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250VXS144-22 VIPER-X INTERIOR STUD

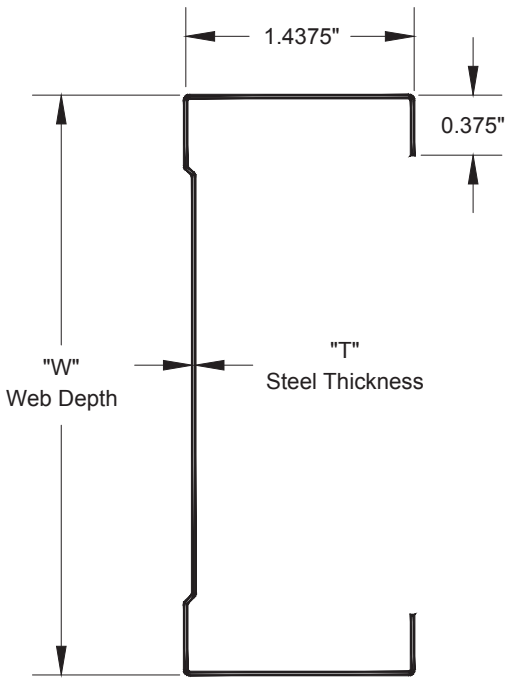
Geometric Properties

2-1/2" x 1-7/16" flange, Viper-X Studs are manufactured from standard G40 hot-dipped galvanized steel. G60 and G90 coatings are available through special order, and may require up-charges and extended lead times.

Steel Thickness

Member	Design Thickness (in)	Minimum Thickness (in)	Yield (ksi)	Web Sizes (in)	Coating[4,5]	Flange (in)	Return Lip (in)
250VXS144-22	0.0235	0.0223	57	2-1/2	G40	1-7/16	3/8

Notes: **1.** Uncoated steel thickness. Thickness is for carbon sheet steel. **2.** Minimum thickness represents 95% of the design thickness and is the minimum acceptable thickness. **3.** Knockout size for 1-5/8" Stud is 3/4" x 2". **4.** Per ASTM C645 & A1003, Table 1. **5.** G60 and G90 available upon request. Will require extended lead time and upcharge.



Color Code (painted on ends): Pink & Black

ASTM & Code Standards:
- ASTM A653/A653M, A924/A924M, A1003/1003, C645 & C754, E119
- IAPMO ER-0524
- IBC: 2012, 2015
- AISI: 2007, 2012, 2015
- AISI: S100-12, S240-15

LEED v4 for Building and Design Construction
- MR Prerequisite: Construction and Demolition Waste Management Planning.
- MR Credit: Construction and Demolition Waste Management.
- MR Credit: Building Product Disclosure and Optimization – Sourcing of Raw Materials, Option 2.
- MR Credit: Building Product Disclosure and Optimization – Environmental Product Declarations, Options 1 & 2.
- MR Credit: Building Product Disclosure and Optimization – Material Ingredients, Option 1.
- MR Credit: Building Life-Cycle Impact Reduction, Option 4.

CEMCO cold-formed steel framing products contain 30% to 37% recycled steel.
■ Total Recycled Content: 36.9% ■ Post-Consumer: 19.8% ■ Pre-Consumer: 14.4%

CSI Division: 09.22.16 – Non-Structural Metal Framing

250VXS144-22 Viper-X Section and Structural Properties

Yield Stress (ksi)	Web Height, h (in)	Design Thickness[3], t (in)	Gross Properties						Effective Properties					Torsional Properties					Critical Unbraced Length, Lu (in)
			Weight (lb/ft)	Area (in^2)	Ix (in^4)	Rx (in)	Iy (in^4)	Ry (in)	Ixe (in^4)	Sxe (in^3)	Ma-l (k-in)	Ma-d (k-in)	Vag (k)	J (x 10^{-6}) (in^4)	Cw (in^6)	Xo (in-k)	Ro (in-k)	ß	
57	2.500	0.0235	0.477	0.140	0.148	1.027	0.040	0.534	0.142	0.089	2.994	2.806	0.615	25.850	0.058	-1.158	1.637	0.500	27.60

Notes: **1.** Web height to thickness ratio (h/t) exceeds 200. Web stiffeners required at all support points and concentrated loads. **2.** Members having a web height to thickness ratio (h/t) value exceeding 260 will not have effective properties listed, only gross properties will be listed. **3.** Web height value (h) used for h/t calculation is the flat width of the web. For (S) members, this is the out to out member size, minus twice the thickness, minus twice the inside bend radius. **4.** Members having a flange width to thickness ratio (b/t) value exceeding 60 must be considered for use with the limitations described in AISI S100-12 section B1. **5.** Flange width value (b) used for b/t calculation is the flat width of the flange. For (S) members, this is the out to out member size, minus twice the thickness, minus twice the inside bend radius.

Non-Composite Limiting Heights – Braced at 48" O.C.

Depth (in)	Member	Yield (ksi)	Design Thickness (in)	Spacing O.C. (in)	5 PSF			7.5 PSF			10 PSF		
					L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
2-1/2	250VXS144-22	57	0.0235	12	15' 6"	12' 4"	10' 9"	13' 7"	10' 9 "	9' 5"	12' 4"	9' 9"	8' 7"
	250VXS144-22	57	0.0235	16	14' 3"	11' 4"	9' 10"	12' 5"	9' 10"	8' 7"	11' 3" f	8' 11"	7' 10"
	250VXS144-22	57	0.0235	24	12' 4"	9' 9"	8' 7"	10' 7" f	8' 7"	7' 6"	9' 2" f	7' 9"	6' 9"

Notes: **1.** Web height to thickness ratio (h/t) exceeds 200. Web stiffeners required at all support points and concentrated loads. **2.** Lateral loads of 5 psf, 7.5 psf, and 10 psf have NOT been reduced for strength or deflection checks. Full lateral load is applied. **3.** Limiting heights are in accordance with AISI S100-12 using all steel non-composite design. **4.** Limiting heights are established by considering flexure (f), web crippling (w) and deflection. **5.** Allowable moment is the lesser of Mal and Mad. Stud distortional buckling based on an assumed KΦ = 0. **6.** For bending, studs are assumed to be adequately braced to develop full allowable moment. **7.** Web crippling check is based on AISI S100-12 section C3.4.2 Condition 1: End One-Flange Loading with 1" end bearing.

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Non-Composite Limiting Heights – Fully Braced

Depth (in)	Member	Design (in)	Min (in)	Yield (ksi)	Spacing (o.c.)	5 PSF			7.5 PSF			10 PSF		
						L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
2-1/2	250VXS144-22	0.0235	0.0223	57	12	15' 6"	12' 4"	10' 9''	13' 6"	10' 9"	9' 5"	12' 4"	9' 9"	8' 6"
	250VXS144-22	0.0235	0.0223	57	16	14' 2"	11' 3''	9' 10"	12' 5"	9' 10"	8' 7"	11' 3"	8' 11"	7' 10"
	250VXS144-22	0.0235	0.0223	57	24	12' 4"	9' 9''	8' 6"	10' 9"	8' 6"	7' 5"	9' 8" f	7' 9"	6' 9"

Notes: **1.** Web height to thickness ratio (h/t) exceeds 200. Web stiffeners required at all support points and concentrated loads. **2.** Lateral loads of 5 psf, 7.5 psf, and 10 psf have NOT been reduced for strength or deflection checks. Full lateral load is applied. **3.** Limiting heights are in accordance with AISI S100-12 using all steel non-composite design. **4.** Limiting heights are established by considering flexure (f), web crippling (w) and deflection. **5.** Allowable moment is the lesser of Mal and Mad. Stud distortional buckling based on an assumed KΦ = 0. **6.** For bending, studs are assumed to be adequately braced to develop full allowable moment. **7.** Studs are fully braced when unbraced length is less than Lu. See section properties table for Lu values. **8.** Web crippling check is based on AISI S100-12 section C3.4.2 Condition 1: End One-Flange Loading with 1" end bearing.

Allowable Composite Heights for Non-Load Bearing Walls

Depth (in)	Member	Design (in)	Min (in)	Yield (ksi)	Spacing (o.c.)	5 PSF			7.5 PSF			10 PSF		
						L/120	L/240	L/360	L/120	L/240	L/360	L/120	L/240	L/360
2-1/2	250VXS144-22	0.0235	0.0223	57	12	18'-11"	15'-0"	13'-1"	16'-6"	13'-1"	11'-5"	15'-0"	11'-11"	10'-5"
	250VXS144-22	0.0235	0.0223	57	16	17'-2"	13'-8"	11'-11"	15'-0"	11'-11"	10'-6"	13'-8"	10'-10"	10'-0"
	250VXS144-22	0.0235	0.0223	57	24	15'-0"	11'-11"	10'-5"	13'-1"	10'-5"	8'-10"	11'-10"	9'-3"	7'-9"

Notes: **1.** Viper composite limiting heights are based on testing in accordance with ICC-ES acceptance criteria AC86-2012. **2.** Limiting heights are established by considering flexure, shear, web crippling, and deflection. **3.** No screws are required between stud and track, except as required by ASTM C754. Composite heights are based on using standard top track. Mechanically fastening of gypsum panel to the stud and track is required. **4.** Viper-X composite limiting heights based on a single layer of 5/8" type X gypsum board applied vertically to both sides of the wall over full height. 5/8" Type X wallboard from the following manufacturers are acceptable: USG, National, Georgia-Pacific, Temple Inland, CertainTeed, American, & LaFarge.

Screw Allowable Loads (lbs.)

Member	Design Thickness (in)	Min. Thickness (in)	Fy Yield (ksi)	Fu Tensile (ksi)	#6 SCREW (0.138" Dia; 0.25" Head)		#8 SCREW (0.164" Dia; 0.3125" Head)		#10 SCREW (0.190" Dia; 0.340" Head)		#12 SCREW (0.216" Dia; 0.340" Head)	
					Shear	Tension	Shear	Tension	Shear	Tension	Shear	Tension
250VXS144-22	0.0235	0.0223	57	65	174[1]	60	184[1]	71	236[1]	82	152	93

Notes: **1.** Shear values are tested per AISI S100-12 and S905 procedure. **2.** Capacities are based on section E4 of the AISI S100-12 Specification. **3.** Capacities are based on Allowable Strength Design (ASD). **4.** Screw pull-out capacities are based on listed head diameter. **5.** Two sheets of equal thickness and tensile strength are assumed in tabulated values. **6.** When materials of different steel thickness and tensile strength are connected, use the lowest value for shear capacity (tilting and bearing), for pull-out capacity use sheet closest to screw tip and for pull-over capacity use sheet closest to screw head. **7.** Where multiple fasteners are used, screws are assumed to have a center-to-center spacing of at least 3 times the nominal diameter. **8.** Screws are assumed to have a center-of-screw to edge-of-steel dimension of at least 1.5 times the nominal diameter of the screw. **9.** When screws are subjected to combination of shear and tension forces, interaction equation of AISI S100-12 Specification section E4.5 shall be used.