LOAD-BEARING STUD FRAMING SYSTEM

33–97 mil structural C-studs for load-bearing walls, curtain walls and framing at openings



PRODUCT 02 · STRUCTURAL FRAMING

Cold-formed steel C-studs from 33 to 97 mil (20 to 12 ga reference) for walls that carry floor and roof loads, wind load, or both. Every stud has stiffening lips on both flanges and oval service knockouts on the web, in the length you order.

- 138 sizes: nine web widths from 1-5/8" to 14"
- Five flange widths, 1-1/4" to 3", with lips from 3/16" to 5/8"
- Five thicknesses, 33 to 97 mil, colour-coded by thickness
- Minimum yield 33 ksi (33–43 mil) and 50 ksi (54–97 mil)
- Hot-dip galvanized G60 steel
- Matching track, deep-leg track and slotted track

WEB WIDTHS	FLANGES	LIPS	THICKNESS	MIN. YIELD	COATING
1-5/8" – 14"	1-1/4" – 3"	3/16" – 5/8"	33 – 97 mil	33 · 50 ksi	G60 · Z180

1 WHERE IT IS USED

- Load-bearing walls carrying floors and roofs
- Exterior curtain walls, infill and bypass, under wind load
- Headers, jambs and posts at openings
- Parapets, tall interior walls and walls with heavy finishes
- Floor and roof joists: see Product 03, LSF cold-formed joist framing system

DESIGNED BY AN ENGINEER

Load-bearing and exterior walls need a structural design. Member size, thickness, spacing, bracing and connections come from the project's design professional.

2 PART NUMBER

600	S	162	-54
WEB DEPTH 1/100 in · 600 = 6"	MEMBER S = stud · T = track	FLANGE 1/100 in · 162 = 1-5/8"	THICKNESS mils · 54 = 0.054" min.

The industry four-part designator: web depth and flange width in 1/100 inch, the member type, and minimum base-steel thickness in mils. Order by part number, length and quantity.

3 MATERIAL BY THICKNESS

THICKNESS	GAUGE REF.	MIN. BASE STEEL	DESIGN THICKNESS	MIN. YIELD	COLOUR CODE
33 mil	20 ga	0.033" · 0.84 mm	0.0346" · 0.88 mm	33 ksi	White
43 mil	18 ga	0.043" · 1.09 mm	0.0451" · 1.15 mm	33 ksi	Yellow
54 mil	16 ga	0.054" · 1.37 mm	0.0566" · 1.44 mm	50 ksi	Green
68 mil	14 ga	0.068" · 1.73 mm	0.0713" · 1.81 mm	50 ksi	Orange
97 mil	12 ga	0.097" · 2.46 mm	0.1017" · 2.58 mm	50 ksi	Red

Steel to ASTM A1003/A1003M, G60 (Z180) hot-dip zinc coating to ASTM A653/A653M, members to ASTM C955. Thickness is minimum base steel without coating; gauge is a reference only, so specify by mils. General information only: see the Important notice on the last page.

STEEL
Steel is a non-combustible material

DIMENSIONALLY STABLE
Steel does not rot, shrink or split

ORDERED TO LENGTH
Studs come in the length you order

RECYCLABLE
Offcuts and scrap steel can be recycled

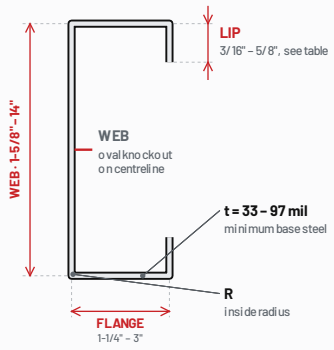
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PROFILE & DIMENSIONS

138 stud sizes · 1-5/8" to 14" · 33 to 97 mil

4 STUD PROFILE

STRUCTURAL C-STUD · S125 TO S300



AT A GLANCE

SECTION	C-stud with lips
WIDTHS	1-5/8" to 14"
FLANGES	1-1/4" · 1-5/8" · 2" · 2-1/2" · 3"
THICKNESS	33 · 43 · 54 · 68 · 97 mil
KNOCKOUTS	Oval, on web centreline
LENGTHS	Any length you order
STANDARD	ASTM C955 · CSA S136 design

Section not to scale. Web width and flange are outside dimensions; lip length depends on the flange.

5 FLANGES & LIPS

FLANGE	WIDTH	MM	LIP	MM	TYPICAL USE
S125	1-1/4"	31.8	3/16"	4.8	Heavier interior walls
S162	1-5/8"	41.3	1/2"	12.7	Most load-bearing and curtain walls
S200	2"	50.8	5/8"	15.9	Wider bearing for sheathing and connections
S250	2-1/2"	63.5	5/8"	15.9	Heavy loads and floor joists
S300	3"	76.2	5/8"	15.9	Very heavy loads and longer spans

Typical uses are general guidance; the design sets the flange.

6 WEB WIDTHS

WEB	WIDTH	MM	THICKNESSES
162	1-5/8"	41.3	33
250	2-1/2"	63.5	33 · 43 · 54
362	3-5/8"	92.1	33 · 43 · 54 · 68 · 97
400	4"	101.6	33 · 43 · 54 · 68 · 97
600	6"	152.4	33 · 43 · 54 · 68 · 97
800	8"	203.2	33 · 43 · 54 · 68 · 97
1000	10"	254.0	43 · 54 · 68 · 97
1200	12"	304.8	43 · 54 · 68 · 97
1400	14"	355.6	43 · 54 · 68 · 97

7 MATCHING TRACK

WEB	LEGS	THICKNESSES
162T	1-1/4" · 2"	33
250T	1-1/4" · 2" · 3"	33 · 43 · 54
362T	1-1/4" · 2" · 3"	33 · 43 · 54 · 68 · 97
400T	1-1/4" · 2" · 3"	33 · 43 · 54 · 68 · 97
600T	1-1/4" · 2" · 3"	33 · 43 · 54 · 68 · 97
800T	1-1/4" · 2" · 3"	33 · 43 · 54 · 68 · 97
1000T	1-1/4" · 2" · 3"	33 · 43 · 54 · 68 · 97
1200T	1-1/4" · 2" · 3"	43 · 54 · 68 · 97
1400T	1-1/4" · 2" · 3"	43 · 54 · 68 · 97

Track legs have no lips; track takes a stud of the same web width.

Give part number, length and quantity, e.g. **600S162-54 × 12'-6"**. Studs come in the length you order.

RELATED PRODUCTS

Track and deep-leg track: Product 04 · Slotted deflection track: Product 05 · Cold-formed joists: Product 03 · Clips and connectors: Product 22 · Interior 18 mil studs: Product 01.

SIZES & WEIGHTS

Every structural stud size offered, by web, flange and thickness

8 SIZES OFFERED & APPROXIMATE WEIGHT, LB/FT

Each number is a size offered; the value is its approximate weight in pounds per foot. A dash means that size is not offered. Part number = stud code + thickness, e.g. 600S162-54.

STUD	WEB	FLANGE	33 MIL	43 MIL	54 MIL	68 MIL	97 MIL
162S125	1-5/8"	1-1/4"	0.49	–	–	–	–
250S125	2-1/2"	1-1/4"	0.60	0.77	–	–	–
250S162		1-5/8"	0.76	0.98	1.22	–	–
362S125	3-5/8"	1-1/4"	0.73	0.95	–	–	–
362S162		1-5/8"	0.89	1.16	1.44	1.78	2.46
362S200		2"	1.01	1.31	1.63	2.02	2.81
362S250		2-1/2"	1.13	1.46	1.82	2.27	3.16
362S300		3"	1.25	1.62	2.01	2.51	3.50
400S162	4"	1-5/8"	0.94	1.21	1.51	1.87	2.59
400S200		2"	1.05	1.37	1.70	2.12	2.94
400S250		2-1/2"	1.17	1.52	1.89	2.36	3.29
400S300		3"	1.29	1.67	2.09	2.60	3.63
600S125	6"	1-1/4"	1.01	1.31	–	–	–
600S162		1-5/8"	1.17	1.52	1.89	2.36	3.29
600S200		2"	1.29	1.67	2.09	2.60	3.63
600S250		2-1/2"	1.41	1.83	2.28	2.84	3.98
600S300		3"	1.52	1.98	2.47	3.09	4.32
800S162	8"	1-5/8"	1.41	1.83	2.28	2.84	3.98
800S200		2"	1.52	1.98	2.47	3.09	4.32
800S250		2-1/2"	1.64	2.13	2.66	3.33	4.67
800S300		3"	1.76	2.29	2.86	3.57	5.02
1000S162	10"	1-5/8"	–	2.13	2.66	3.33	4.67
1000S200		2"	–	2.29	2.86	3.57	5.02
1000S250		2-1/2"	–	2.44	3.05	3.81	5.36
1000S300		3"	–	2.59	3.24	4.06	5.71
1200S162	12"	1-5/8"	–	2.44	3.05	3.81	5.36
1200S200		2"	–	2.59	3.24	4.06	5.71
1200S250		2-1/2"	–	2.75	3.43	4.30	6.05
1200S300		3"	–	2.90	3.63	4.54	6.40
1400S162	14"	1-5/8"	–	2.75	3.43	4.30	6.05
1400S200		2"	–	2.90	3.63	4.54	6.40
1400S250		2-1/2"	–	3.06	3.82	4.78	6.75
1400S300		3"	–	3.21	4.01	5.03	7.09

Approximate weights, calculated from nominal dimensions for the base steel of the unpunched section. Actual weights vary with thickness tolerance, coating and knockouts. For handling and shipping estimates only, not for design. 1 lb/ft = 1.488 kg/m.

MATERIAL, COATING & IDENTIFICATION

What the steel is, and how to tell one thickness from another

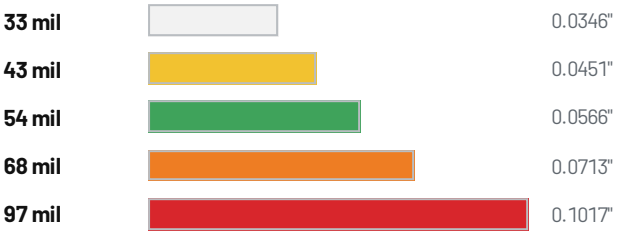
9 THICKNESS, YIELD & COLOUR CODE

MILS	GAUGE REF.	MIN. BASE, IN	MM	DESIGN, IN	MM	INSIDE RADIUS, MM	MIN. YIELD, KSI · MPA	COLOUR
33	20	0.033"	0.84	0.0346"	0.88	1.9	33 · 230	White
43	18	0.043"	1.09	0.0451"	1.15	1.8	33 · 230	Yellow
54	16	0.054"	1.37	0.0566"	1.44	2.2	50 · 340	Green
68	14	0.068"	1.73	0.0713"	1.81	2.7	50 · 340	Orange
97	12	0.097"	2.46	0.1017"	2.58	3.9	50 · 340	Red

Designation thickness in mils is the minimum base-steel thickness, 95% of the design thickness, without coating. Inside bend radii are typical industry values. Where a stud of 54 mil or more is used, specify the 50 ksi yield on the drawings so there is no doubt.

10 THICKNESS COMPARED

Bar length is proportional to design thickness.

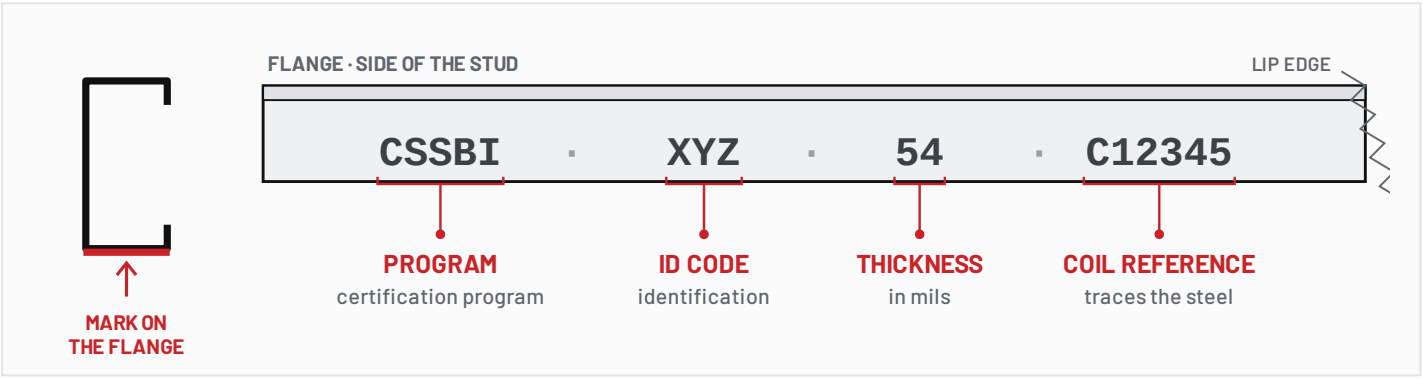


11 ZINC COATING

COATING	METRIC	TOTAL ZINC, BOTH SIDES	USE
G60	Z180	0.60 oz/ft² · 180 g/m²	Standard for structural studs
G90	Z275	0.90 oz/ft² · 275 g/m²	Severe exposure, on request

Hot-dip galvanized to ASTM A653/A653M. Where cut ends or welds lose coating, touch up with zinc-rich paint as the specification requires.

12 IDENTIFICATION



Members certified under the CSSBI 61 program carry a legible mark along the flange (the side of the stud): the program initials, an identification code, the thickness in mils, and a reference that traces back to the steel coil. The example above is schematic.

The thickness colour code (white, yellow, green, orange, red) helps crews tell thicknesses apart on site. Always confirm by the part number and the thickness mark, not by colour alone.

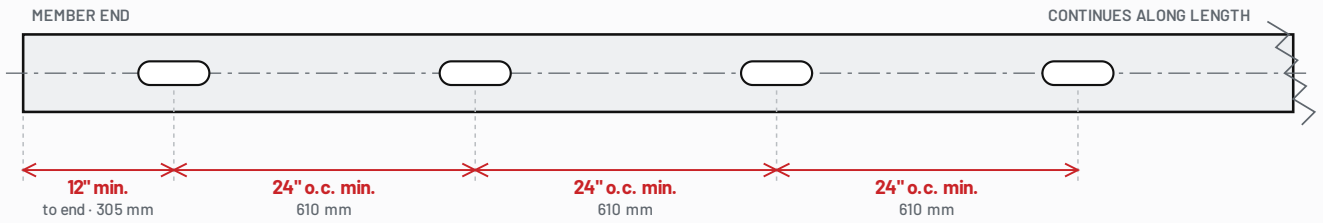
13 STEEL PROPERTIES USED IN DESIGN

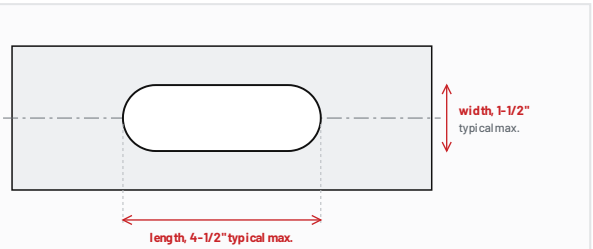
PROPERTY	IMPERIAL	METRIC	REFERENCE
Modulus of elasticity, E	29,500 ksi	203,000 MPa	CSA S136
Shear modulus, G	11,300 ksi	78,000 MPa	CSA S136
Poisson's ratio	0.30	0.30	CSA S136
Density	490 lb/ft³	7,850 kg/m³	Typical
Thermal expansion	6.5 × 10⁻⁶ /°F	11.7 × 10⁻⁶ /°C	Typical

KNOCKOUTS & WALL TYPES

How structural studs are used and how load travels through them

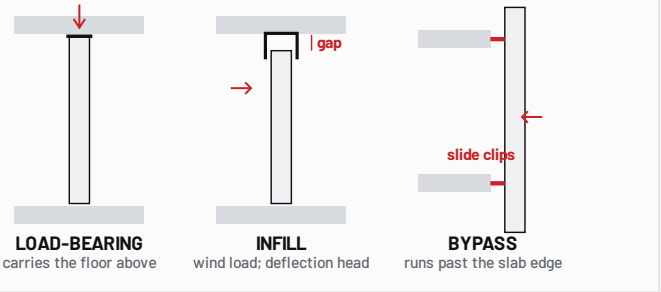
14 SERVICE KNOCKOUTS





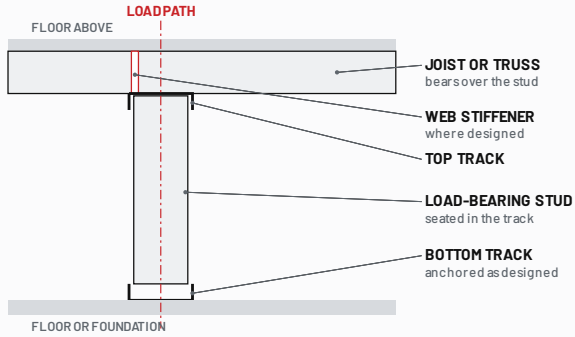
Oval knockouts on the web centreline take bridging channel, conduit and pipe. The figures shown are the usual industry limits for knockout size and spacing; exact dimensions of our knockouts are available on request. Holes cut on site, or holes near bearing points and concentrated loads, need the design professional's approval, and may need reinforcing.

15 THREE KINDS OF WALL



Load-bearing walls carry floors and roofs down to the foundation. **Infill** walls sit between slabs and carry wind; their head needs room for the slab above to move. **Bypass** walls run past the slab edge and are tied back with slide clips.

16 IN-LINE FRAMING



Load passes straight down when joists, trusses and studs line up. Where members are offset beyond what the design allows, a load distribution member is needed. Web stiffeners at bearings are placed as designed.

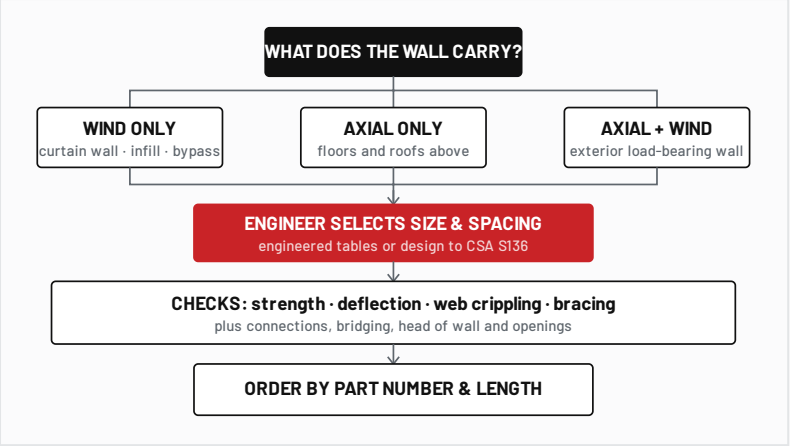
STRUCTURAL DESIGN DATA

This data sheet does not give section properties, load tables or limiting heights. The design professional should use engineered data for the specific product, to CSA S136 and the building code. Contact us about available technical data.

SELECTION & DESIGN

How a structural stud is chosen, and the criteria commonly specified

17 FROM LOAD TO PART NUMBER



WHAT THE DESIGN CHECKS

- **Axial strength** for studs carrying floors and roofs
- **Bending strength** under wind or lateral load
- **Combined axial and bending** for exterior load-bearing walls
- **Deflection** against the limit for the finish
- **Web crippling and shear** at bearings and supports
- **Bracing** bridging or sheathing against twist and buckling
- **Connections** screws, welds, clips and anchors

SAME STUD, THREE JOBS

The same size and thickness can work as a wind-bearing stud, an axial load-bearing stud, or both. What changes is the design: the loads, the bracing and the connections.

18 DESIGN CRITERIA COMMONLY SPECIFIED

ITEM	COMMONLY SPECIFIED	GOVERNED BY
Deflection, gypsum board finishes	L/240 to L/360	Project specification
Deflection, stucco, EIFS, exterior sheathing	L/360	Project specification
Deflection, masonry veneer backup	Stricter, commonly L/600	CSA S304 and CSA A370
Stud spacing	12" · 16" · 19.2" · 24" o.c.	Design
Bridging rows, axial load-bearing studs	4'-0" o.c. maximum	Design
Bridging rows, wind-bearing studs	5'-0" o.c. maximum	Design
Movement gap at deflection heads	As detailed, commonly 1/2" or more	Design
Wind load for design	NBC 1-in-50-year pressure	National Building Code

Values are those often found in Canadian guide specifications and are listed for orientation only. The building code, the project specification and the design professional govern every project.

ENGINEERED SELECTION TABLES

Our part numbers follow the CSSBI standard section designations. Industry member-selection tables for these standard sections (CSSBI 58, Lightweight Steel Framing Member Selection Tables) are used by many design professionals. Confirm with us which tables apply to Saturn Metal studs before relying on them, and have the final selection made by the engineer of record.

19 READING ENGINEERED STUD TABLES

Two kinds of load

Strength checks use factored loads; deflection checks use specified (unfactored) loads. Check which one a table lists before comparing.

Wind and deflection

Curtain-wall tables list the limiting height for a stud, spacing, wind pressure and deflection limit. In Canada the wind deflection check usually includes the NBC importance factor for serviceability.

Axial with wind

Combined tables give the axial load a stud can carry at a given height, spacing and lateral load. They assume a bridging spacing and restrained stud ends, stated in the table notes.

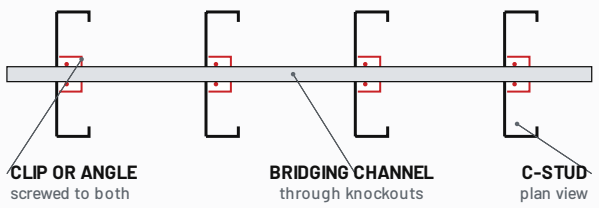
Bearing and bracing

Web crippling values assume a stated bearing length, and strengths assume the stated bracing. Shorter bearing or wider bracing needs its own check.

DETAILING

Bracing, connections, openings and the head of wall

20 BRACING & BRIDGING

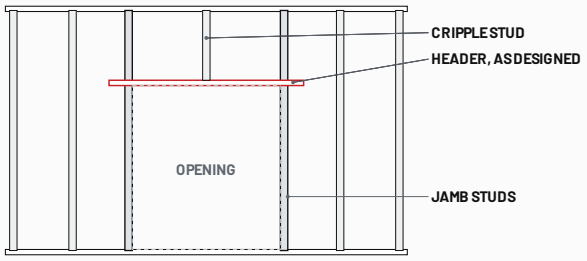


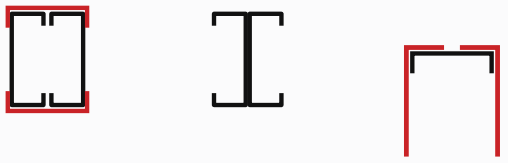
Slender C-studs need bracing so they don't buckle sideways or twist under load. Bracing may come from sheathing fixed to both flanges, where the design counts on it, or from rows of bridging channel run through the knockouts and fixed to every stud with a clip or angle. Bridging is anchored to the structure at intervals the design sets. Temporary bracing may be needed until sheathing is on.

21 BEARING & CONNECTIONS

- Seat studs in the track as the design requires, so load passes into the track and not only the screws
- Screws: self-drilling, sized by the design; at least three threads should pass through the last steel layer
- Welding, where specified: by a company certified to CSA W47.1, to CSA W59; touch up the coating with zinc-rich paint
- Web stiffeners or clips where concentrated loads or bearings need them
- Splices only where the design professional permits, and as detailed
- Do not cut flanges or lips; notching needs approval

22 OPENINGS & HEADERS

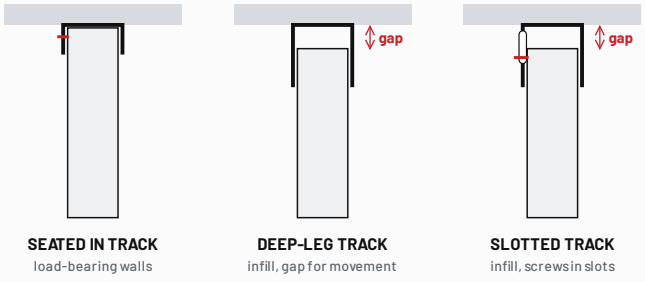




red = track or angle · black = C-stud or track

Headers carry the load above an opening to the jambs. Common forms are box headers, back-to-back C-studs and L-headers built from angles. Jambs are often two or more studs. Header type, size and connections come from the design.

23 HEAD OF WALL



Load-bearing studs are seated in the track so load passes into it. Infill walls under a slab that deflects need deep-leg or slotted track, or deflection clips, with the gap set by the design.

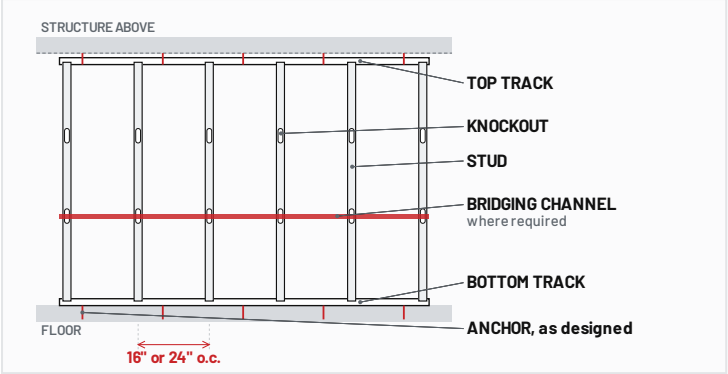
FIRE & SOUND

A fire-resistance rating (CAN/ULC-S101, ASTM E119) or STC rating (ASTM E90, E413) belongs to the whole tested or listed assembly, not to the stud. Match stud size, thickness and spacing, board, screws, insulation and sealant to the listed design.

INSTALLATION & SYSTEM

How the parts go together on site

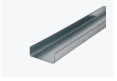
24 TYPICAL INSTALLATION



1. Lay out and anchor the bottom track as the design requires.
2. Stand studs at the design spacing, lined up with the joists or trusses above, knockouts aligned.
3. Seat each stud in the track and fasten both flanges as detailed.
4. Install bridging, headers, jambs and bracing as designed, then the top track or head detail.
5. Keep temporary bracing in place until sheathing and permanent bracing are complete.

General information only, not installation instructions. Install to ASTM C1007, the structural drawings and specifications, and applicable codes.

25 SYSTEM PARTS



Track
Top and bottom runner, same web width



Deep-leg track
For infill heads that need a gap



Slotted track
Vertical slots for head-of-wall movement



Bridging channel
Runs through the knockouts



Bridging clip
Fixes the channel at each stud



Deflection clips
Head-of-wall and bypass movement

26 STANDARDS

- ASTM C955 · structural members
- ASTM A1003 · A653 · steel & coating
- CSA S136 · cold-formed steel design
- AISI S240 · structural framing
- ASTM C1007 · installation
- CSA W59 · W47.1 · welding
- National Building Code of Canada

27 TYPICAL SCREWS

- Self-drilling screws with a point rated for the total steel thickness
- Size, number and spacing as the design requires
- Follow the screw maker's data; see our Fastening guide

28 STORAGE

Store bundles dry, off the ground and under ventilated cover to prevent wet-storage stain. Edges are sharp: use gloves and appropriate PPE. Lift bundles safely; do not drop or walk on them.

SPECIFYING & QUALITY

Tolerances, submittals, specification outline and certification

29 ERECTION TOLERANCES

ITEM	COMMONLY SPECIFIED
Stud plumb, axial load-bearing	Within 1/1000 of the height
Stud plumb, wind-bearing	Within 1/500 of the height
Stud straightness	Within 1/1000 of the length
Gap, stud end to track web	1/8" (3 mm) maximum
Stud spacing	± 1/8" (3 mm) from the design
Track anchors	As designed, commonly 32" o.c. maximum

Orientation only; the project specification governs. Member tolerances follow ASTM C955 and AISI S240.

30 TYPICAL SUBMITTALS

- Shop drawings sealed by a professional engineer, with connections and bracing
- Engineering calculations, when requested
- Material test reports for steel and coating
- Product data for studs, track, clips and fasteners
- Proof of certification for the framing members
- Field review reports by the engineer

31 SPECIFICATION OUTLINE · 05 40 00

Part 1 General: design by a professional engineer to CSA S136 and the National Building Code; design criteria; submittals; quality assurance.
Part 2 Products: cold-formed structural steel C-studs to ASTM C955, steel to ASTM A1003, minimum yield 33 ksi (33–43 mil) and 50 ksi (54–97 mil), G60 coating to ASTM A653; sizes and thicknesses per the structural drawings; Saturn Metal DS-02; track, bridging, clips and fasteners as shown.
Part 3 Execution: install to ASTM C1007 and the shop drawings; tolerances; bracing; touch-up of damaged coating; field review.

32 BEFORE YOU ORDER: CHECKLIST

- Stud part number and thickness from the structural drawings
- Lengths, including exact wall heights
- Quantities from the takeoff
- Matching track, deep-leg or slotted track
- Bridging channel, clips and connectors
- Headers, jambs and web stiffener pieces

Certification: our cold-formed framing members are product certified by CISC to CSSBI 61:24. Certification covers only the members named in our current Product Scope Listing; confirm the status of a specific member with us before relying on it.
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IMPORTANT NOTICE

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