factory preformed steel sheet minimum [_____] mm base metal thickness, [aluminum-zinc alloy coated] [zinc coated] [pre-finished] of manufacturer's standard profile [indicated], with male and female side lap. [Install sealant material in female lap, where liner sheet is to be used as a vapour barrier]. Cut ends of sheets square and clean.

.4 Diagonal web members: factory preformed steel sheet, minimum [_____] mm base thickness, [zinc coated] shop cut and formed to profile [indicated] from manufacturer's standard.

.5 Gussets, lateral spacers: factory preformed steel sheet, minimum [_____] mm base metal thickness, [zinc coated] shop cut and formed to profile [indicated] from manufacturer's standard.

PART 3 - EXECUTION

3.1 Erection

.1 Erect structural frame in accordance with shop drawings and to [CSA S16-09]. Erection tolerances not to exceed those specified in CSSBI 30M-06.

.2 Prepare galvanized structural steel surfaces for field welding by removing zinc before welding. After welding, chip away flux and prime with spot primer.

.3 Obtain written permission of [Engineer] [Consultant] prior to field cutting or altering of structural members.

.4 Touch up with shop primer, bolts, rivets, welds and burned or scratched surfaces where exposed at completion of erection.

3.1 Wall Panels

.1 Install wall panel assemblies ensuring a completed weather-tight installation.

3.2 Roof Assembly

.1 Secure sheets to [structural beams] [and] [wall panels] [and] [truss assemblies].

.2 Secure side laps.

.3 Continually seal side and end laps.

.4 Install roof assemblies ensuring a completed installation.

.5 Install ceiling panels ensuring a continuous [vapour] [air] [dustproof] barrier by pre-caulking joints.

.6 Install all necessary closures, gaskets, caulking sealants and flashings.

3.3 Thermal Insulation

.1 Install insulation and vapour retarder to maintain continuity of thermal and moisture protection to building elements and spaces.

.2 Fit insulation closely around and behind electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 For roof system, apply insulation in ceiling to form continuous thermal barrier in conjunction with vapour barrier formed by ceiling panels.

.4 For roof system, ensure continuous [vapour] [air] [dust-proof] barrier seal by pre-caulking joints of ceiling panel.

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SECTION 2
FRAMELESS STANDARD COLOUR CHART

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COLOUR AVAILABILITY CHART

STANDARD COLOURS	
FRAMELESS STANDARD COLOURS:	
BONE WHITE	QC18273
BRONZE	QC18406
CHARCOAL	QC18306
DARK RED	QC18250
HERON BLUE	QC18330
MELCHERS GREEN	QC18307
POLAR WHITE	QC18008
STONE GREY	QC18305
TAN	QC18315
GALVANIZED	
GALVALUME PLUS	

BEHLEN RESERVES THE RIGHT TO CHANGE COLOUR AVAILABILITY WITHOUT NOTICE

EFFECTIVE DATE: MAY 2014

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SECTION 3
FRAMELESS BUILDING SYSTEM

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FRAMELESS Building Systems
Glossary of Terms

Anchor Bolts – Bolts used to anchor base channel to the foundation (not supplied by Behlen Industries LP).

Ceiling Connector – Structural member connecting ceiling and end wall panel.

Ceiling Jack – Structural curb in the ceiling.

Ceiling Panel– Bottom chord of truss - 4 1/2" corrugated profile (CS45) only.

Corner Footing Channel – Connection plate at building corners and foundation.

Corner Ceiling Connector – Connection member between ceiling panel and wall panel at building corners.

Convex – Building system incorporating trusses with a horizontal bottom chord and radiused top chord.

Corrugated Panel – Structural panel roll formed with either 4 1/2" (CS45) or 7 1/2" (CS75) deep corrugations.

Concrete Curb Height – Difference in height between the finished floor elevation and the underside of base channel.

Dubl Panl® – Building system incorporating trusses with parallel bottom and top chords with a slope of 1 : 82 on the end wall.

Downspout - A conduit used to drain water from the gutter of a building.

Eave Trim – Flashing with gutter profile used to cover the end of the roof panel edge at the eave.

End wall – Non load bearing 4 1/2" (CS45) or 7 1/2" (CS75) corrugated wall panel.

End wall Ceiling to Wall Flashing (C.W.F.) – Flashing from the ceiling panel to the liner panel at the endwall.

Exterior Closure – Corrugated flashing for exterior walls panels.

Footing Channel (inside and outside) – Connection plates between wall panel and foundation.

Furring Clip – Spacer clip between the corrugated wall panel and the liner panel, used with furring strips to build the insulation cavity.

Furring Strip – Horizontal wood or like member (not supplied by Behlen Industries LP) attached to the furring clips for installation of the liner panel.

Gable Trim – Flashing between the end wall and roof panel at the gable.

Gusset (Upper & Lower) – Connection plate between roof/ceiling panels and struts.

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Gutter – A trough located at the eave, designed to carry water from the roof to downspouts or drains.

Gutter Splice Plate – Connection plate between two adjacent gutters.

Hanger Straps – Strap used to fasten the gutter to the roof panel.

Ice Channel – Member fastened to roof panel near the eave to prevent ice from sliding off the roof (not supplied by Behlen Industries LP).

Inner Vertical – Used for non standard framed openings.

Lateral Spacer – member between gussets of adjacent trusses.

Louver Covers – Trim to cover louvering in corrugated panels.

Louvered Panels – Corrugated panels with stamped louvering.

Precoat – Painted finish applied to coiled steel before roll forming process.

Post-Painted – Painted finish applied after the roll forming process.

Roof Angle - Structural member used to connect roof panel to end wall panel.

Roof Jack – Structural curb in the roof.

Roof Panel – Top chord of truss in a Dubl-Panl® or Convex - 4 1/2" corrugated profile (CS45) only. Structural roof panel in a Single Panel - 4 1/2" corrugated profile (CS45) or 7 1/2" corrugated profile (CS75).

Roof Support – Channel located at the interior bearing locations of the roof panel in a single panel building.

Rough Opening – Inside dimension of a structural framed opening.

Saddle Brackets – Gutter supports.

Sidewall – Load bearing CS45 (4 ½") or CS75 (7 ½") corrugated wall panel.

Sidewall Ceiling to Wall Flashing (C.W.F.) – Corrugated closure flashing from the ceiling panel to the liner panel at the sidewall.

Single Panel – Building system incorporating structural roof panels designed to span from support to support with a slope of 1 : 82 on the end wall.

Strut – Web member between roof panel and ceiling panel.

Truss - Combination of roof panel, ceiling panel and struts.

Uplift Vertical – Channel or HSS member at location of overturning reactions.

Vertical – Door or window rough opening jamb.

Wall Gusset – Connection plate between wall panel and struts in a Dubl-Panl® building.

Wall Jack – Structural curb in the wall.

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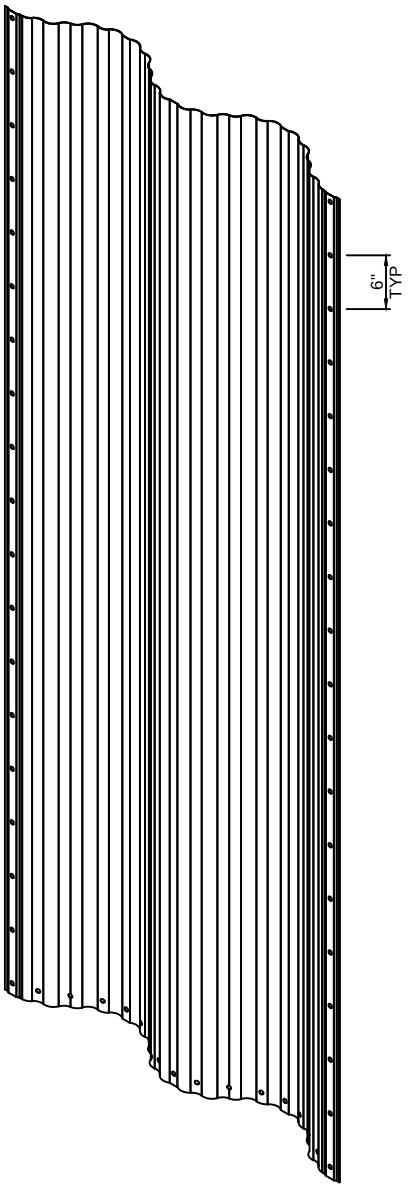
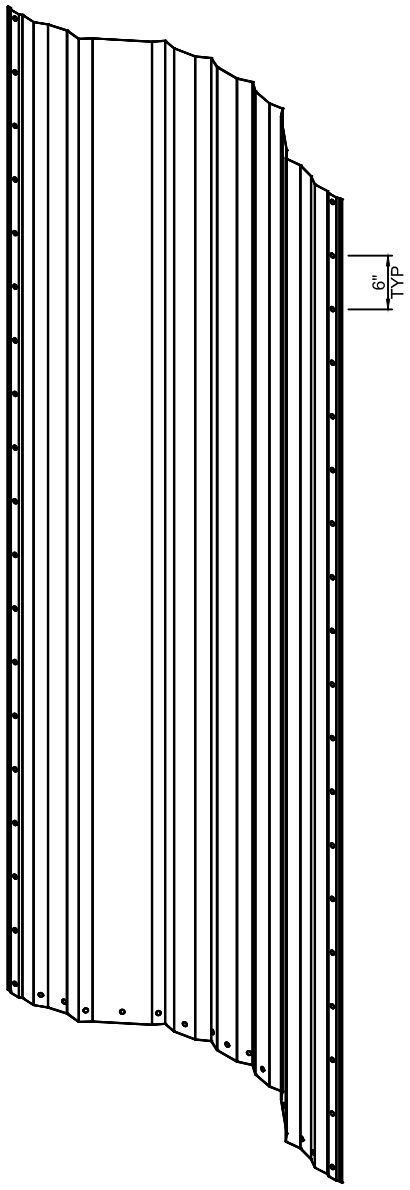
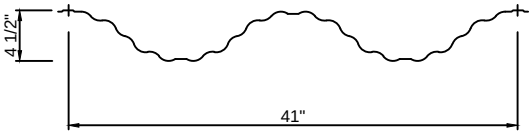
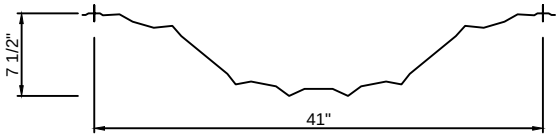






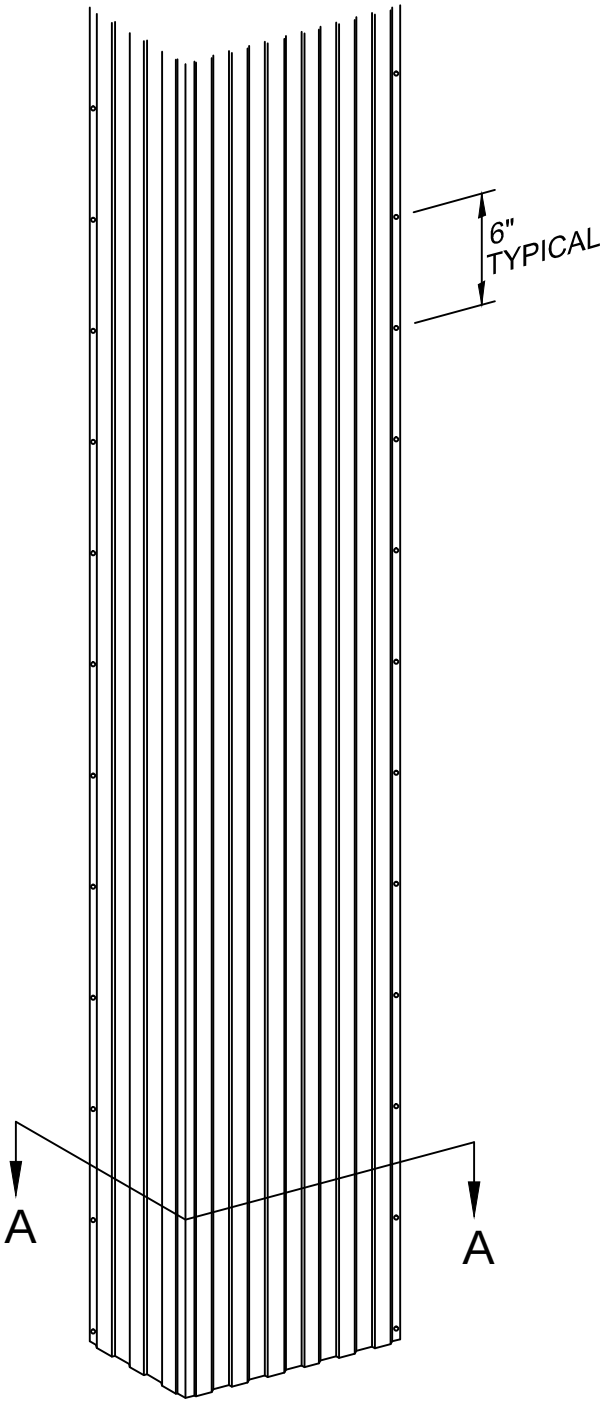
CS45 PANEL



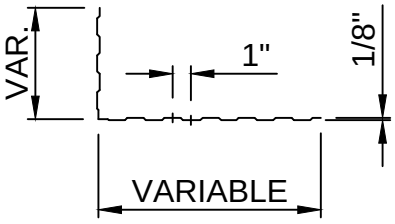
CS75 PANEL

PANEL PROFILES	MAY 2014 Vr 1.1	
FRAMELESS BUILDING SYSTEM	Section: 3	Page: 004

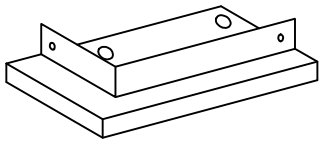
BEHLEN
Made Strong



CORNER PANEL



SECTION AA



CORNER FOOTING CHANNEL

CORNER PANEL AND FOOTING CHANNEL

MAY 2014 Vr 1.1

FRAMELESS BUILDING SYSTEM

Section: 3

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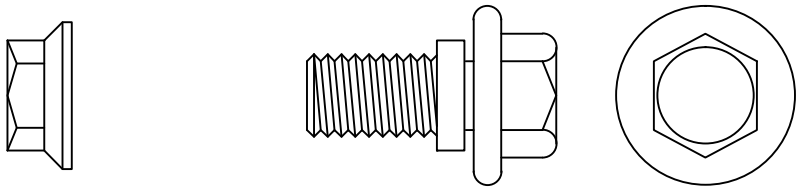
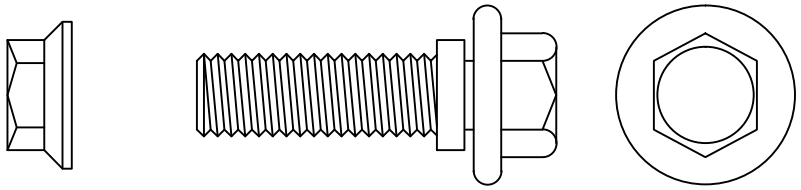
BEHLEN
Made Strong

NUTS BOLTS SEALER



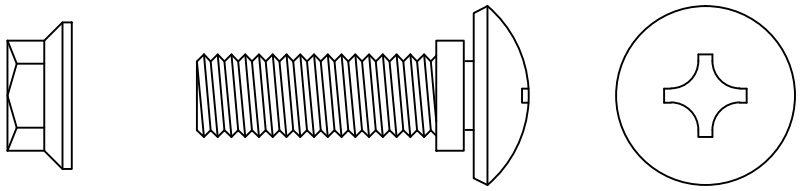
HEX BOLT KIT
WITH WASHER & NUT

3/8" [9.5] NC x 3/4" [19.1]:
999870 - 750 BOLT KIT
999805 - 500 BOLT KIT



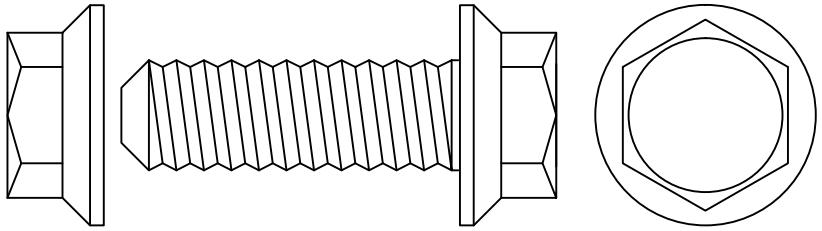
HEX BOLT KIT
WITH WASHER & NUT

3/8" [9.5] NC x 1 1/4" [31.8]:
999873 - 750 BOLT KIT
999812 - 500 BOLT KIT



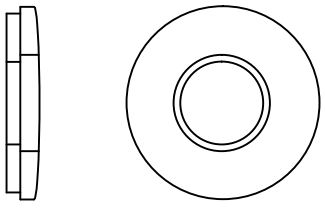
PHILLIPS BOLT KIT
WITH WASHER & NUT

3/8" [9.5] NC x 1 1/4" [31.8]:
999875 - 750 BOLT KIT
999816 - 500 BOLT KIT



BOLT
1/2" [12.7] NC x 1 1/2" [38.1]
3188037

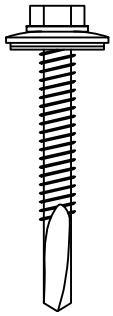
NUT
1/2" [12.7] NC
2688014



WEATHER SEAL WASHER
3/8" [9.5] I.D. x 1" [25.4] O.D.
3948057

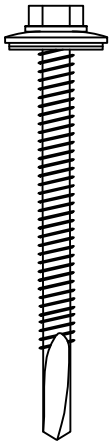
BEHLEN
Made Strong

SCREWS AND FASTENERS



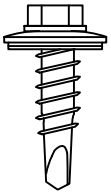
SELF DRILLING SCREW 1" (12-14)
c/w SEALING WASHER

USE: FASTENING PANELS AND CLIPS TO FRAMING
DRILL/TAP CAP: 0.25" - 0.50"



SELF DRILLING SCREW 1 1/2"
c/w SEALING WASHER

USE: FASTENING PANELS AND CLIPS TO FRAMING
DRILL/TAP CAP: 0.25" - 0.50"



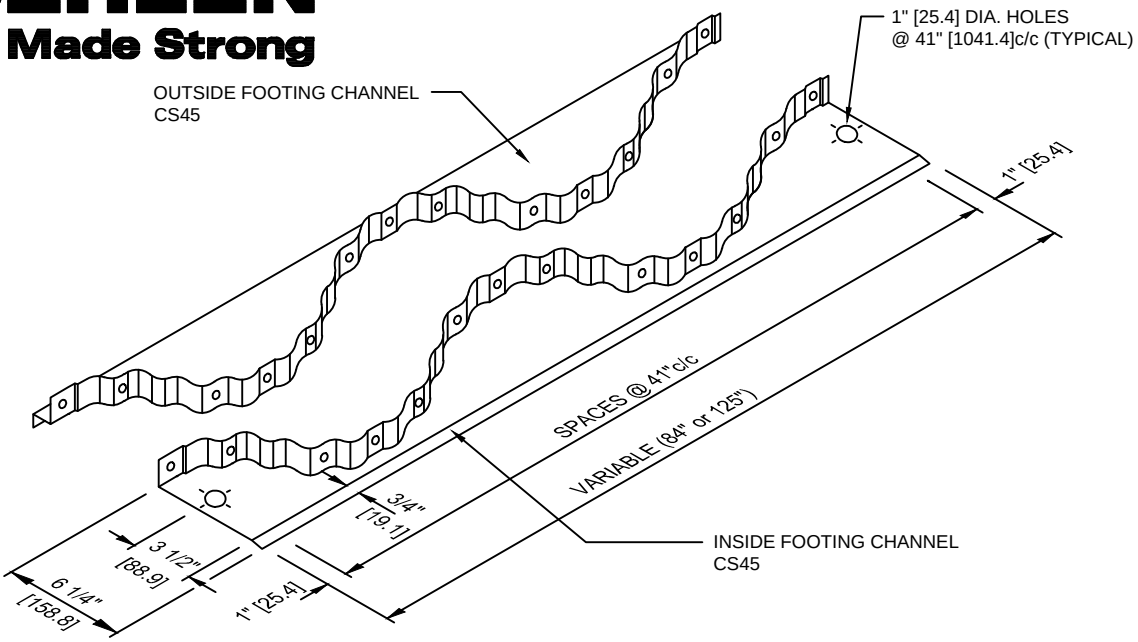
STITCH SCREW 3/4" (14-1/4)
c/w SEALING WASHER

USE: FASTENING PANELS AND TRIMS
DRILL/TAP CAP: 0.03" - 0.095"

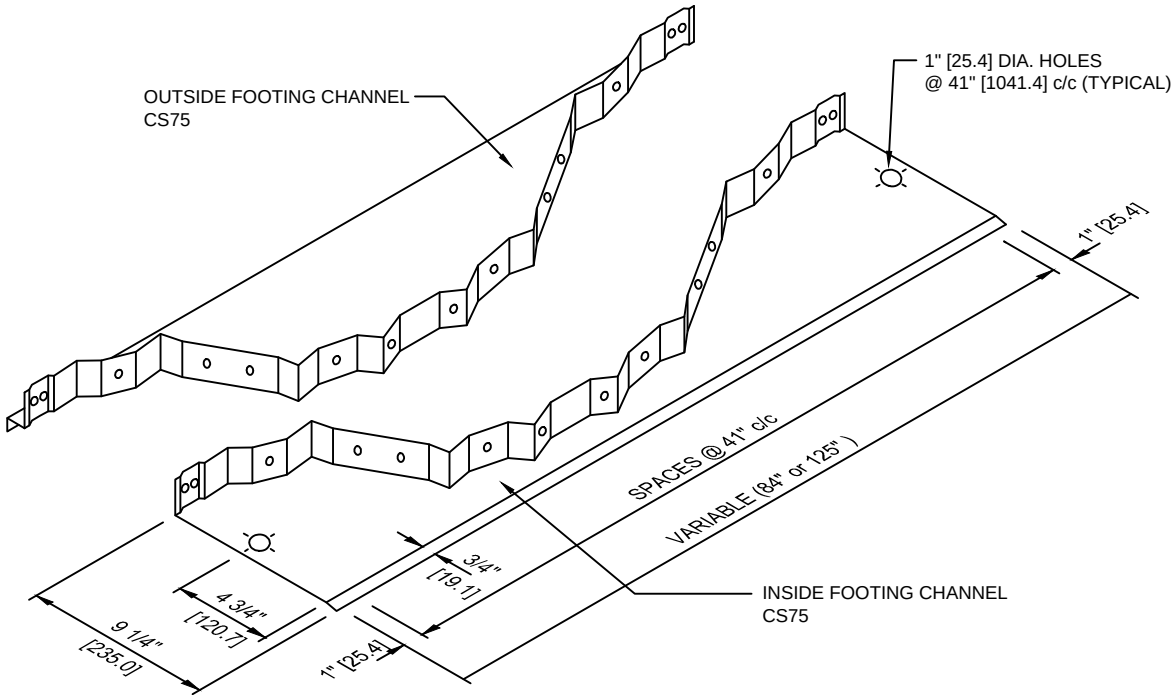
WOOD SCREW 1 1/2"
c/w SEALING WASHER

USE: PANEL TO WOOD FRAMING
DRILL CAPACITY: UP TO LENGTH OF SCREW

BEHLEN
Made Strong



FOOTING CHANNEL - CS45

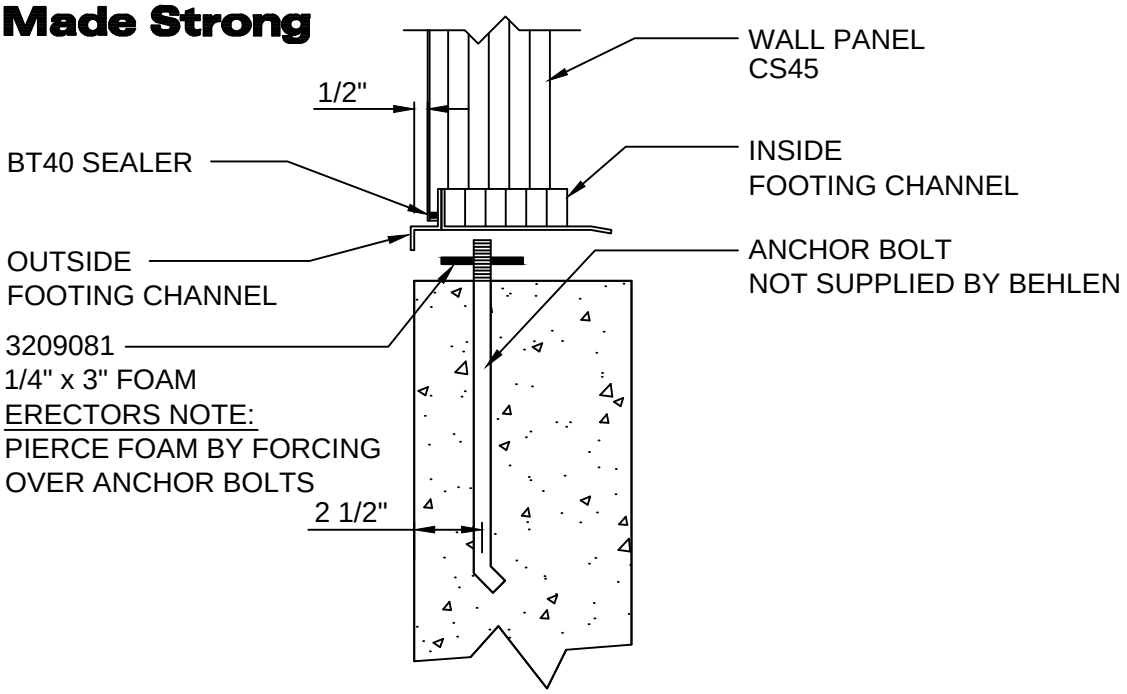


FOOTING CHANNEL - CS75

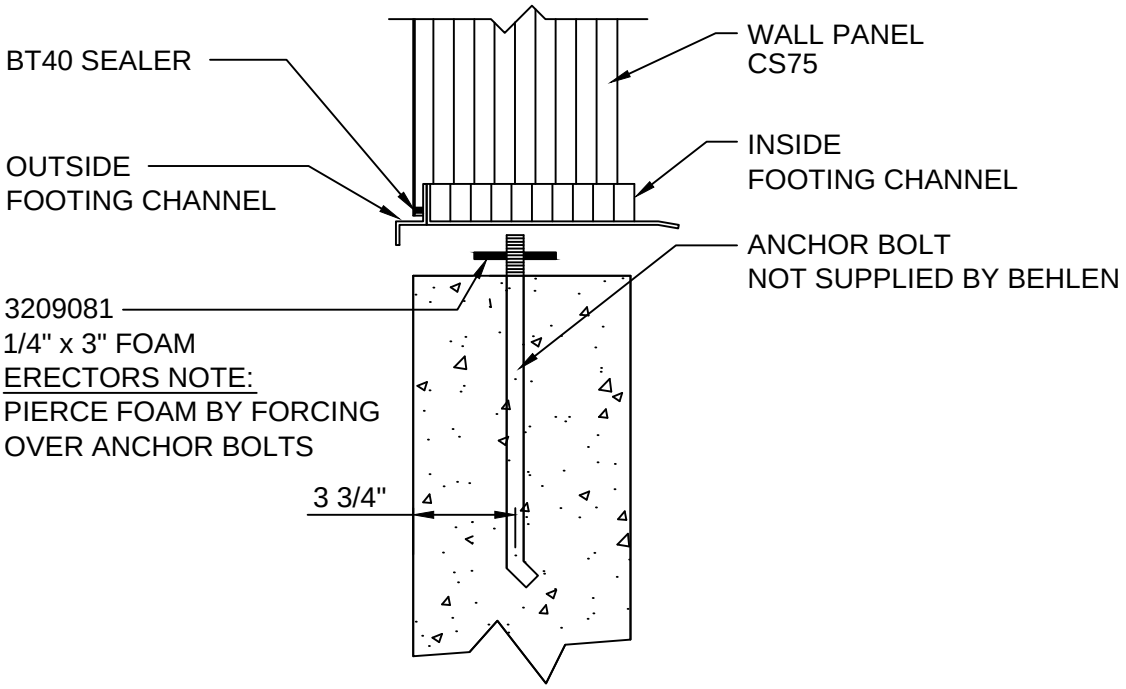
AVAILABLE IN 2 AND 3 PANEL LENGTHS.

FOOTING CHANNEL	MAY 2014 Vr 1.1	
FRAMELESS BUILDING SYSTEM	Section: 3	Page: 008

BEHLEN
Made Strong



FOOTING CHANNEL DETAIL - CS45



FOOTING CHANNEL DETAIL - CS75

FOOTING CHANNEL DETAILS	MAY 2014 Vr 1.1	
FRAMELESS BUILDING SYSTEM	Section: 3	Page: 009

BEHLEN
Made Strong

BUILDING LENGTH CALCULATION

The steps to calculate the overall building length (out to out steel and out to out concrete) are as follows:

Assume that the overall length has been determined to be approximately 102 feet.

Using a CS45 wall panel:

1. Using the CS45 Building Length Chart, follow the panel increment column to the closest number greater than 102.

2. From the chart, 30 panels are required and the length is 102'-6" (30 panels x 3'-5")

3. The overall building length (out to out steel) is 103'-5" (102'-6" + 5 1/2" LH Corner + 5 1/2" RH Corner)

4. The overall out to out concrete dimension is 103'-6" (102'-6" + 6" LH Corner + 6" RH Corner)

Using a CS75 wall panel:

1. Using the CS75 Building Length Chart, follow the panel increment column to the closest number greater than 102.

2. From the chart, 30 panels are required and the length is 102'-6" (30 panels x 3'-5")

3. The overall building length in steel and concrete is 103'-11" (102'-6" + 8 1/2" LH Corner + 8 1/2" RH Corner)

BEHLEN
Made Strong

CORNER DIMENSION	
CONCRETE	6"
STEEL	5 1/2"

OVERALL BUILDING LENGTH							
No. of Panels	Panel Increment	Total Length Steel	Total Length Concrete	No. of Panels	Panel Increment	Total Length Steel	Total Length Concrete
1	3'-5"	4'-4"	4'-5"	38	129'-10"	130'-9"	130'-10"
2	6'-10"	7'-9"	7'-10"	39	133'-3"	134'-2"	134'-3"
3	10'-3"	11'-2"	11'-3"	40	136'-8"	137'-7"	137'-8"
4	13'-8"	14'-7"	14'-8"	41	140'-1"	141'-0"	141'-1"
5	17'-1"	18'-0"	18'-1"	42	143'-6"	144'-5"	144'-6"
6	20'-6"	21'-5"	21'-6"	43	146'-11"	147'-10"	147'-11"
7	23'-11"	24'-10"	24'-11"	44	150'-4"	151'-3"	151'-4"
8	27'-4"	28'-3"	28'-4"	45	153'-9"	154'-8"	154'-9"
9	30'-9"	31'-8"	31'-9"	46	157'-2"	158'-1"	158'-2"
10	34'-2"	35'-1"	35'-2"	47	160'-7"	161'-6"	161'-7"
11	37'-7"	38'-6"	38'-7"	48	164'-0"	164'-11"	165'-0"
12	41'-0"	41'-11"	42'-0"	49	167'-5"	168'-4"	168'-5"
13	44'-5"	45'-4"	45'-5"	50	170'-10"	171'-9"	171'-10"
14	47'-10"	48'-9"	48'-10"	51	174'-3"	175'-2"	175'-3"
15	51'-3"	52'-2"	52'-3"	52	177'-8"	178'-7"	178'-8"
16	54'-8"	55'-7"	55'-8"	53	181'-1"	182'-0"	182'-1"
17	58'-1"	59'-0"	59'-1"	54	184'-6"	185'-5"	185'-6"
18	61'-6"	62'-5"	62'-6"	55	187'-11"	188'-10"	188'-11"
19	64'-11"	65'-10"	65'-11"	56	191'-4"	192'-3"	192'-4"
20	68'-4"	69'-3"	69'-4"	57	194'-9"	195'-8"	195'-9"
21	71'-9"	72'-8"	72'-9"	58	198'-2"	199'-1"	199'-2"
22	75'-2"	76'-1"	76'-2"	59	201'-7"	202'-6"	202'-7"
23	78'-7"	79'-6"	79'-7"	60	205'-0"	205'-11"	206'-0"
24	82'-0"	82'-11"	83'-0"	61	208'-5"	209'-4"	209'-5"
25	85'-5"	86'-4"	86'-5"	62	211'-10"	212'-9"	212'-10"
26	88'-10"	89'-9"	89'-10"	63	215'-3"	216'-2"	216'-3"
27	92'-3"	93'-2"	93'-3"	64	218'-8"	219'-7"	219'-8"
28	95'-8"	96'-7"	96'-8"	65	222'-1"	223'-0"	223'-1"
29	99'-1"	100'-0"	100'-1"	66	225'-6"	226'-5"	226'-6"
30	102'-6"	103'-5"	103'-6"	67	228'-11"	229'-10"	229'-11"
31	105'-11"	106'-10"	106'-11"	68	232'-4"	233'-3"	233'-4"
32	109'-4"	110'-3"	110'-4"	69	235'-9"	236'-8"	236'-9"
33	112'-9"	113'-8"	113'-9"	70	239'-2"	240'-1"	240'-2"
34	116'-2"	117'-1"	117'-2"	71	242'-7"	243'-6"	243'-7"
35	119'-7"	120'-6"	120'-7"	72	246'-0"	246'-11"	247'-0"
36	123'-0"	123'-11"	124'-0"	73	249'-5"	250'-4"	250'-5"
37	126'-5"	127'-4"	127'-5"	74	252'-10"	253'-9"	253'-10"

BUILDING LENGTH CHART - CS45

MAY 2014 Vr 1.1

FRAMELESS BUILDING SYSTEM

BEHLEN
Made Strong

CORNER DIMENSION: 8 1/2"

OVERALL BUILDING LENGTH

No. of Panels	Panel Increment	Total Length in Steel & Concrete	No. of Panels	Panel Increment	Total Length in Steel & Concrete
1	3'-5"	4'-10"	38	129'-10"	131'-3"
2	6'-10"	8'-3"	39	133'-3"	134'-8"
3	10'-3"	11'-8"	40	136'-8"	138'-1"
4	13'-8"	15'-1"	41	140'-1"	141'-6"
5	17'-1"	18'-6"	42	143'-6"	144'-11"
6	20'-6"	21'-11"	43	146'-11"	148'-4"
7	23'-11"	25'-4"	44	150'-4"	151'-9"
8	27'-4"	28'-9"	45	153'-9"	155'-2"
9	30'-9"	32'-2"	46	157'-2"	158'-7"
10	34'-2"	35'-7"	47	160'-7"	162'-0"
11	37'-7"	39'-0"	48	164'-0"	165'-5"
12	41'-0"	42'-5"	49	167'-5"	168'-10"
13	44'-5"	45'-10"	50	170'-10"	172'-3"
14	47'-10"	49'-3"	51	174'-3"	175'-8"
15	51'-3"	52'-8"	52	177'-8"	179'-1"
16	54'-8"	56'-1"	53	181'-1"	182'-6"
17	58'-1"	59'-6"	54	184'-6"	185'-11"
18	61'-6"	62'-11"	55	187'-11"	189'-4"
19	64'-11"	66'-4"	56	191'-4"	192'-9"
20	68'-4"	69'-9"	57	194'-9"	196'-2"
21	71'-9"	73'-2"	58	198'-2"	199'-7"
22	75'-2"	76'-7"	59	201'-7"	203'-0"
23	78'-7"	80'-0"	60	205'-0"	206'-5"
24	82'-0"	83'-5"	61	208'-5"	209'-10"
25	85'-5"	86'-10"	62	211'-10"	213'-3"
26	88'-10"	90'-3"	63	215'-3"	216'-8"
27	92'-3"	93'-8"	64	218'-8"	220'-1"
28	95'-8"	97'-1"	65	222'-1"	223'-6"
29	99'-1"	100'-6"	66	225'-6"	226'-11"
30	102'-6"	103'-11"	67	228'-11"	230'-4"
31	105'-11"	107'-4"	68	232'-4"	233'-9"
32	109'-4"	110'-9"	69	235'-9"	237'-2"
33	112'-9"	114'-2"	70	239'-2"	240'-7"
34	116'-2"	117'-7"	71	242'-7"	244'-0"
35	119'-7"	121'-0"	72	246'-0"	247'-5"
36	123'-0"	124'-5"	73	249'-5"	250'-10"
37	126'-5"	127'-10"	74	252'-10"	254'-3"

BUILDING LENGTH CHART - CS75

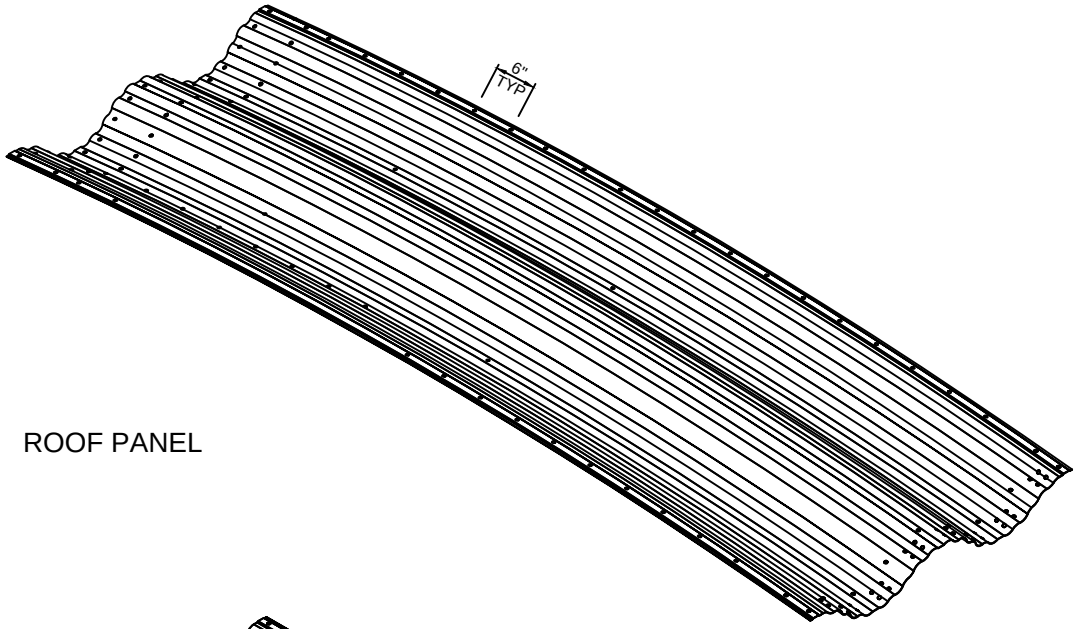
MAY 2014 Vr 1.1

FRAMELESS BUILDING SYSTEM

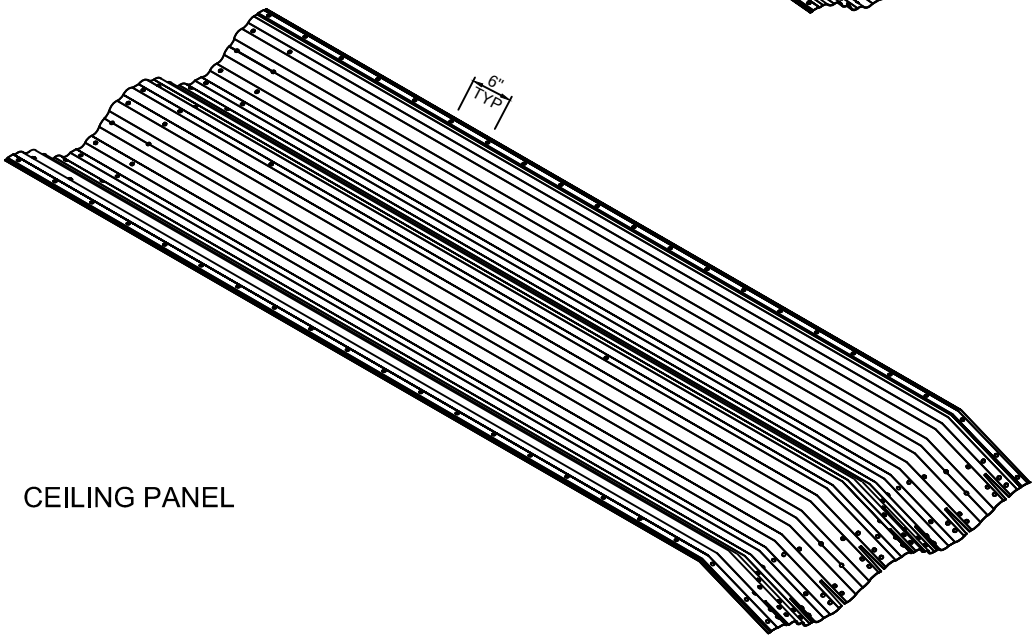
BEHLEN
Made Strong

SECTION 4
CONVEX MODEL

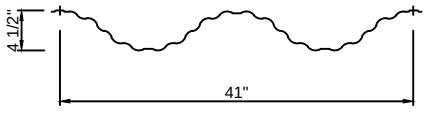
BEHLEN
Made Strong



ROOF PANEL



CEILING PANEL



CS45 PANEL

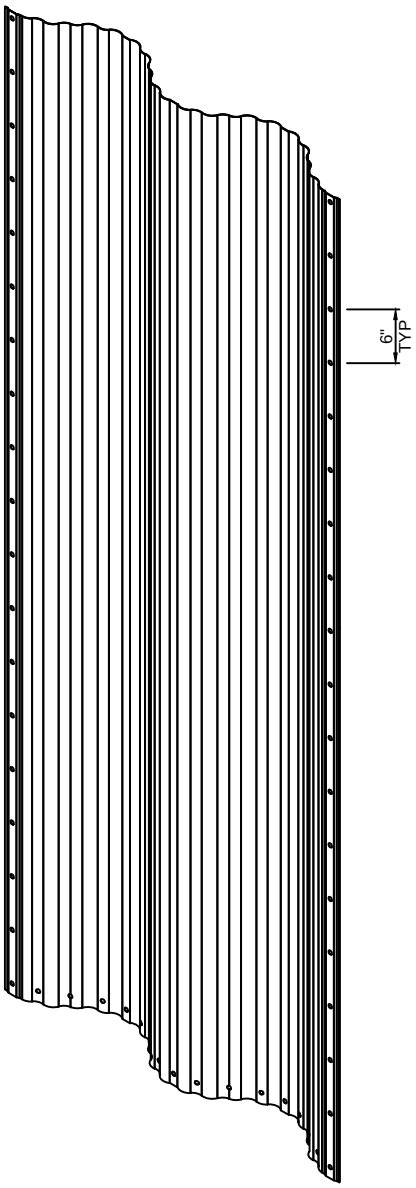
ROOF AND CEILING PANEL PROFILES

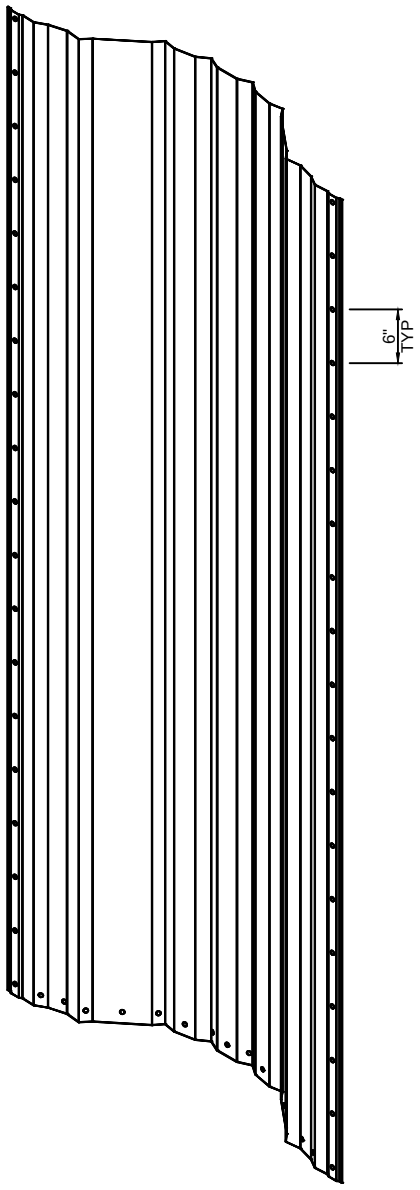
MAY 2014 Vr 1.1

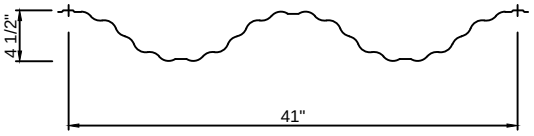
CONVEX MODEL

Section: 4 Page: 002

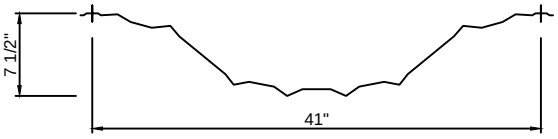
BEHLEN
Made Strong







CS45 PANEL



CS75 PANEL

ENDWALL PANEL PROFILES

MAY 2014 Vr 1.1

CONVEX MODEL

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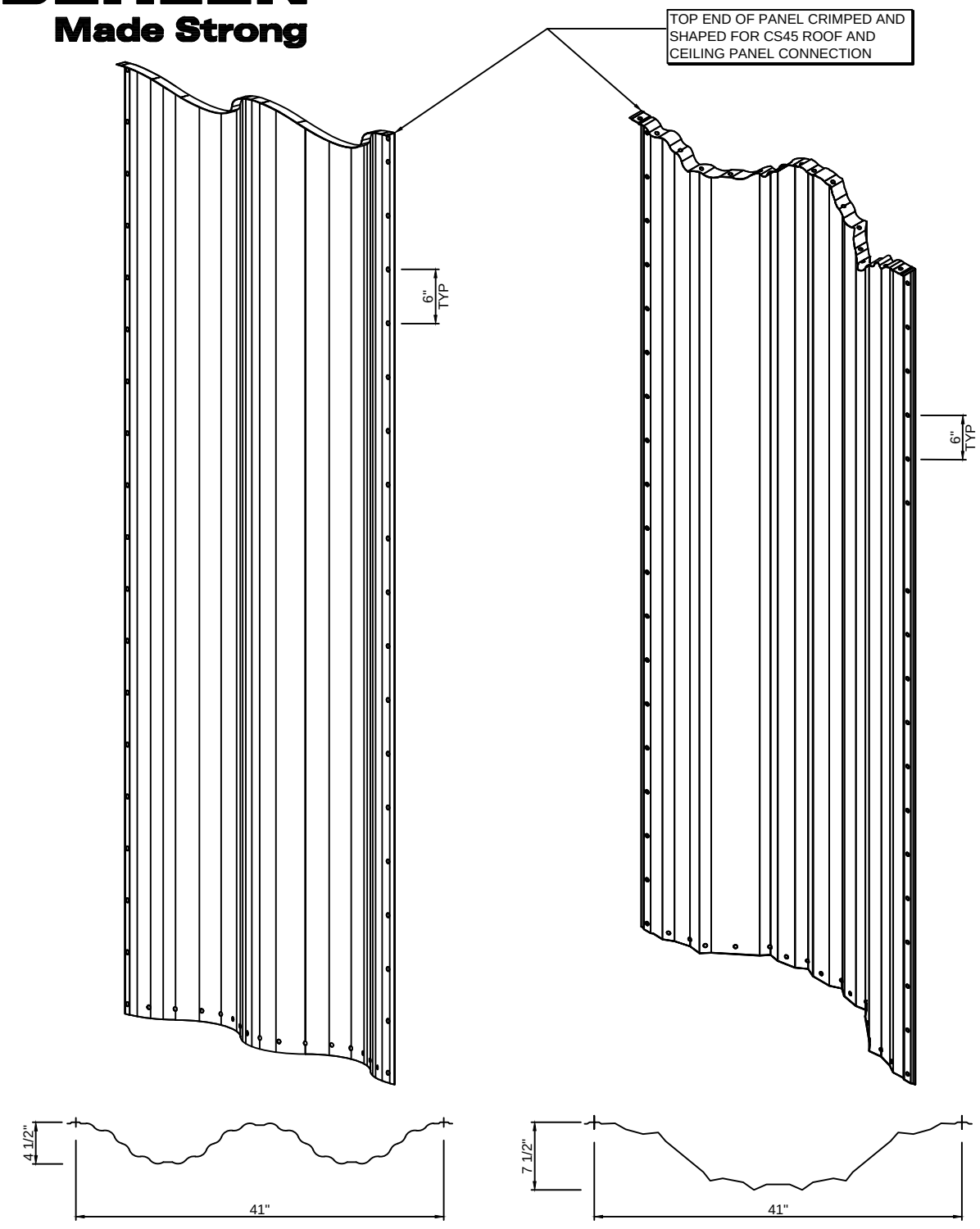
BEHLEN
Made Strong



CS45 PANEL

CS75 PANEL

SIDEWALL PANEL PROFILES

MAY 2014 Vr 1.1

CONVEX MODEL

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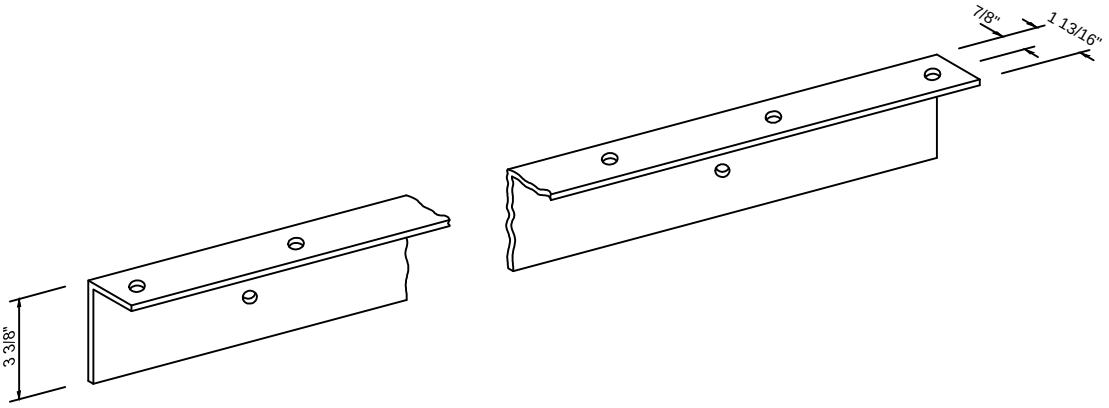
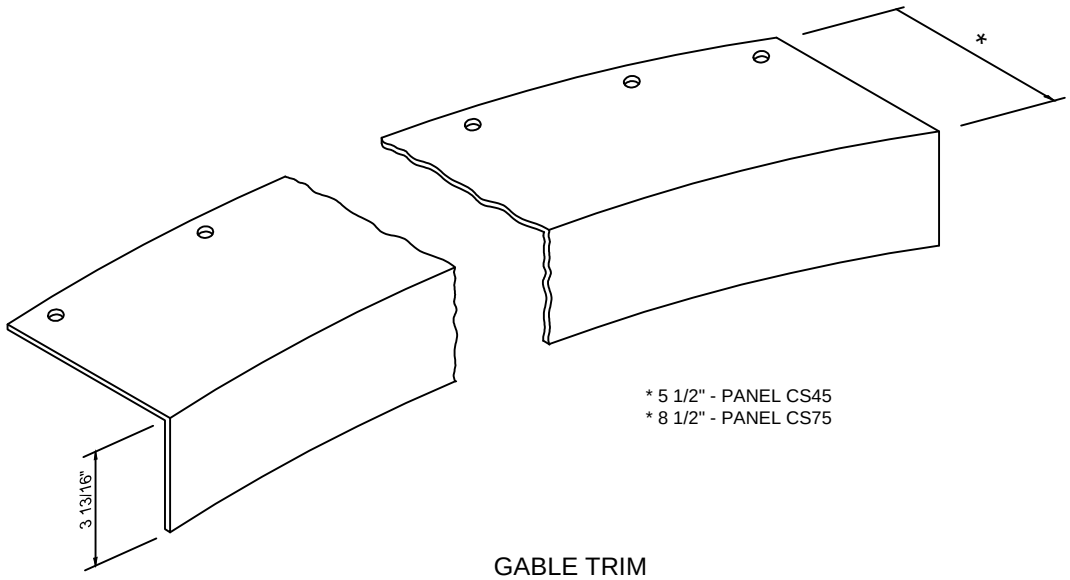
BEHLEN
Made Strong



ROOF ANGLE

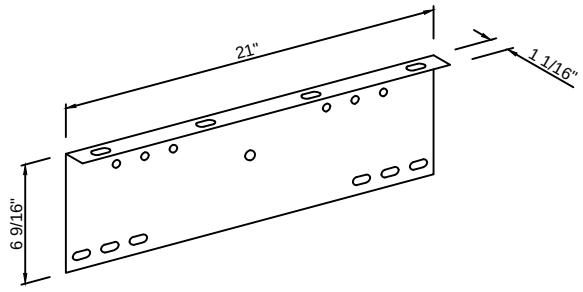


* 5 1/2" - PANEL CS45
* 8 1/2" - PANEL CS75

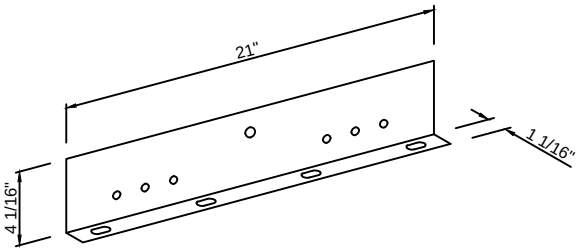
GABLE TRIM

ROOF ANGLE AND GABLE TRIM	MAY 2014 Vr 1.1	
CONVEX MODEL	Section: 4	Page: 005

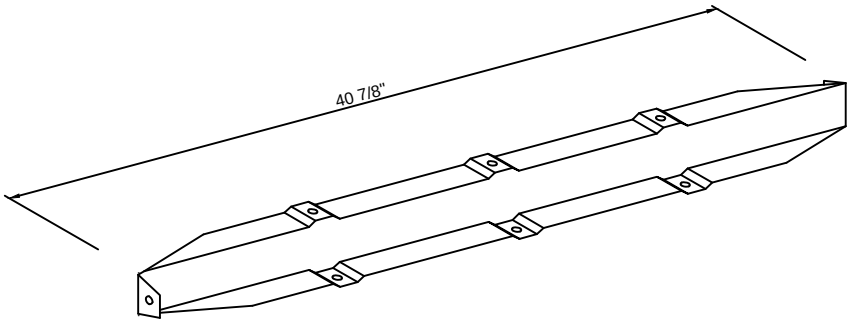
BEHLEN
Made Strong



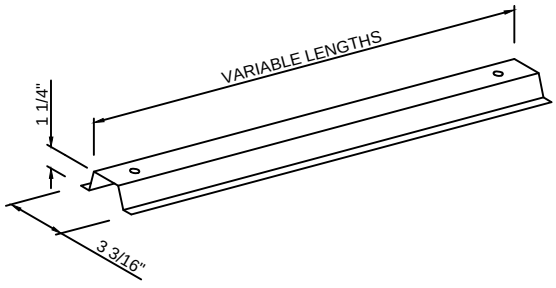
UPPER CHORD GUSSET



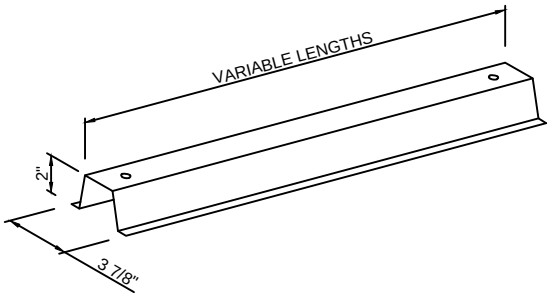
LOWER CHORD GUSSET



LATERAL SPACER



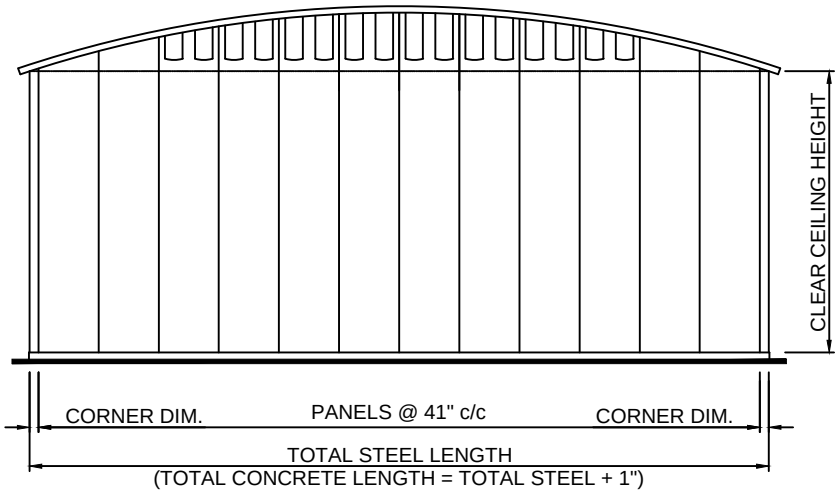
STANDARD STRUT



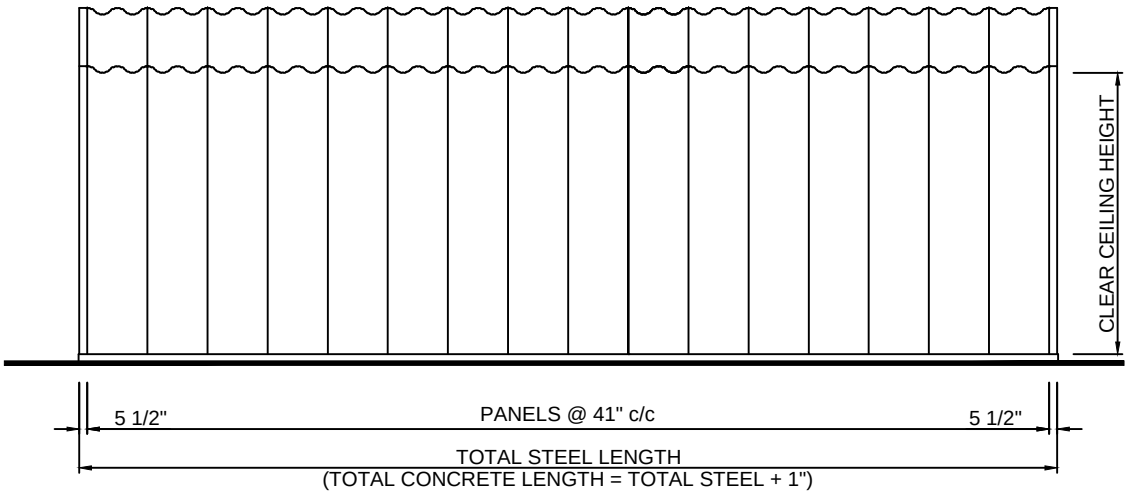
HEAVY DUTY STRUT

CONVEX TRUSS COMPONENTS	MAY 2014 Vr 1.1	
CONVEX MODEL	Section: 4	Page: 006

BEHLEN
Made Strong



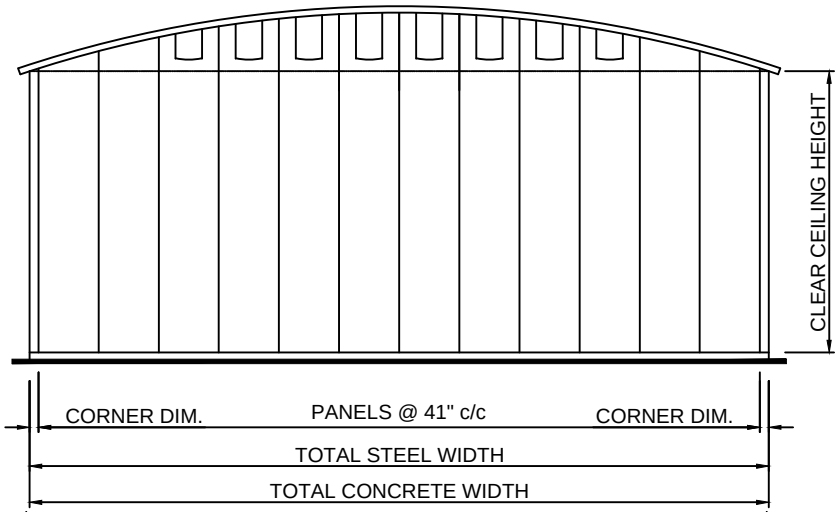
ENDWALL PANEL LAYOUT



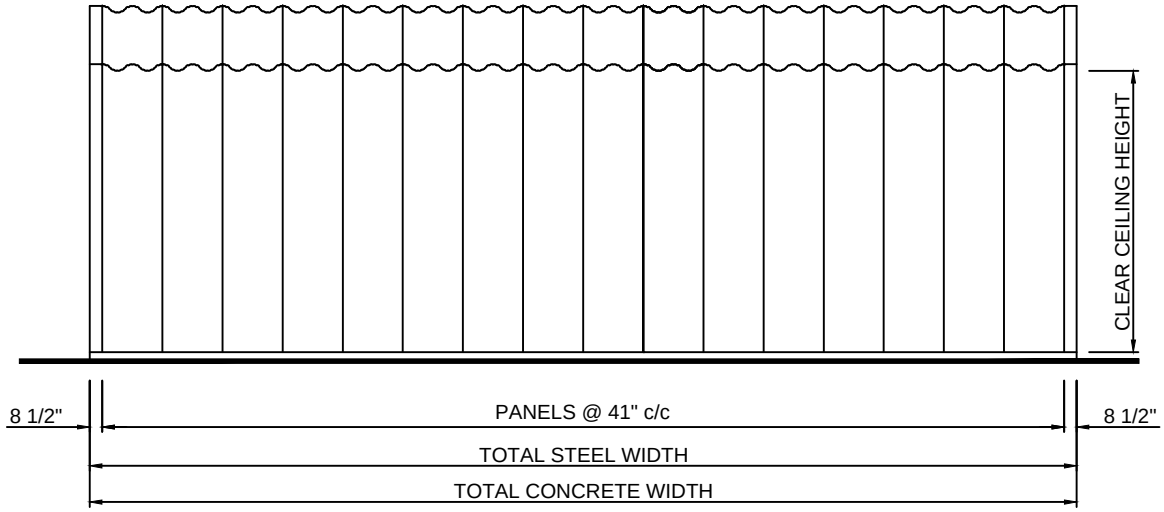
SIDEWALL PANEL LAYOUT

CONVEX PANEL LAYOUT - CS45	MAY 2014 Vr 1.1	
CONVEX MODEL	Section: 4	Page: 007

BEHLEN
Made Strong



ENDWALL PANEL LAYOUT

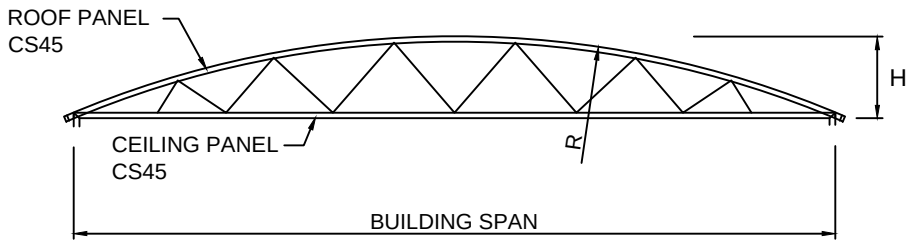


SIDEWALL PANEL LAYOUT

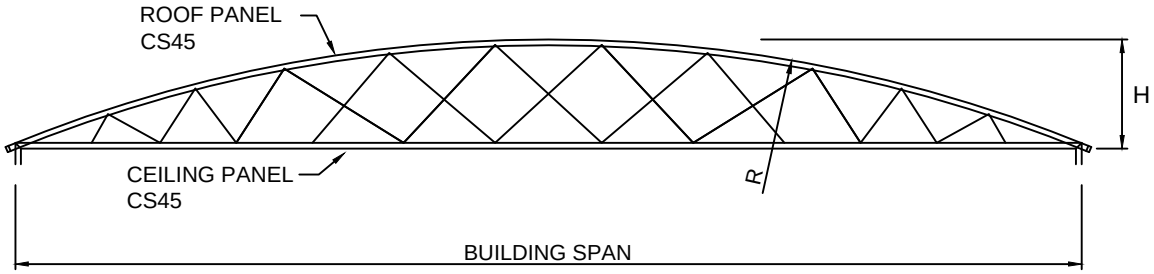
CONVEX PANEL LAYOUT - CS75	MAY 2014 Vr 1.1	
CONVEX MODEL	Section: 4	Page: 008

BEHLEN
Made Strong

TYPE A

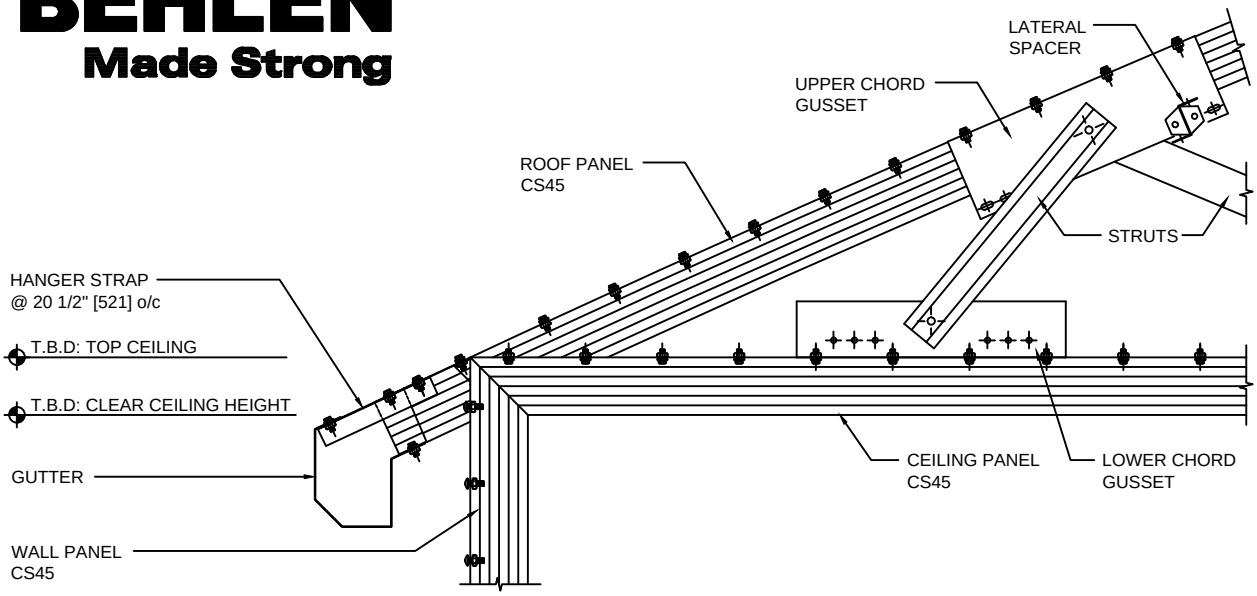


TYPE B

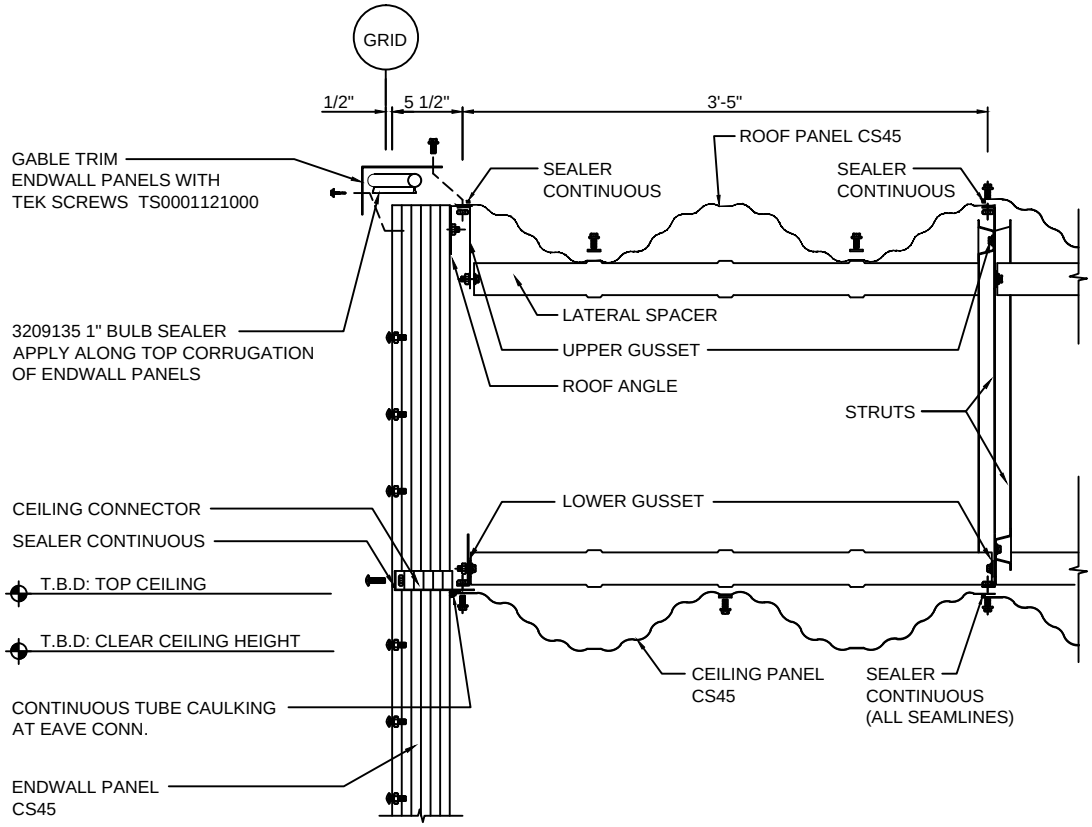


SPAN	R RADIUS	H OVERALL TRUSS DEPTH	TRUSS SYSTEM	EAVE ANGLE
25'-0"	32'-8"	2'-10 5/16"	TYPE A	22.5°
30'-0"	39'-0"	3'-4 1/2"	TYPE A	22.62°
40'-0"	65'-0"	3'-6 5/16"	TYPE A	17.92°
50'-0"	65'-0"	5'-4 1/2"	TYPE A	22.6°
60'-0"	85'-0"	5'-10 1/8"	TYPE A	20.667°
70'-0"	93'-5 3/16"	7'-2 1/8"	TYPE B	22°
80'-0"	106'-9 3/8"	8'-1 13/16"	TYPE B	22°
90'-0"	120'-1 1/2"	9'-1 7/16"	TYPE B	22°
100'-0"	133'-5 11/16"	10'-1 1/8"	TYPE B	22°
110'-0"	146'-9 7/8"	11'-0 13/16"	TYPE B	22°
120'-0"	160'-2"	12'-0 7/16"	TYPE B	22°
130'-0"	173'-6 3/16"	13'-0 1/8"	TYPE B	22°
140'-0"	186'-10 3/8"	13'-11 3/4"	TYPE B	22°
160'-0"	213'-6 11/16"	15'-11 1/8"	TYPE B	22°
180'-0"	240'-3"	17'-10 7/16"	TYPE B	22°
200'-0"	266'-11 3/8"	19'-9 3/4"	TYPE B	22°

BEHLEN
Made Strong



SIDEWALL SECTION



ENDWALL SECTION

SECTIONS - CS45 WALLS

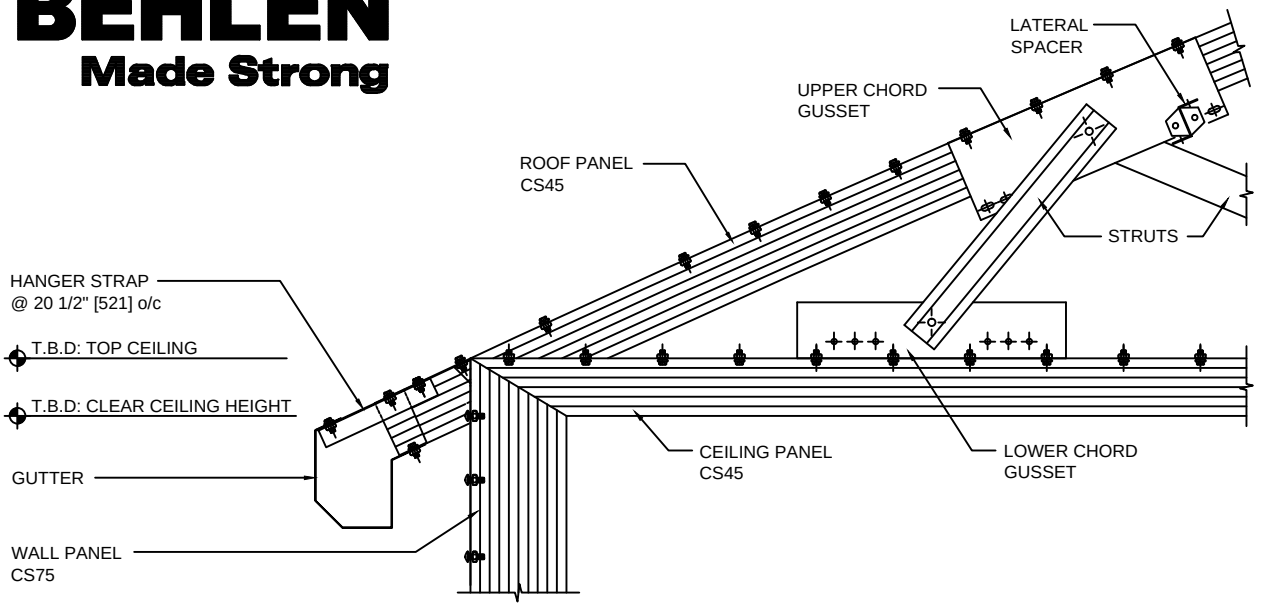
MAY 2014 Vr 1.1

CONVEX MODEL

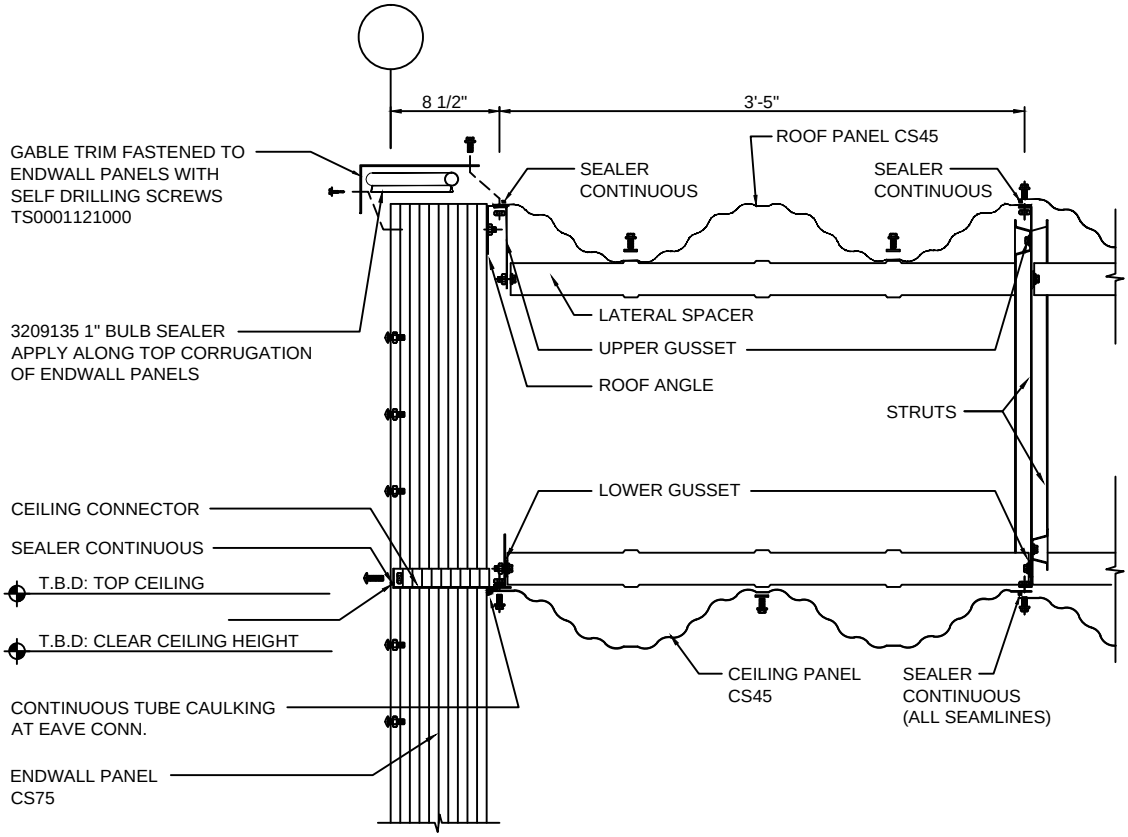
Section: 4

Page: 010

BEHLEN
Made Strong



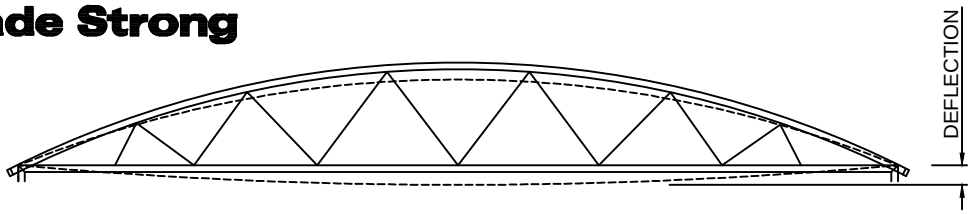
SIDEWALL SECTION



ENDWALL SECTION

SECTIONS - CS75 WALLS	MAY 2014 Vr 1.1	
CONVEX MODEL	Section: 4	Page: 011

BEHLEN
Made Strong



1. TEMPERATURE DEFLECTION IS THE RESULT OF A DIFFERENCE IN THE TEMPERATURE OF THE ROOF AND CEILING PANELS.

2. LOAD DEFLECTION IS THE RESULT OF LIVE LOAD ONLY.

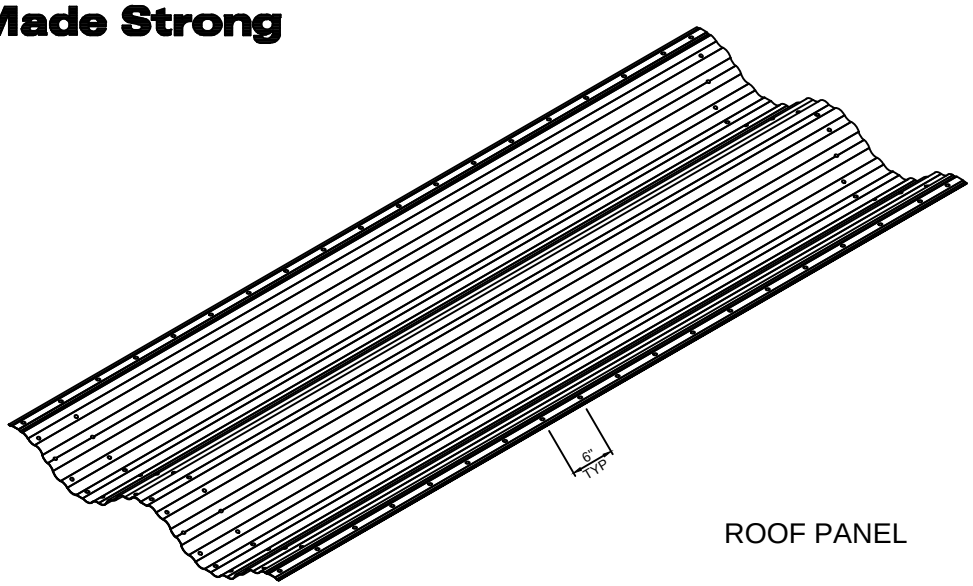
3. A TEMPERATURE INCREASE OF THE ROOF PANEL OVER THE CEILING PANEL WILL GIVE THE TRUSS A POSITIVE (UP) DEFLECTION AND A DECREASE IN TEMPERATURE GIVES A NEGATIVE (DOWN) DEFLECTION.

SPAN	Dead + Collateral Load 10 PSF (inches)	LIVE LOAD 40 psf (inches)	WINTER 60°C (inches)	SUMMER 30°C (inches)
25'-0"	0	-1/8	-7/16	+ 3/16
30'-0"	-1/16	-1/8	-1/2	+ 1/4
40'-0"	-1/8	-7/16	-11/16	+ 5/16
50'-0"	-1/8	-7/16	-7/8	+ 7/16
60'-0"	-3/16	-11/16	-1 1/16	+ 1/2
70'-0"	-1/4	-7/8	-1 3/16	+ 5/8
80'-0"	-5/16	-1 1/8	-1 3/8	+ 11/16
90'-0"	-5/16	-1 5/16	-1 9/16	+ 3/4
100'-0"	-7/16	-1 5/8	-1 3/4	+ 7/8
110'-0"	-7/16	-1 3/4	-1 7/8	+ 15/16
120'-0"	-9/16	-2 1/16	-2 1/16	+ 1 1/16
130'-0"	-3/4	-2 3/4	-2 5/16	+ 1 1/8
140'-0"	-3/4	-2 13/16	-2 7/16	+ 1 3/16
160'-0"	-15/16	-3 5/8	-2 3/4	+ 1 3/8
180'-0"	-1	-3 13/16	-3 1/8	+ 1 9/16
200'-0"	-1	-3 7/8	-3 7/16	+1 3/4
FOR SPECIFIC LOADINGS AND TEMPERATURE DIFFERENCES CONSULT FACTORY.				

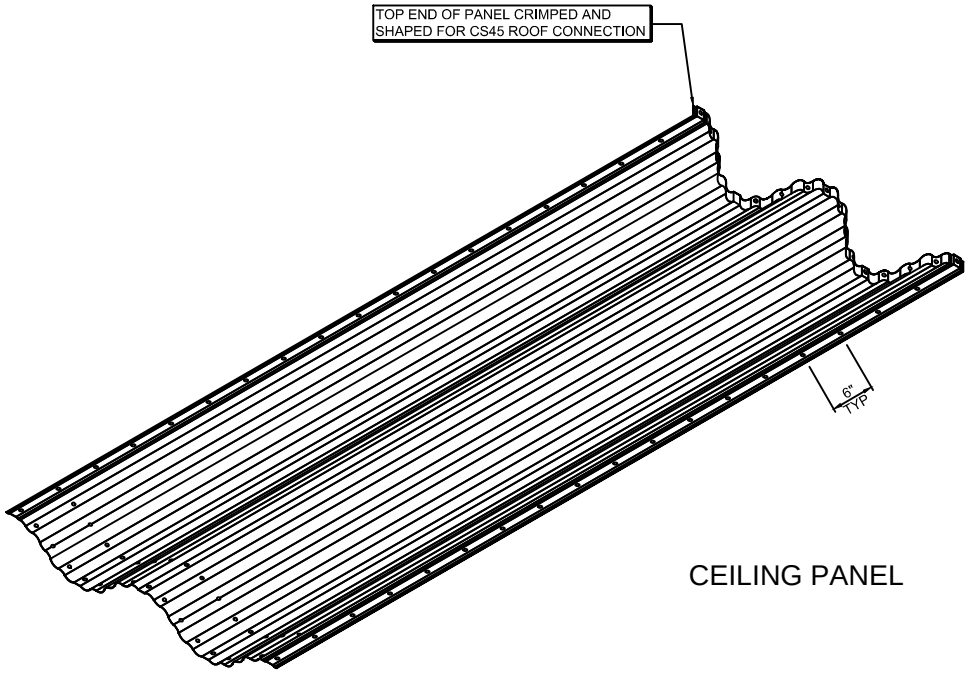
BEHLEN
Made Strong

SECTION 5
DUBL-PANL® MODEL

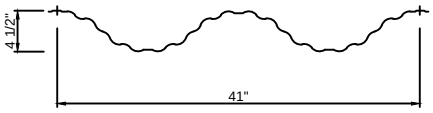
BEHLEN
Made Strong



ROOF PANEL



CEILING PANEL



CS45 PANEL

ROOF AND CEILING PANEL PROFILES

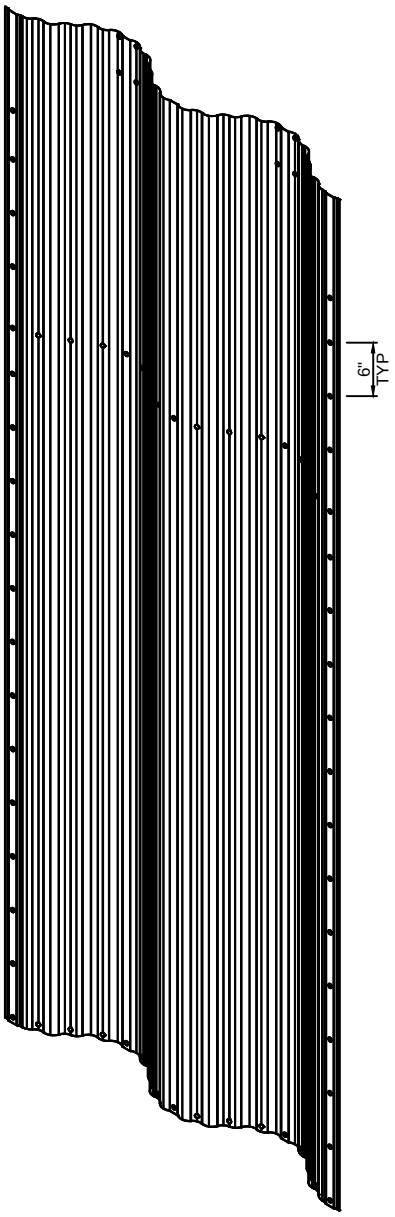
MAY 2014 Vr 1.1

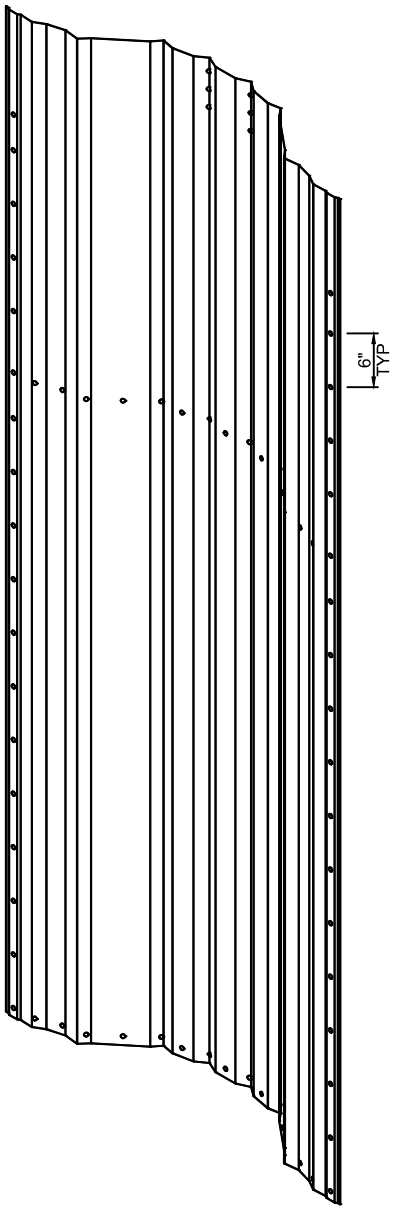
DUBL-PANL© MODEL

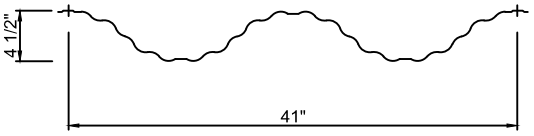
Section: 5

Page: 002

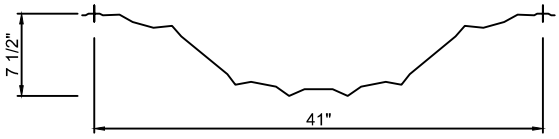
BEHLEN
Made Strong







CS45 PANEL



CS75 PANEL

ENDWALL PANEL PROFILES

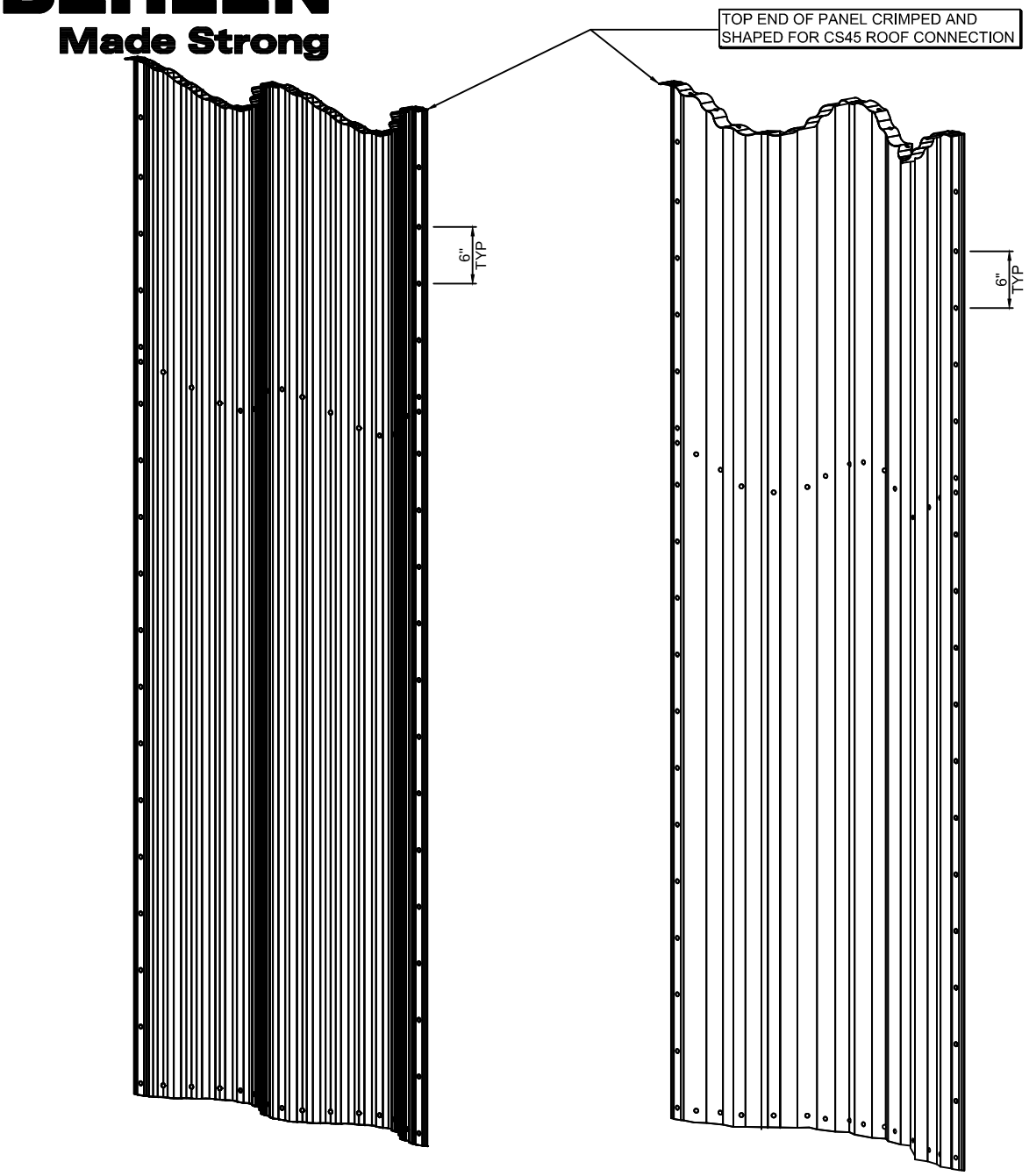
MAY 2014 Vr 1.1

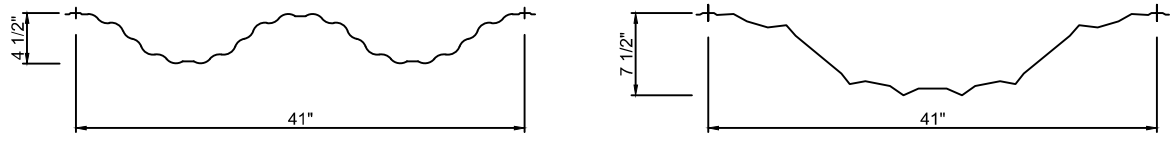
DUBL-PANL® MODEL

Section: 5

Page: 003

BEHLEN
Made Strong





CS45 PANEL

CS75 PANEL

SIDEWALL PANEL PROFILES

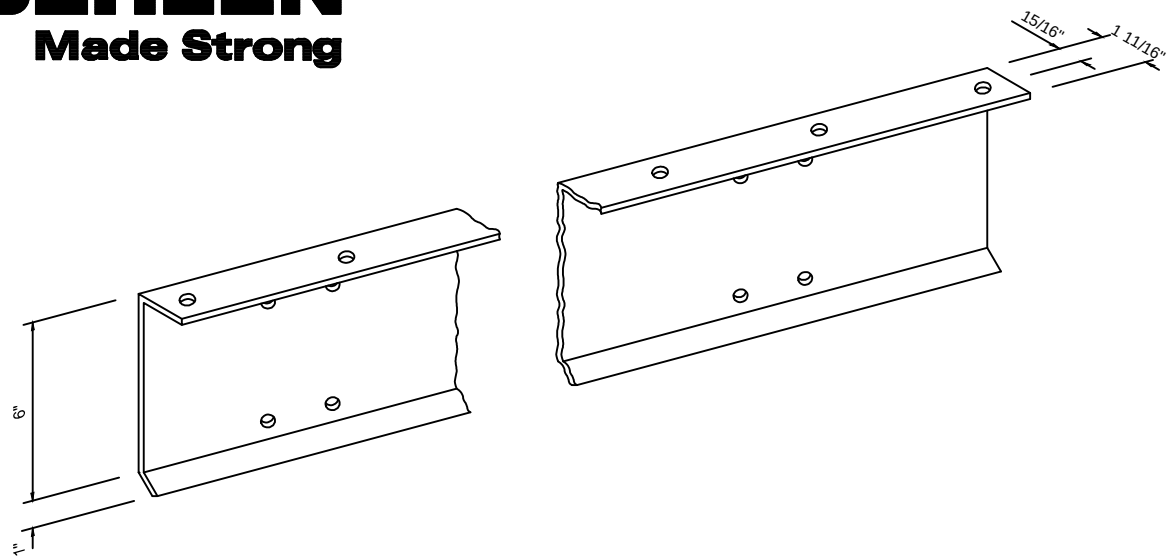
MAY 2014 Vr 1.1

DUBL-PANL® MODEL

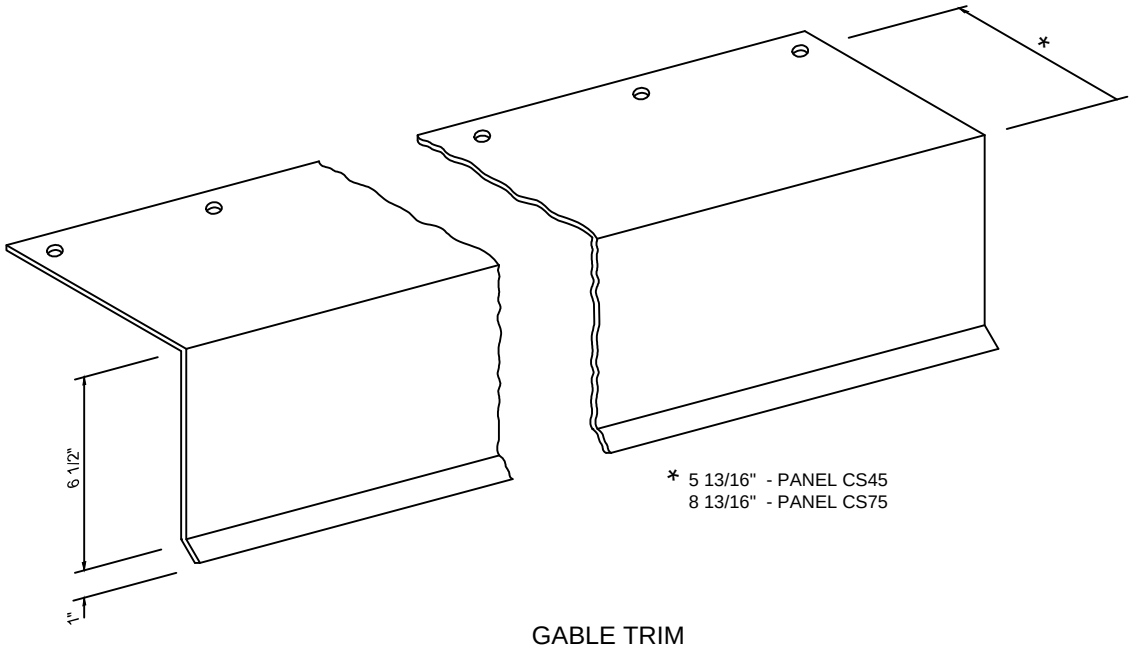
Section: 5

Page: 004

BEHLEN
Made Strong



ROOF ANGLE

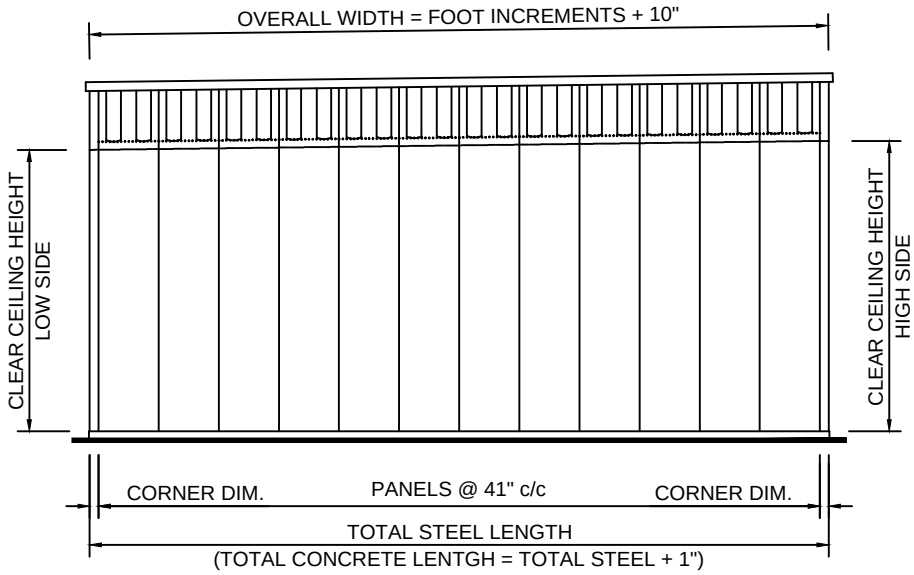


* 5 13/16" - PANEL CS45
8 13/16" - PANEL CS75

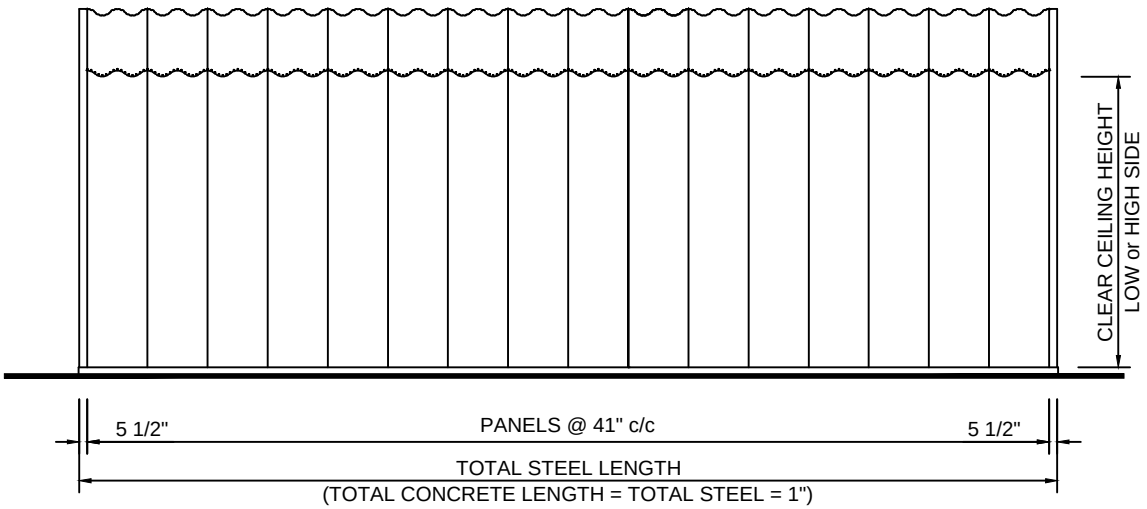
GABLE TRIM

ROOF ANGLE AND GABLE TRIM	MAY 2014 Vr 1.1	
DUBL-PANL® MODEL	Section: 5	Page: 005

BEHLEN
Made Strong



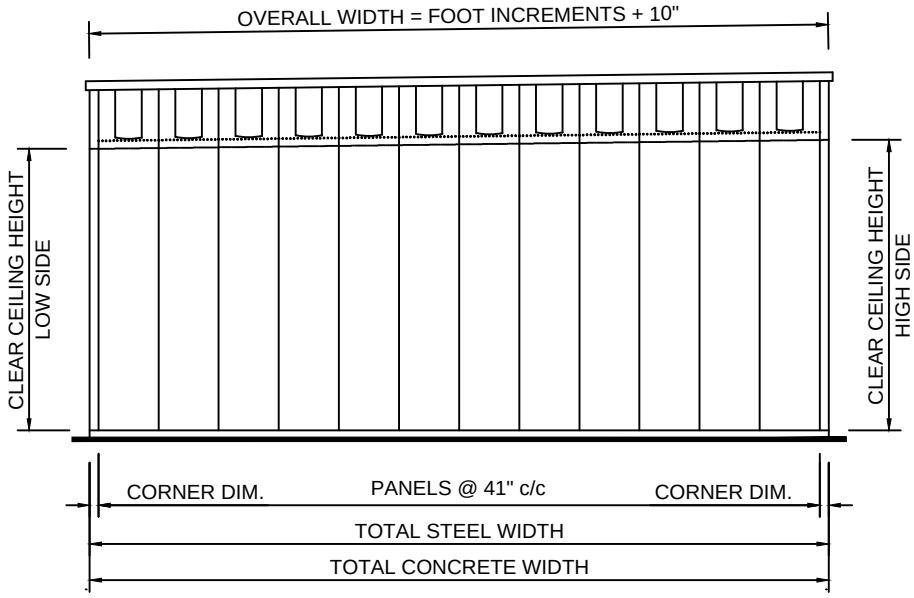
ENDWALL PANEL LAYOUT



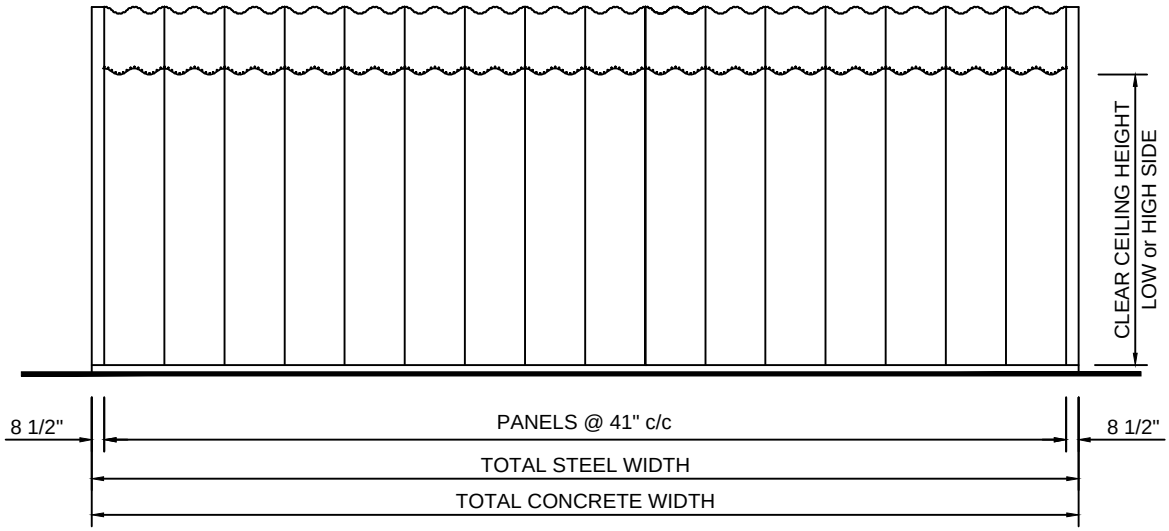
SIDEWALL PANEL LAYOUT

PANEL LAYOUT - CS45	MAY 2014 Vr 1.1	
DUBL-PANL© MODEL	Section: 5	Page: 006

BEHLEN
Made Strong



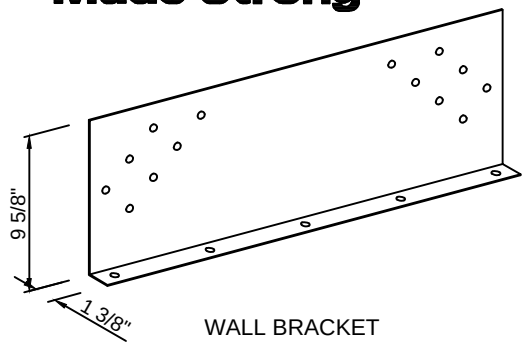
ENDWALL PANEL LAYOUT



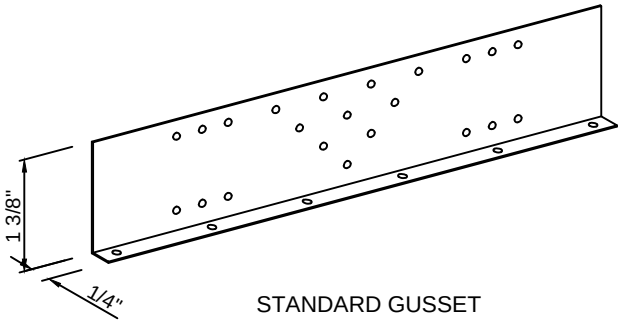
SIDEWALL PANEL LAYOUT

PANEL LAYOUT - CS75	MAY 2014 Vr 1.1	
DUBL-PANL® MODEL	Section: 5	Page: 007

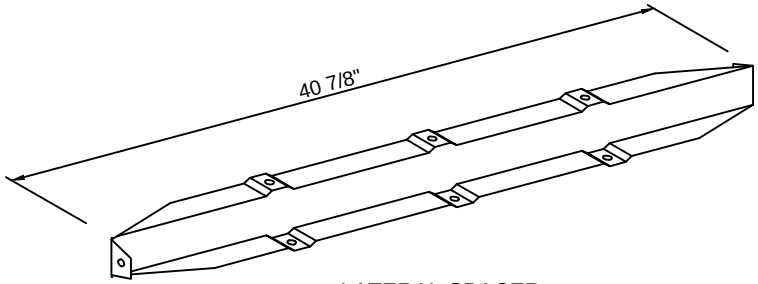
BEHLEN
Made Strong



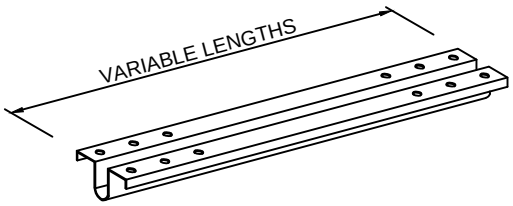
WALL BRACKET



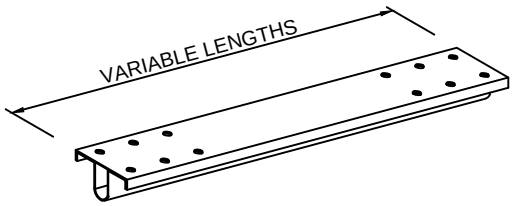
STANDARD GUSSET



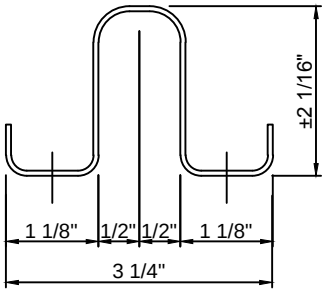
LATERAL SPACER



STANDARD STRUT



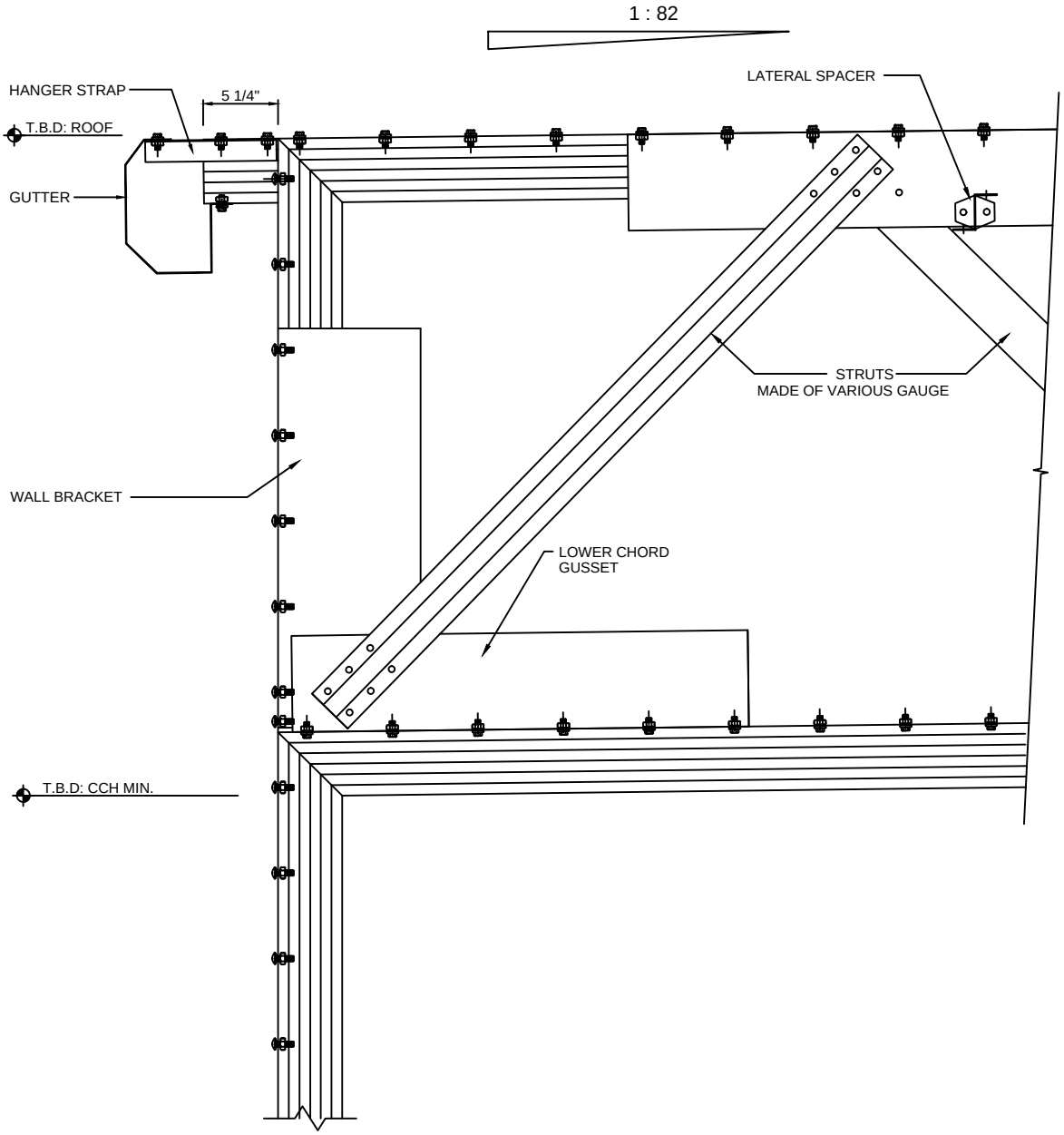
REINFORCED STRUT



STRUT SECTION

TRUSS COMPONENTS	MAY 2014 Vr 1.1	
DUBL-PANL© MODEL	Section: 5	Page: 008

BEHLEN
Made Strong



SIDEWALL SECTION TYPE "A"

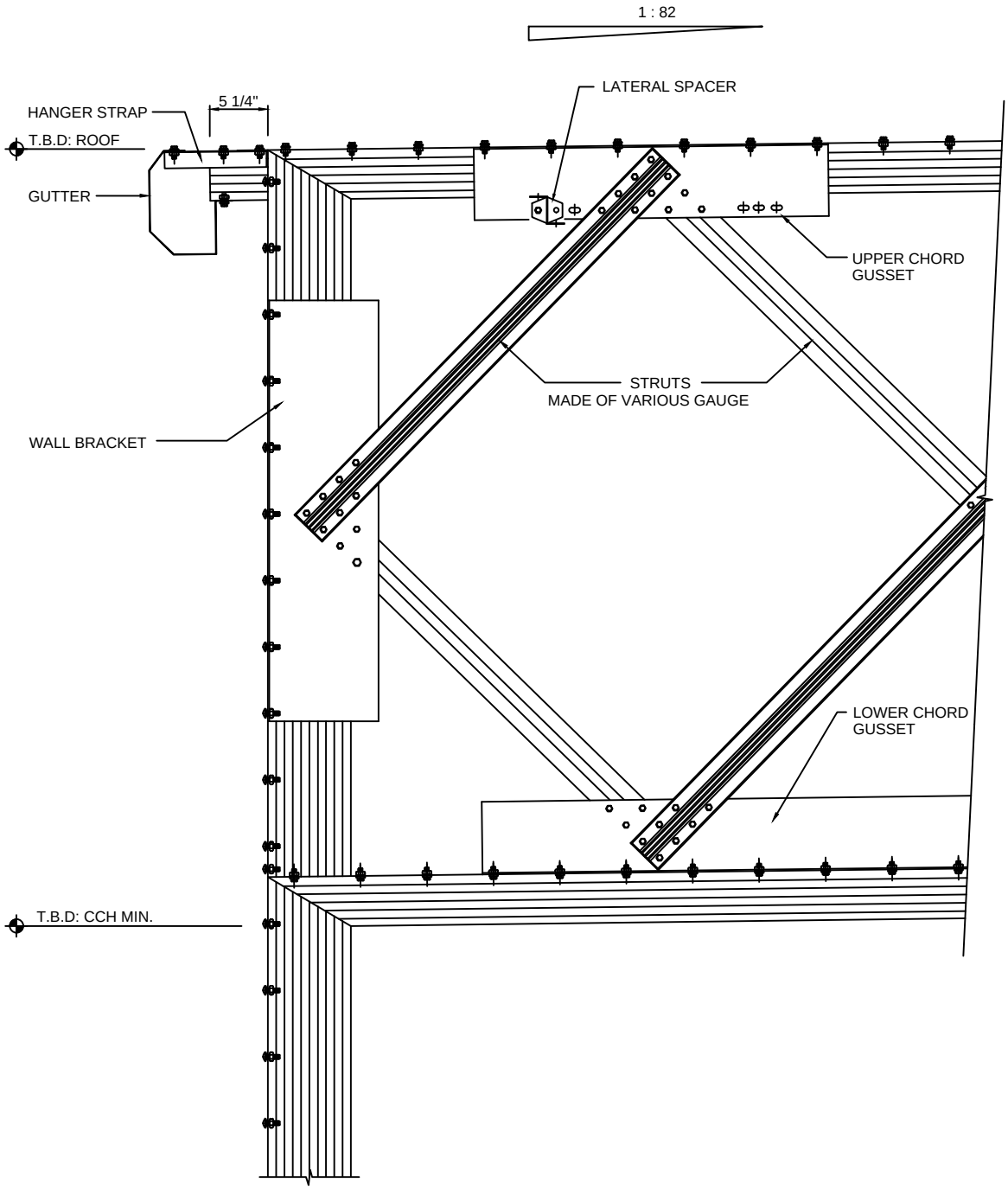
MAY 2014 Vr 1.1

DUBL-PANL© MODEL

Section: 5

Page: 009

BEHLEN
Made Strong



SIDEWALL SECTION TYPE "B"

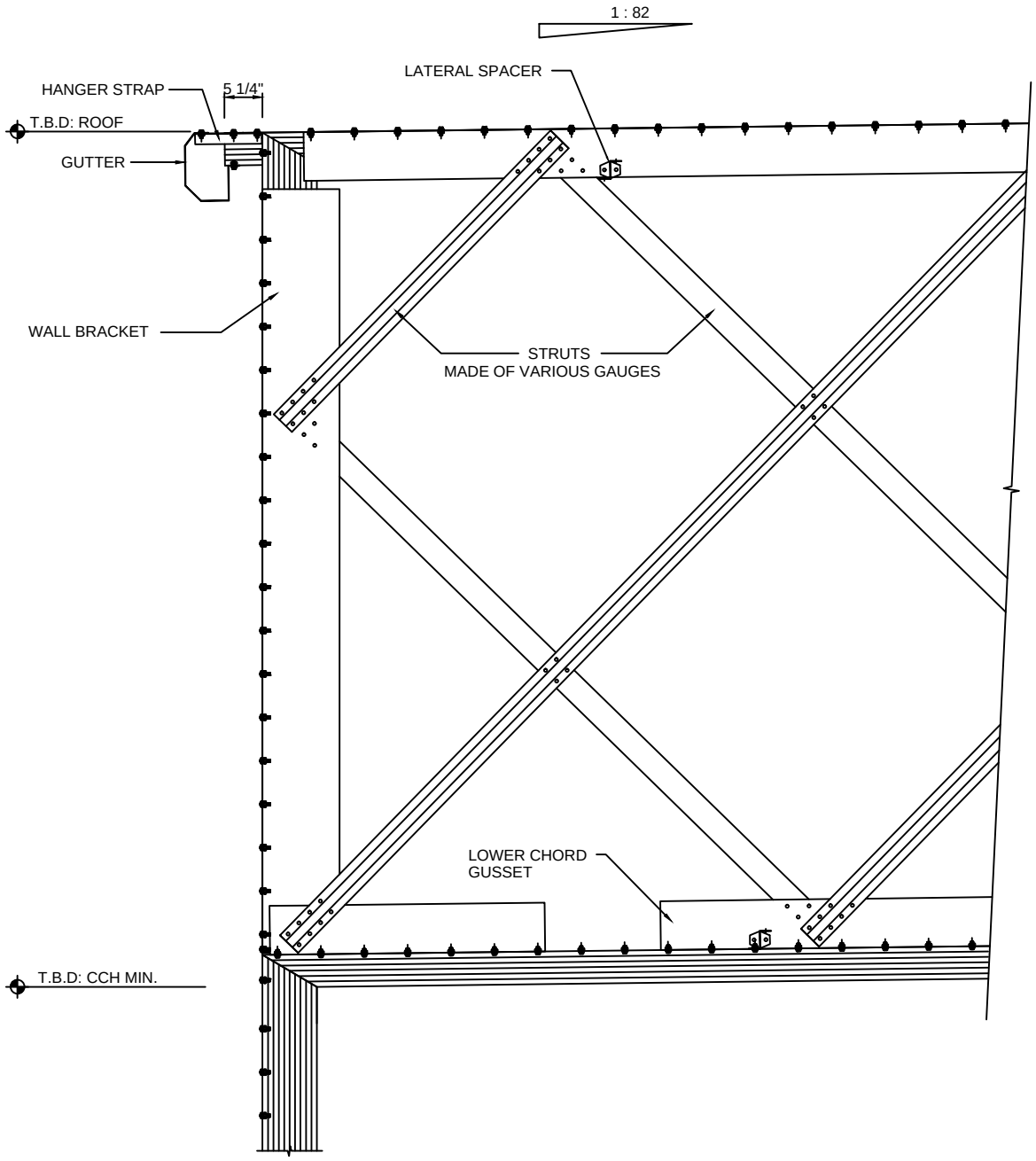
MAY 2014 Vr 1.1

DUBL-PANL© MODEL

Section: 5

Page: 010

BEHLEN
Made Strong



SIDEWALL SECTION TYPE "C"

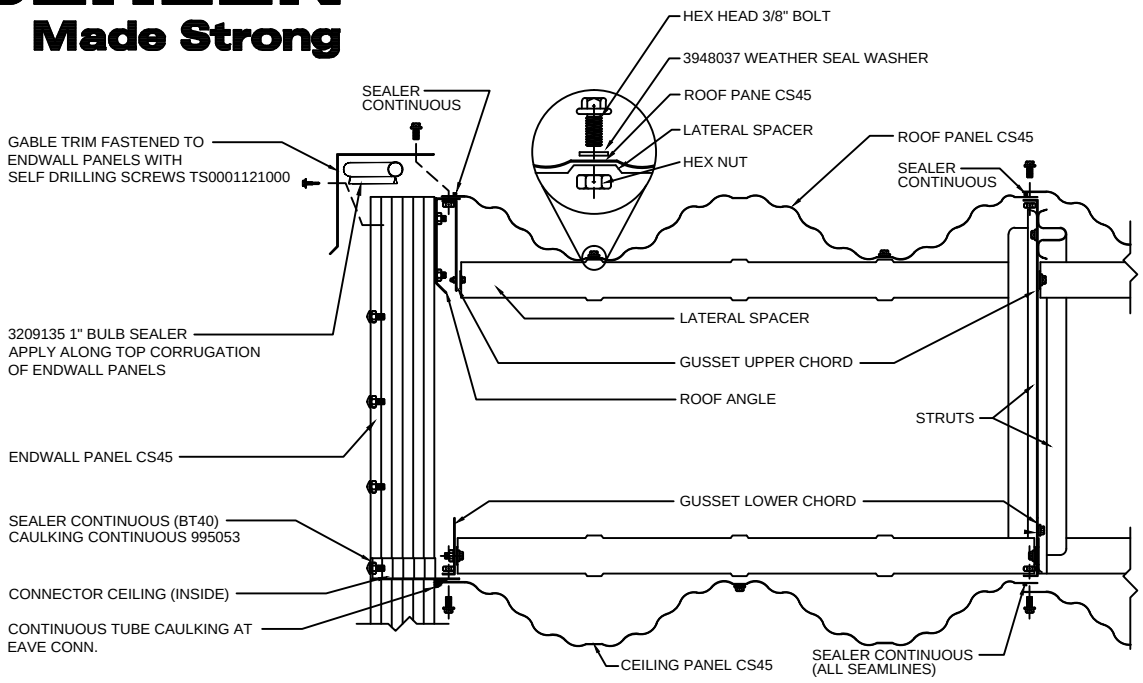
MAY 2014 Vr 1.1

DUBL-PANL© MODEL

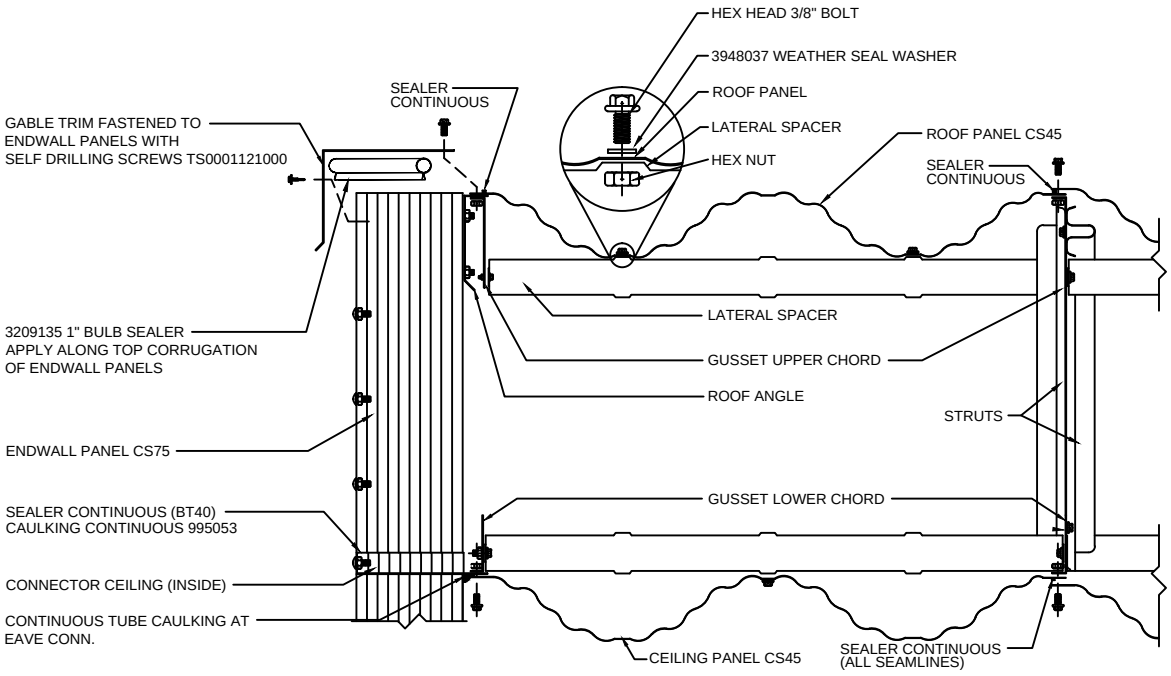
Section: 5

Page: 011

BEHLEN
Made Strong



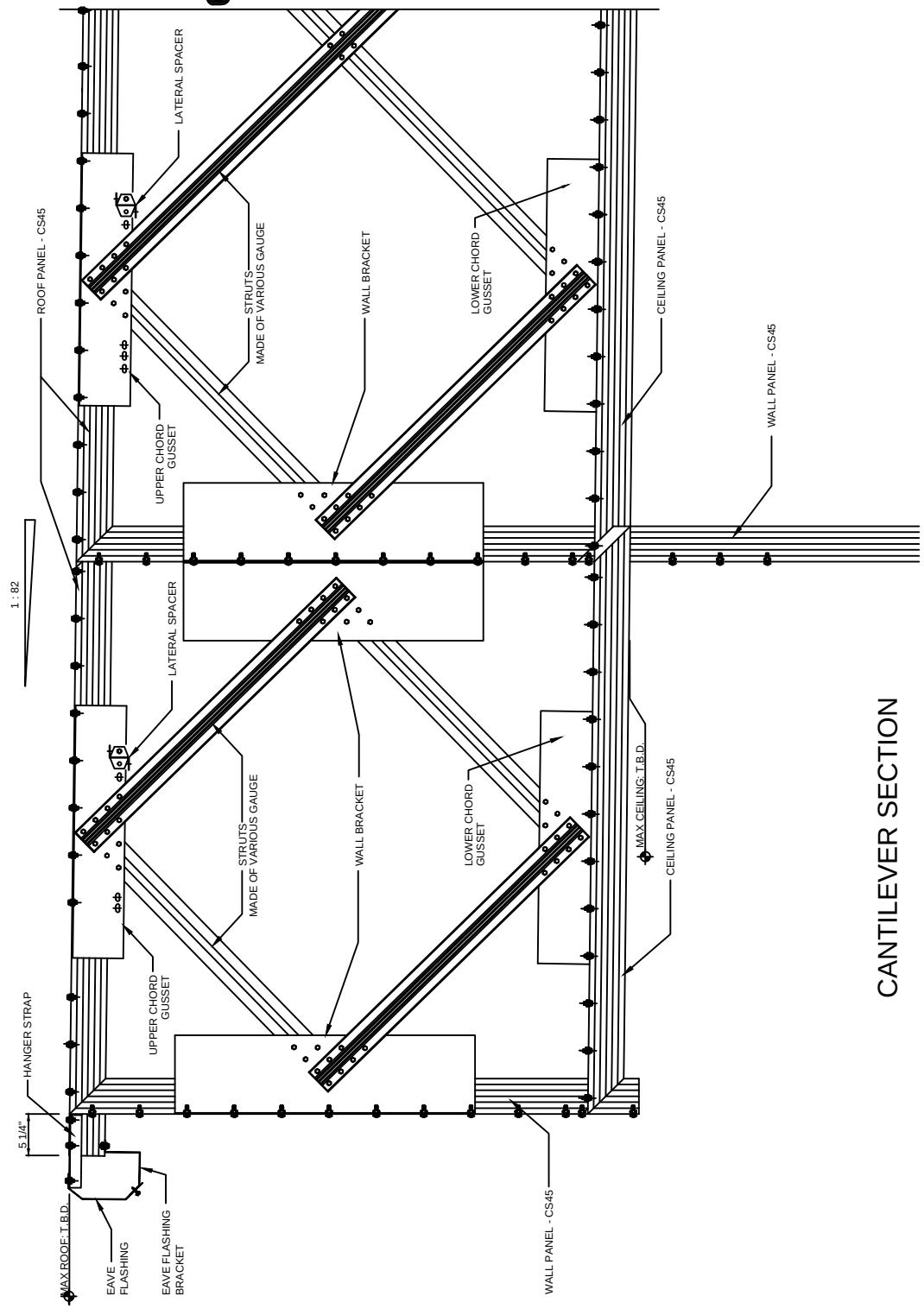
ENDWALL SECTION - CS45



ENDWALL SECTION - CS75

ENDWALL SECTIONS	MAY 2014 Vr 1.1	
DUBL-PANL© MODEL	Section: 5	Page: 012

BEHLEN
Made Strong



CANTILEVER SECTION

CANTILEVER SECTION TYPE "B"

MAY 2014 Vr 1.1

DUBL-PANL© MODEL

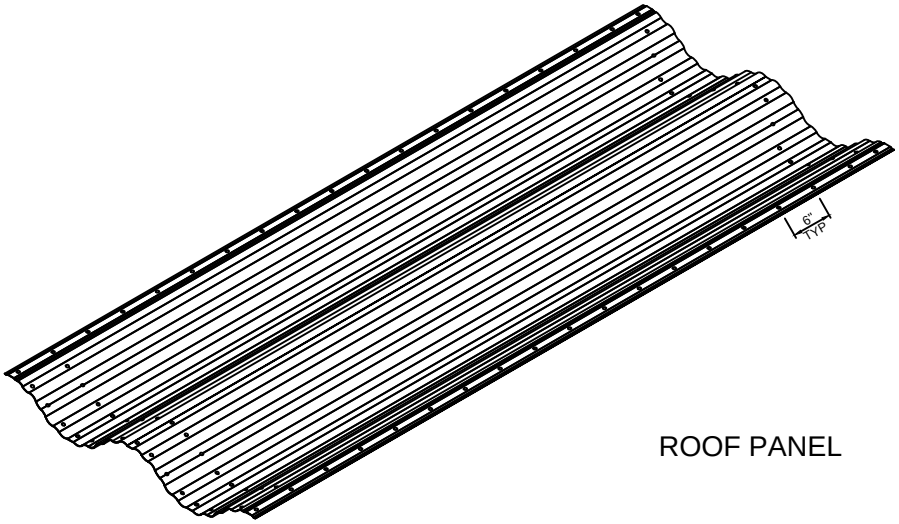
Section: 5

Page: 013

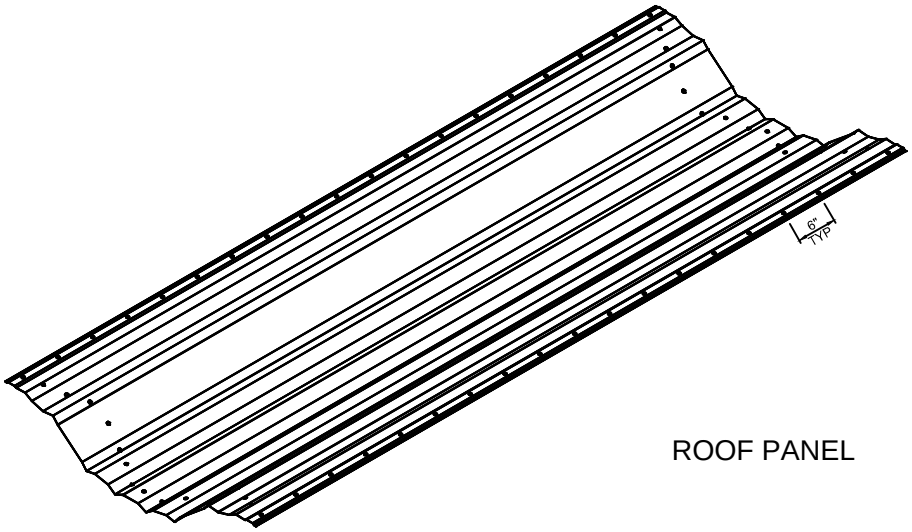
BEHLEN
Made Strong

SECTION 6
SINGLE PANEL MODEL

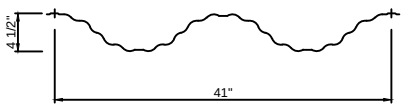
BEHLEN
Made Strong



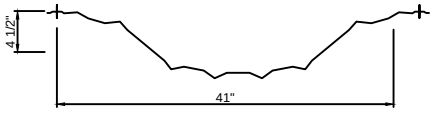
ROOF PANEL



ROOF PANEL



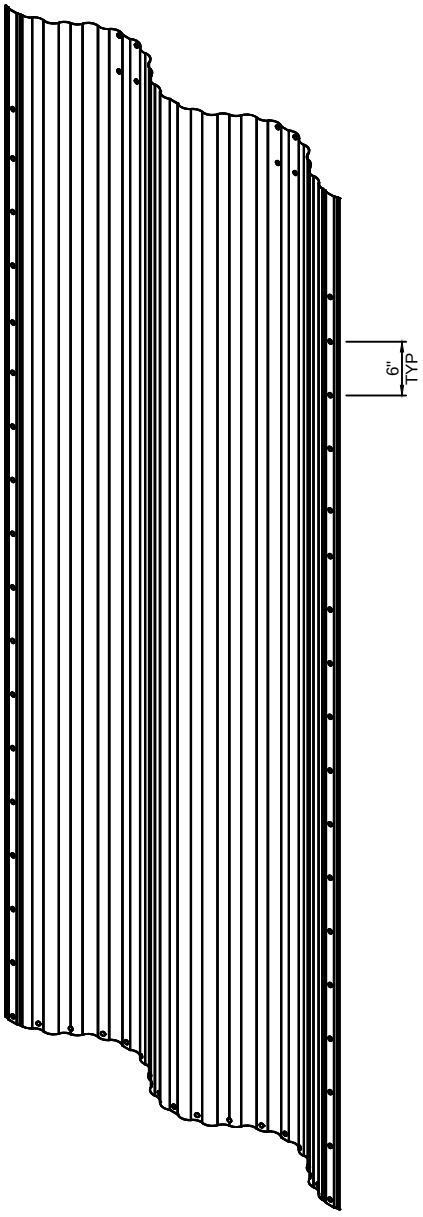
CS45 PANEL

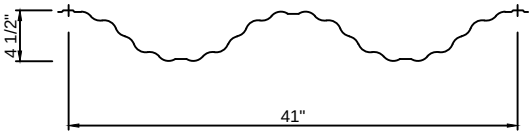


CS75 PANEL

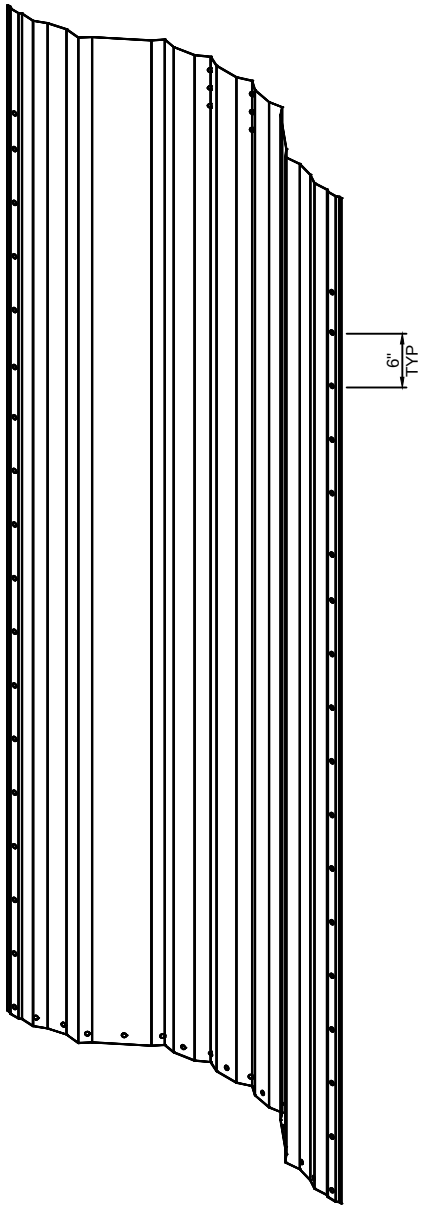
ROOF PANELS	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 002

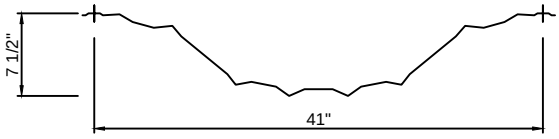
BEHLEN
Made Strong





CS45 PANEL

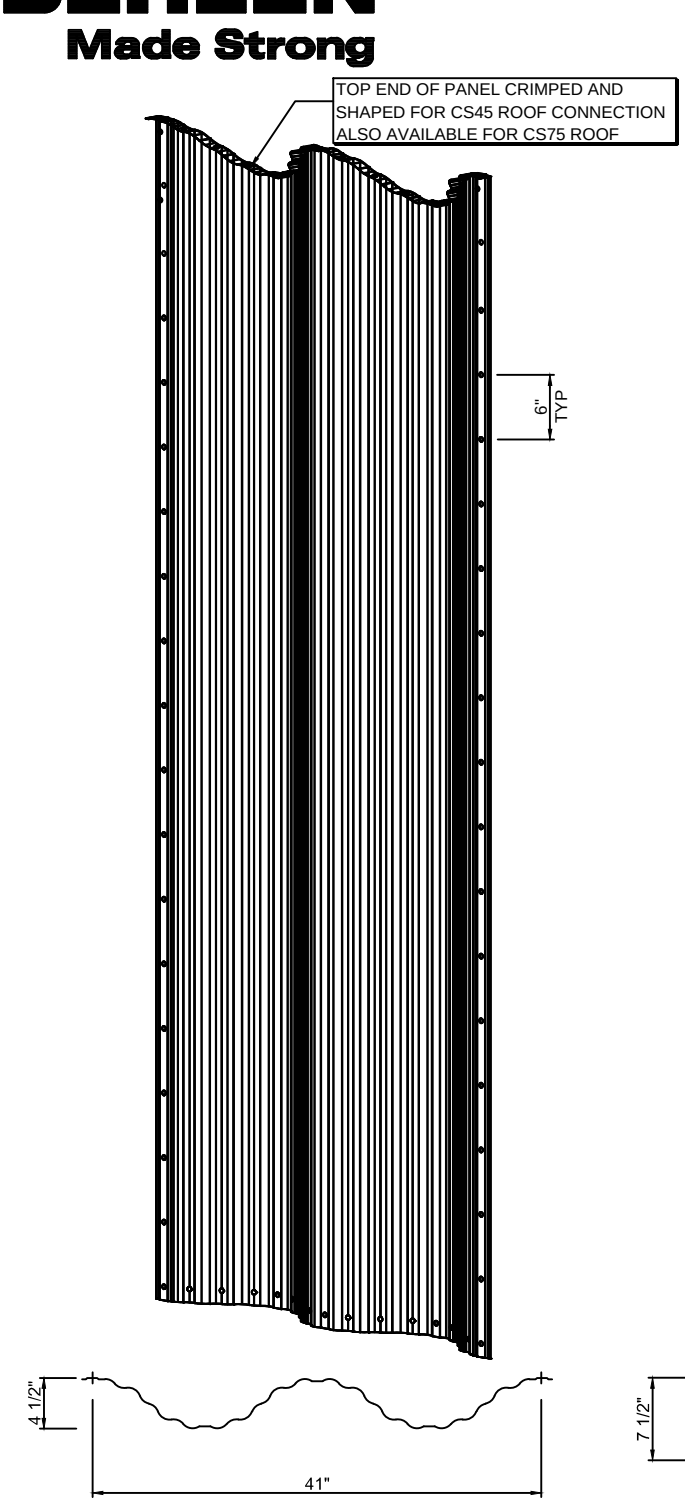




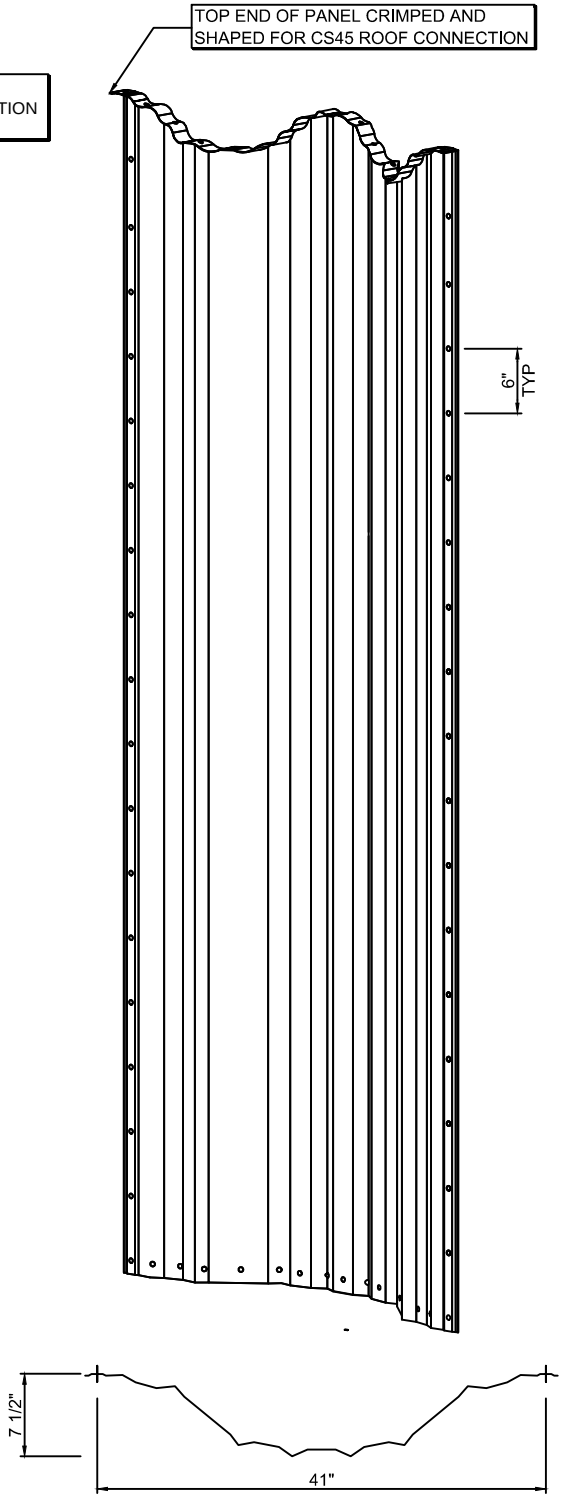
CS75 PANEL

ENDWALL PANEL PROFILES	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 003

BEHLEN
Made Strong



CS45 PANEL



CS75 PANEL

SIDEWALL PANEL PROFILES

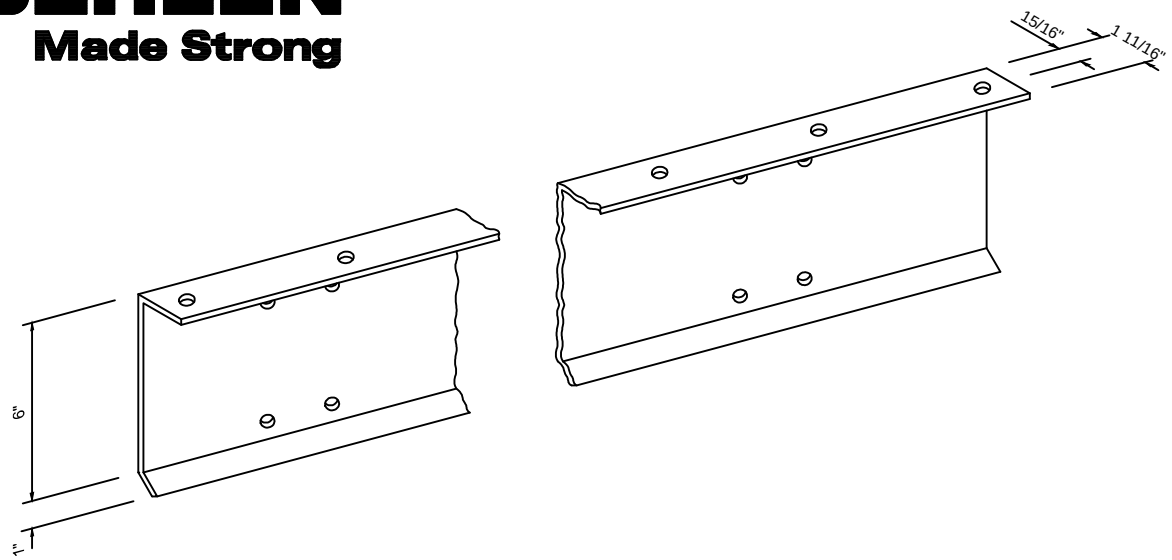
MAY 2014 Vr 1.1

SINGLE PANEL MODEL

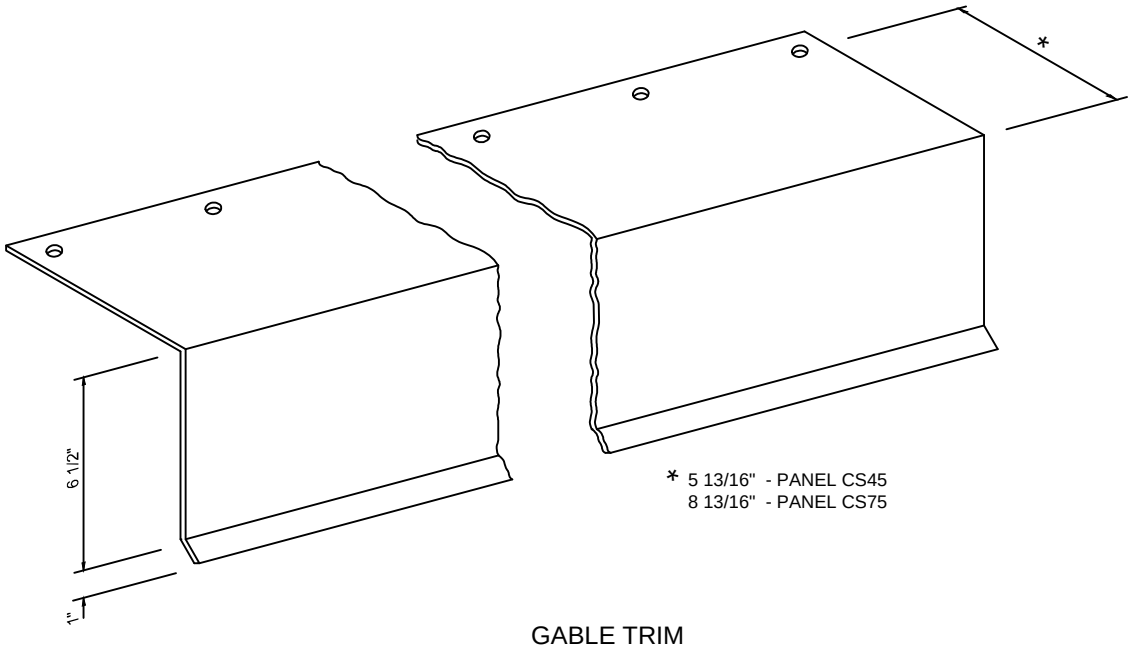
Section: 6

Page: 004

BEHLEN
Made Strong



ROOF ANGLE

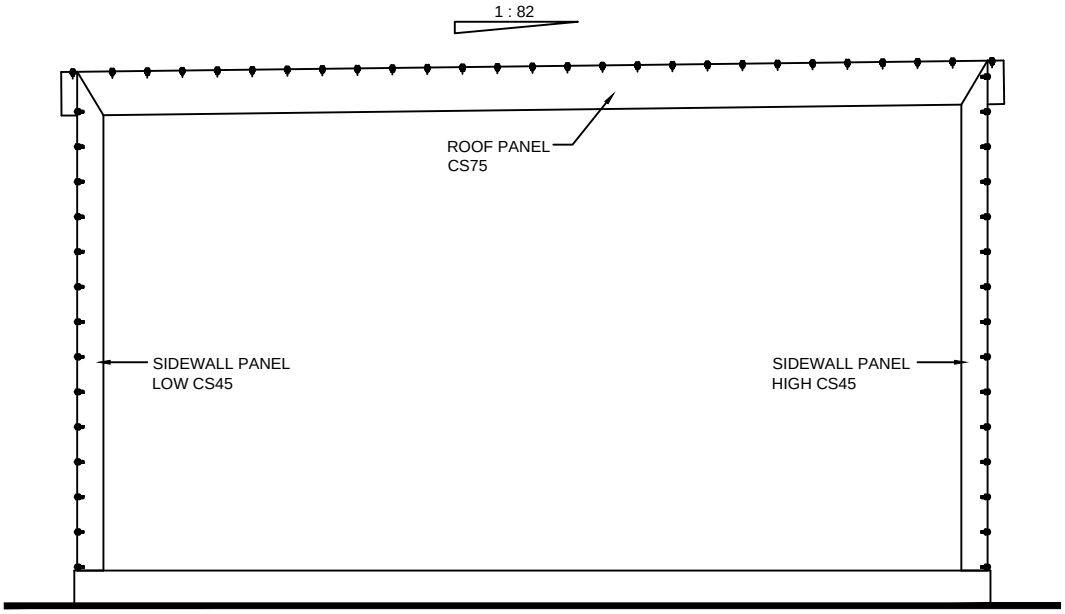


* 5 13/16" - PANEL CS45
8 13/16" - PANEL CS75

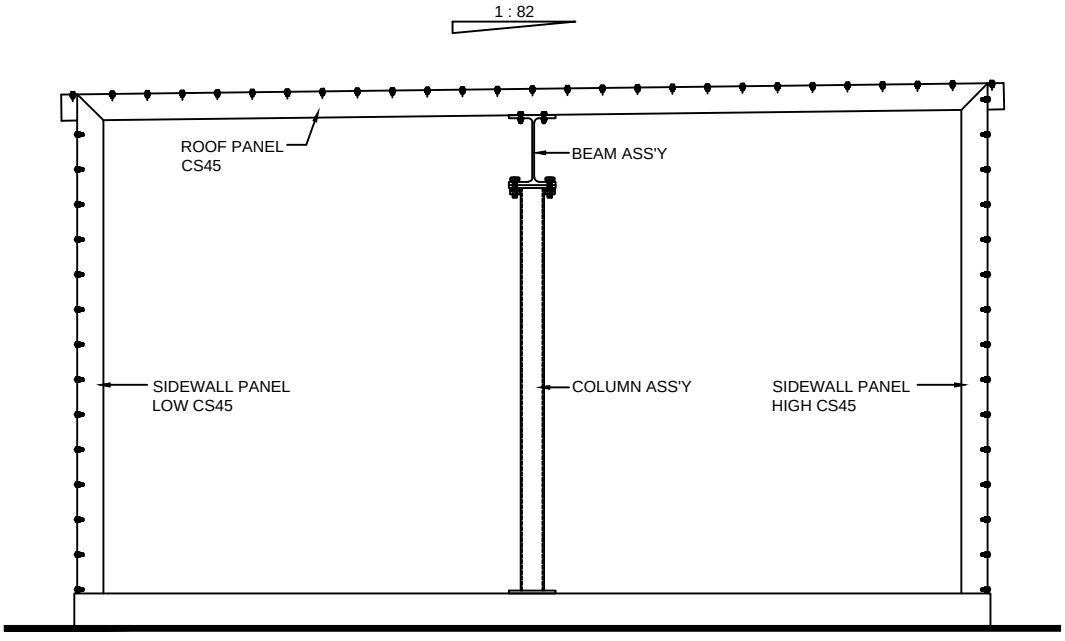
GABLE TRIM

ROOF ANGLE AND GABLE TRIM	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 005

BEHLEN
Made Strong

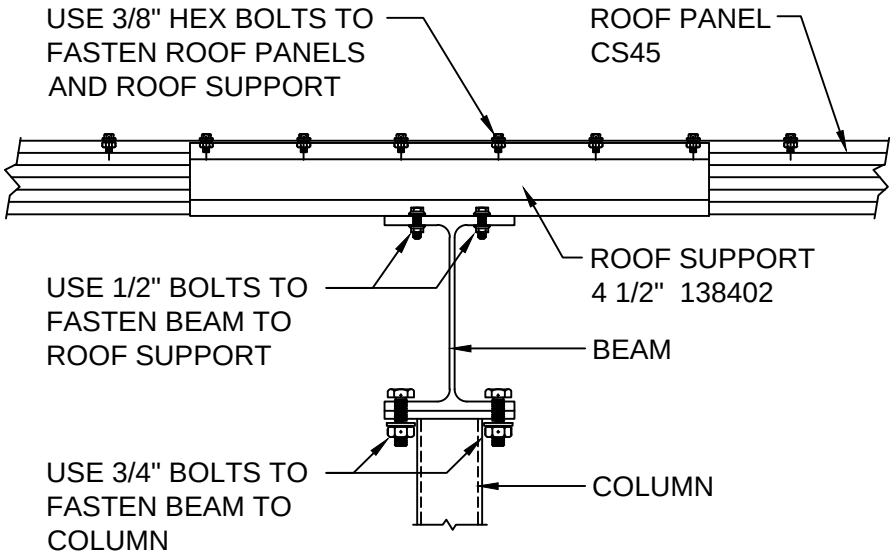


SINGLE PANEL - CS75 ROOF PANEL

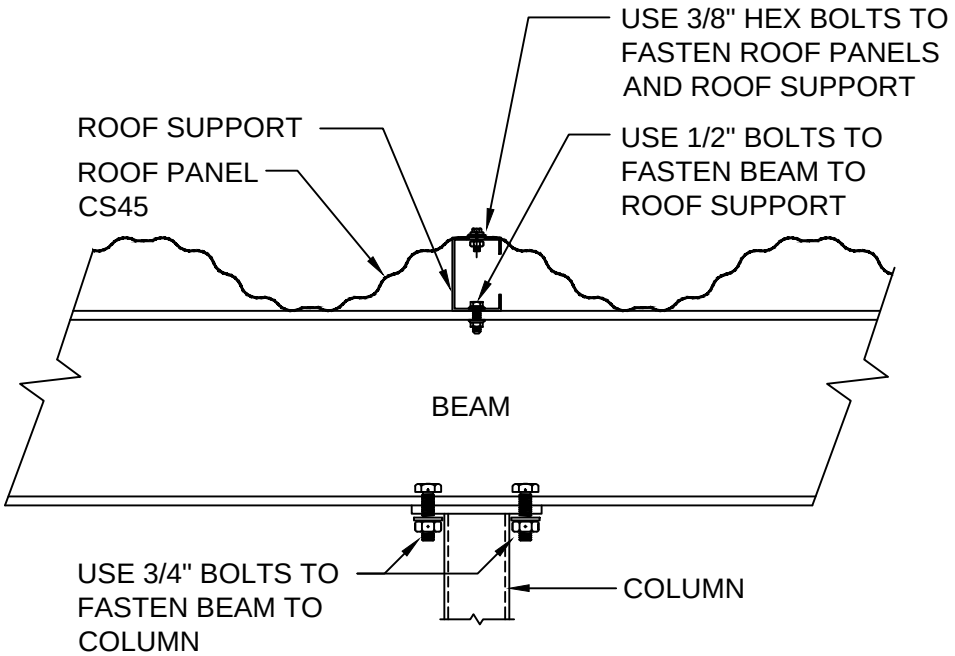


MULTI-SPAN SINGLE PANEL - CS45 ROOF PANEL

BEHLEN
Made Strong



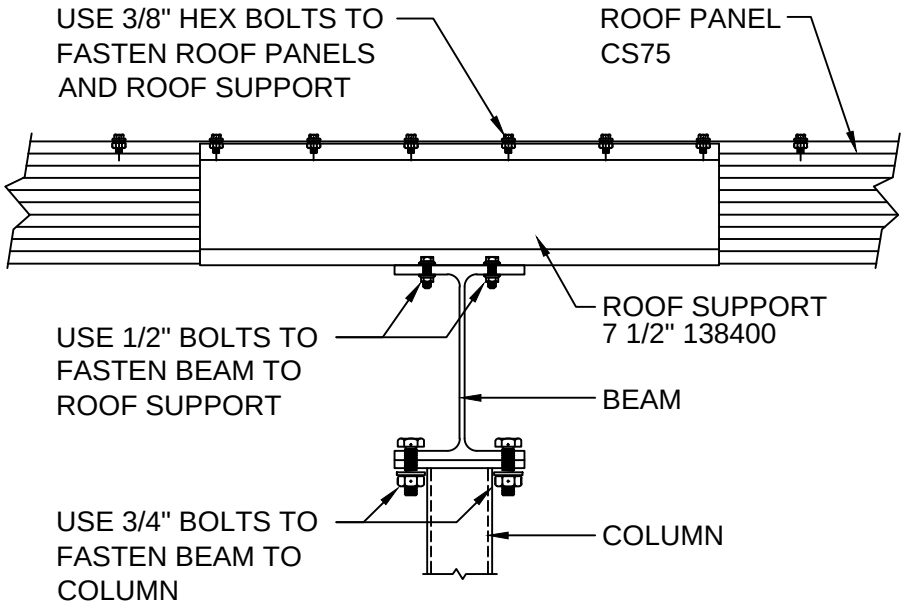
ROOF SUPPORT DETAIL



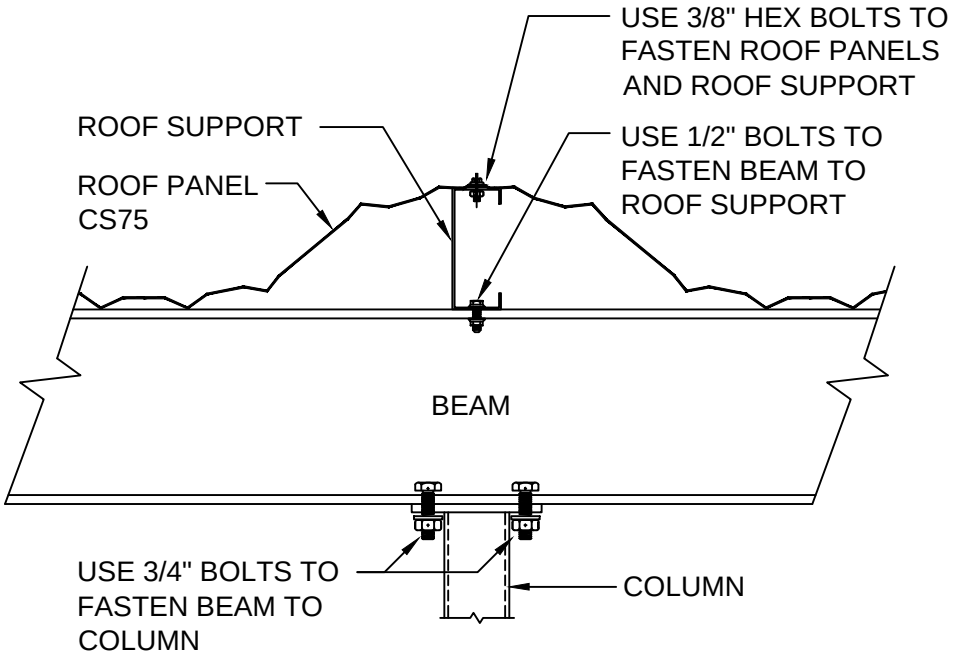
SECTION THROUGH ROOF SUPPORT

ROOF SUPPORT - CS45	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 007

BEHLEN
Made Strong



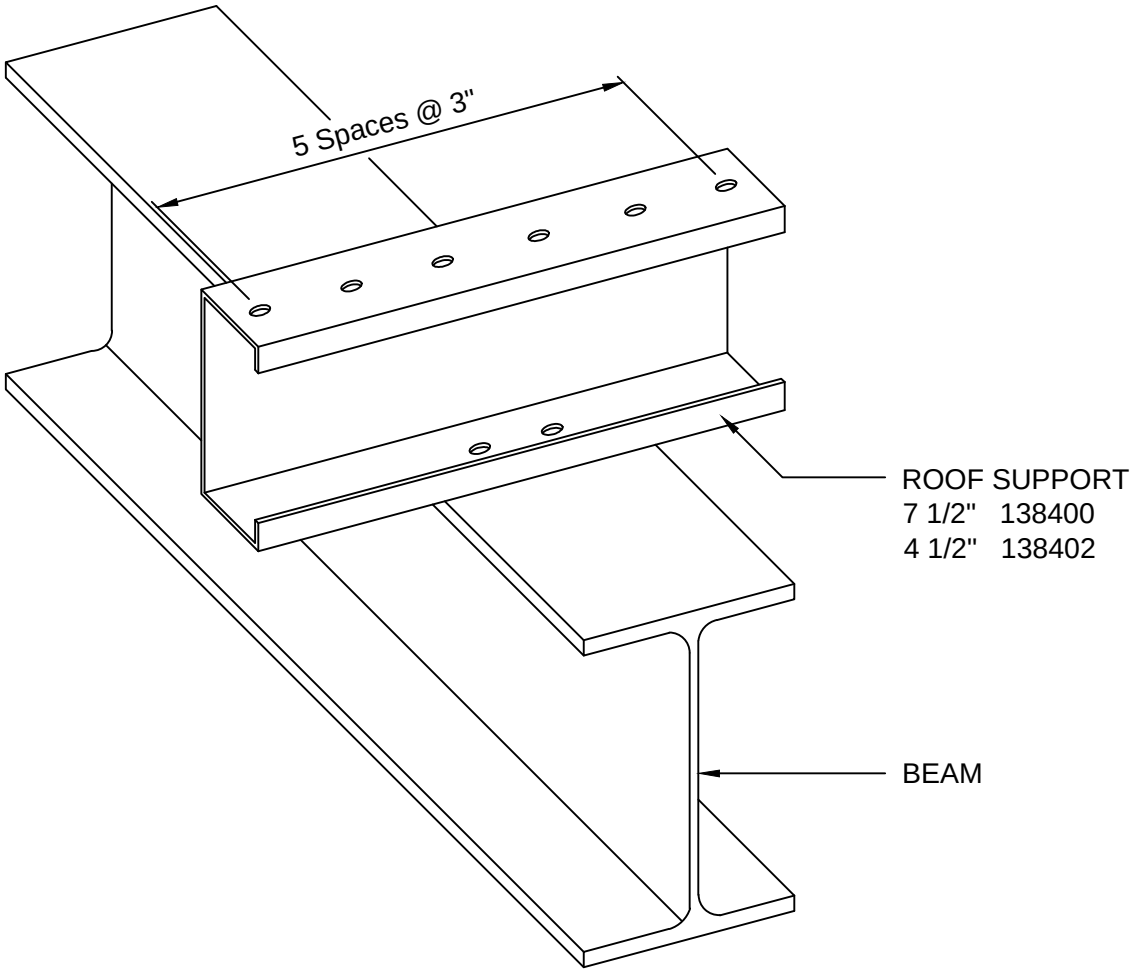
ROOF SUPPORT DETAIL



SECTION THROUGH ROOF SUPPORT

ROOF SUPPORT - CS75	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 008

BEHLEN
Made Strong



TYPICAL ROOF SUPPORT

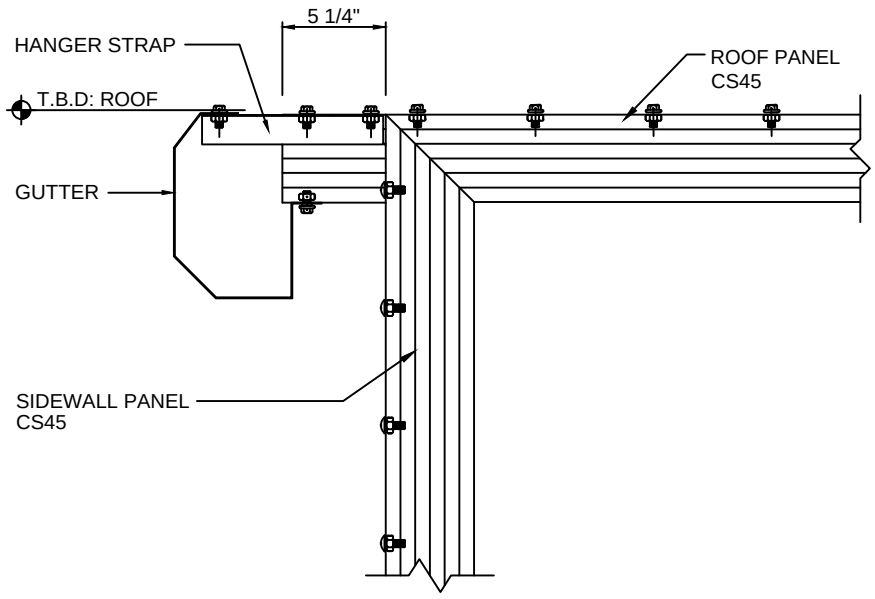
MAY 2014 Vr 1.1

SINGLE PANEL MODEL

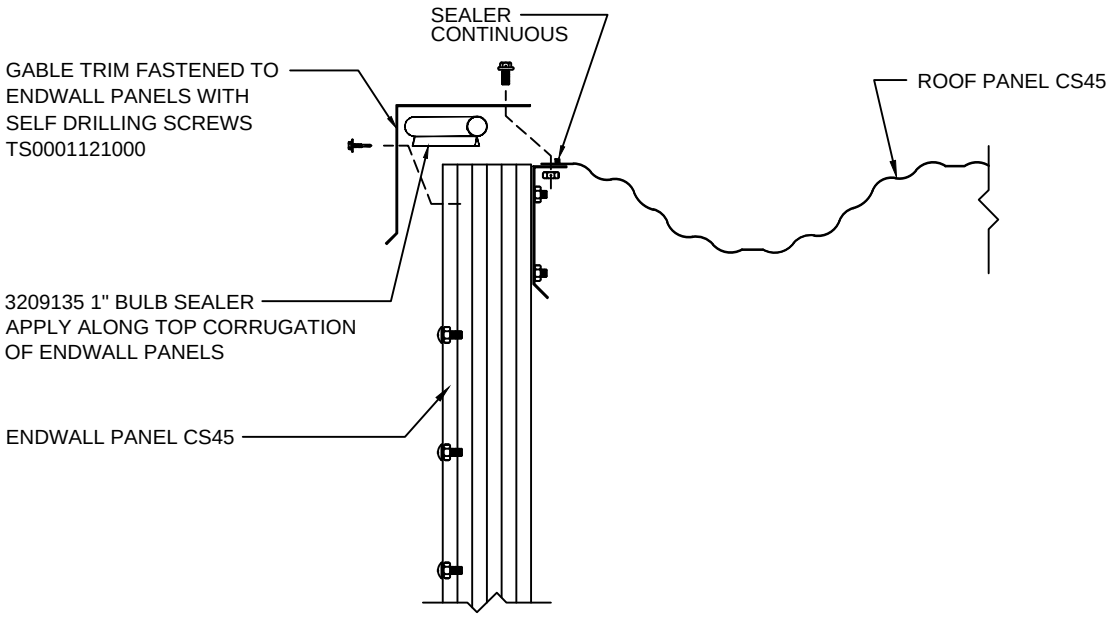
Section: 6

Page: 009

BEHLEN
Made Strong



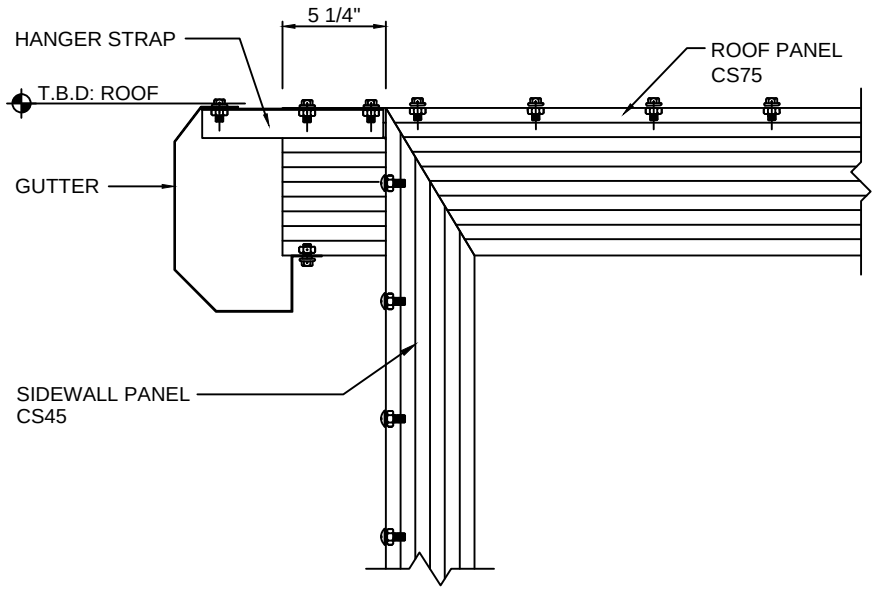
SIDEWALL SECTION



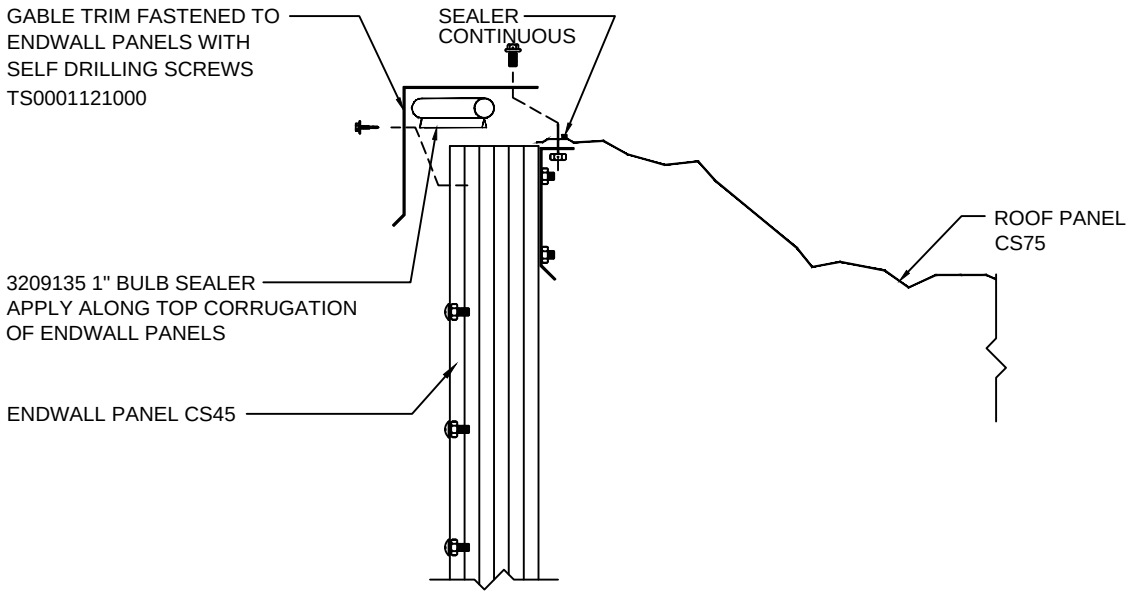
ENDWALL SECTION - CS45

WALL SECTIONS WITH CS45 ROOF	MAY 2014 Vr 1.1	
SINGLE PANEL MODEL	Section: 6	Page: 010

BEHLEN
Made Strong



SIDEWALL SECTION - CS75



ENDWALL SECTION - CS75

WALL SECTIONS WITH CS75 ROOF

MAY 2014 Vr 1.1

SINGLE PANEL MODEL

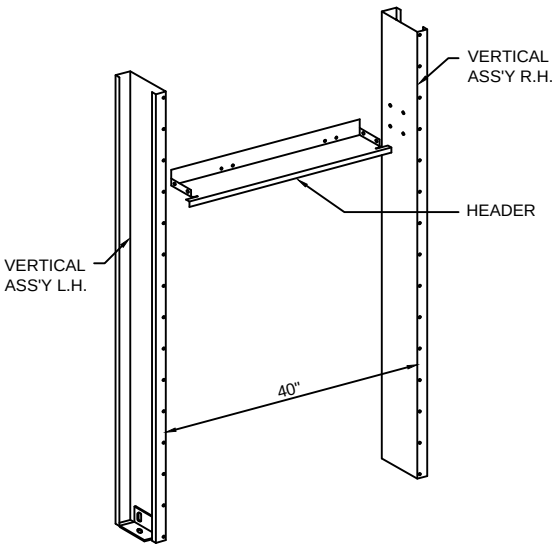
Section: 6

Page: 011

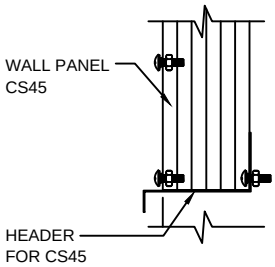
BEHLEN
Made Strong

SECTION 7
FRAMED OPENINGS

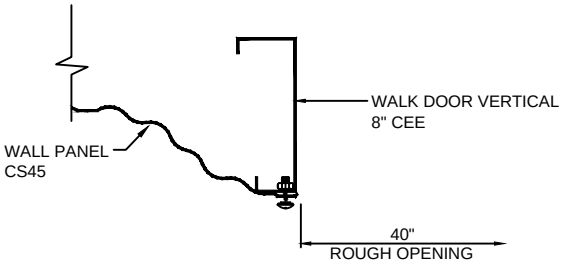
BEHLEN
Made Strong



SINGLE WALK DOOR FRAME - CS45
3'-4" x 7'-2"



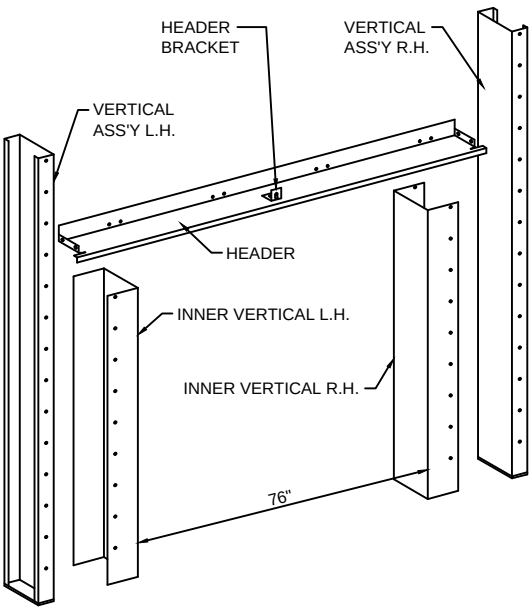
HEADER DETAIL



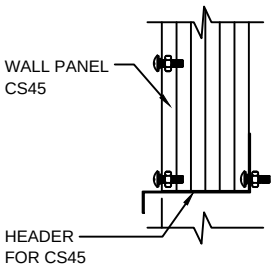
JAMB DETAIL

SINGLE WALK DOOR FRAME - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 002

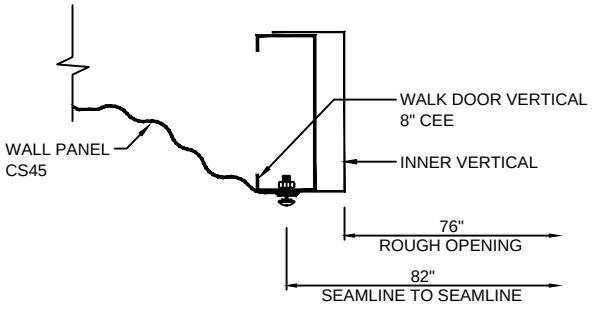
BEHLEN
Made Strong



DOUBLE WALK DOOR FRAME - CS45
6'-4" x 7'-2"



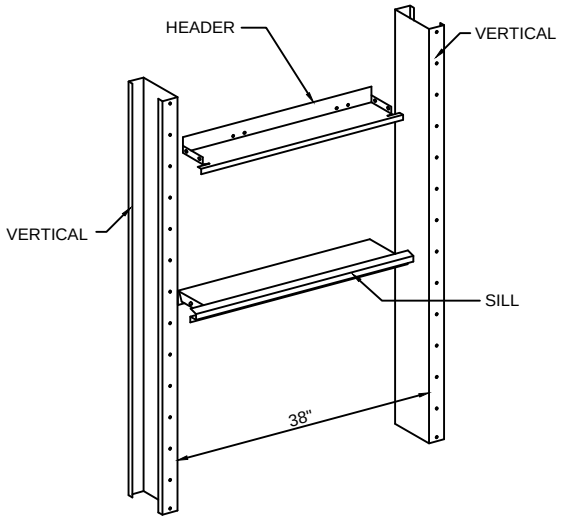
HEADER DETAIL



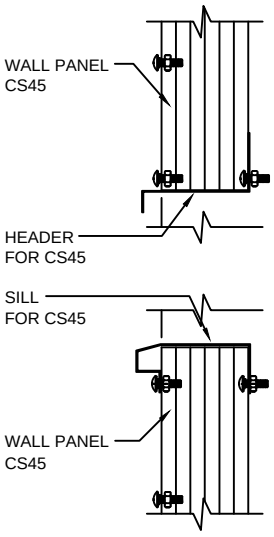
JAMB DETAIL

DOUBLE WALK DOOR FRAME - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 003

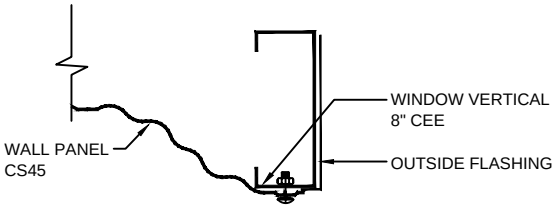
BEHLEN
Made Strong



SINGLE WINDOW - CS45
3'-2" x 4'-0"



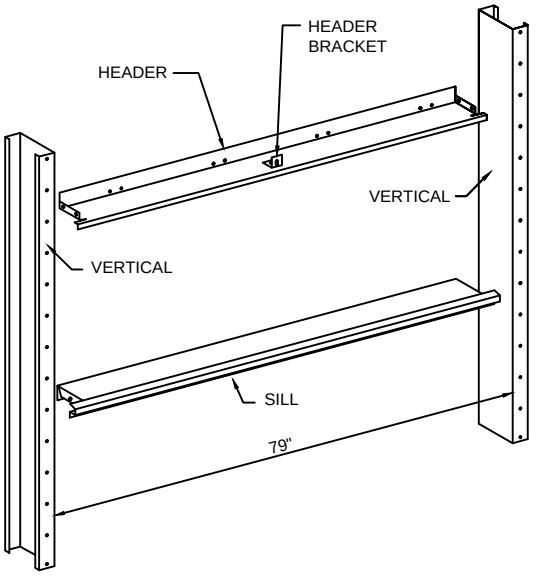
HEADER & SILL DETAIL



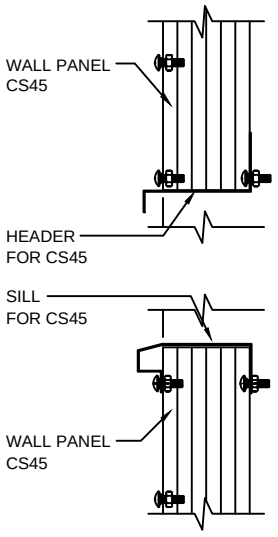
JAMB DETAIL

SINGLE WINDOW FRAME - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 004

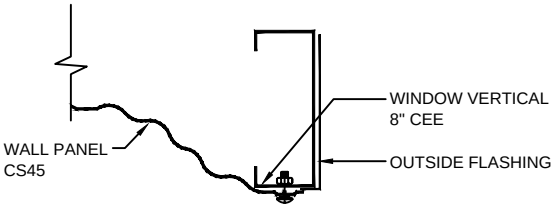
BEHLEN
Made Strong



DOUBLE WINDOW FRAME - CS45
6'-7" x 7'-2"



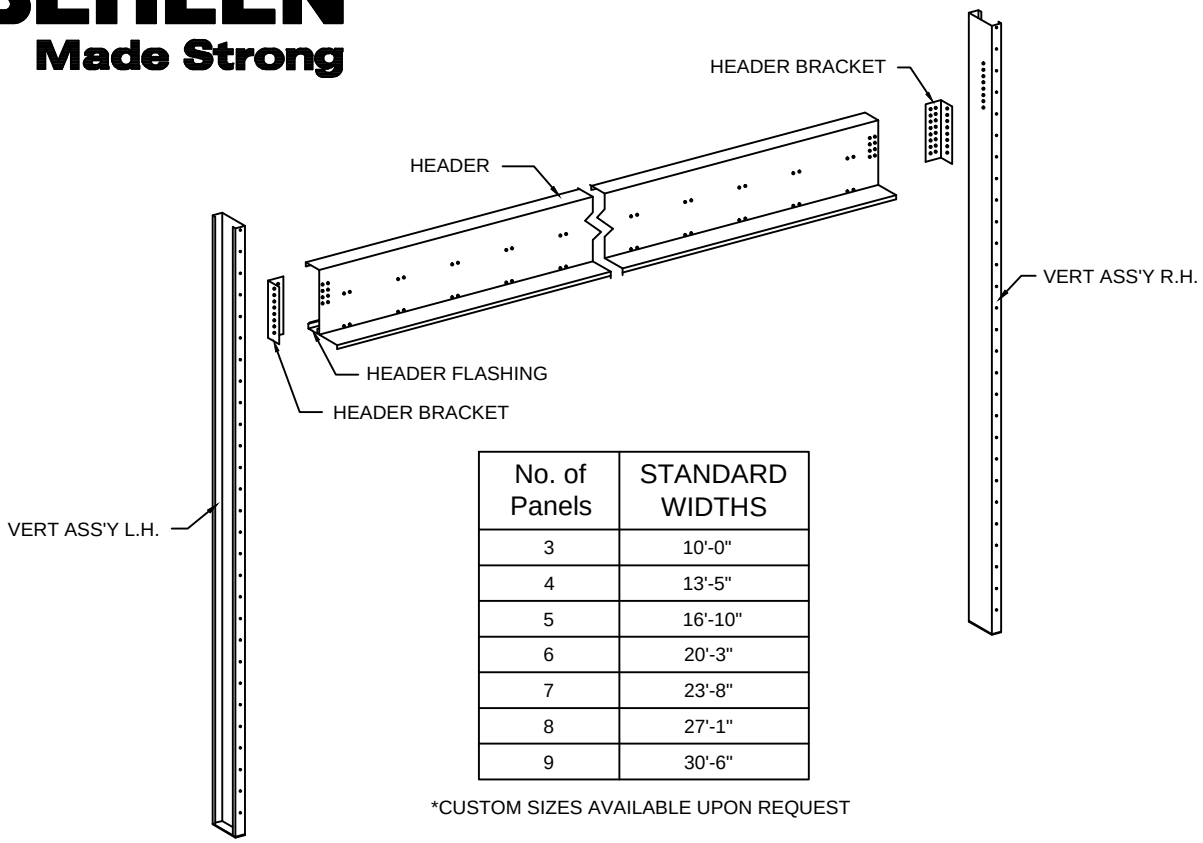
HEADER & SILL DETAIL



JAMB DETAIL

DOUBLE WINDOW FRAME - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 005

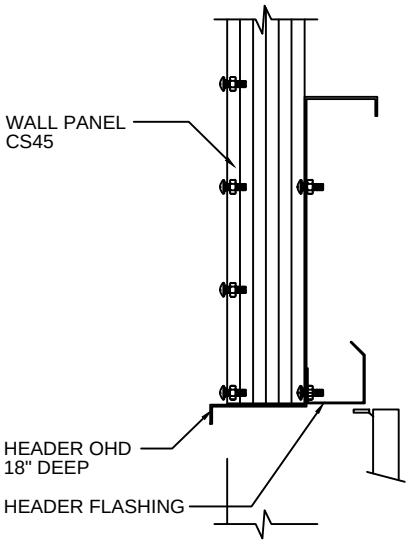
BEHLEN
Made Strong



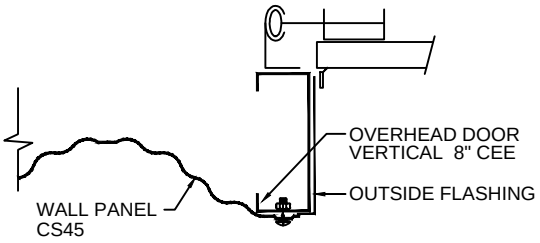
No. of Panels	STANDARD WIDTHS
3	10'-0"
4	13'-5"
5	16'-10"
6	20'-3"
7	23'-8"
8	27'-1"
9	30'-6"

*CUSTOM SIZES AVAILABLE UPON REQUEST

OVERHEAD DOOR FRAME - CS45
c/w CHANNEL VERTICALS & FORMED HEADER



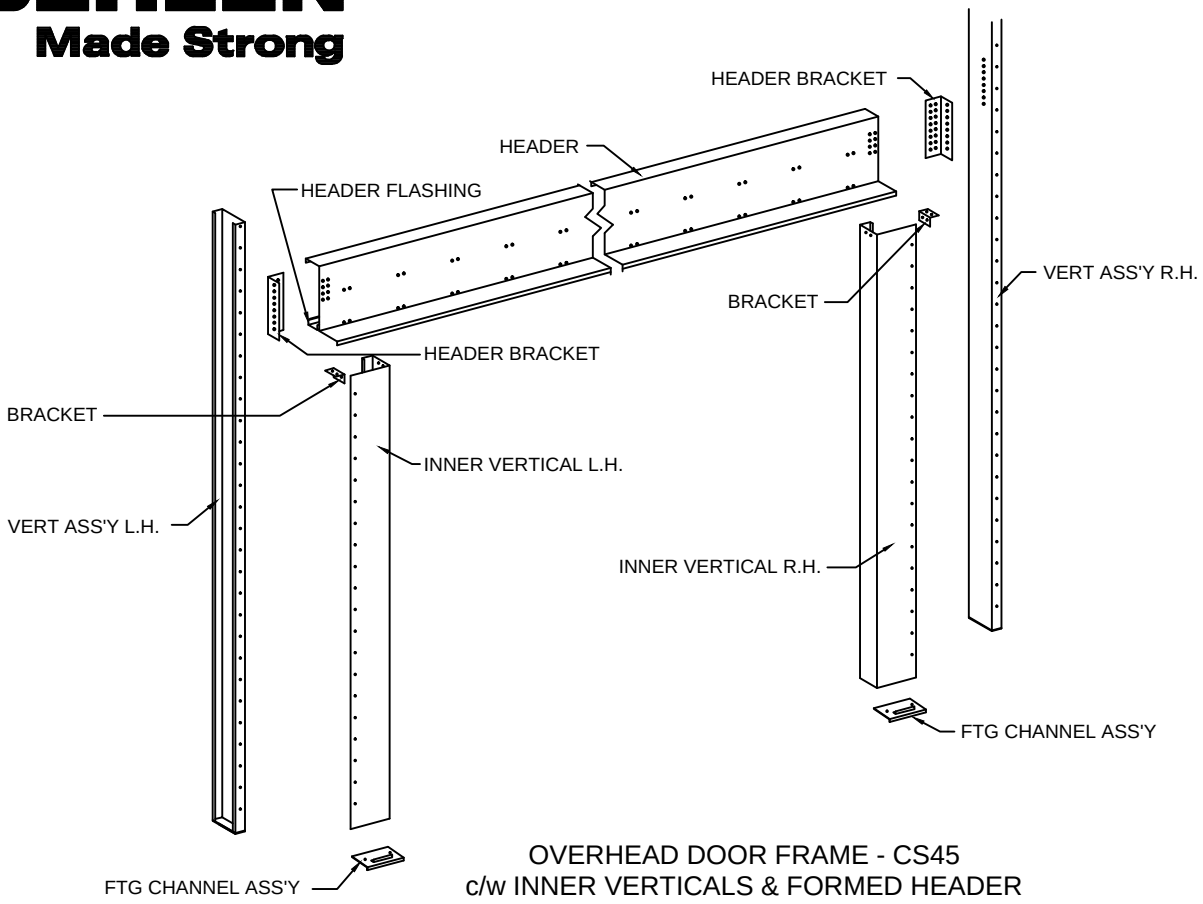
HEADER DETAIL



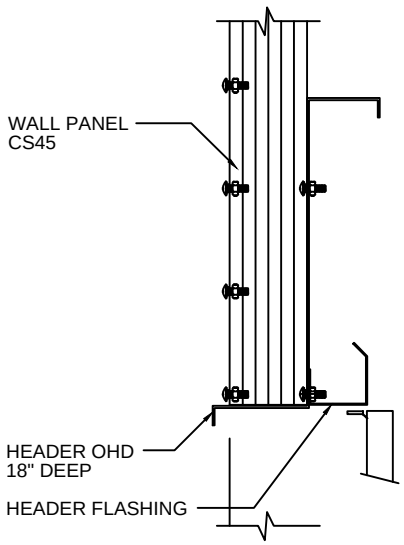
JAMB DETAIL

OVERHEAD DOOR FRAME - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 006

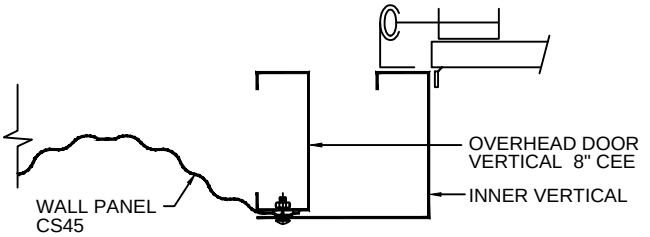
BEHLEN
Made Strong



OVERHEAD DOOR FRAME - CS45
c/w INNER VERTICALS & FORMED HEADER



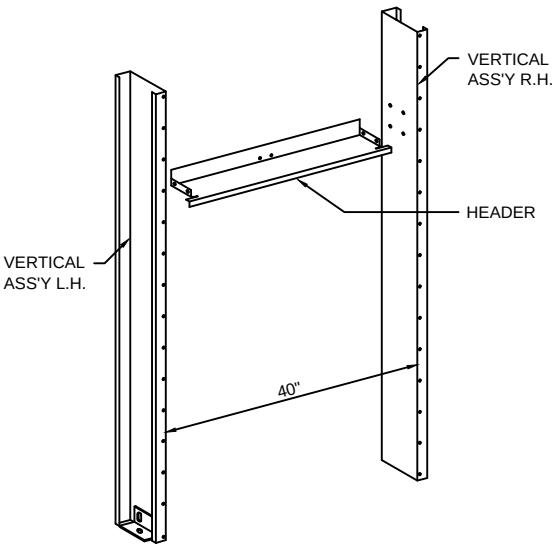
HEADER DETAIL



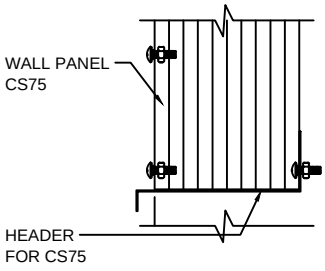
JAMB DETAIL

OVERHEAD DOOR c/w INNER VERTICALS - CS45	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 007

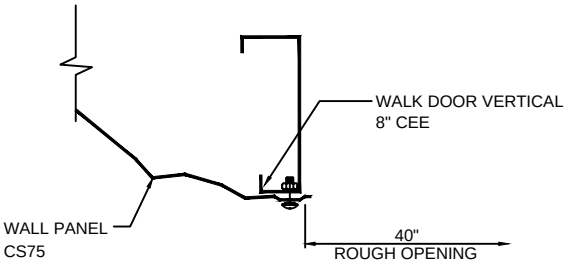
BEHLEN
Made Strong



SINGLE WALK DOOR FRAME - CS75
3'-4" x 7'-2"



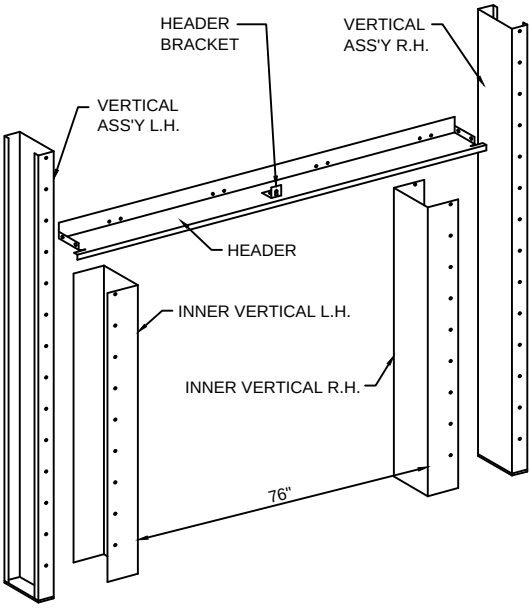
HEADER DETAIL



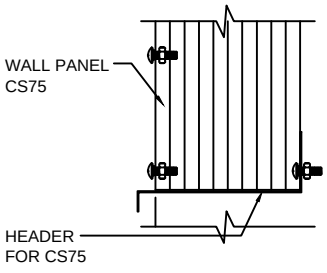
JAMB DETAIL

SINGLE WALK DOOR FRAME - CS75	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 008

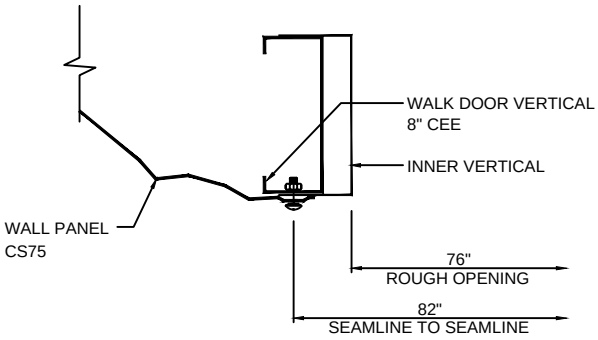
BEHLEN
Made Strong



DOUBLE WALK DOOR FRAME - CS75
6'-4" x 7'-2"



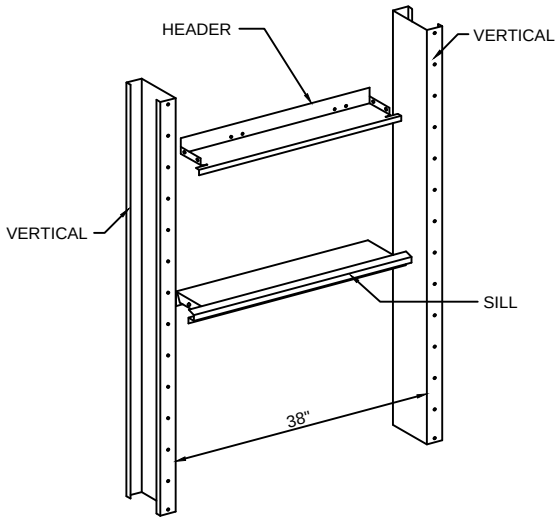
HEADER DETAIL



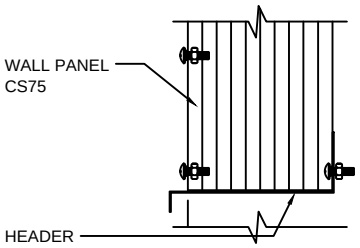
JAMB DETAIL

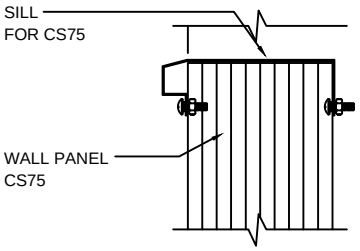
DOUBLE WALK DOOR FRAME - CS75	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 009

BEHLEN
Made Strong

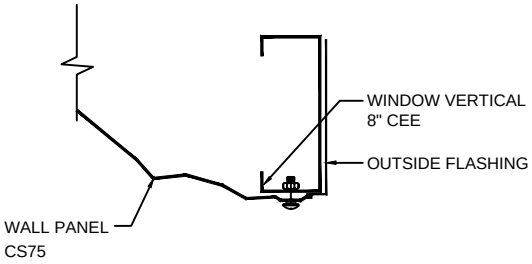


SINGLE WINDOW - CS75
3'-2" x 4'-0"





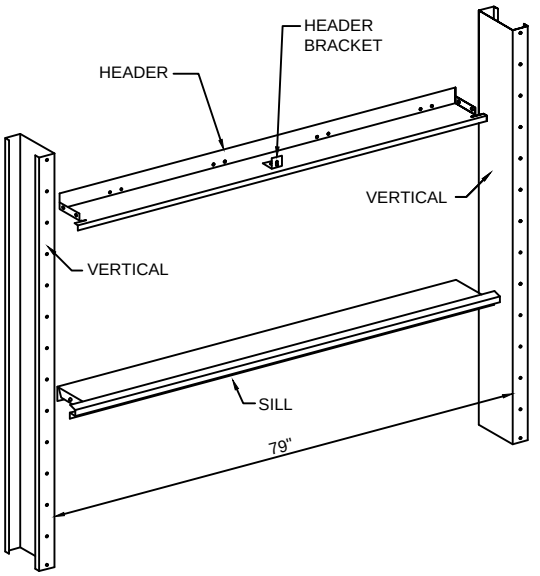
HEADER & SILL DETAIL



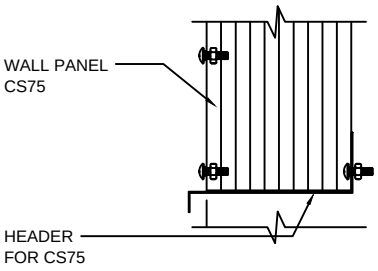
JAMB DETAIL

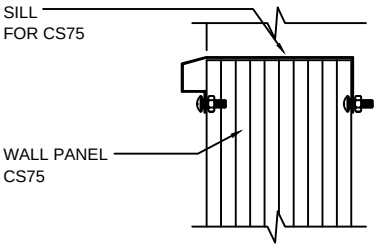
SINGLE WINDOW FRAME - CS75	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 010

BEHLEN
Made Strong

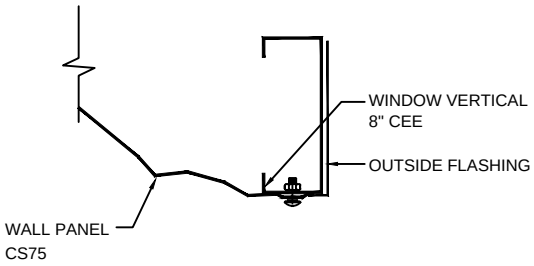


DOUBLE WINDOW FRAME - CS75
6'-7" x 7'-2"





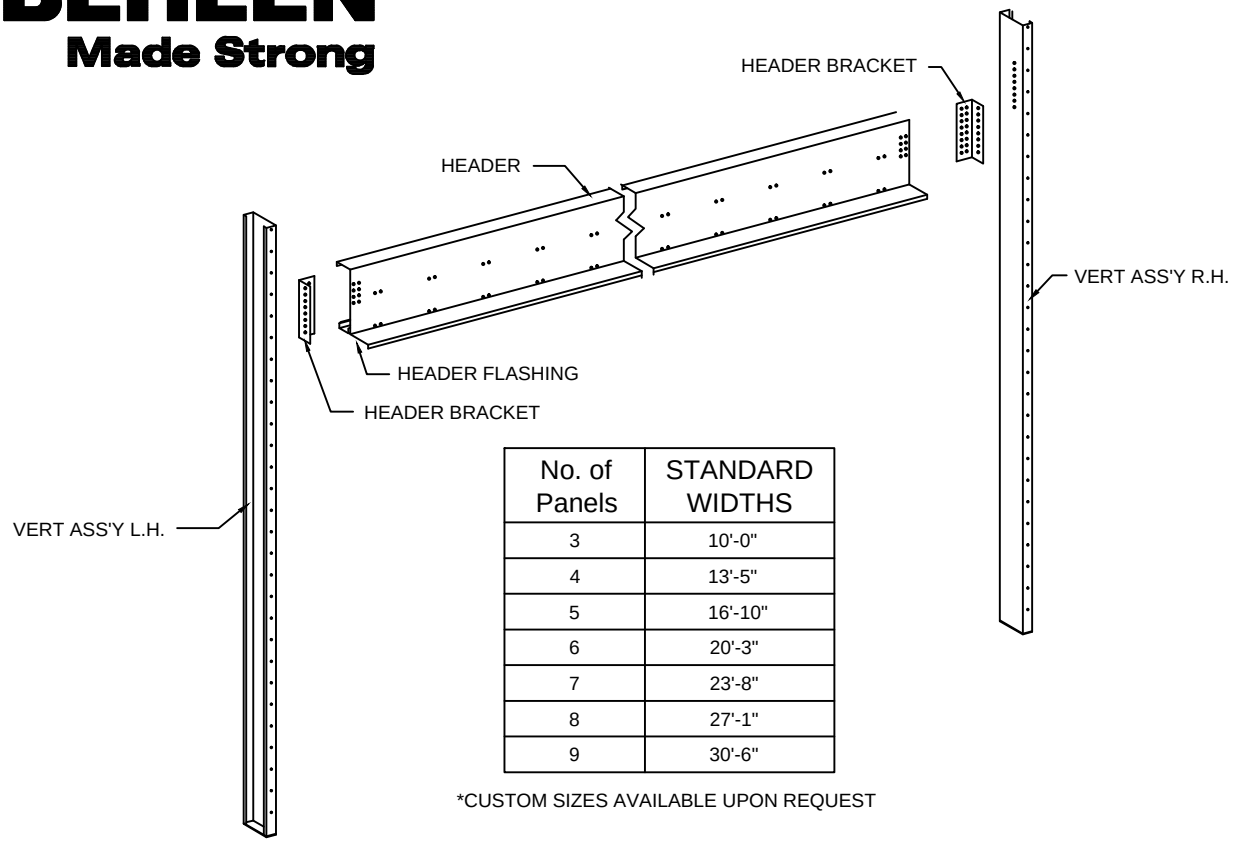
HEADER & SILL DETAIL



JAMB DETAIL

DOUBLE WINDOW FRAME - CS75	MAY 2014 Vr 1.1	
FRAMED OPENINGS	Section: 7	Page: 011

BEHLEN
Made Strong



No. of Panels	STANDARD WIDTHS
3	10'-0"
4	13'-5"
5	16'-10"
6	20'-3"
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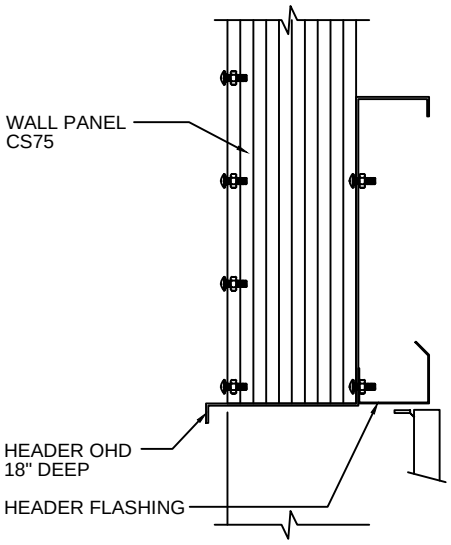
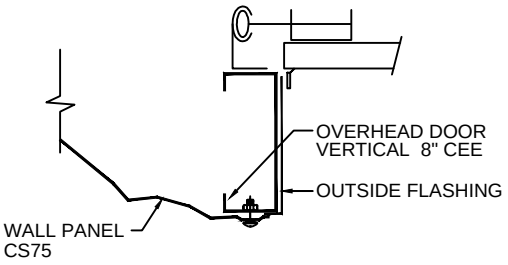
9	30'-6"

*CUSTOM SIZES AVAILABLE UPON REQUEST

OVERHEAD DOOR FRAME - CS75
c/w CHANNEL VERTICALS & FORMED HEADER

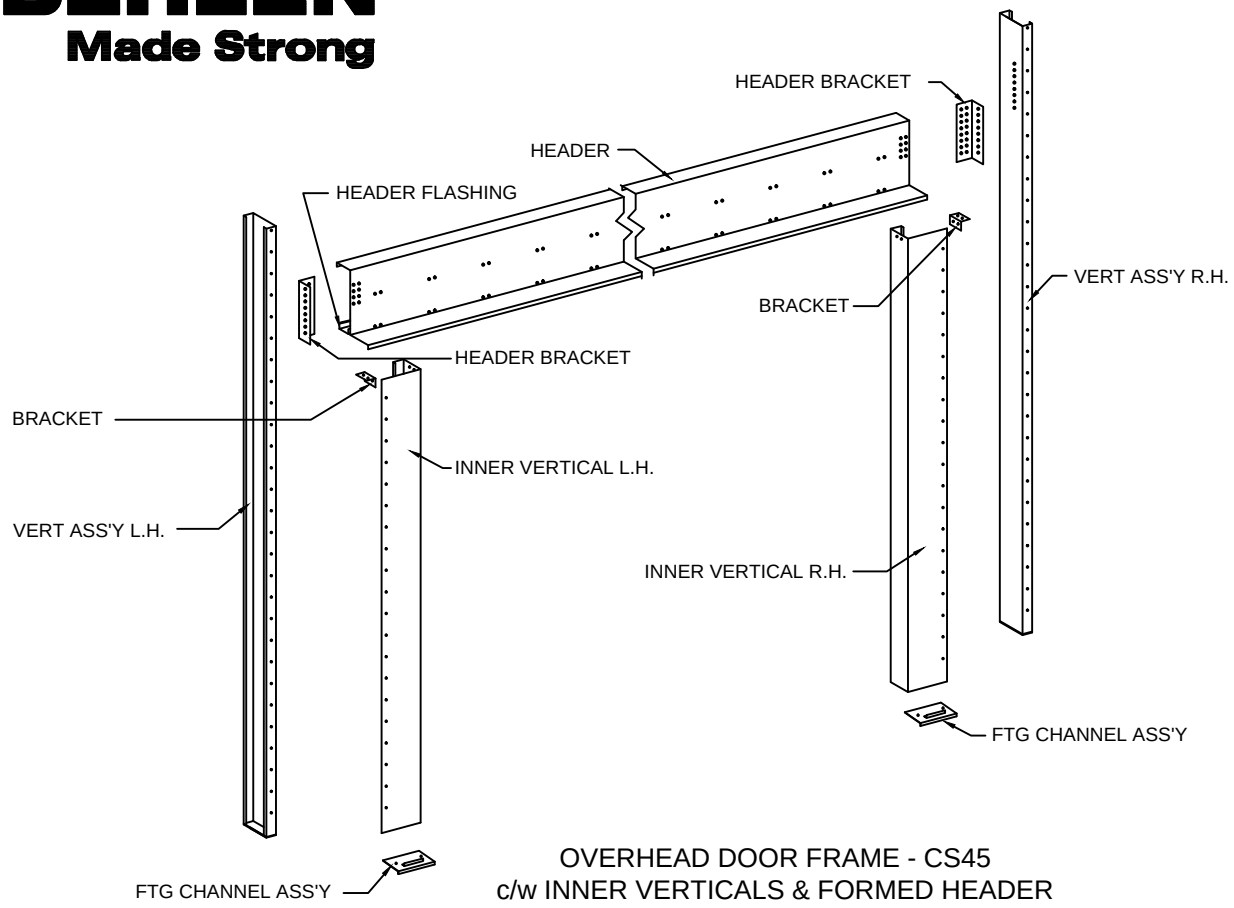


HEADER DETAIL

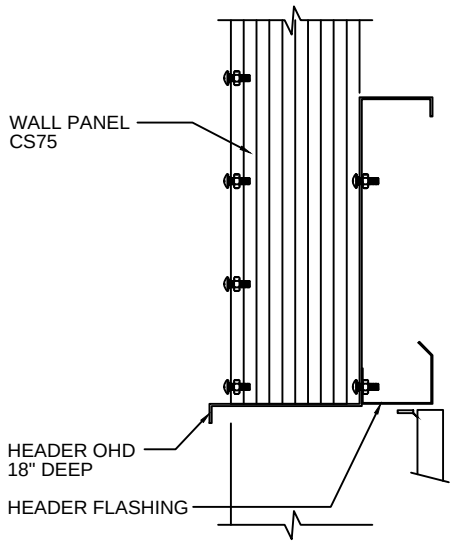


JAMB DETAIL

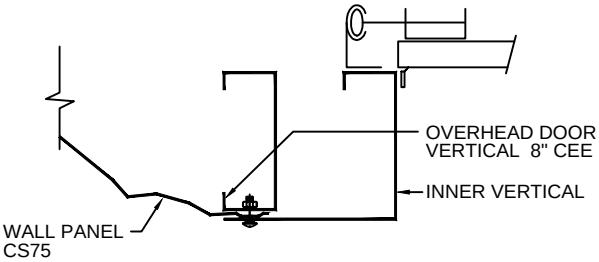
BEHLEN
Made Strong



OVERHEAD DOOR FRAME - CS45
c/w INNER VERTICALS & FORMED HEADER



HEADER DETAIL



JAMB DETAIL

OVERHEAD DOOR c/w INNER VERTICALS - CS75	MAY 2014 Vr 1.1	
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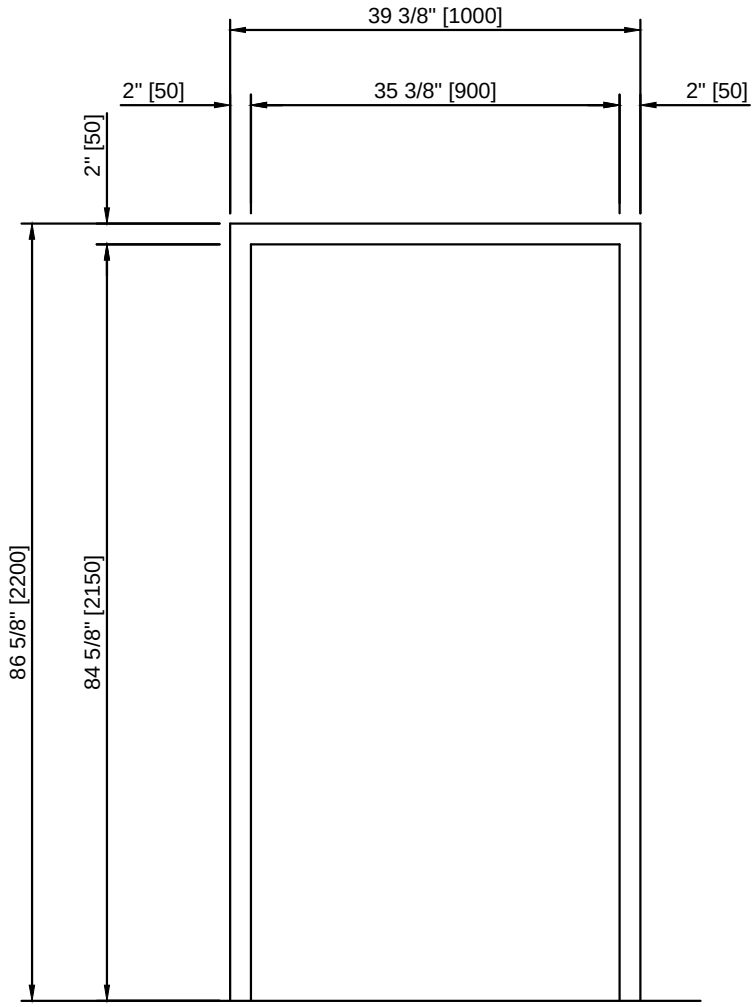
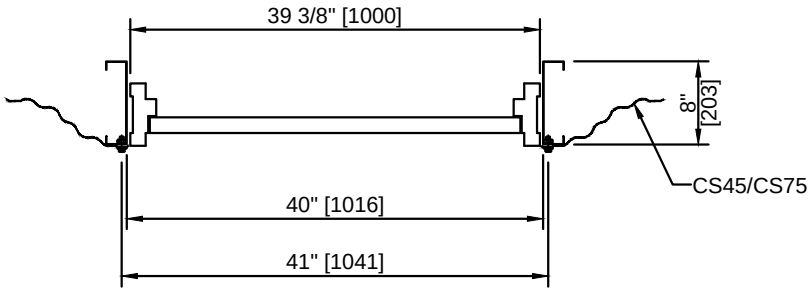
BEHLEN
Made Strong



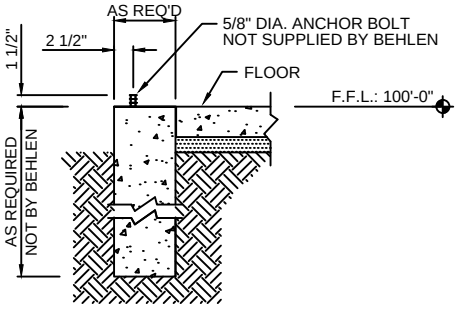
TYPICAL SINGLE METRIC DOOR JAMB
REPLACES IMPERIAL 3'-4" x 7'-2" DOOR JAMB



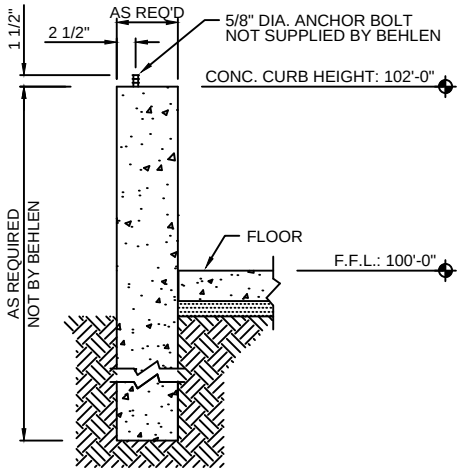
BEHLEN
Made Strong

SECTION 8
FOUNDATIONS AND CONCRETE

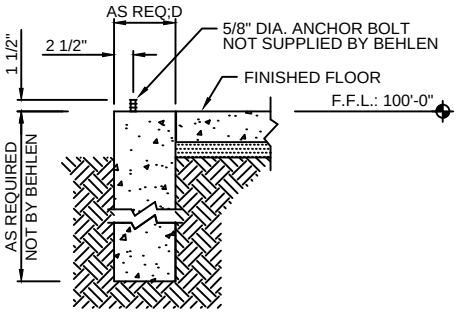
BEHLEN
Made Strong



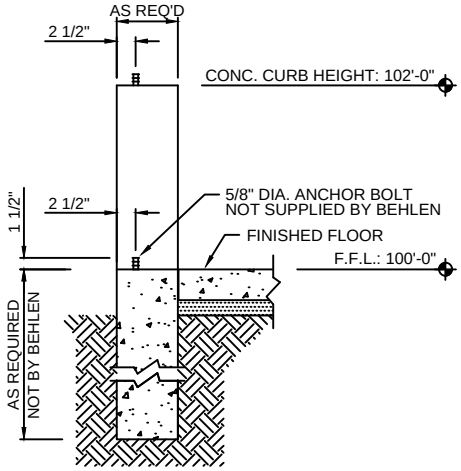
FOUNDATION DETAIL
TYPICAL



FOUNDATION DETAIL
TYPICAL



FOUNDATION DETAIL
AT OVERHEAD DOOR



FOUNDATION DETAIL
AT OVERHEAD DOOR

FOUNDATION DETAILS - CS45	MAY 2014 Vr 1.1	
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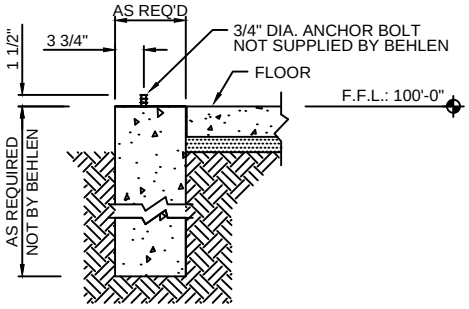
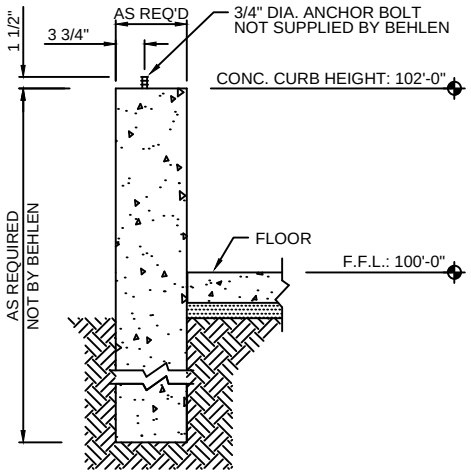
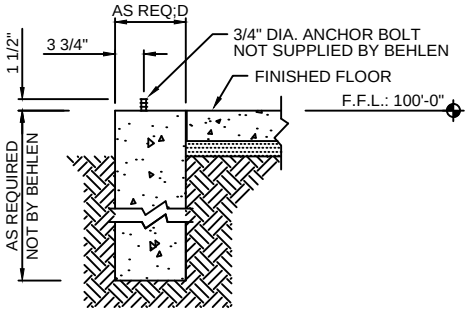
BEHLEN
Made Strong



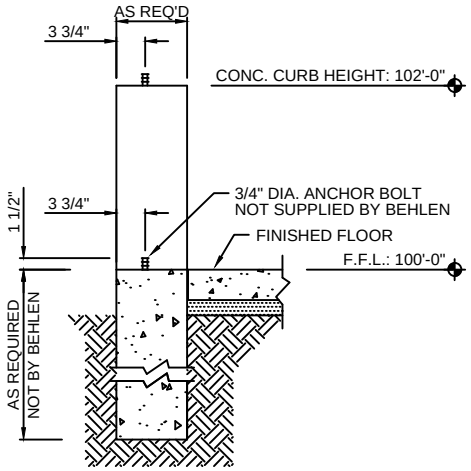
FOUNDATION DETAIL
TYPICAL



FOUNDATION DETAIL
TYPICAL



FOUNDATION DETAIL
AT OVERHEAD DOOR



FOUNDATION DETAIL
AT OVERHEAD DOOR

FOUNDATION DETAILS - CS75	MAY 2014 Vr 1.1	
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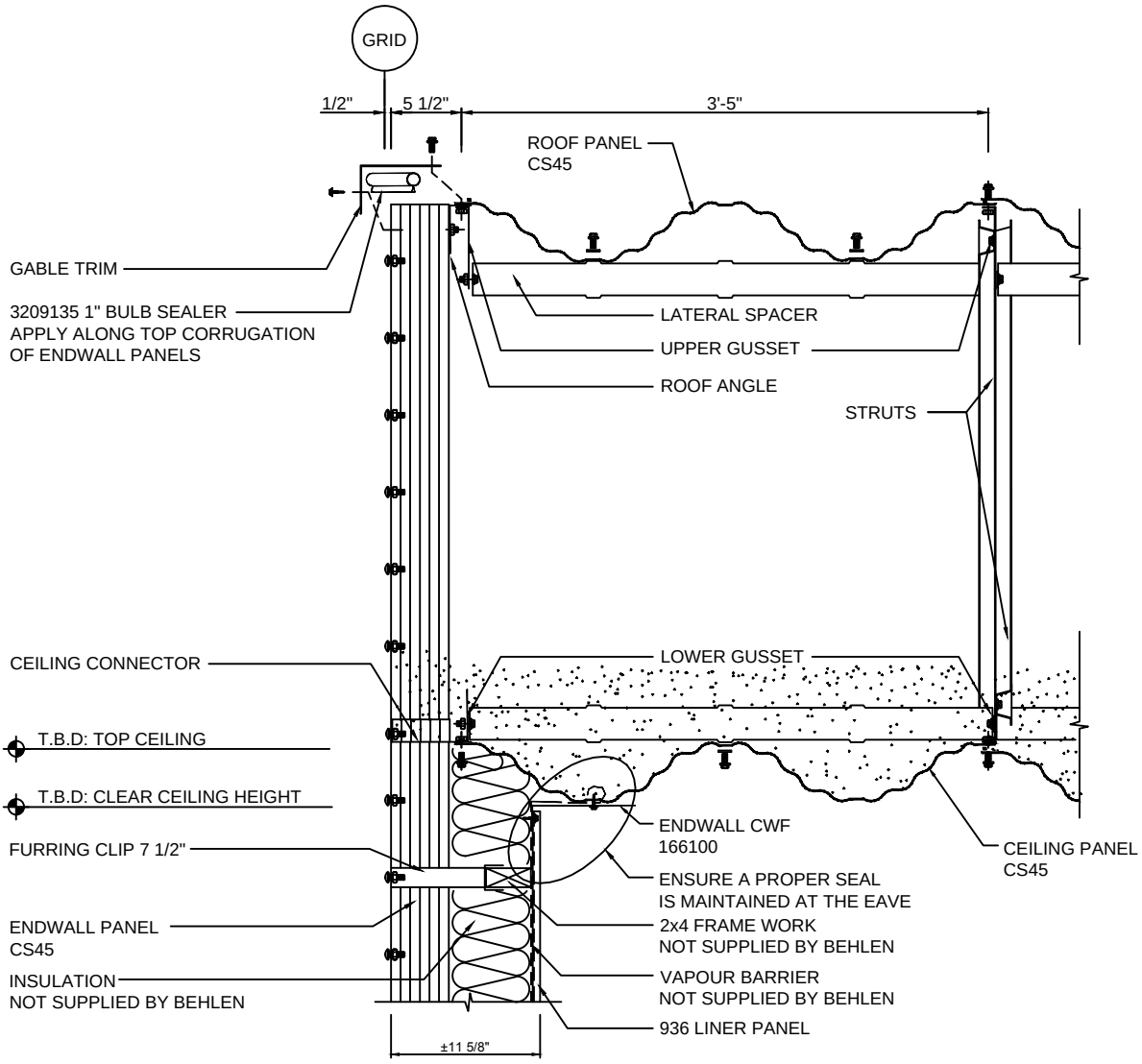
BEHLEN
Made Strong

SECTION 9
INSULATION

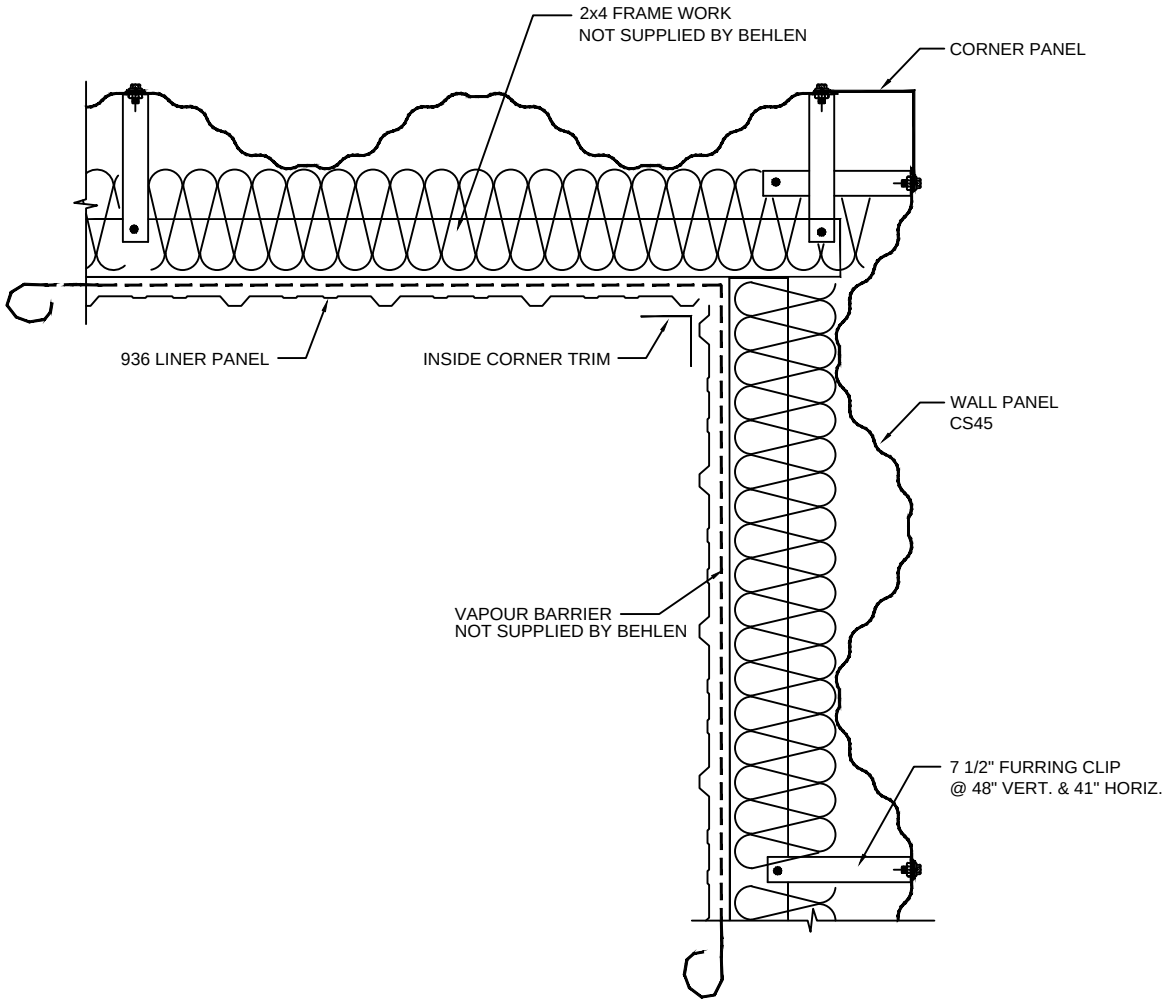
BEHLEN
Made Strong



ENDWALL SECTION - CS45

ENDWALL SECTION - CS45	MAY 2014 Vr 1.1	
INSULATION	Section: 9	Page: 002

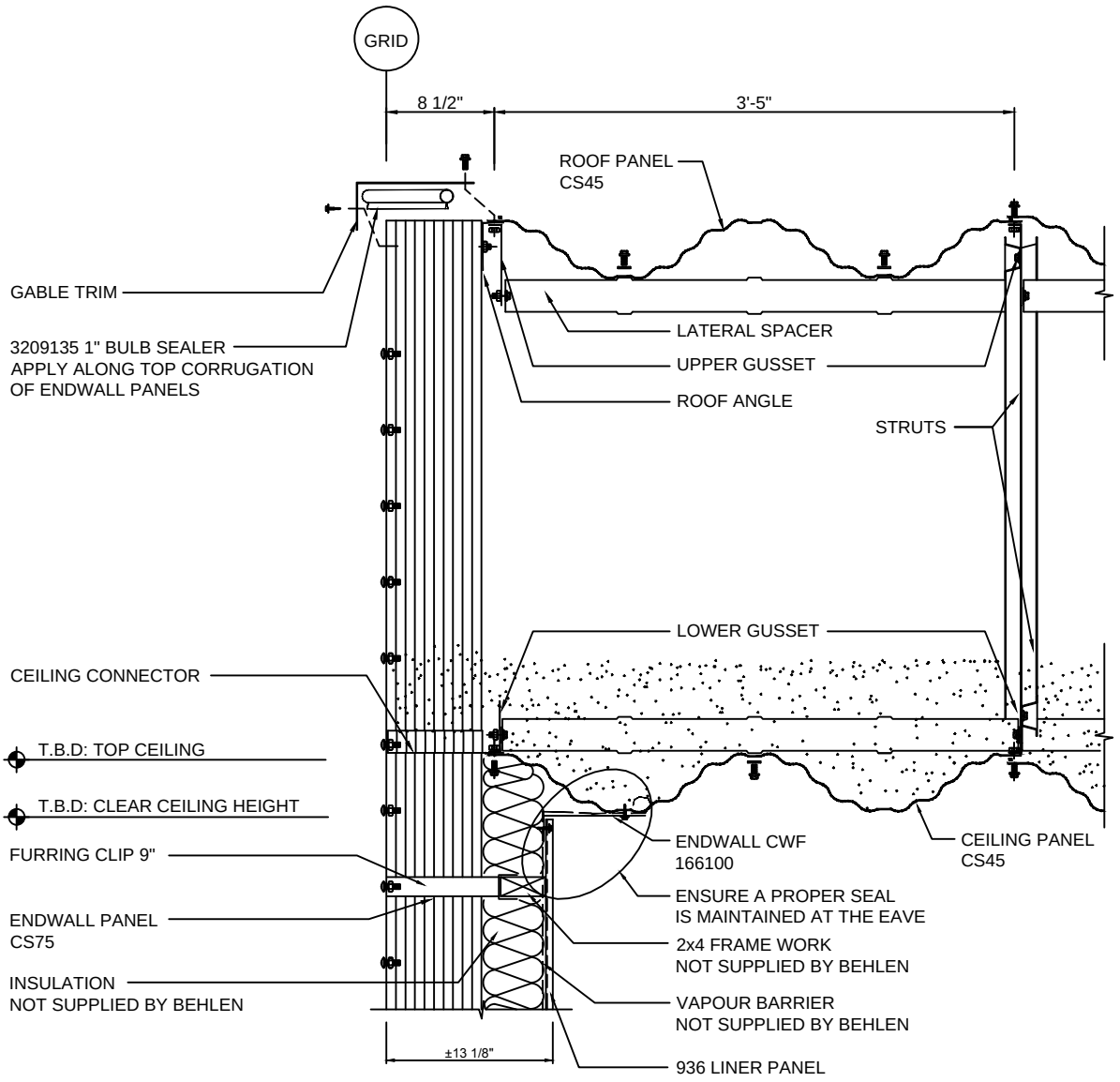
BEHLEN
Made Strong



936 LINER DETAIL - CS45

936 LINER DETAIL - CS45	MAY 2014 Vr 1.1	
INSULATION	Section: 9	Page: 003

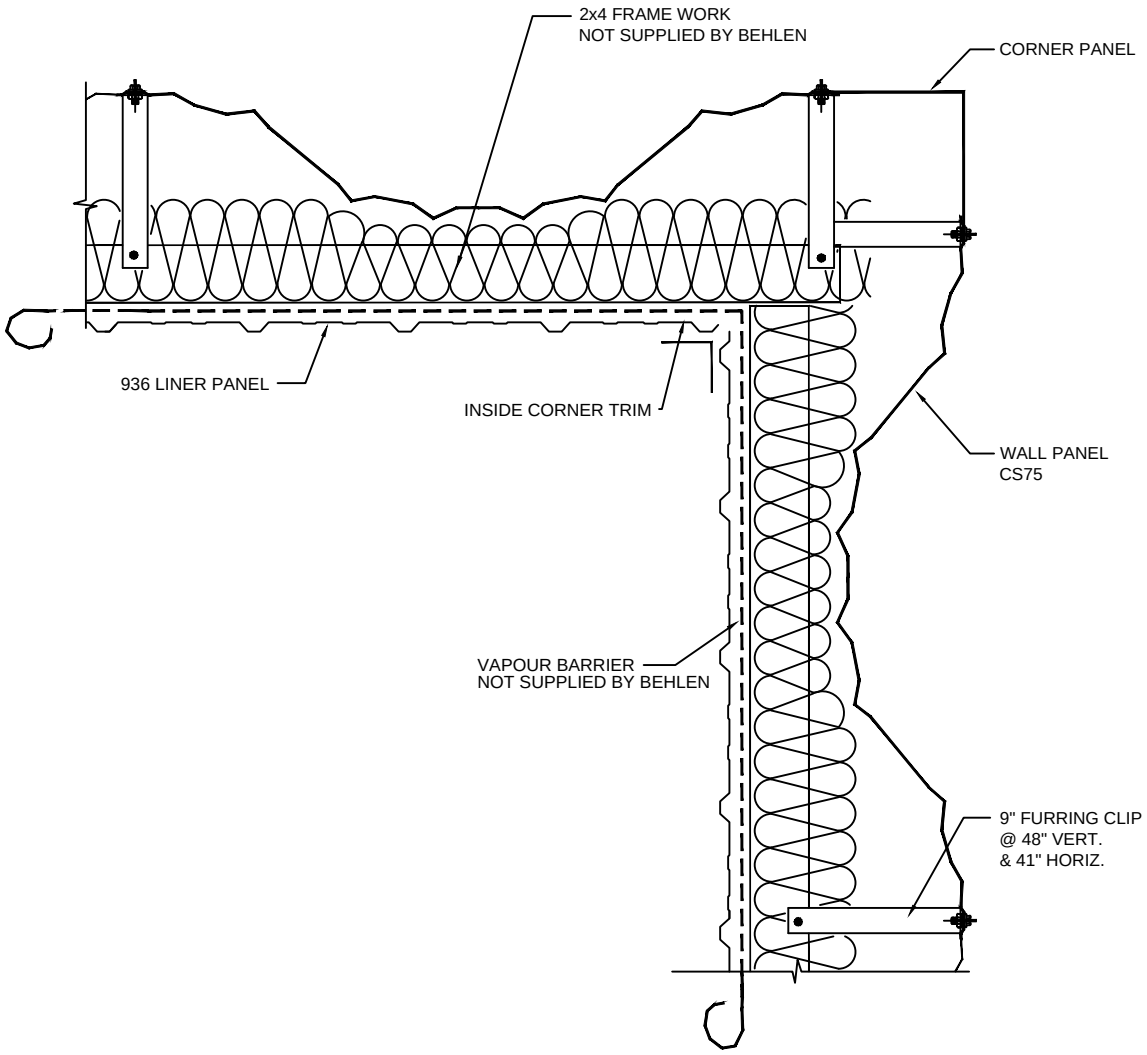
BEHLEN
Made Strong



ENDWALL SECTION - CS75

ENDWALL SECTION - CS75	MAY 2014 Vr 1.1	
INSULATION	Section: 9	Page: 004

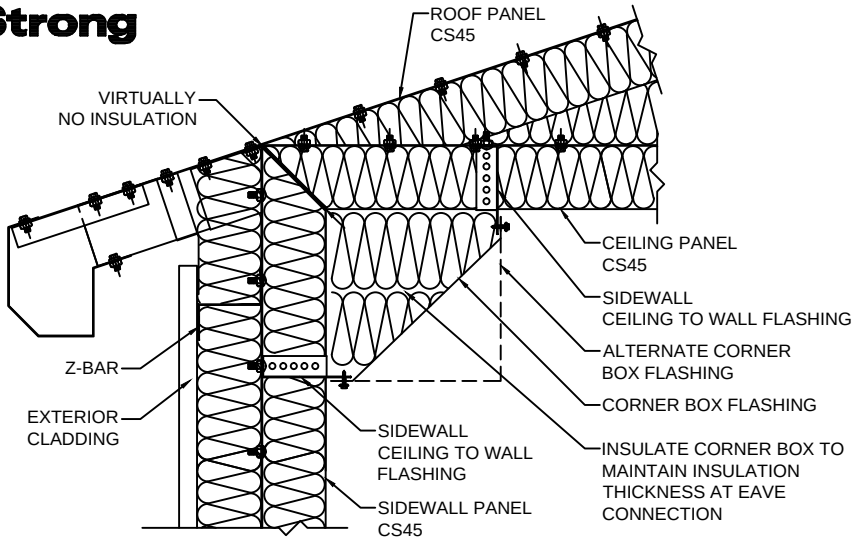
BEHLEN
Made Strong



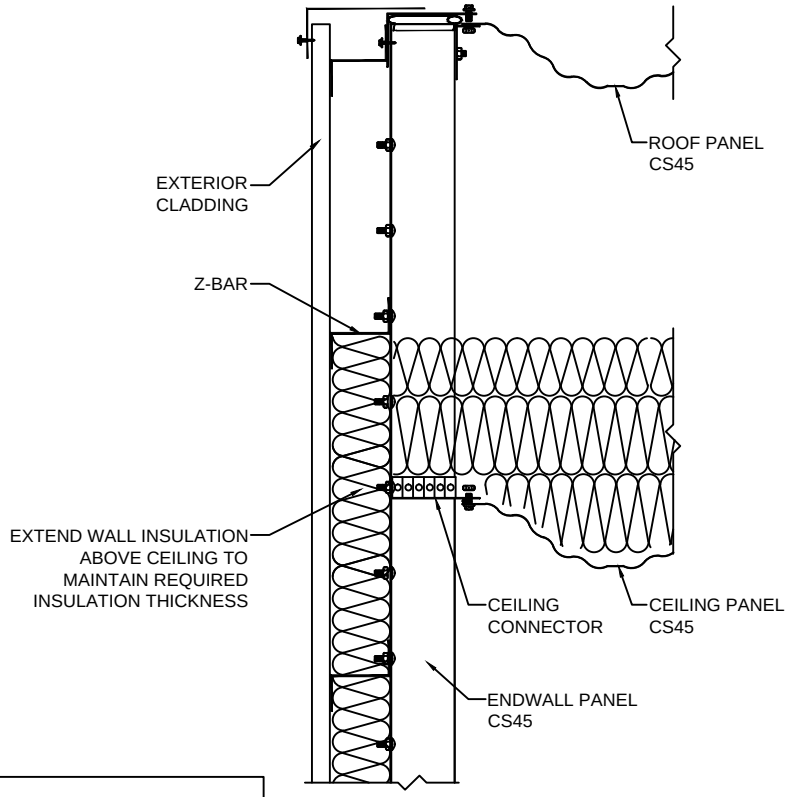
936 LINER DETAIL - CS75

936 LINER DETAIL - CS75	MAY 2014 Vr 1.1	
INSULATION	Section: 9	Page: 005

BEHLEN
Made Strong



CONVEX SIDEWALL



CONVEX ENDWALL

NOTE:
CONFIRM OPTION ABOVE AT THE TIME OF QUOTING. CORNER BOX DETAILS AT ENDWALLS TO BE DETERMINED BASED ON BUILDING WIDTH/ENDWALL CORNER DIMENSION.

CONVEX EAVE - EXTERIOR CLADDING

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INSULATION

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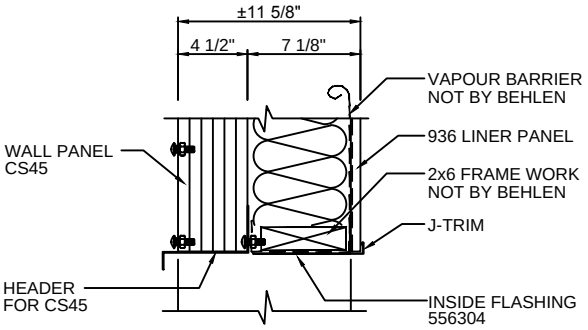
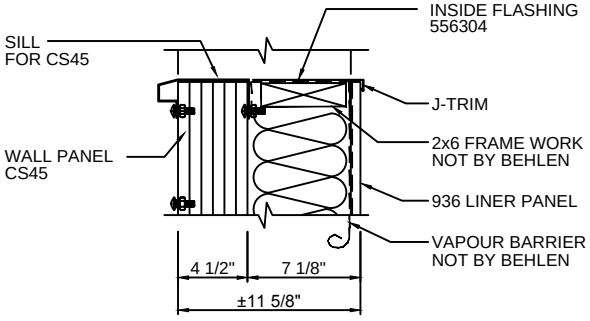
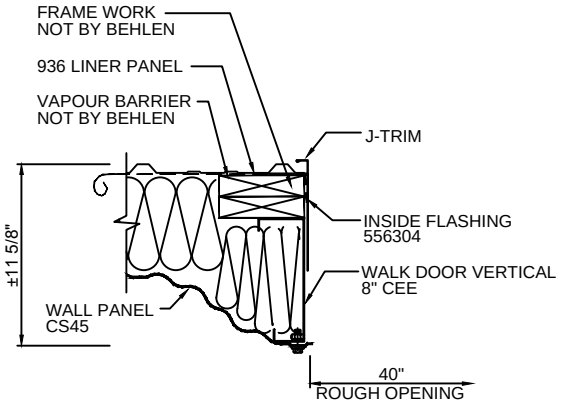
BEHLEN
Made Strong



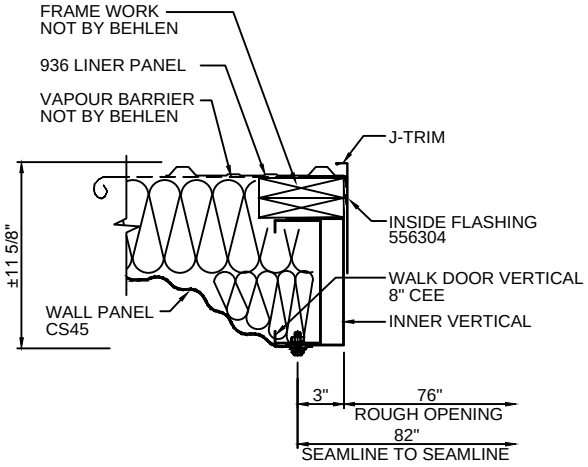
HEADER DETAIL - TYPICAL
FOR WALK DOORS AND WINDOWS



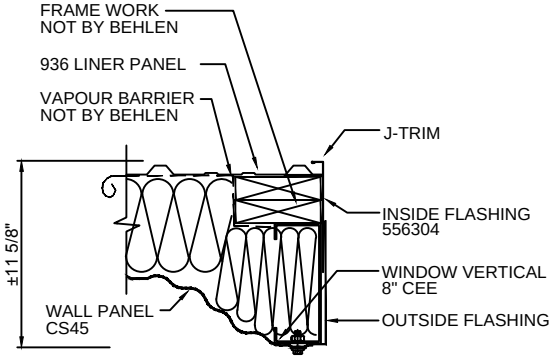
SILL DETAIL - TYPICAL
FOR WINDOWS



INSULATION & JAMB DETAIL FOR
SINGLE WALK DOOR FRAME



INSULATION & JAMB DETAIL FOR
DOUBLE WALK DOOR FRAME



INSULATION & JAMB DETAIL FOR
WINDOW FRAMES

WALK DOOR & WINDOW FRAMES - CS45

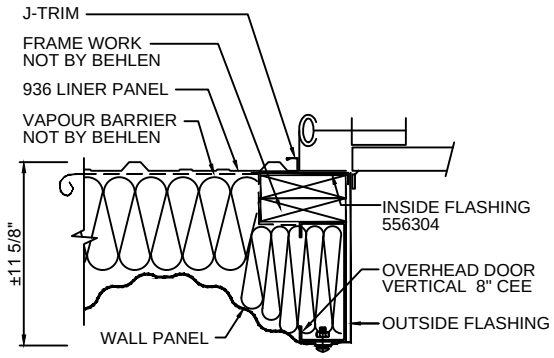
MAY 2014 Vr 1.1

INSULATION

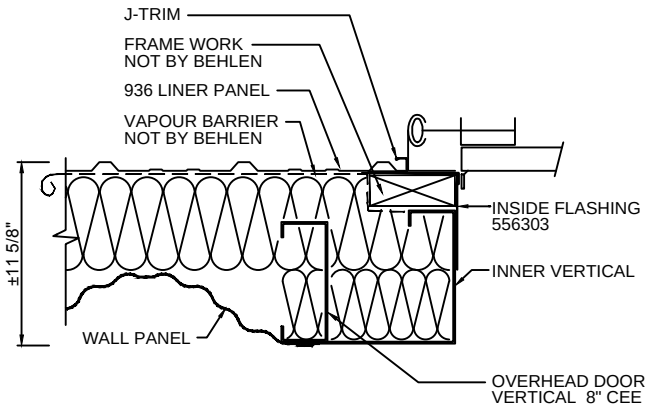
Section: 9

Page: 007

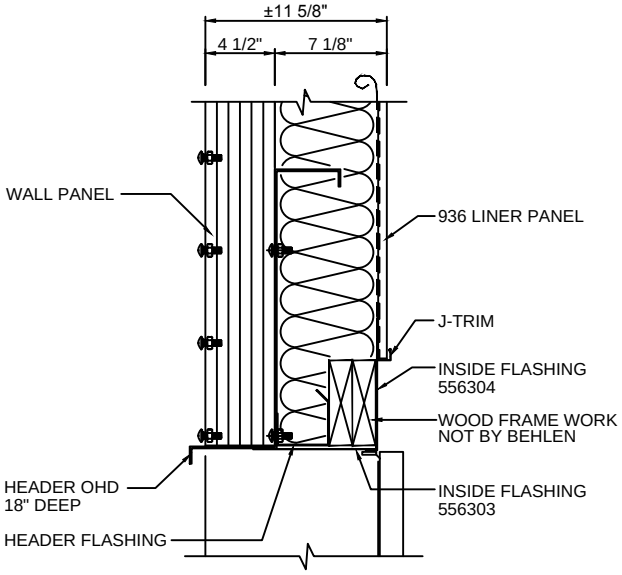
BEHLEN
Made Strong



INSULATION & JAMB DETAIL
FOR OVERHEAD DOOR FRAME

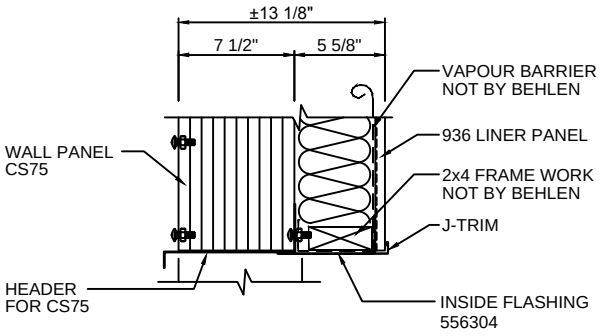


INSULATION & JAMB DETAIL
FOR OVERHEAD DOOR FRAME
c/w INNER VERTICALS

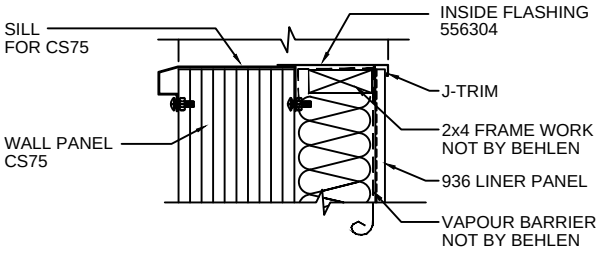


HEADER DETAIL - TYPICAL

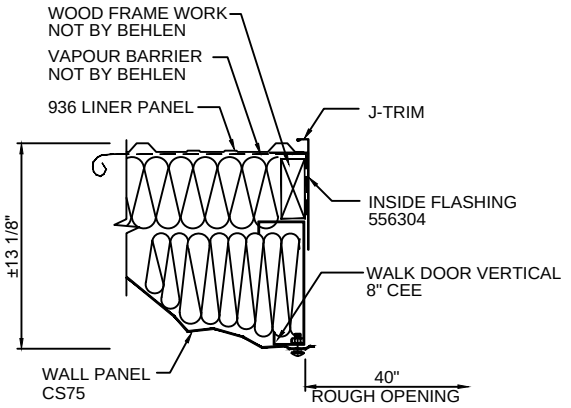
BEHLEN
Made Strong



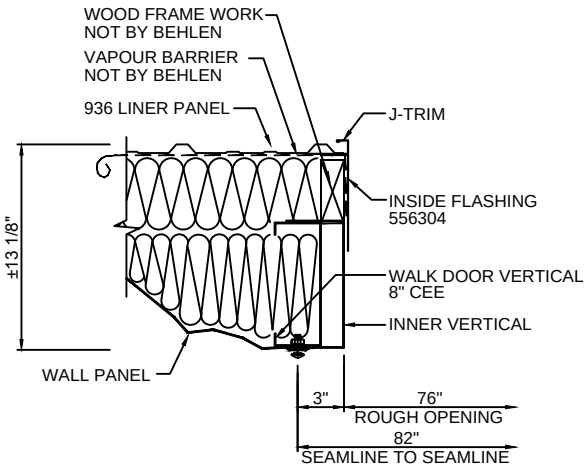
HEADER DETAIL - TYPICAL
FOR WALK DOORS AND WINDOWS



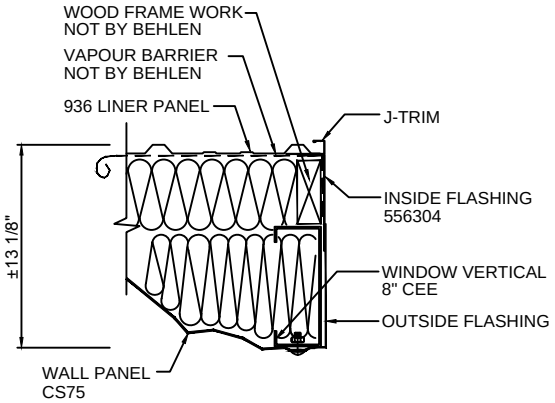
SILL DETAIL - TYPICAL
FOR WINDOW FRAMES



INSULATION & JAMB DETAIL FOR
SINGLE WALK DOOR FRAME



INSULATION & JAMB DETAIL FOR
DOUBLE WALK DOOR FRAME



INSULATION & JAMB DETAIL FOR
WINDOW FRAME

WALK DOOR & WINDOW FRAMES - CS75

MAY 2014 Vr 1.1

INSULATION

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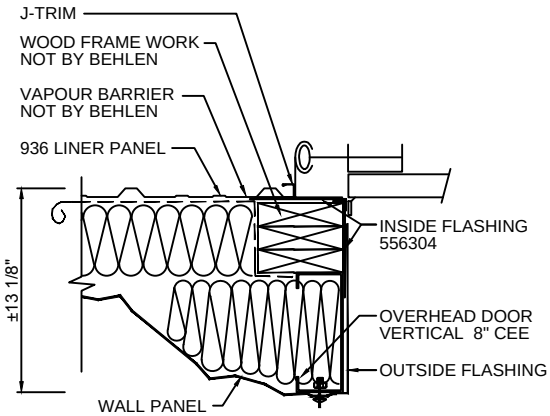
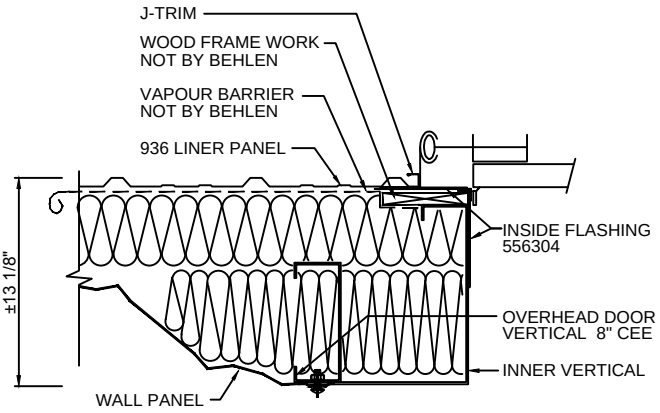
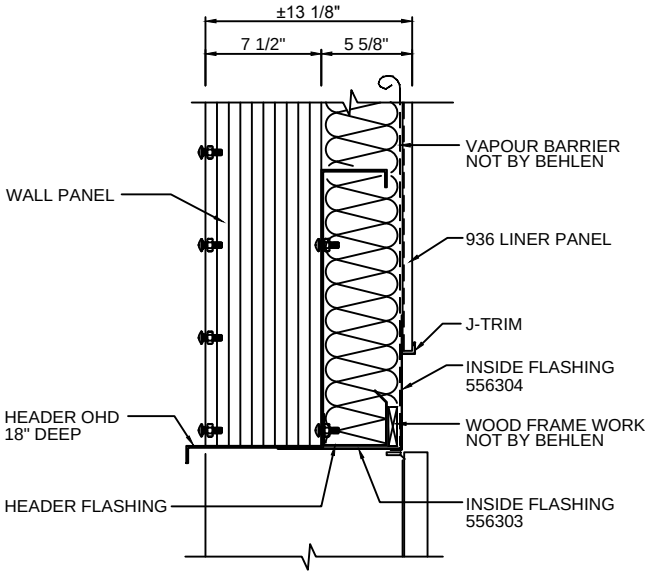
BEHLEN
Made Strong



INSULATION & JAMB DETAIL FOR
OVERHEAD DOOR FRAMES



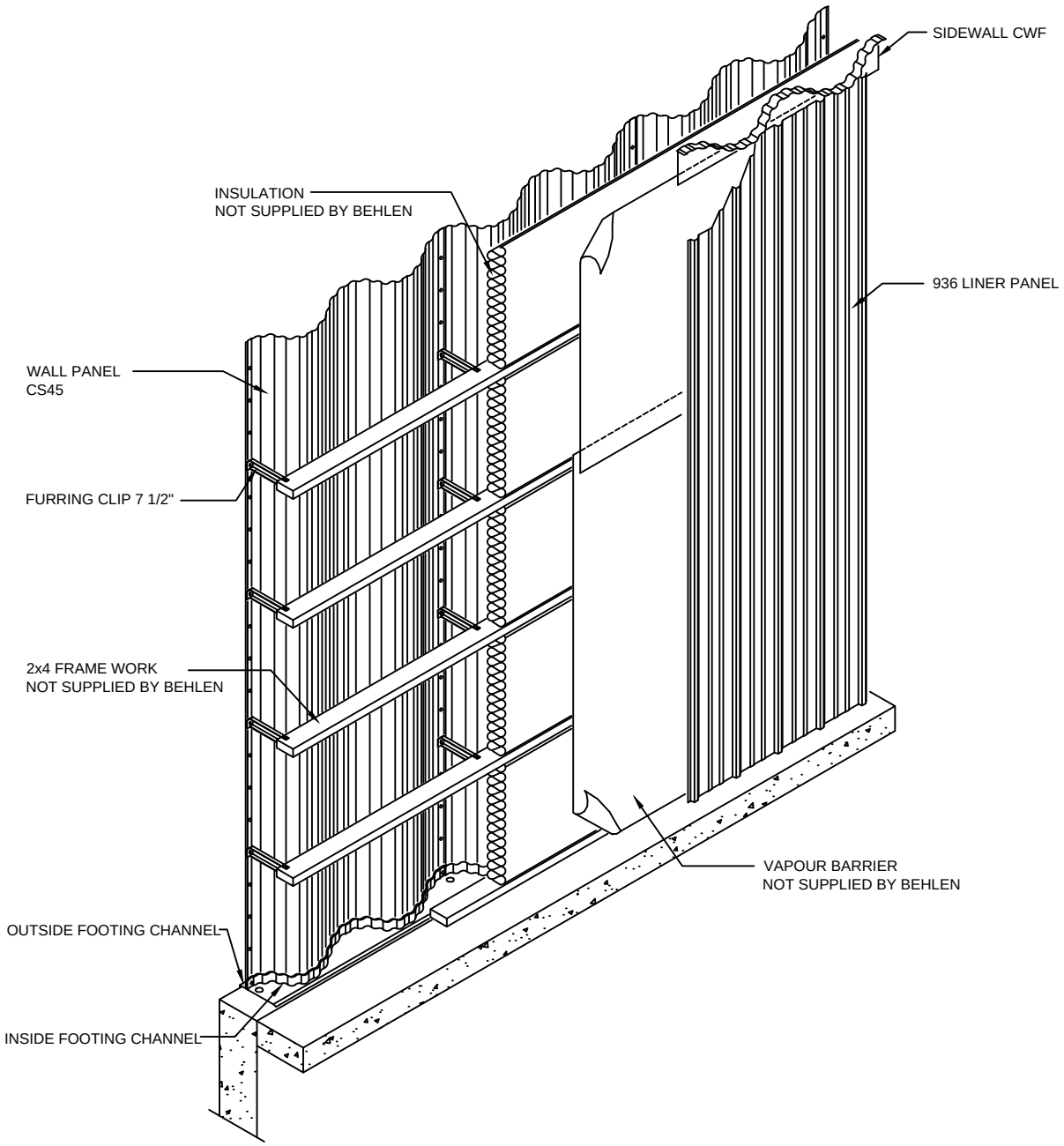
INSULATION & JAMB DETAIL FOR
OVERHEAD DOOR FRAMES
c/w INNER VERTICALS



HEADER DETAIL - TYPICAL

OVERHEAD DOOR FRAMES - CS75	MAY 2014 Vr 1.1	
INSULATION	Section: 9	Page: 010

BEHLEN
Made Strong



FRAMELESS WALL ASSEMBLY

MAY 2014 Vr 1.1

INSULATION

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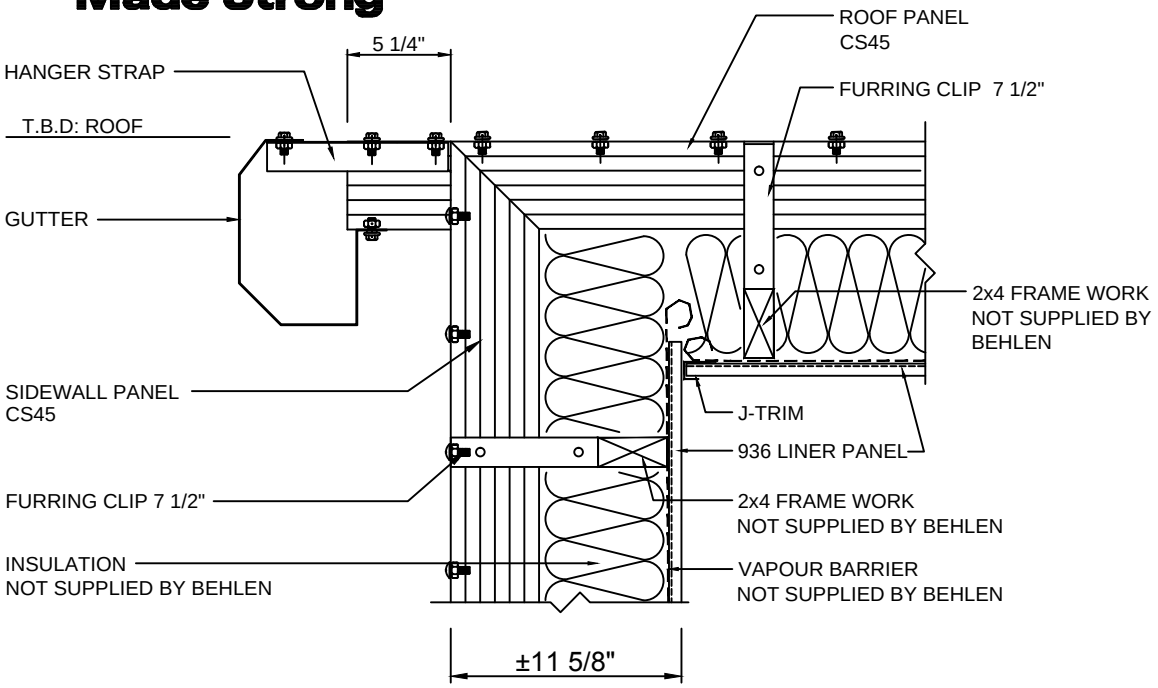
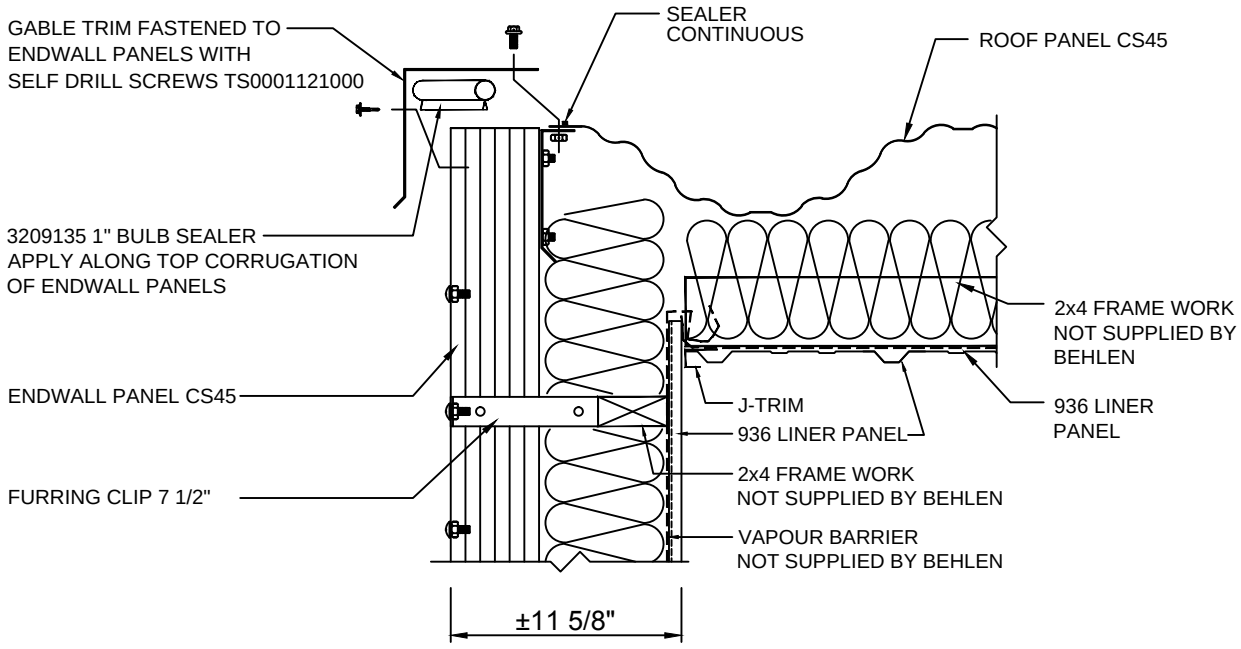
BEHLEN
Made Strong



SIDEWALL SECTION



ENDWALL SECTION

SINGLE PANEL SECTIONS - CS45

MAY 2014 Vr 1.1

INSULATION

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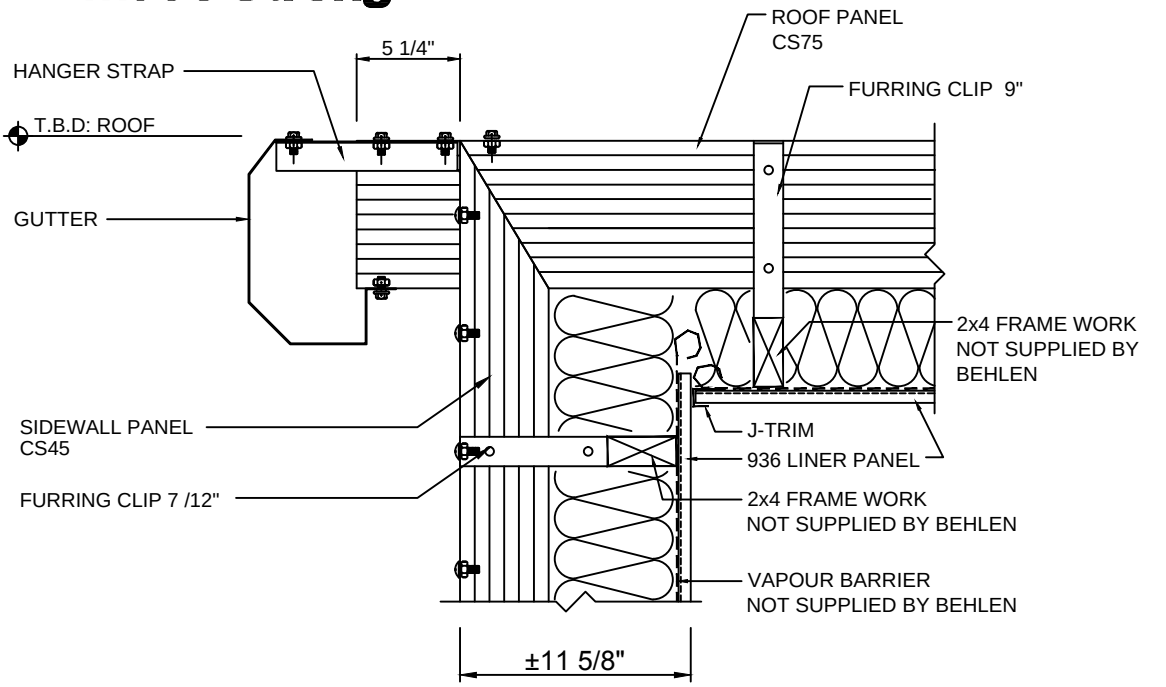
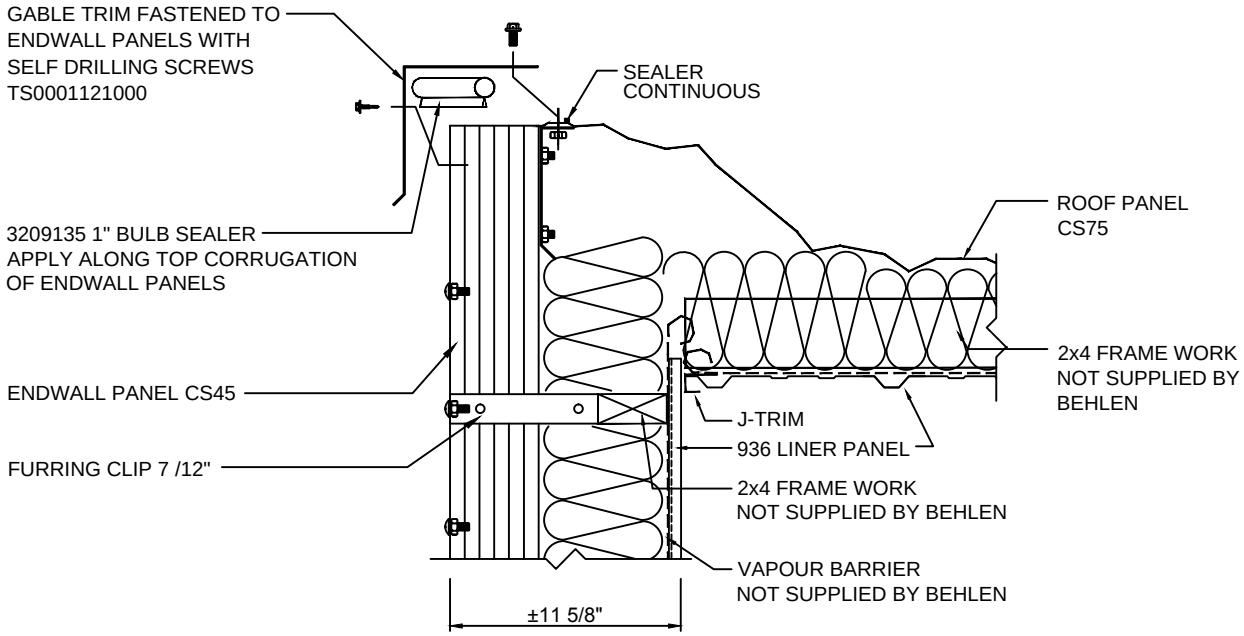
BEHLEN
Made Strong



SIDEWALL SECTION - CS75



ENDWALL SECTION - CS75

SINGLE PANEL SECTIONS - CS75	MAY 2014 Vr 1.1	
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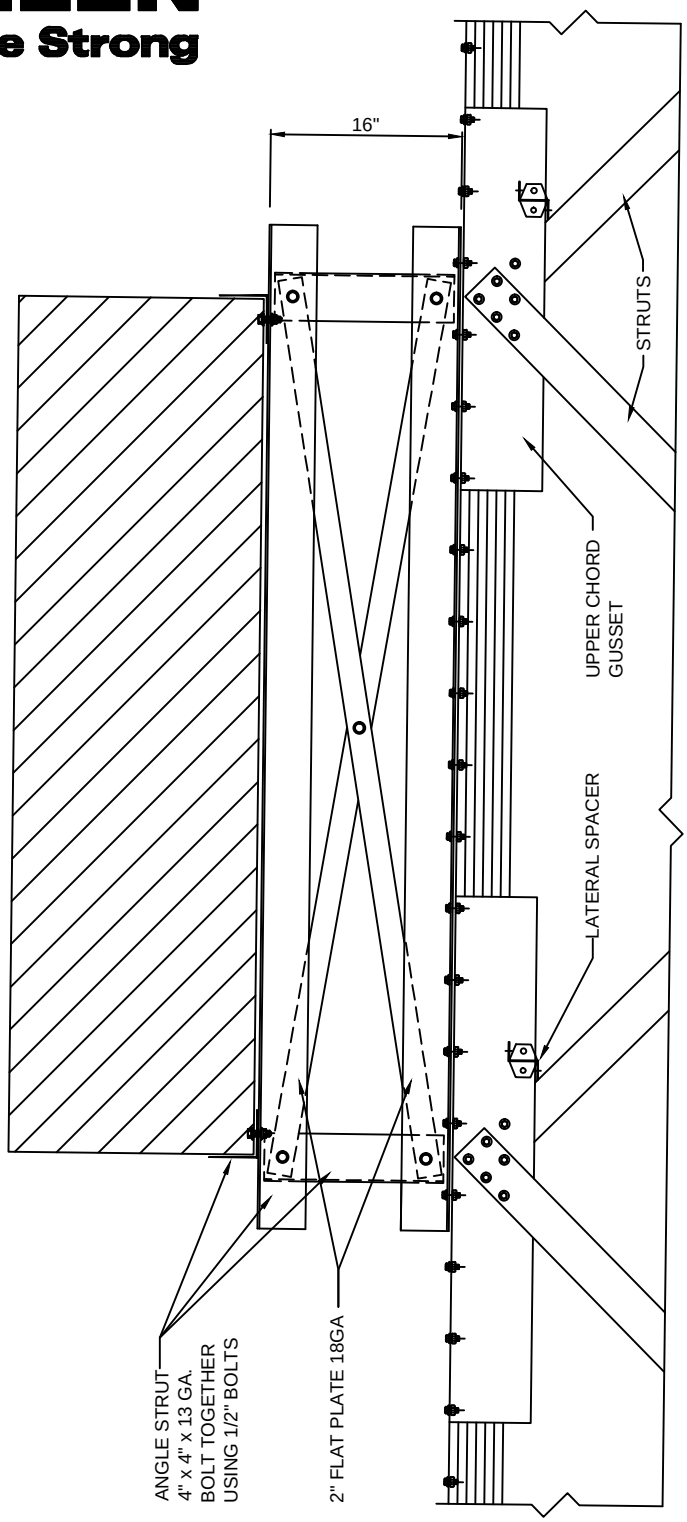
BEHLEN
Made Strong

SECTION 10
MECHANICAL AND VENTILATION

BEHLEN
Made Strong



DUBL-PANL© ROOF SUPPORT

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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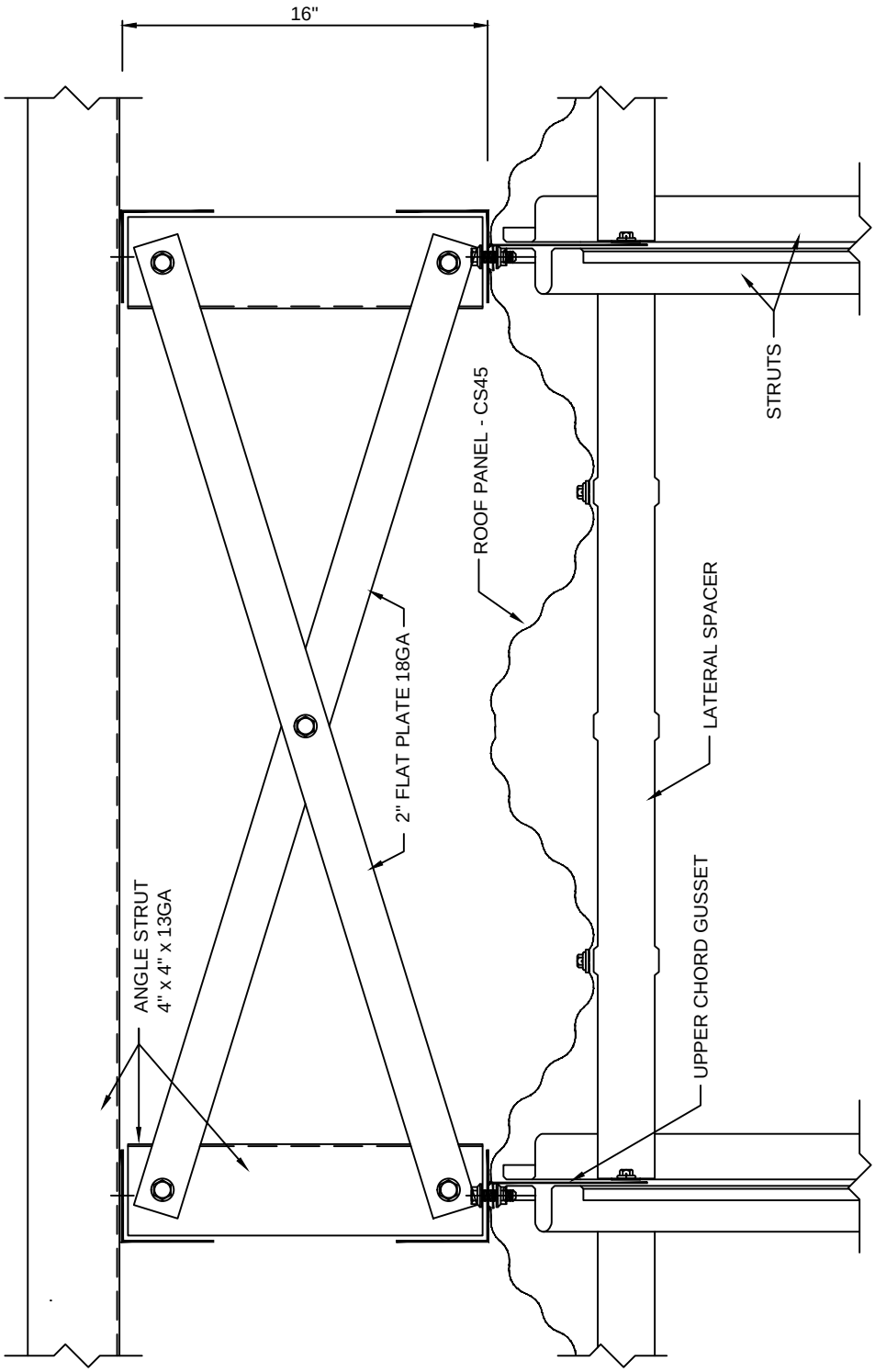
BEHLEN
Made Strong



DUBL-PANL® ROOF SUPPORT

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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BEHLEN
Made Strong

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1 1
SECTION THROUGH MECHANICAL OPENING

CONVEX MECHANICAL OPENING

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MECHANICAL AND VENTILATION

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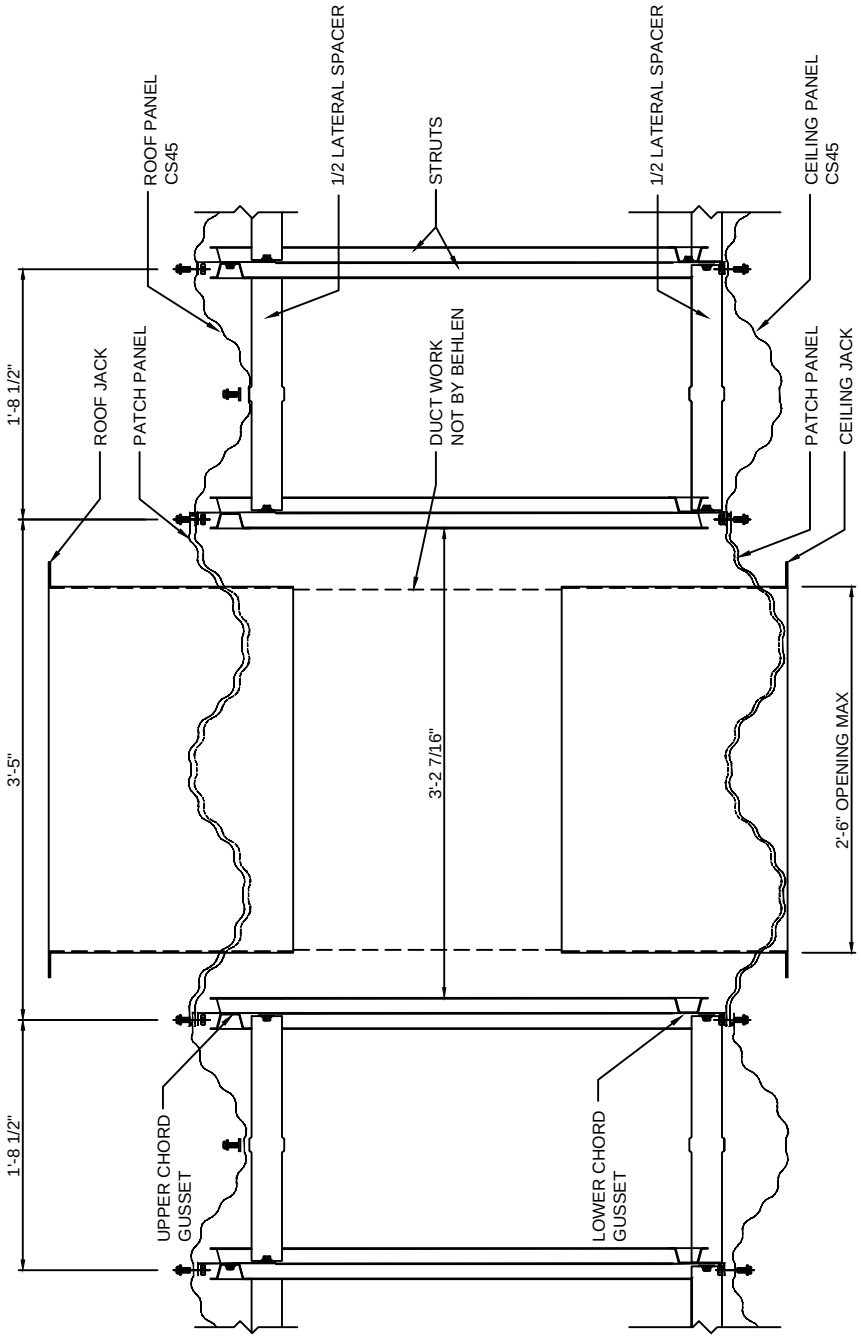
BEHLEN
Made Strong



DUBL-PANL© ROOF OPENING

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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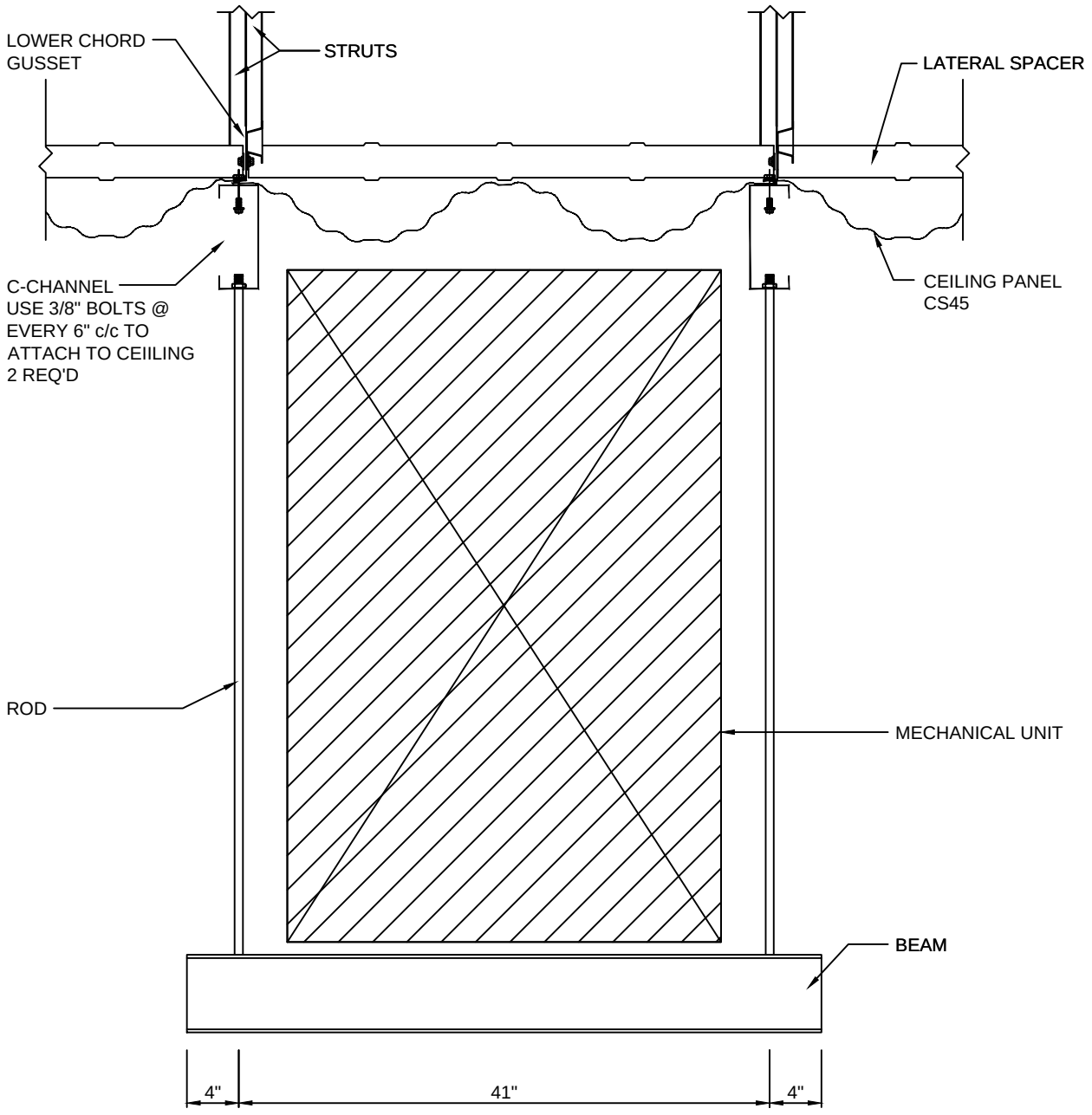
BEHLEN
Made Strong



MECHANICAL UNIT

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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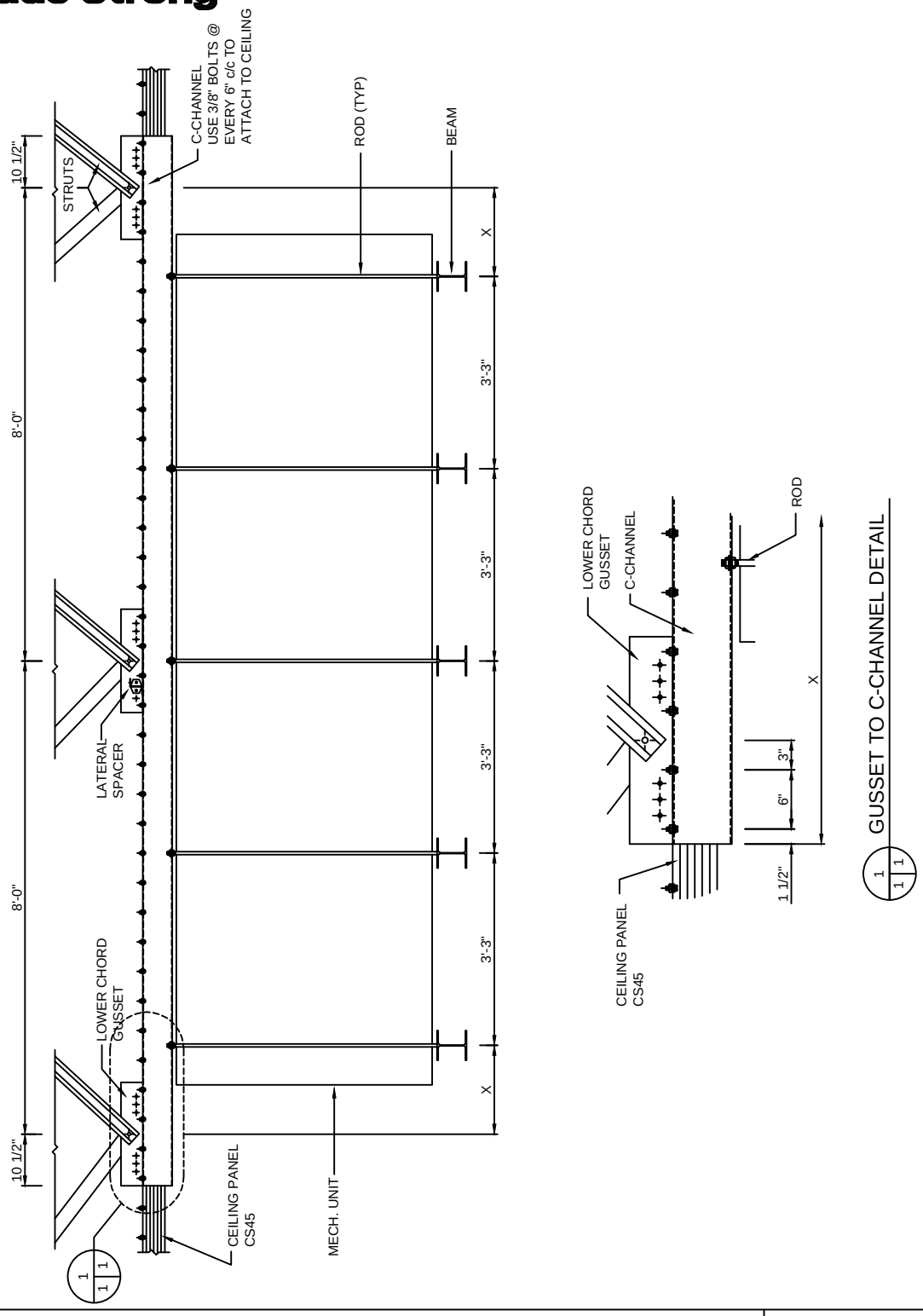
BEHLEN
Made Strong



MECHANICAL UNIT

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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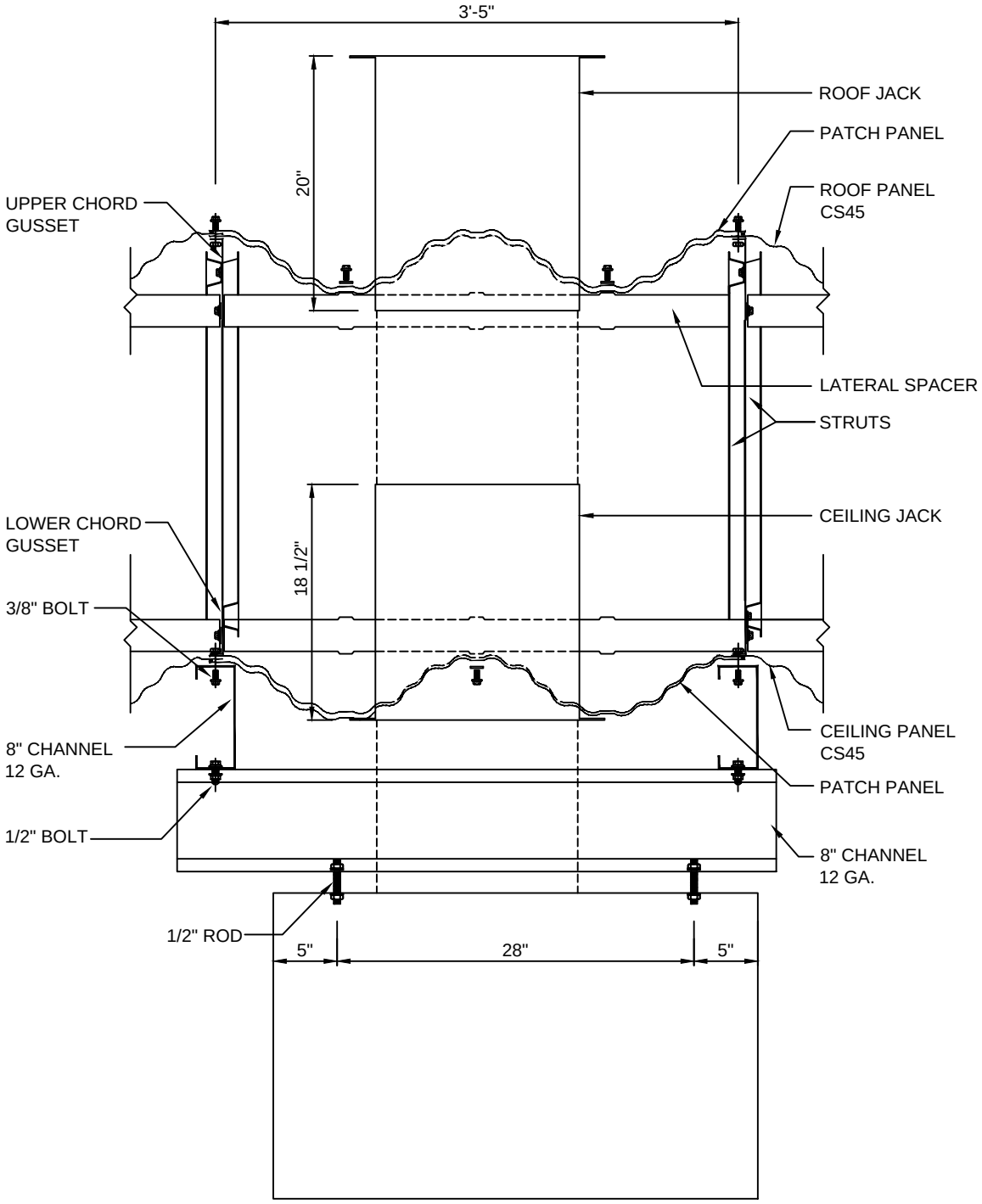
BEHLEN
Made Strong



ROOF AND CEILING JACKS

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MECHANICAL AND VENTILATION

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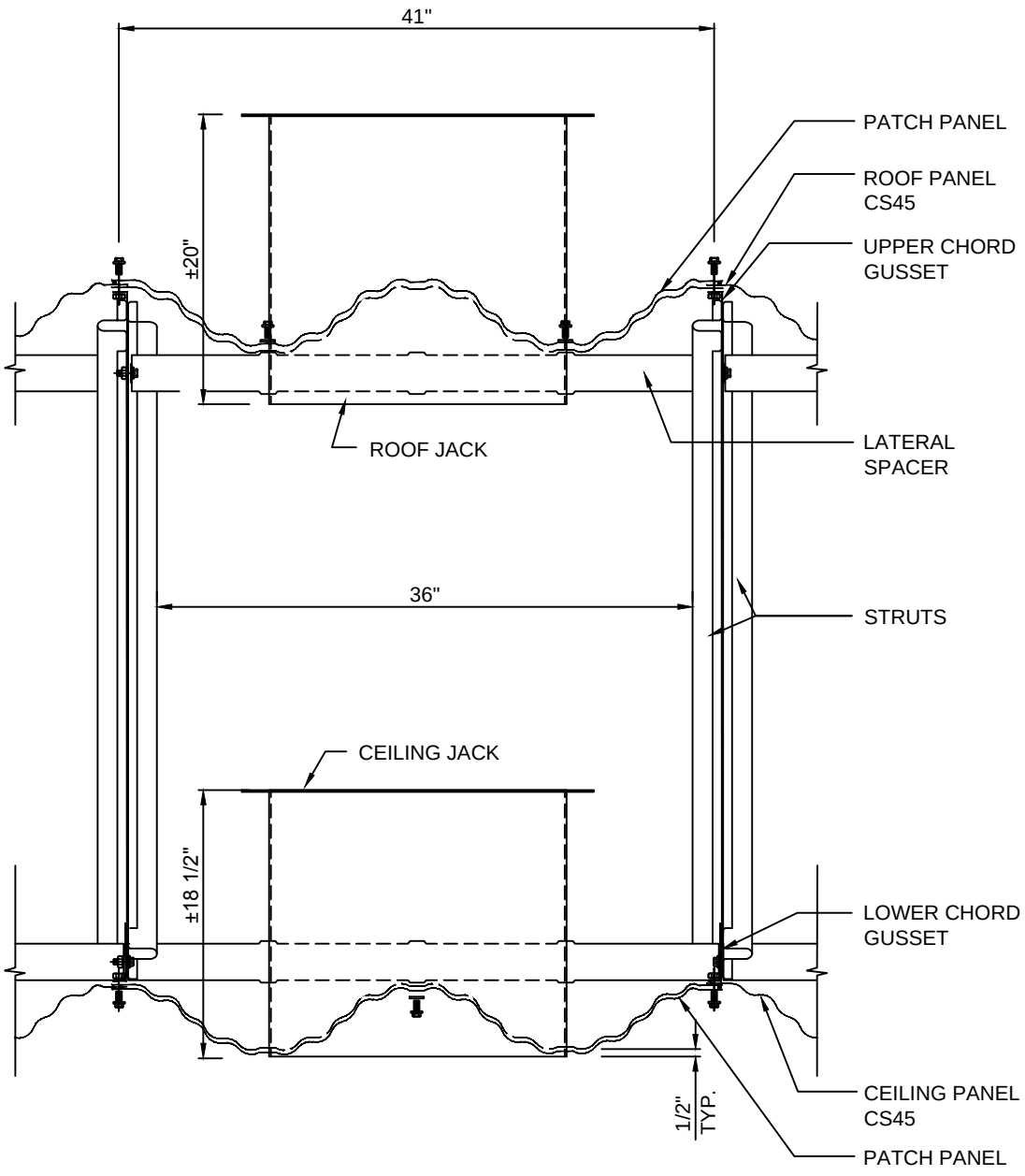
BEHLEN
Made Strong



ROOF AND CEILING JACKS

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

Section: 10

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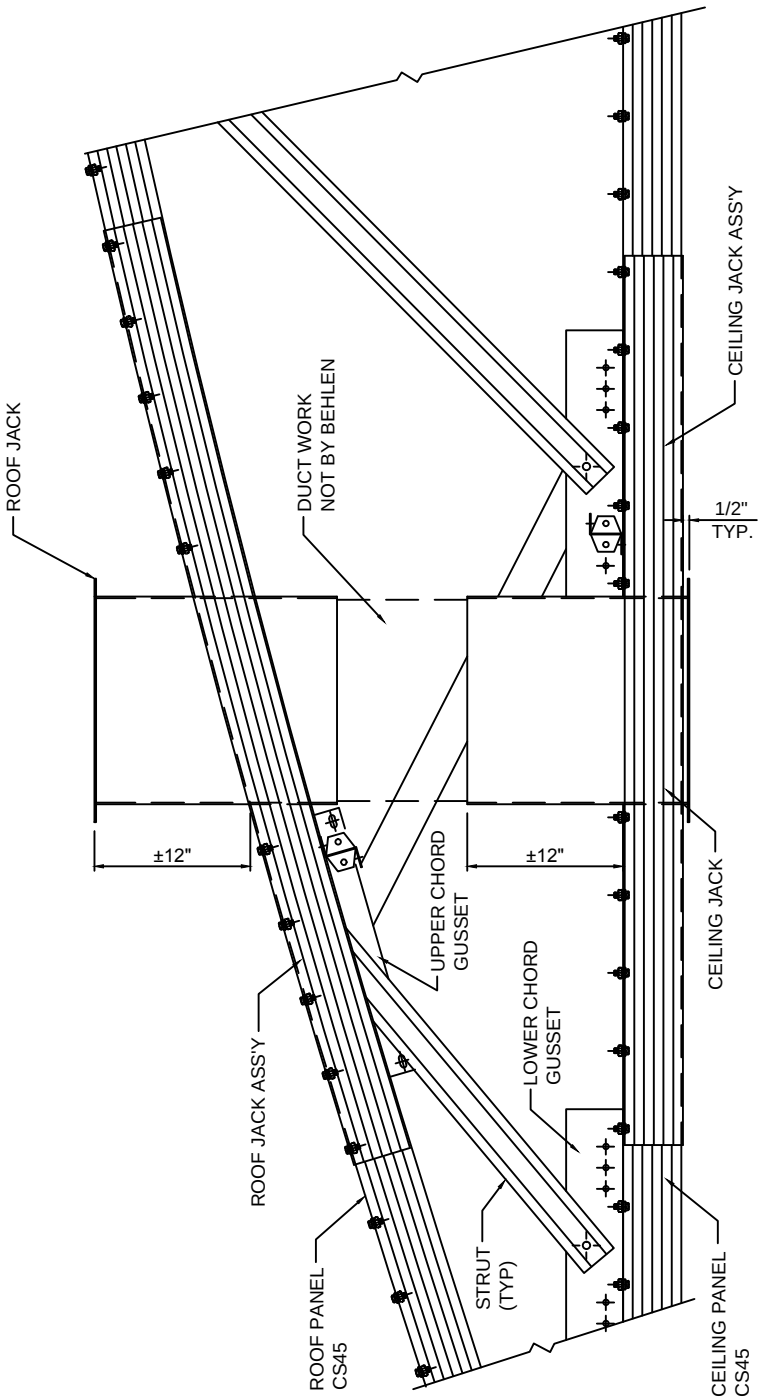
BEHLEN
Made Strong



ROOF AND CEILING JACKS

MAY 2014 Vr 1.1

MECHANICAL AND VENTILATION

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BEHLEN
Made Strong

PIPE ATTACHMENT DETAIL

SECTION THROURH PIPE ATTACHMENT

PIPE ATTACHMENT

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ROD ATTACHMENT DETAIL

SECTION THROUGH ROD ATTACHMENT

ROD ATTACHMENT

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BEHLEN
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BEHLEN
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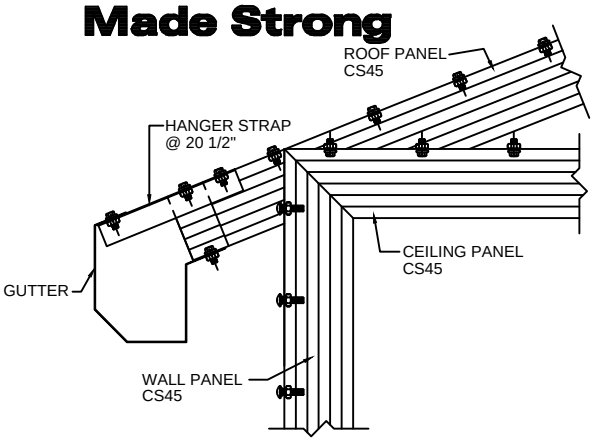
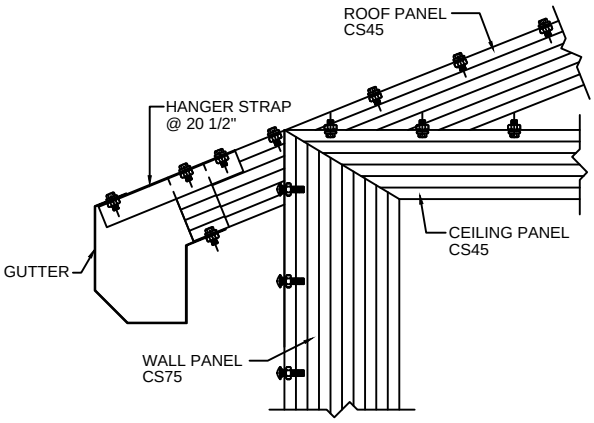


IT IS THE OWNER'S RESPONSIBLITY TO ENSURE GUTTERS ARE KEPT FREE OF OBSTRUCTIONS, INCLUDING ICE BUILD UP.

GUTTER SECTION - CS45 WALL



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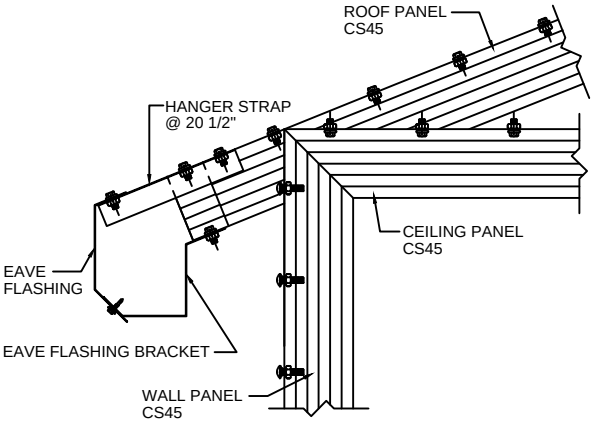
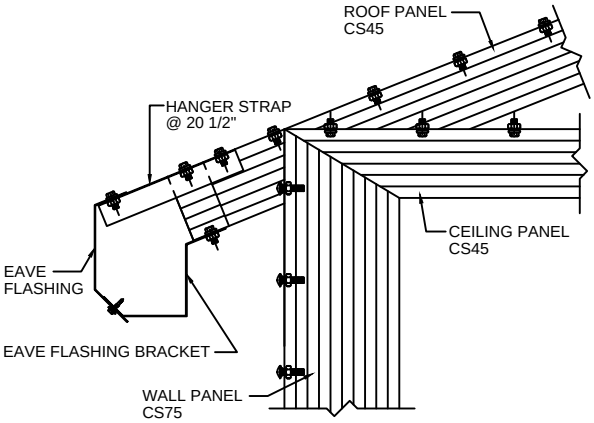
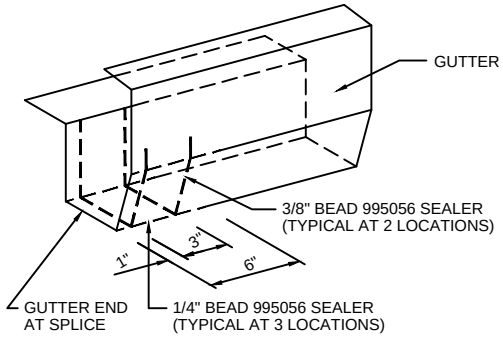
GUTTER SECTION - CS75 WALL



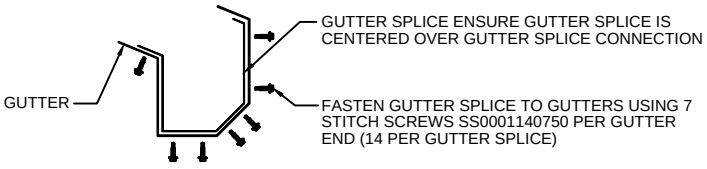
EAVE FLASHING SECTION - CS45 WALL



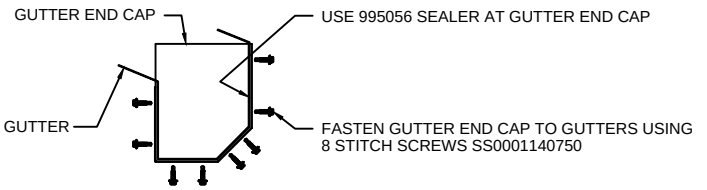
EAVE FLASHING SECTION - CS75 WALL



GUTTER SEALER DETAIL



GUTTER SPLICE FASTENER LAYOUT
ROOF PANEL & HANGER STRAP NOT SHOWN FOR CLARITY



GUTTER END CAP FASTENER LAYOUT
ROOF PANEL, GABLE COVER & HANGER STARP NOT SHOWN FOR CLARITY

CONVEX EAVE SECTIONS

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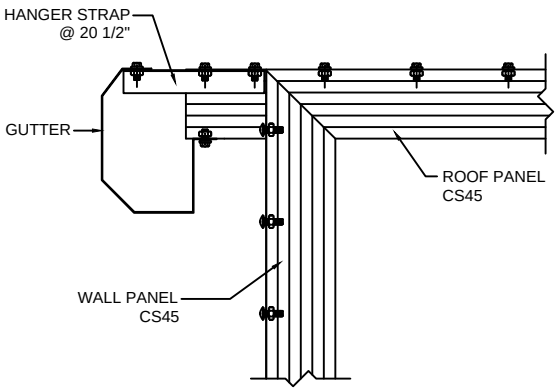
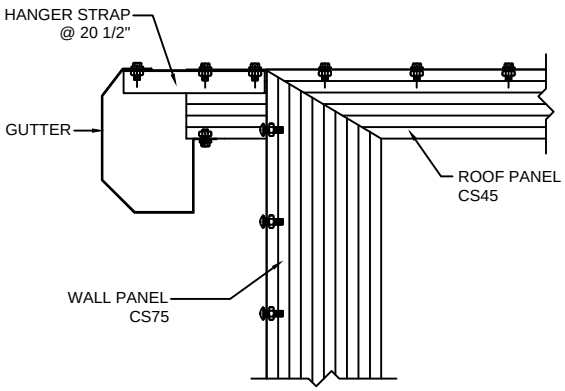


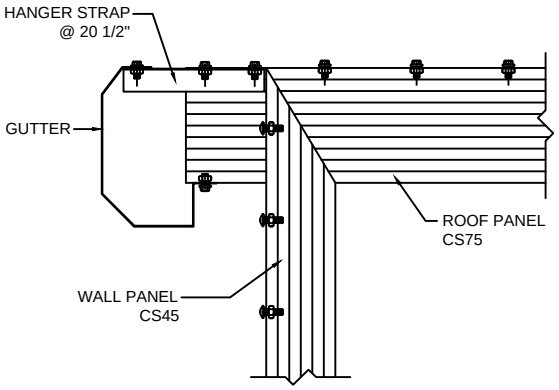
IT IS THE OWNER'S RESPONSIBLITY TO ENSURE GUTTERS ARE KEPT FREE OF OBSTRUCTIONS, INCLUDING ICE BUILD UP.

GUTTER SECTION - CS45 ROOF & CS45 WALL



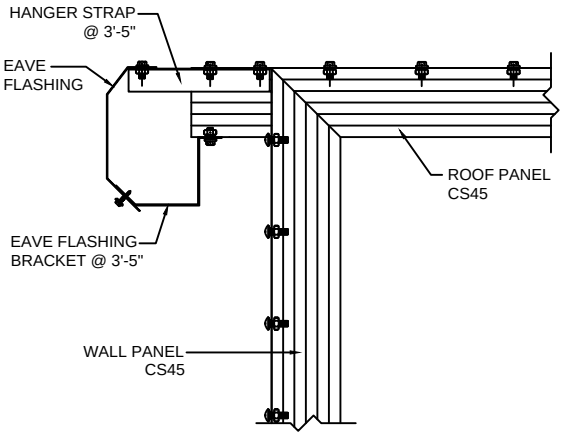
IT IS THE OWNER'S RESPONSIBLITY TO ENSURE GUTTERS ARE KEPT FREE OF OBSTRUCTIONS, INCLUDING ICE BUILD UP.

GUTTER SECTION - CS45 ROOF & CS75 WALL

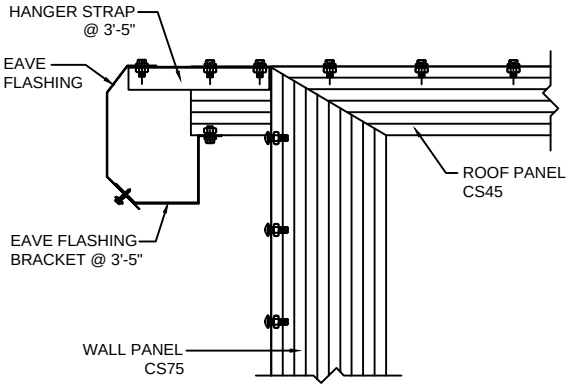


IT IS THE OWNER'S RESPONSIBLITY TO ENSURE GUTTERS ARE KEPT FREE OF OBSTRUCTIONS, INCLUDING ICE BUILD UP.

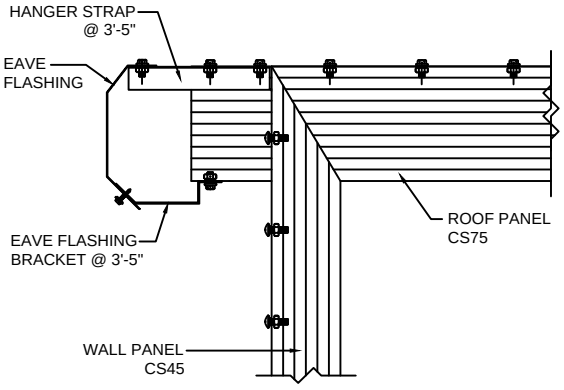
GUTTER SECTION - CS75 ROOF & CS45 WALL



EAVE FLASHING SECTION - CS45 ROOF & CS45 WALL



EAVE FLASHING SECTION - CS45 ROOF & CS75 WALL



EAVE FLASHING SECTION - CS75 ROOF & CS45 WALL

SINGLE PANEL & DUBL-PANL® EAVE SECTIONS

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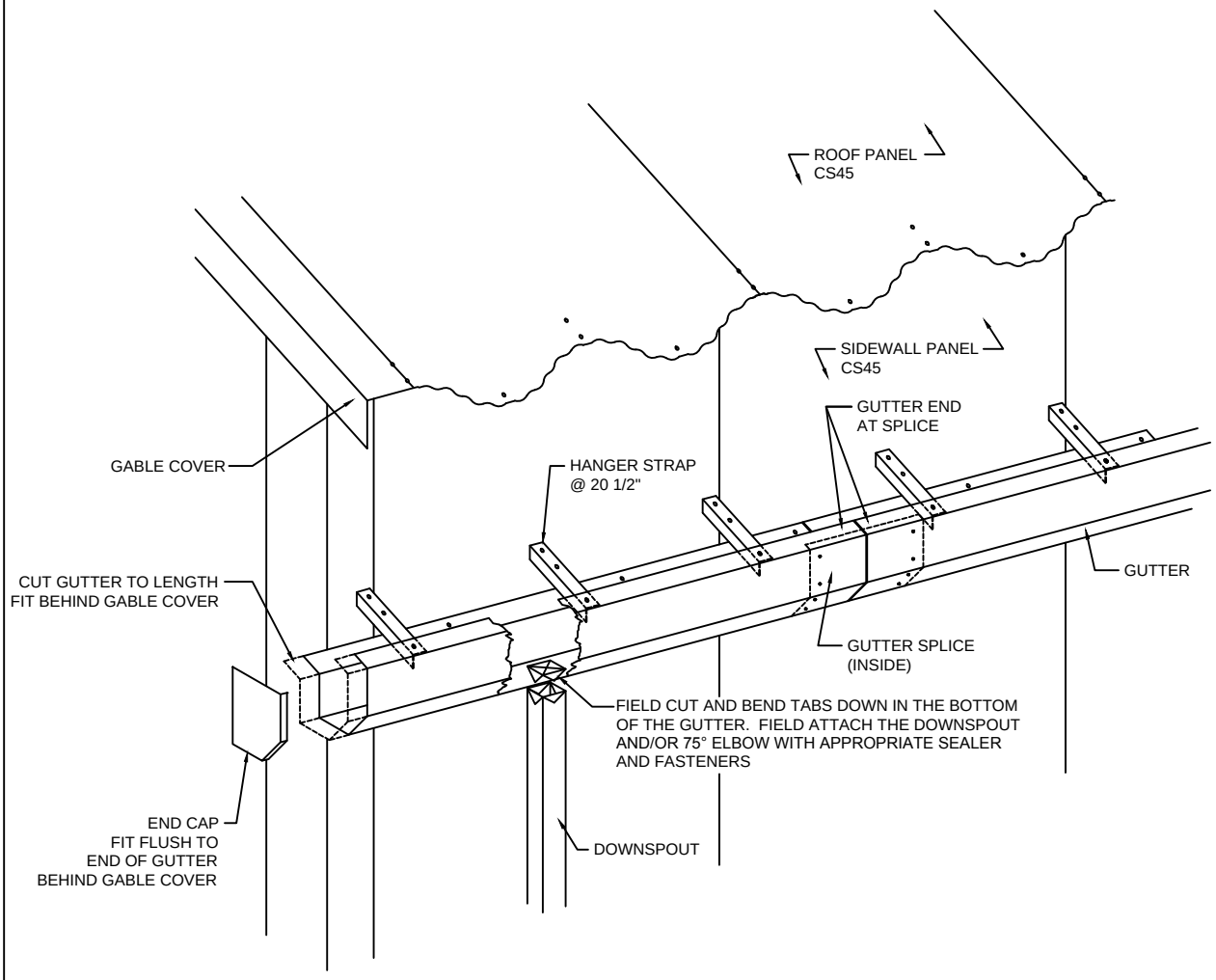

GUTTER & DOWNSPOUT ISOMETRIC LAYOUT

CONVEX GUTTER LAYOUT

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BEHLEN
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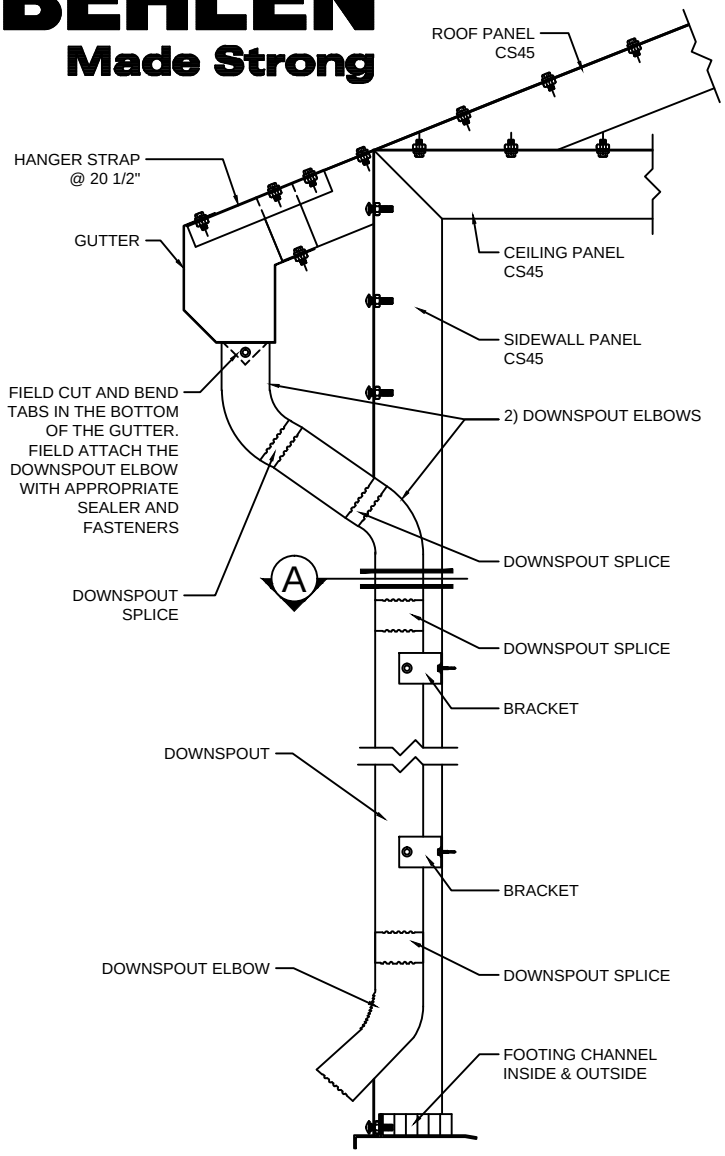
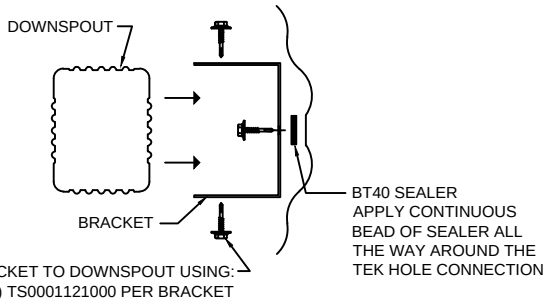


OPTION #1
DOWNSPOUT INSET



A DOWNSPOUT BRACKET INSTALLATION
FOR OPTION #1

CONVEX DOWNSPOUT LAYOUT OPTION #1

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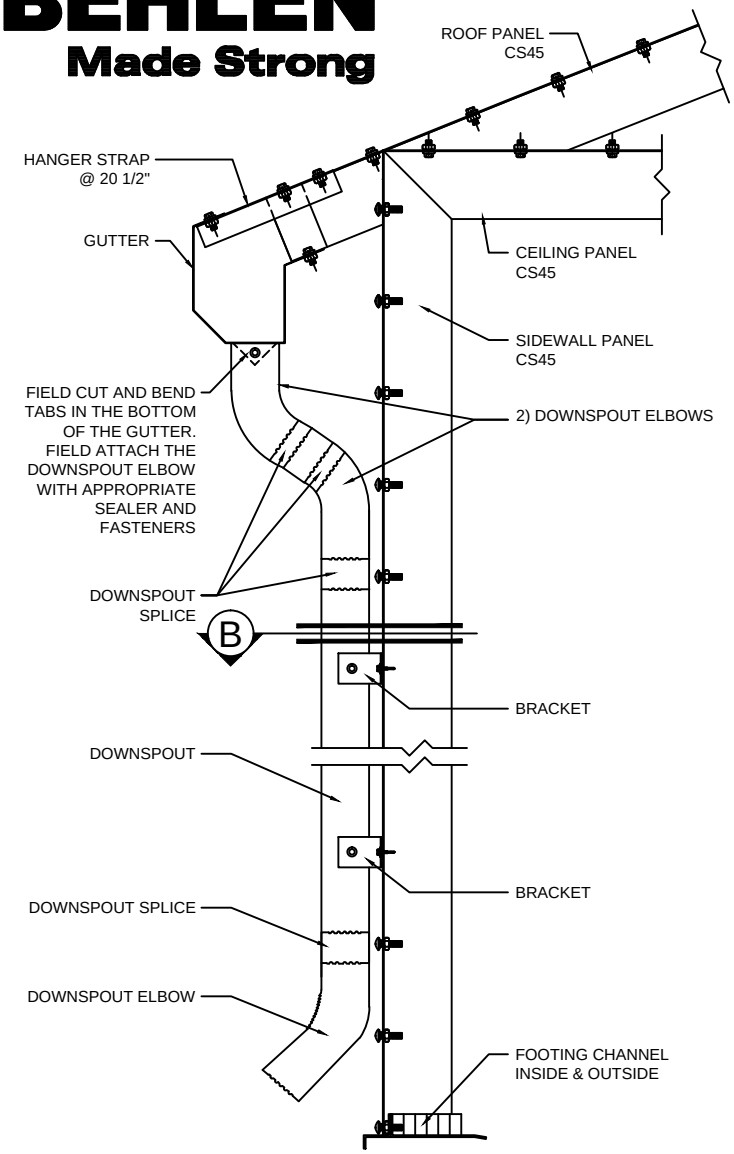
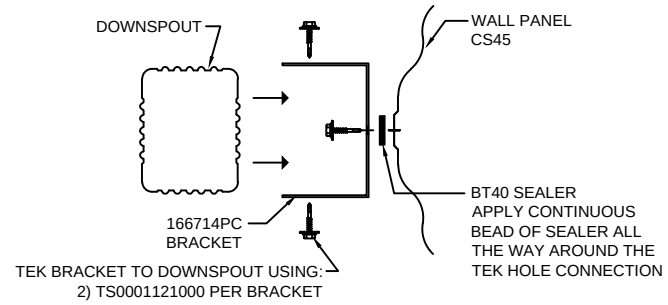


OPTION #2
DOWNSPOUT IN LINE WITH OUTSIDE STEEL



B DOWNSPOUT BRACKET INSTALLATION FOR OPTION #2

CONVEX DOWNSPOUT LAYOUT OPTION #2

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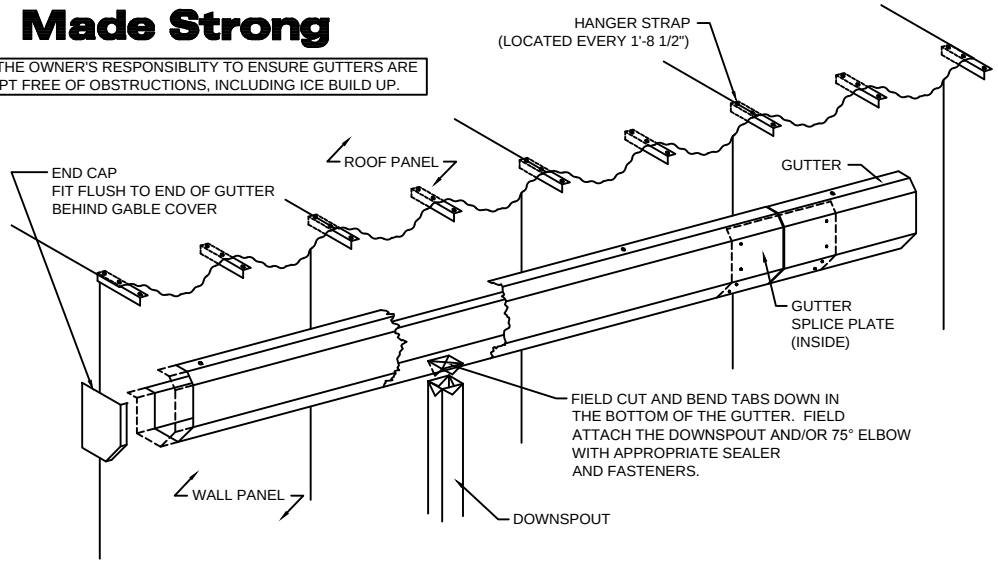
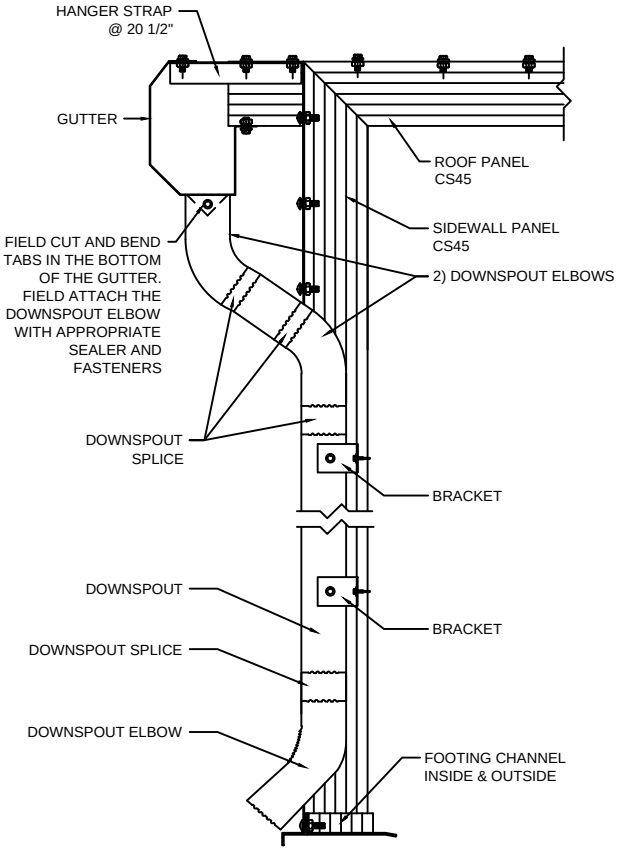
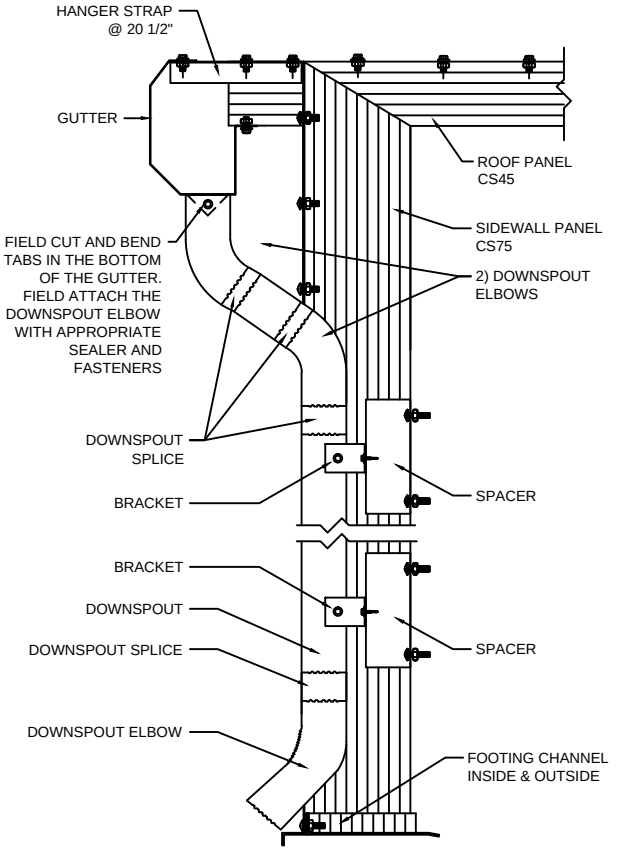
IT IS THE OWNER'S RESPONSIBLITY TO ENSURE GUTTERS ARE KEPT FREE OF OBSTRUCTIONS, INCLUDING ICE BUILD UP.



GUTTER & DOWNSPOUT LAYOUT - CS45 ROOF



DOWNSPOUT INSET TO OUTSIDE STEEL
CS45 SIDE WALL



DOWNSPOUT INSET TO OUTSIDE STEEL
CS75 SIDE WALL

SINGLE PANEL & DUBL-PANL® LAYOUTS - CS45

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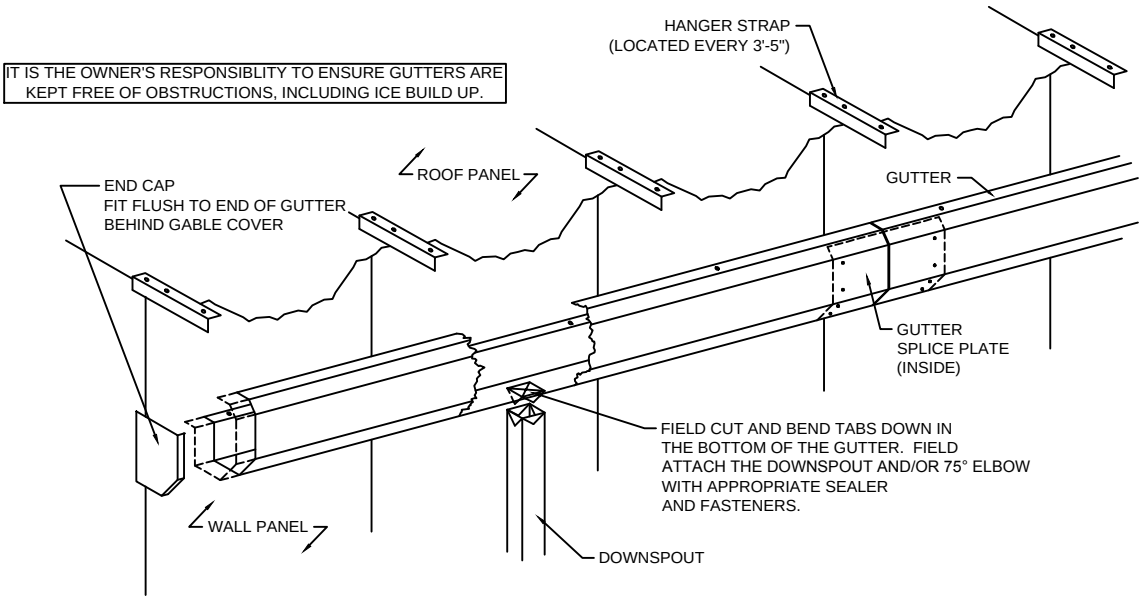
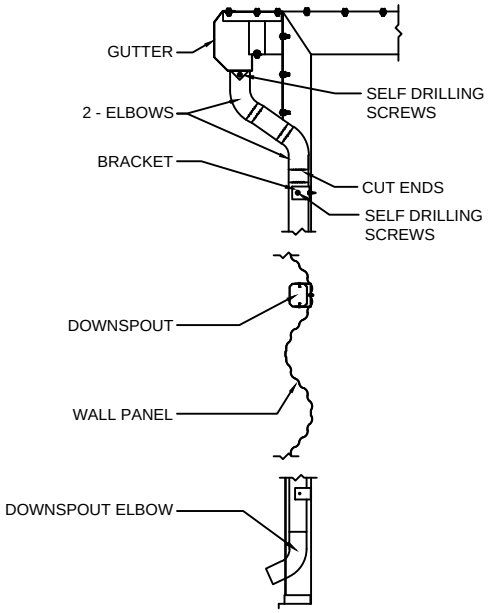


GUTTER & DOWNSPOUT LAYOUT - CS75 ROOF



DOWNSPOUTS - CS75 ROOF

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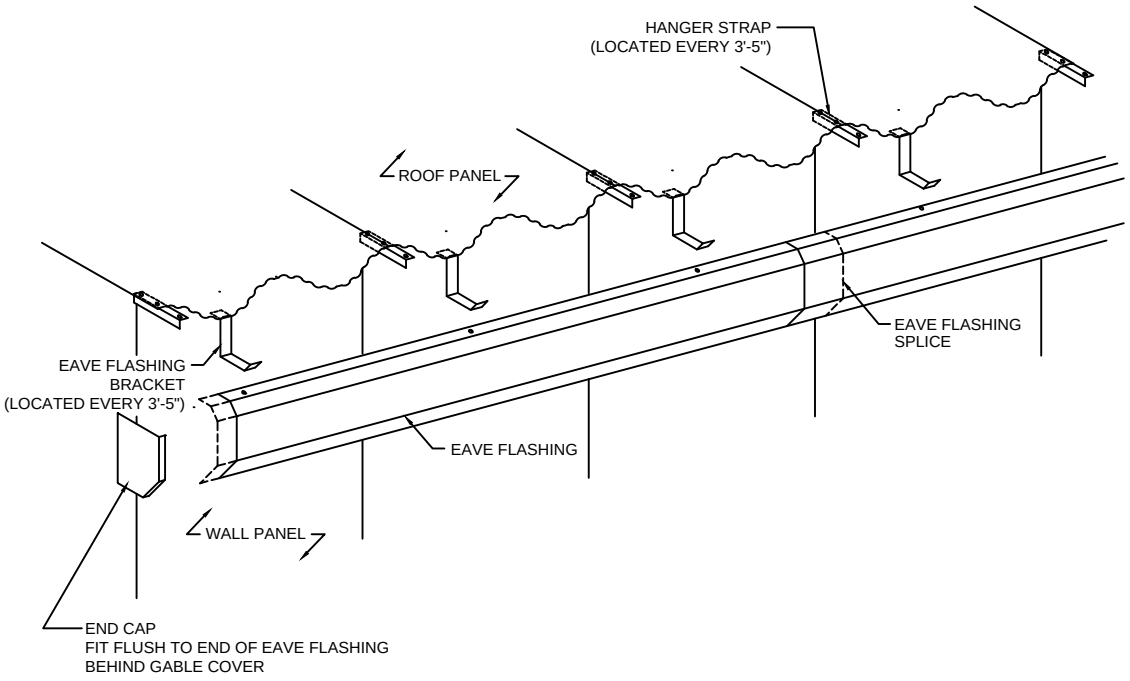

EAVE FLASHING LAYOUT - CS45 ROOF

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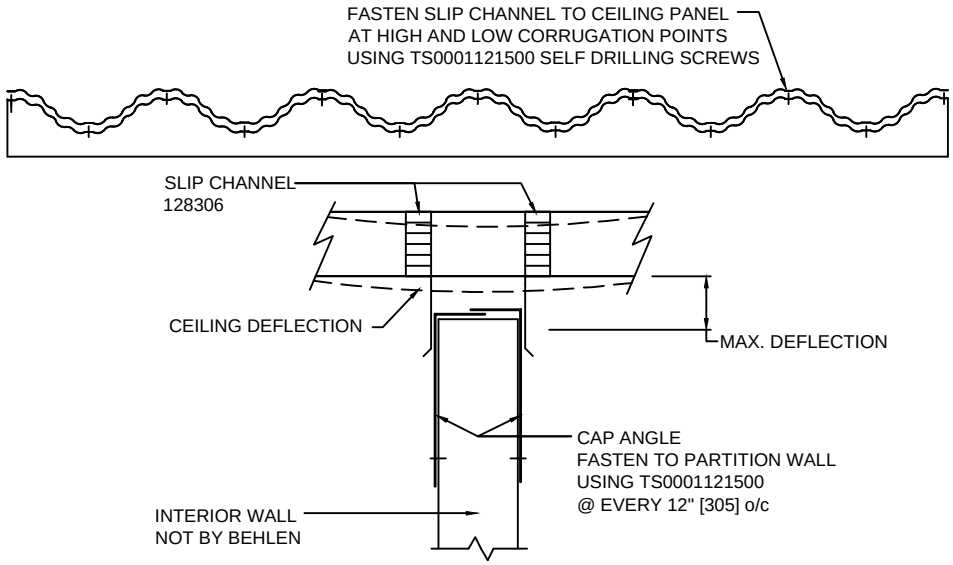
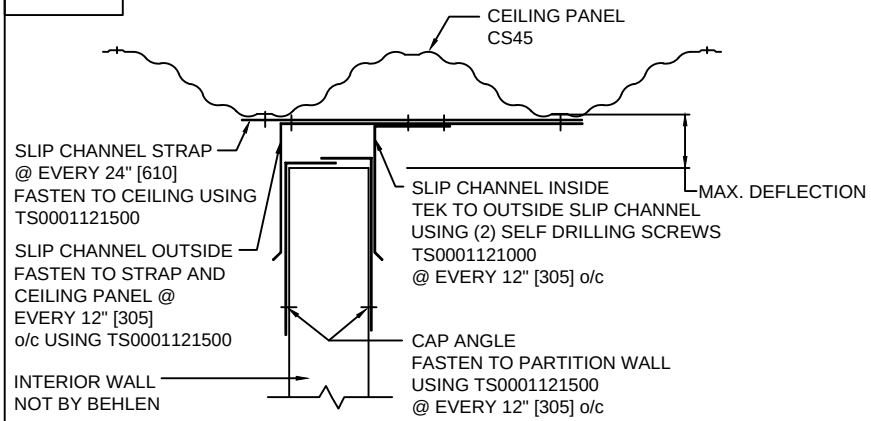
TYPE 1

SLIP CHANNEL DETAIL - TYPICAL FOR ALL SLIP CHANNEL PERPENDICULAR TO THE CORRUGATION



TYPE 2

SLIP CHANNEL DETAIL - PARALLEL



SLIP CHANNEL INFORMATION

SLIP CHANNEL COMPONENTS ARE DESIGNED FOR CLOSURE ONLY, AND NOT FOR LATERAL SUPPORT OF INTERIOR PARTITION WALL.

NOTE

FOR MAXIMUM DEFLECTIONS SEE DEFLECTION CHART IN SECTION 4

INTERIOR WALL MAY OR MAY NOT BE SUPPLIED BY BEHLEN

FOR CONVEX TRUSS DEFLECTIONS, SEE SECTION 4, PAGE 12.

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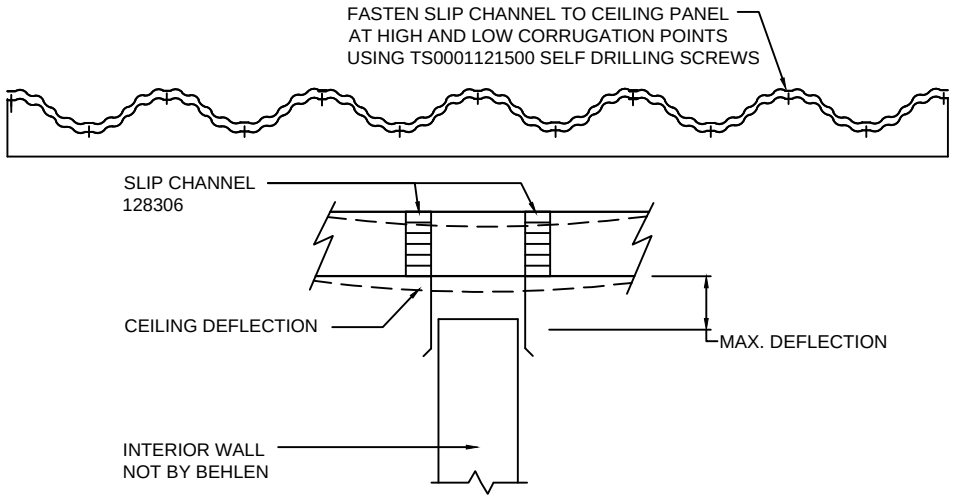
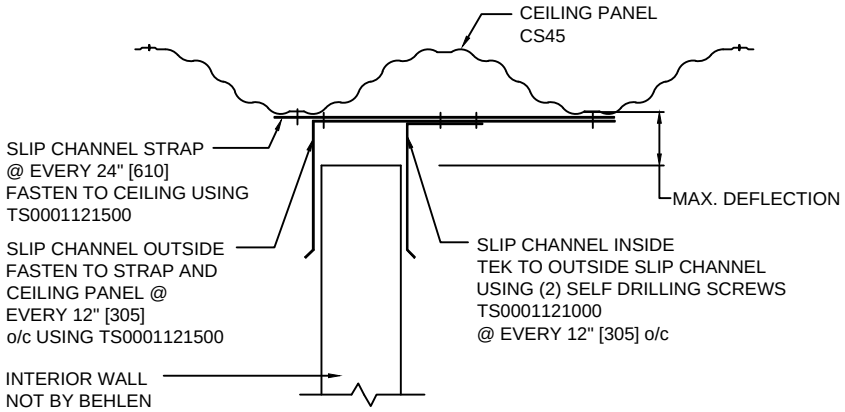
TYPE 1

CEILING TO WALL FLASHING DETAIL - TYPICAL FOR WALL PERPENDICULAR TO THE CORRUGATION



TYPE 2

CEILING TO WALL FLASHING DETAIL - TYPICAL FOR WALL PARALLEL TO THE CORRUGATION



SLIP CHANNEL INFORMATION

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NOTE

FOR MAXIMUM DEFLECTIONS SEE DEFLECTION CHART IN SECTION 4

FOR CONVEX TRUSS DEFLECTIONS, SEE SECTION 4, PAGE 12.

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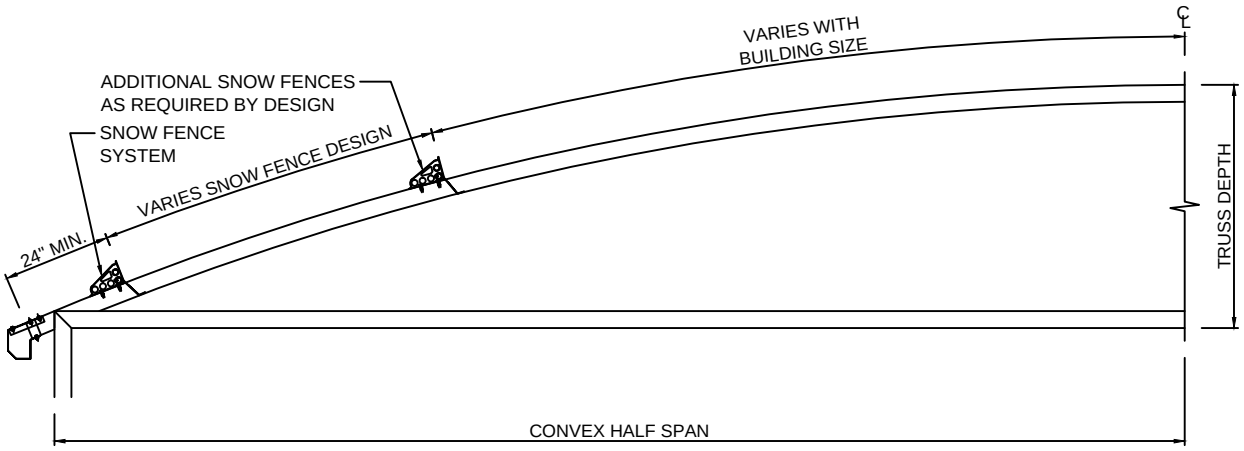
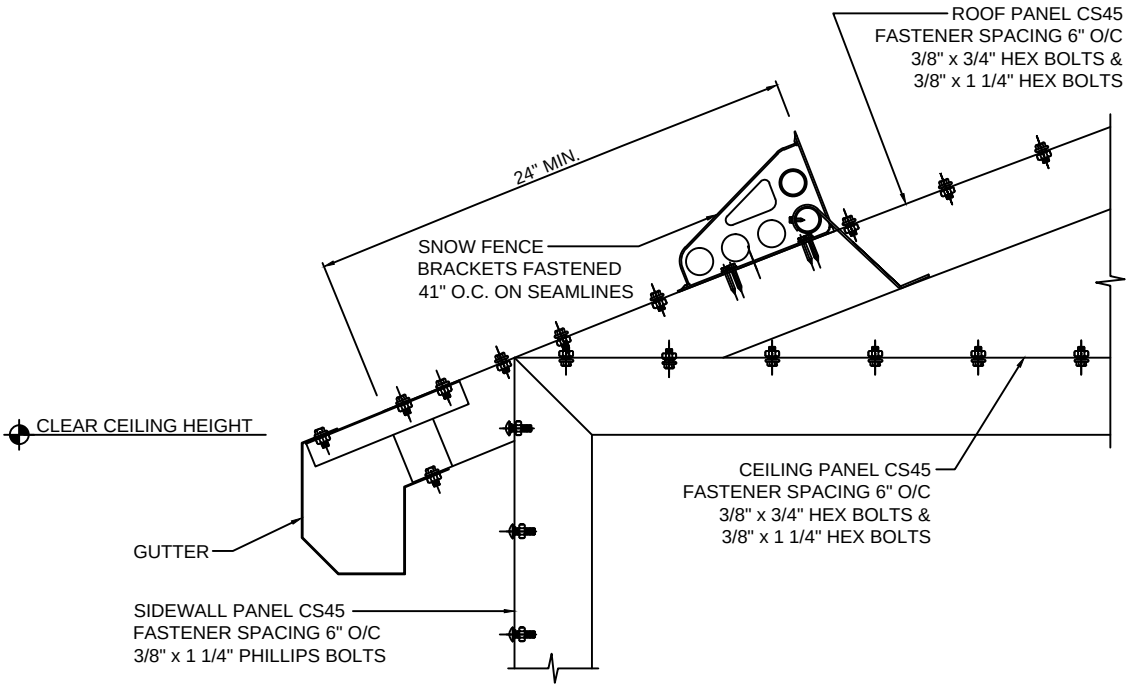


SNOW FENCE LAYOUT



SNOW FENCE EAVE DETAIL

CONTACT ROOFERS WORLD FOR COMPLETE DESIGN, PRICING, AND DETAILS.

ROOFERS WORLD
2590 Sheffield Road
Ottawa, Ontario
K1Bb 3V7

TELEPHONE: 613-736-7654
TOLL FREE: 1-800-352-6147
FAX: 613-736-7737
E-MAIL: sales@roofersworld.com
INTERNET: http://www.roofersworld.com/snostop.htm

SNOW FENCE DETAIL

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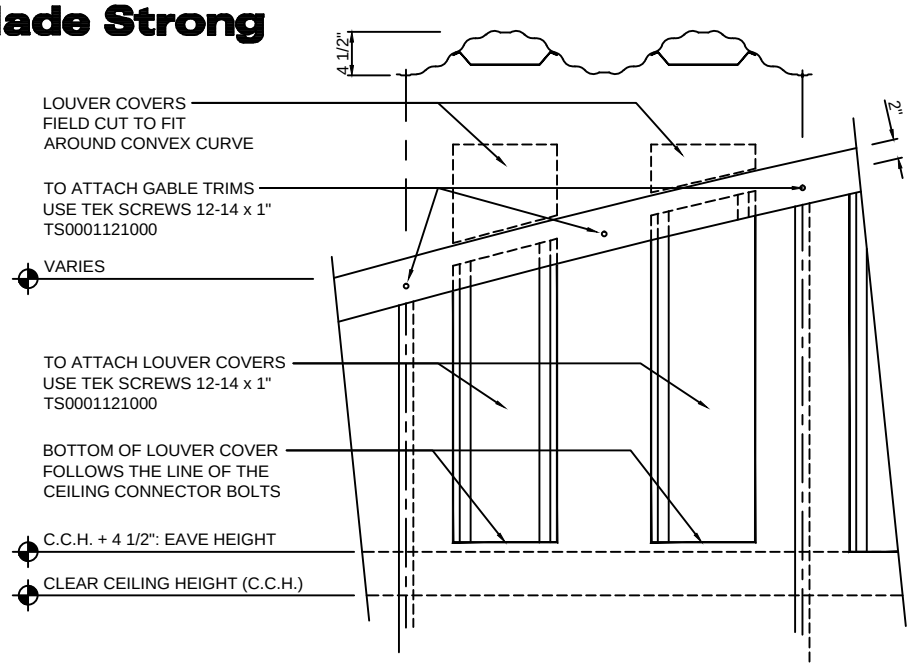
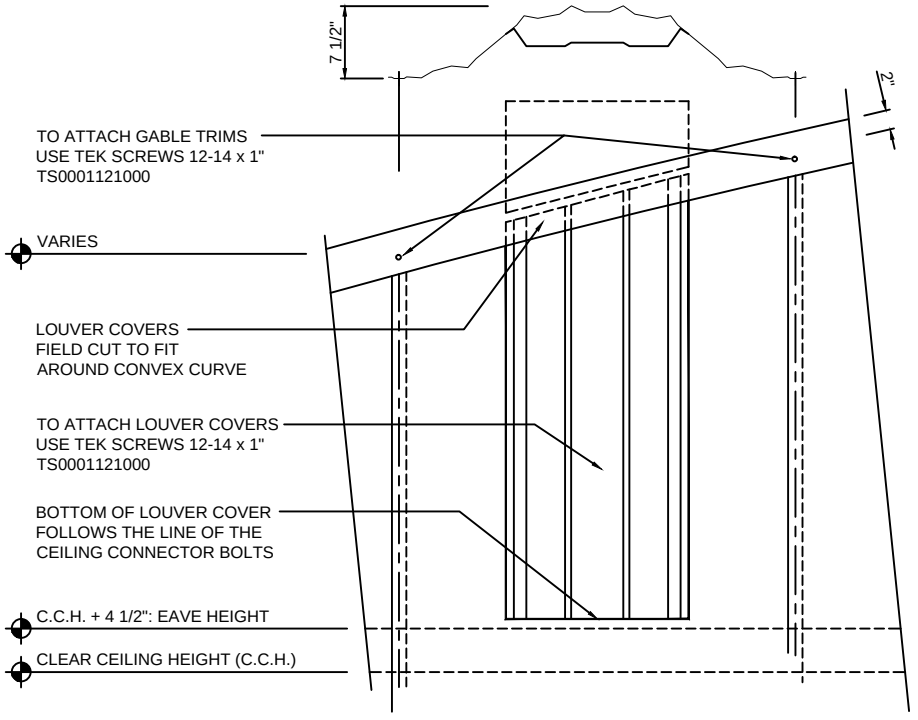


LOUVER DETAIL - CS45



LOUVER DETAIL - CS75

CONVEX LOUVER DETAILS

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BEHLEN
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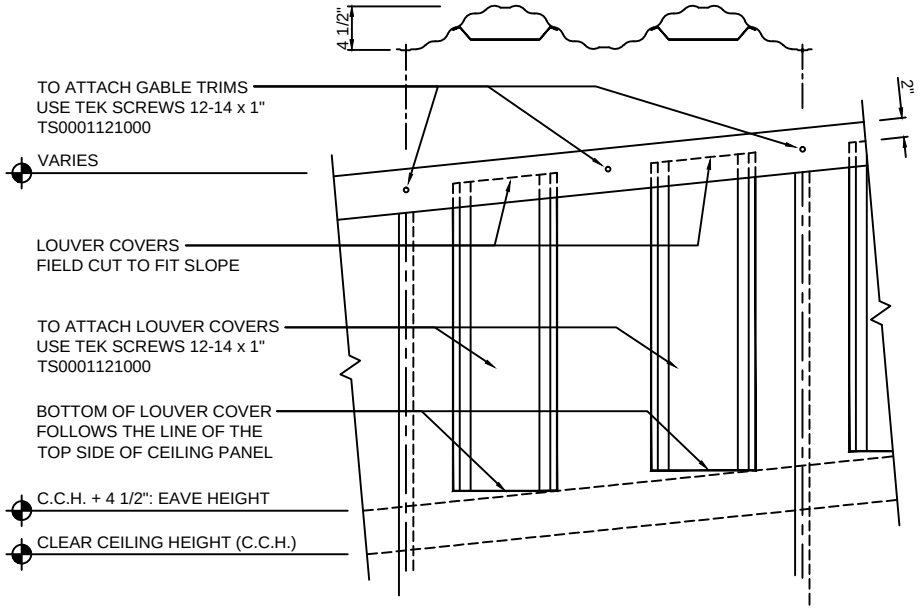
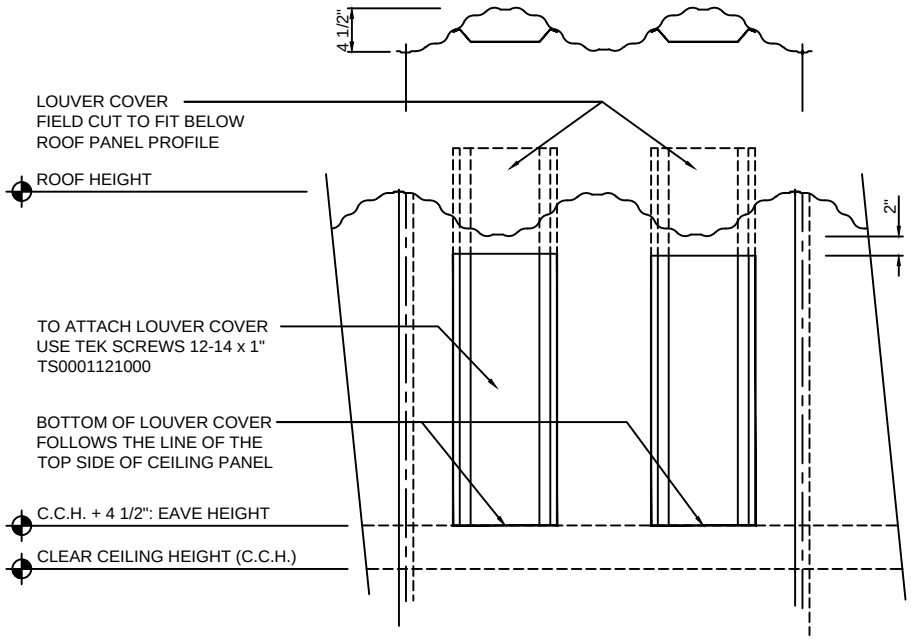


ENDWALL LOUVER DETAIL - CS45



SIDEWALL LOUVER DETAIL - CS45
(SIDEWALL LOUVERS ARE NOT STANDARD)

BEHLEN
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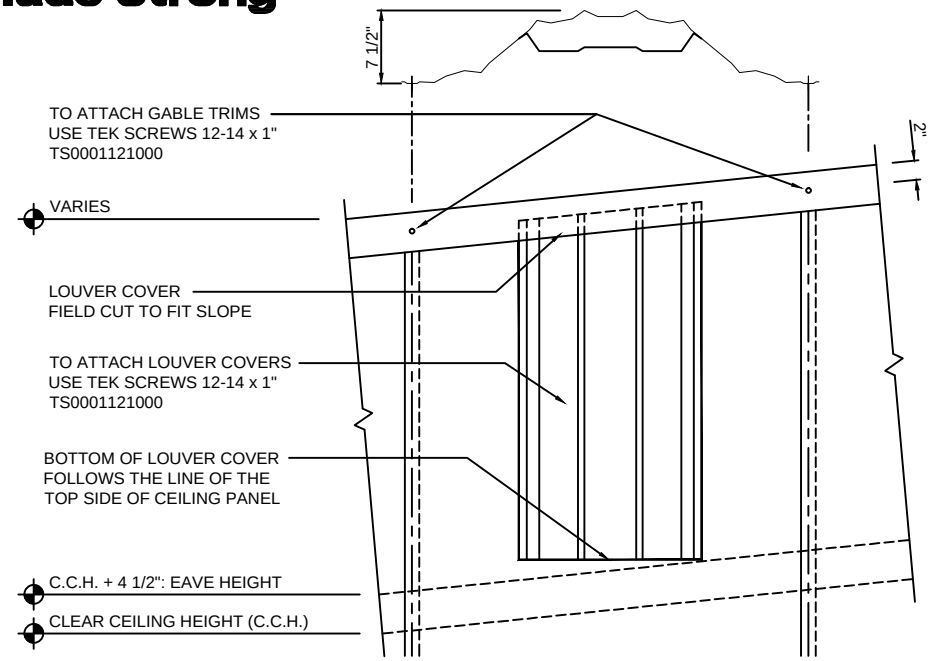
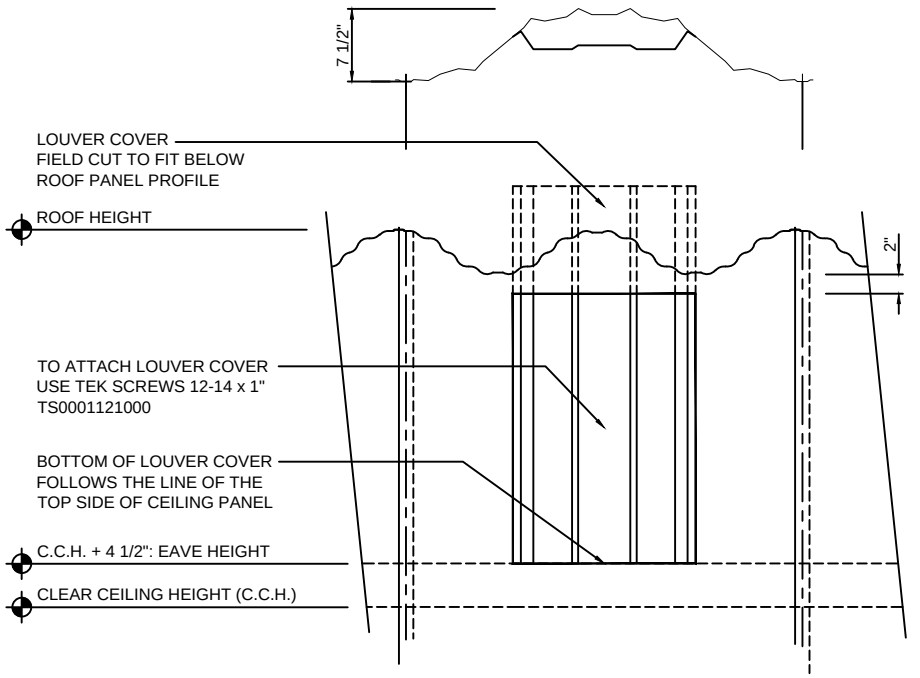


ENDWALL LOUVER DETAIL - CS75



SIDEWALL LOUVER DETAIL - CS75
(SIDEWALL LOUVERS ARE NOT STANDARD)

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SECTION 12
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BEHLEN
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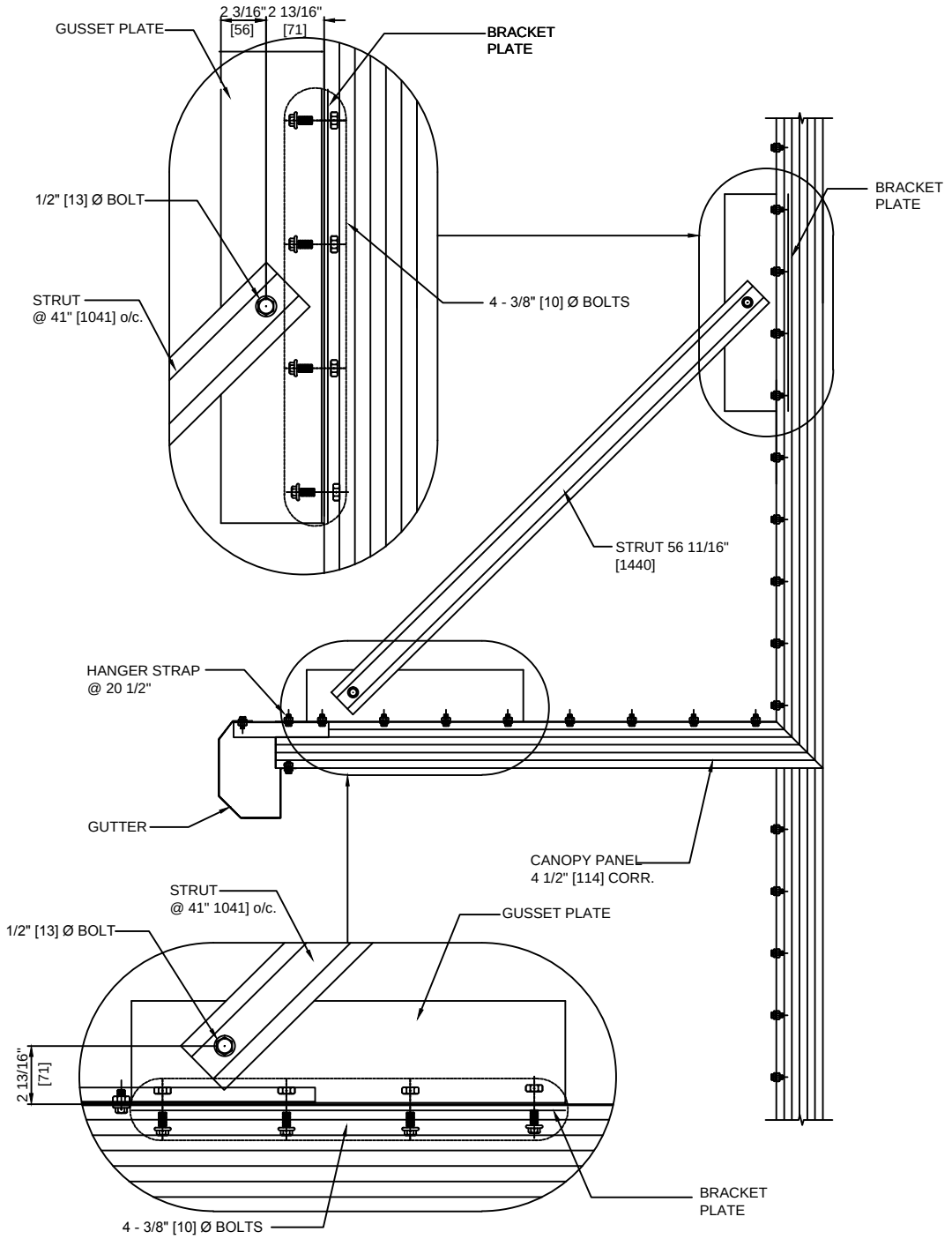

SIDEWALL CANOPY SECTION

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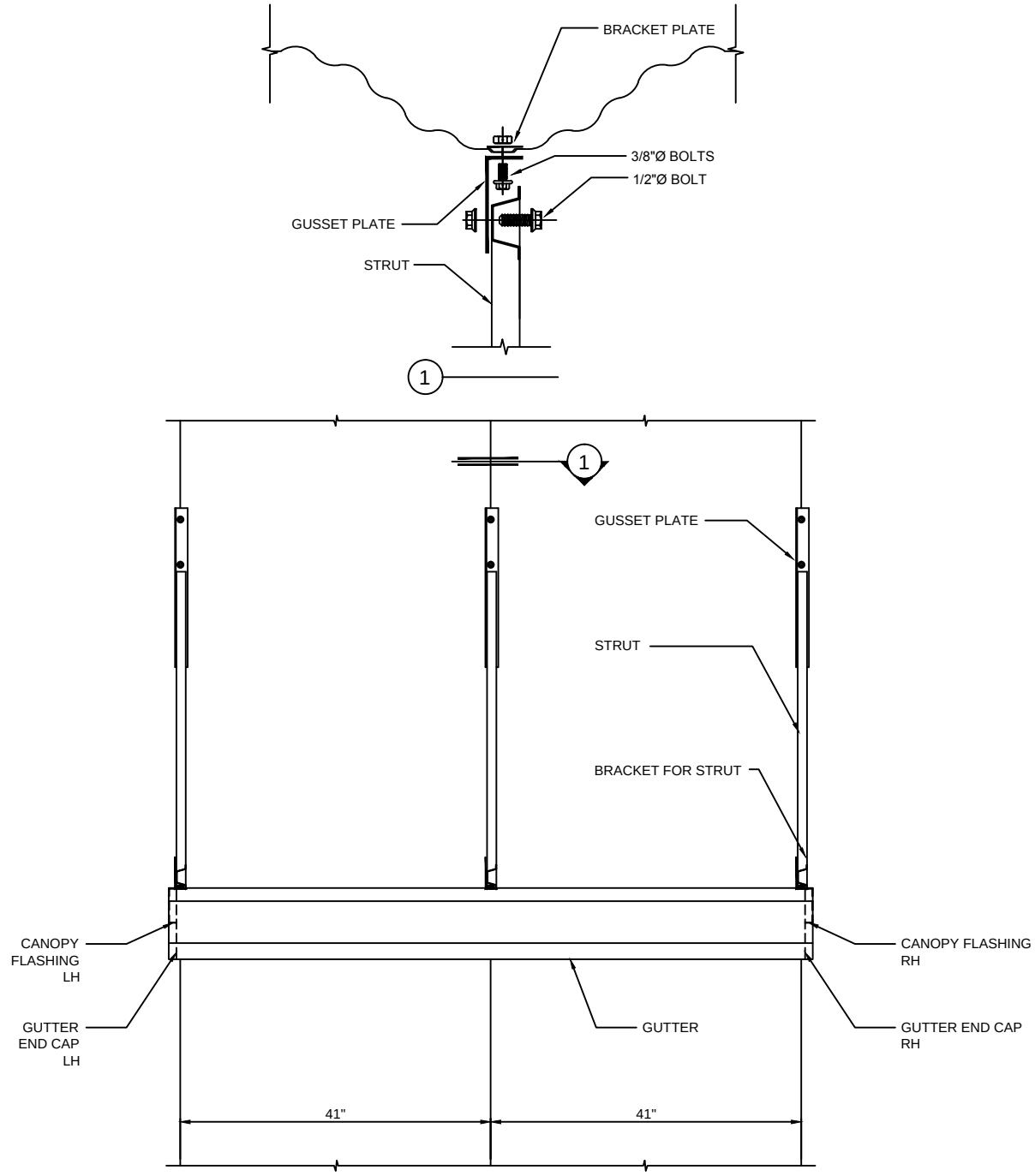

SIDEWALL CANOPY DETAIL
FRONT VIEW

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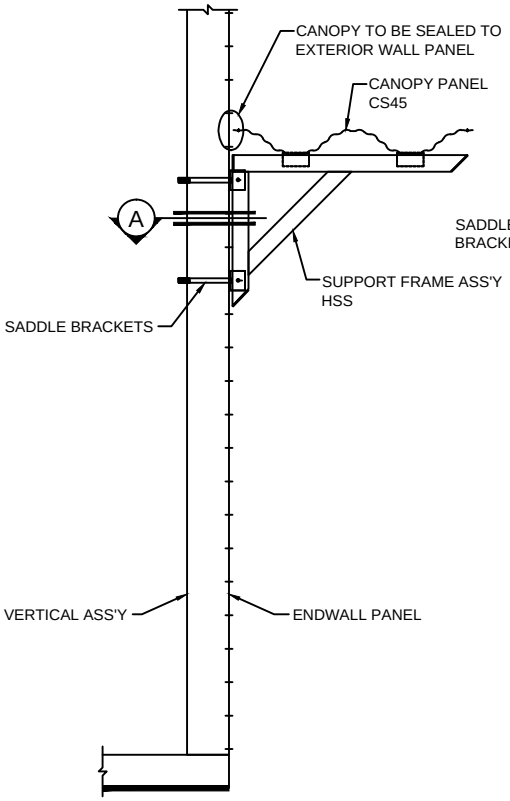
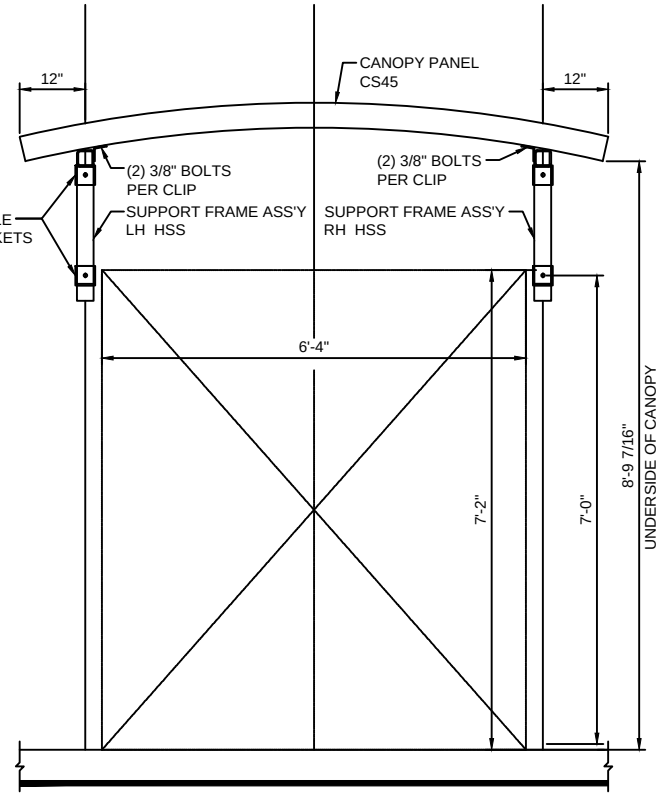
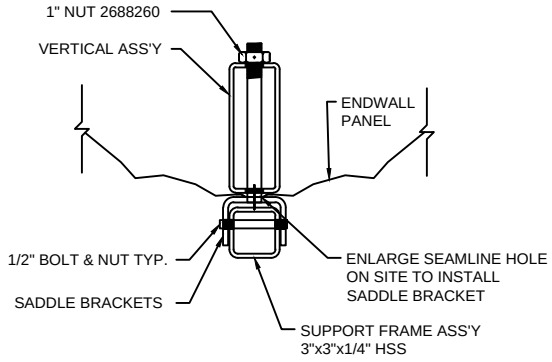


CANOPY SIDE VIEW



CANOPY ELEVATION



A CANOPY SUPPORT SECTION

CURVED CANOPY	MAY 2014 Vr 1.1	
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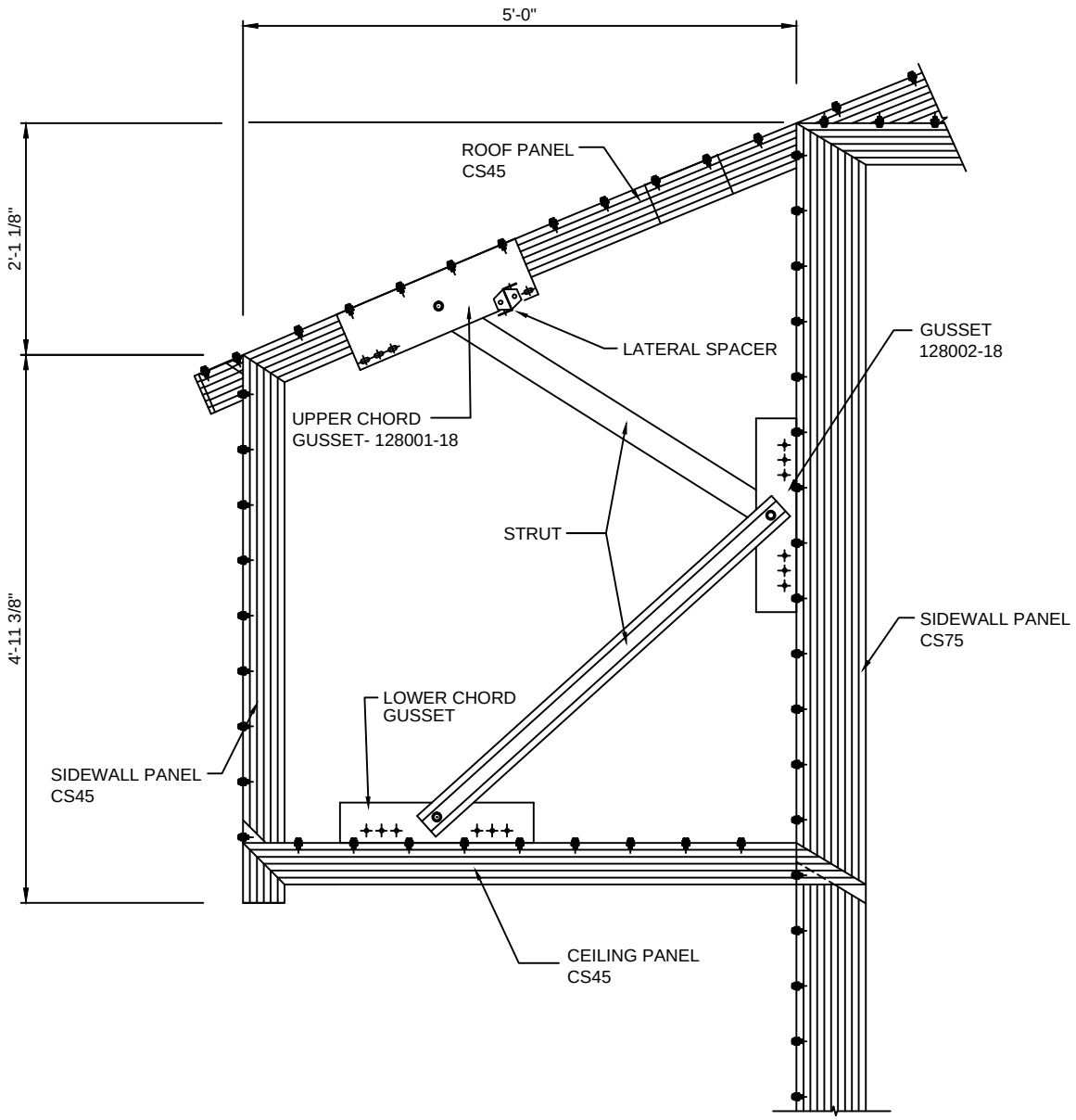

SECTION THROUGH OVERHANG
ON SIDEWALL

OVERHANG SECTION	MAY 2014 Vr 1.1	
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BEHLEN
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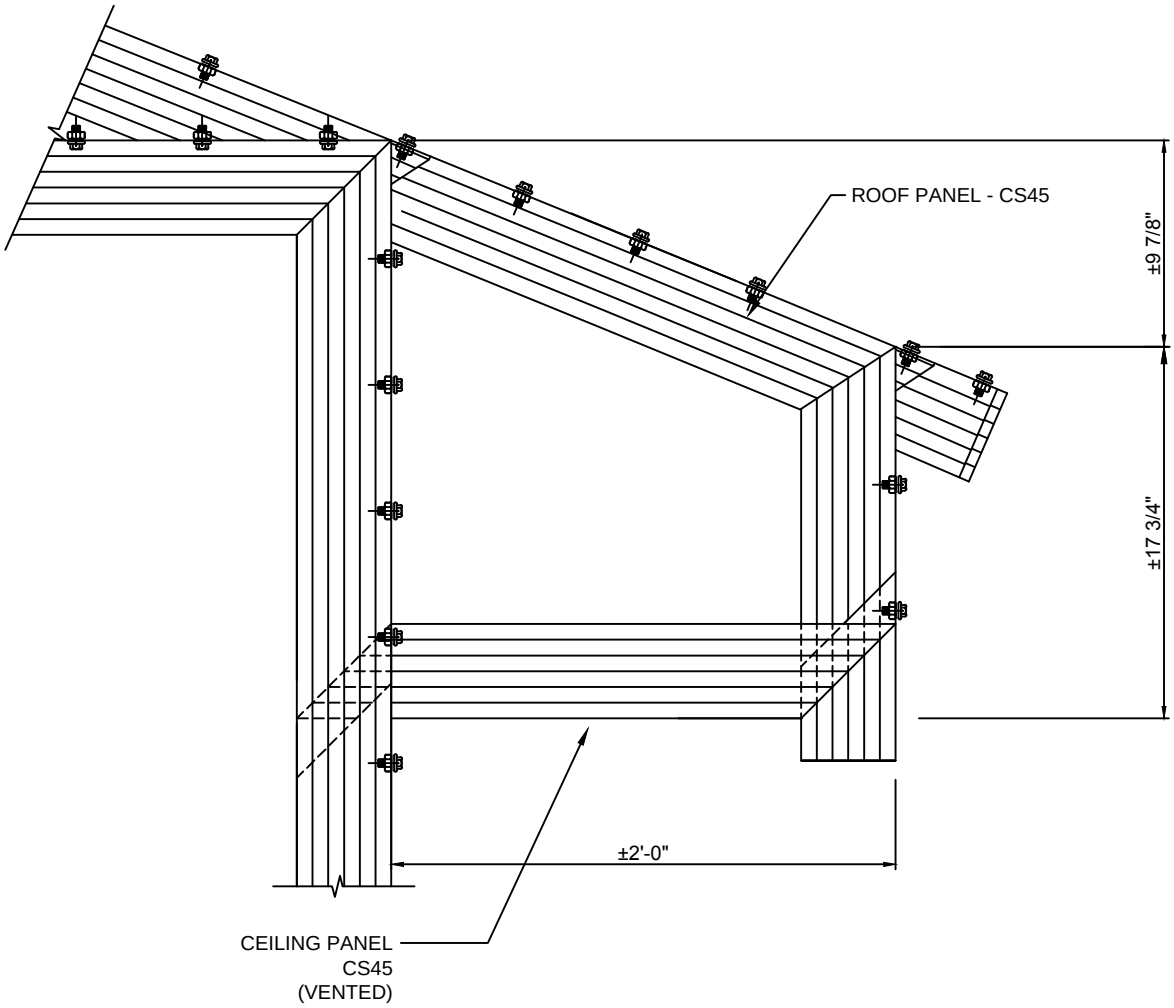

SECTION THROUGH OVERHANG
ON SIDEWALL

OVERHANG SECTION	MAY 2014 Vr 1.1	
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BEHLEN
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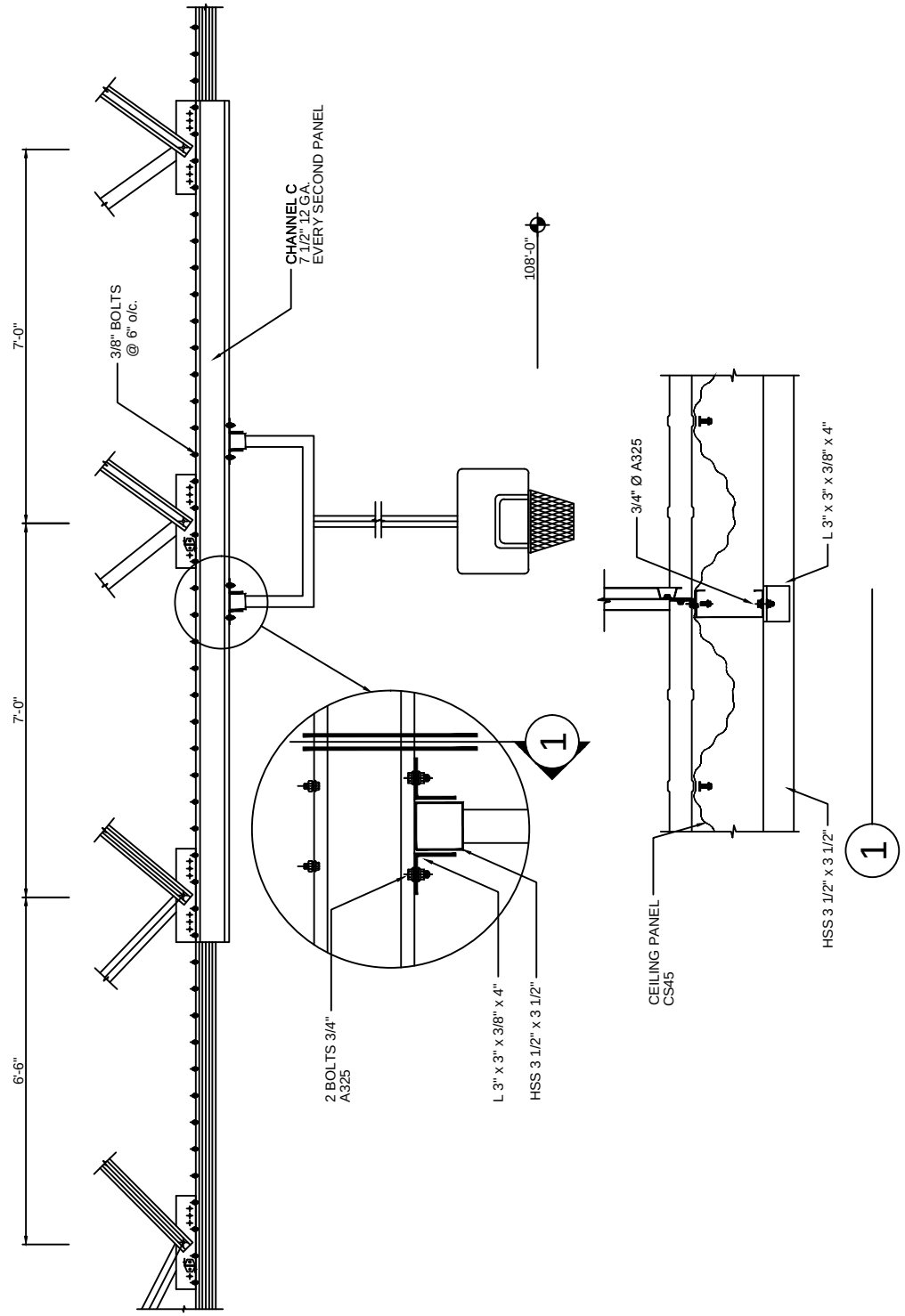

BASKETBALL NET	MAY 2014 Vr 1.1	
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BEHLEN
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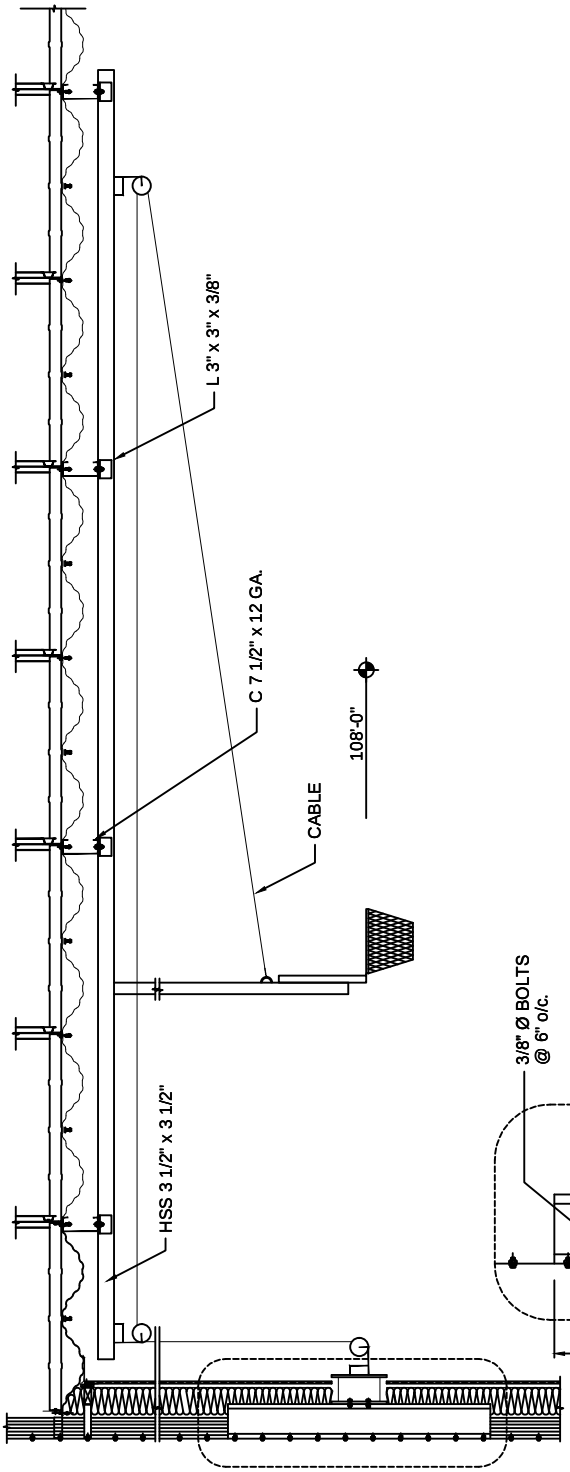
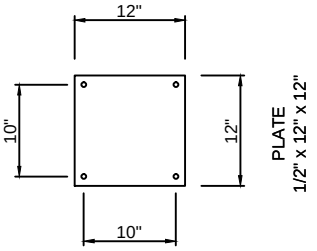
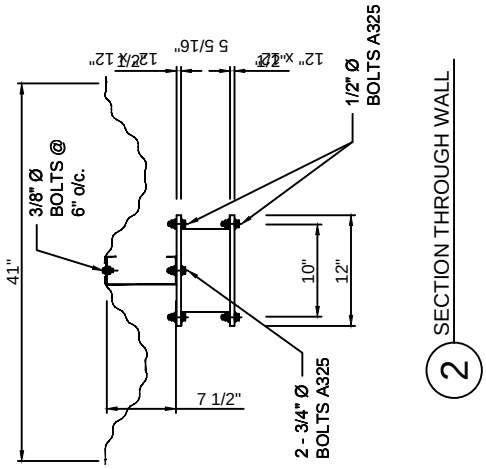
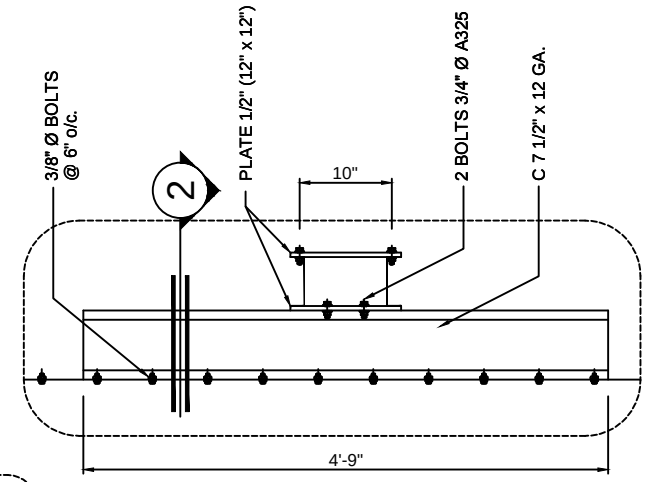






2 SECTION THROUGH WALL



BASKETBALL NET	MAY 2014 Vr 1.1	
ARCHITECTURAL	Section: 12	Page: 008

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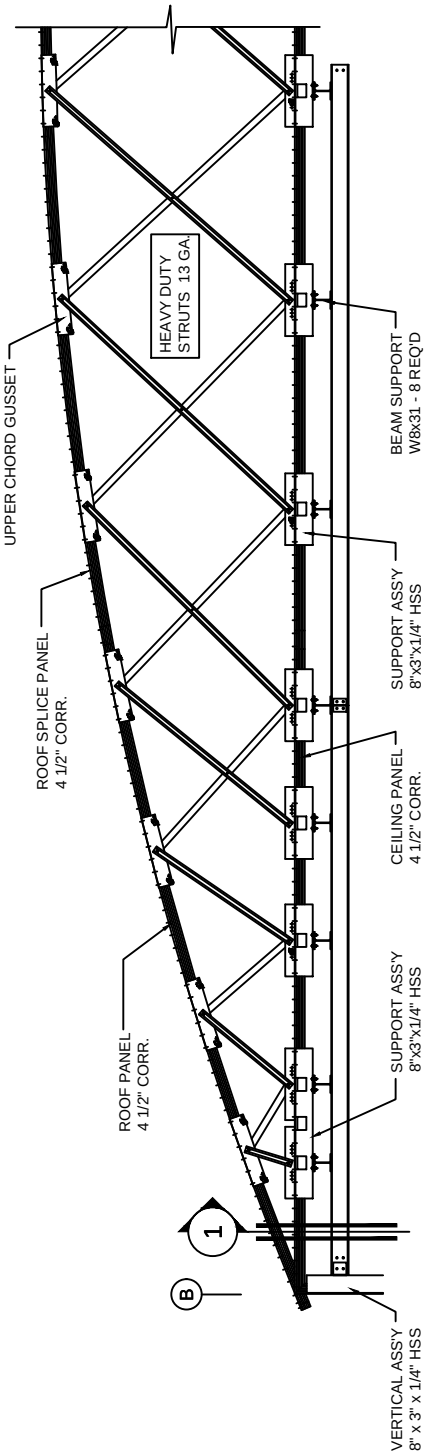
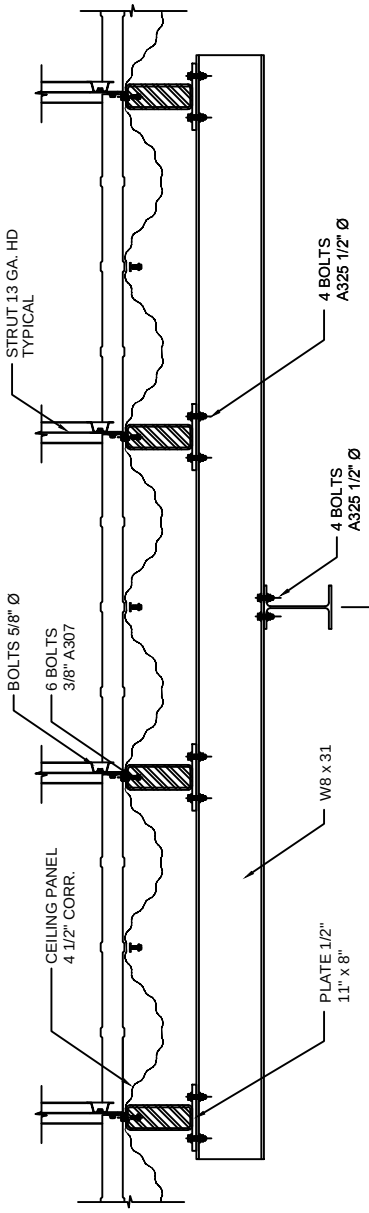


CRANE SYSTEM WITH HEAVY DUTY TRUSS



1 CRANE SYSTEM

MONORAIL DETAILS

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PLAN VIEW OF LAYOUT

3 ANGLE STOP DETAIL

2 MONO RAIL SPLICE DETAIL

MONORAIL DETAILS

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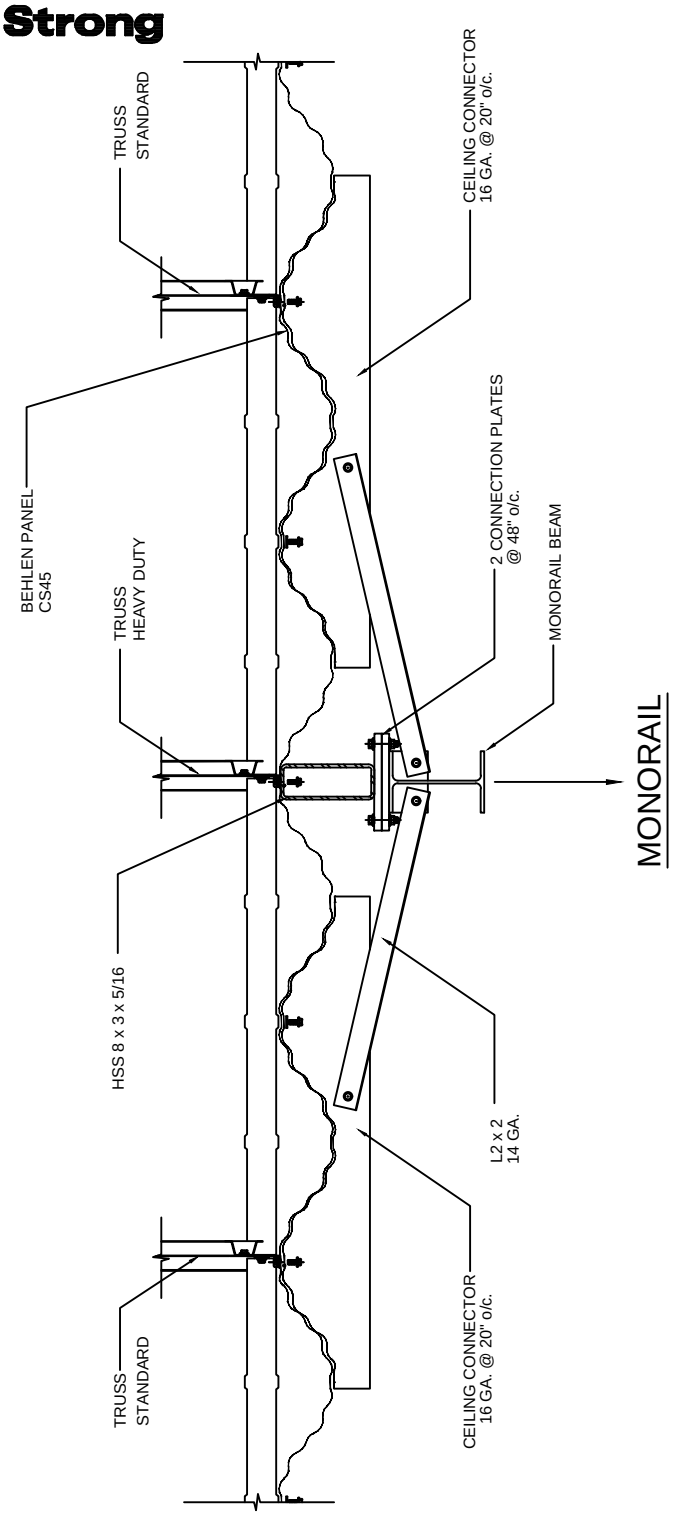

MONORAIL DETAIL

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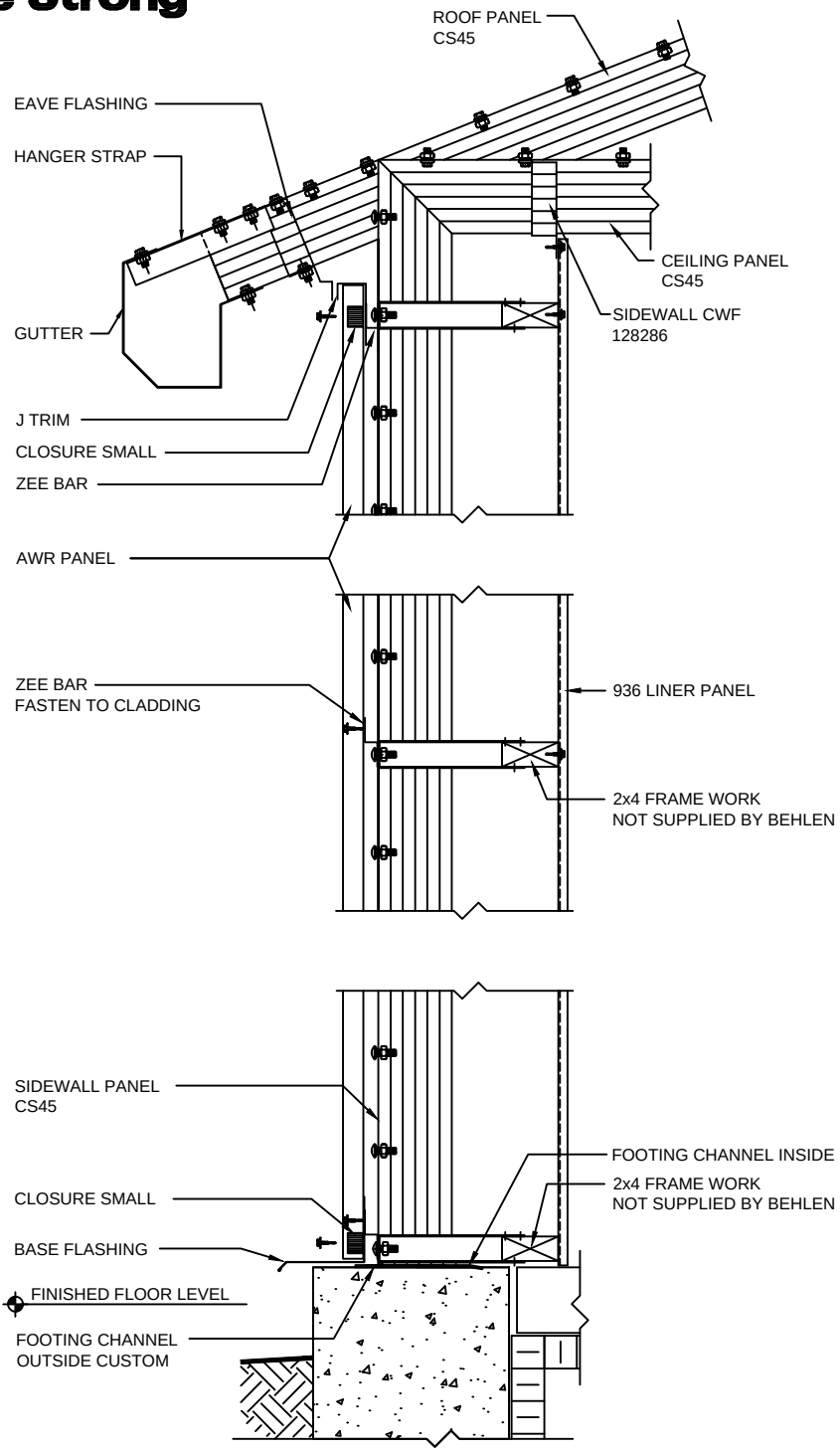

OUTSIDE CLADDING DETAILS

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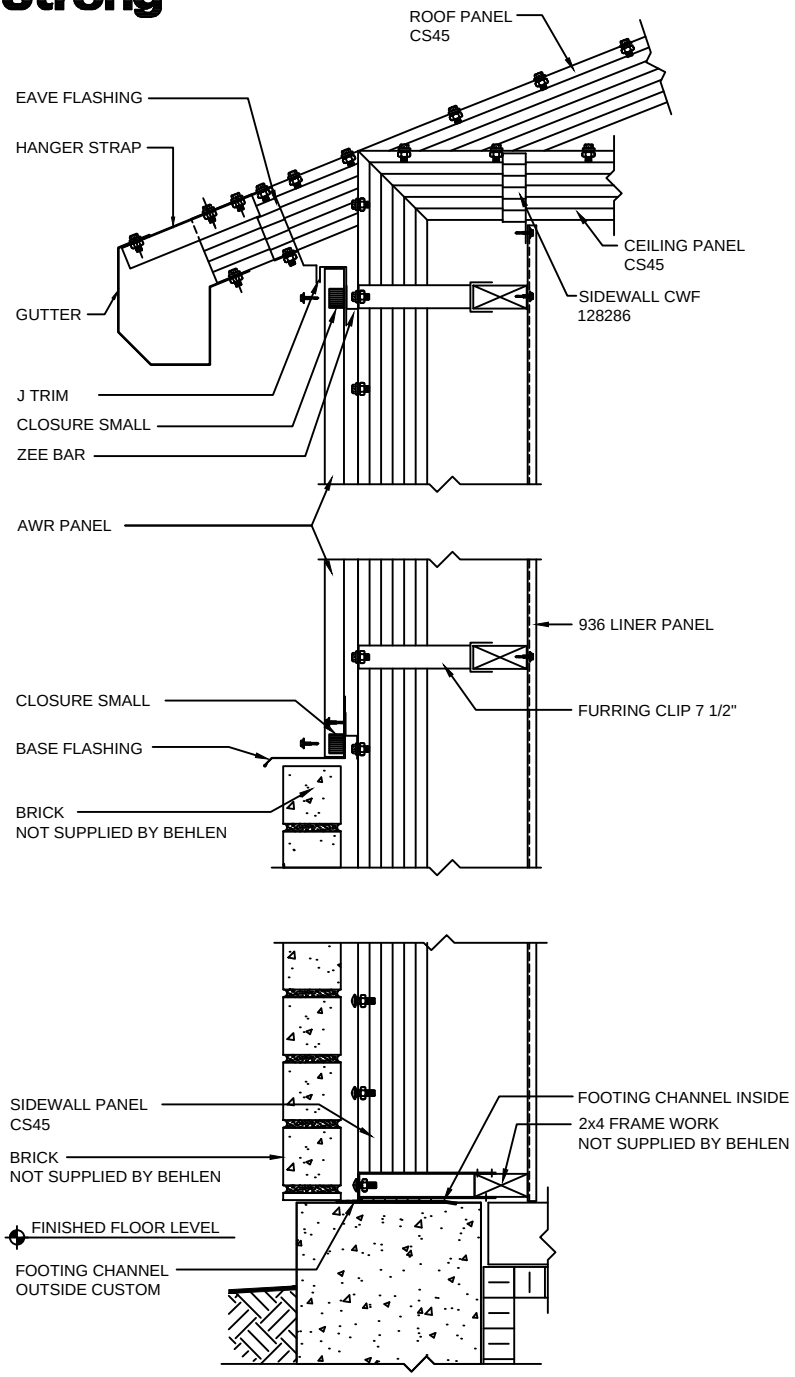

BRICK CLADDING DETAILS

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