



Expanding Your Solutions

**Corporate Headquarters**  
13191 Crossroads Pkwy N., Ste 325  
City of Industry, CA 91746  
Phone: 800.775.2362  
Fax: 626.330.7598

**Manufacturing Facilities**  
City of Industry, CA  
Denver, CO  
Ft. Worth, TX  
Pittsburg, CA

**Structural Engineering/Design**  
1001-A Pittsburgh Antioch Hwy  
Pittsburg, CA 94565  
Phone: 800.775.2362  
Fax: 626.330.7598

**Technical Services**  
13191 Crossroads Pkwy N., Ste 325  
City of Industry, CA 91746  
Phone: 800.416.2278  
Fax: 626.249.5004

## 400VXS144-18 VIPER-X INTERIOR STUD

### Geometric Properties

4" 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 <sup>4,5</sup>	Flange (in)	Return Lip (in)
400VXS144-18	0.0188	0.0179	57	4	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 is 1-1/2" x 2-3/4". 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):** Dark Gray

### ASTM & Code Standards:

- ASTM A653/A653M, A924/A924M, A1003/1003, C645 & C754, E119
- IAPMO ER-0524
- IBC: 2012, 2015, 2018, 2021
- CBC: 2013, 2016, 2019
- AISI: S100, S220

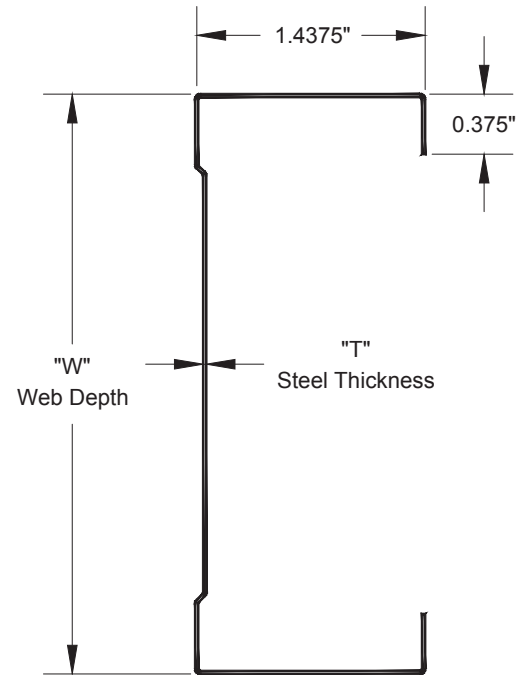
### LEED v4 for Building and Design Construction

- 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



### 400VXS144-18<sup>1</sup> Viper-X Section and Structural Properties

Yield Stress (ksi)	Web Height, h (in)	Design Thickness <sup>2</sup> , t (in)	Gross Properties						Effective Properties					Torsional Properties					Critical Unbraced Length, Lu (in)
			Weight (lb/ft)	Area (in <sup>2</sup> )	I <sub>x</sub> (in <sup>4</sup> )	R <sub>x</sub> (in)	I <sub>y</sub> (in <sup>4</sup> )	R <sub>y</sub> (in)	I <sub>xe</sub> (in <sup>4</sup> )	S <sub>xe</sub> (in <sup>3</sup> )	Ma-l (k-in)	Ma-d (k-in)	V <sub>ag</sub> (k)	J (x 10 <sup>-6</sup> ) (in <sup>4</sup> )	C <sub>w</sub> (in <sup>6</sup> )	X <sub>o</sub> (in-k)	R <sub>o</sub> (in-k)	β	
57	4.000	0.0188	0.479	0.141	0.350	1.576	0.037	0.514	0.329	0.118	3.738	3.359	0.519	16.611	0.125	-0.975	1.923	0.743	26.88

**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 & S220 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
4	400VXS144-18 <sup>1</sup>	57	0.0188	12	20' 7"	16' 4"	14' 3"	16' 11" f	14' 3"	12' 5"	14' 8" f	12' 11"	11' 4"
	400VXS144-18 <sup>1</sup>	57	0.0188	16	18' 0" f	14' 11"	13' 1"	14' 8" f	13' 1"	11' 5"	12' 9" f	11' 10"	10' 4"
	400VXS144-18 <sup>1</sup>	57	0.0188	24	14' 8" f	12' 11"	11' 4"	12' 0" f	11' 4"	9' 11"	10' 0" w	10' 0" w	9' 0"

**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 & S220 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 Ma and Md. Stud distortional buckling based on an assumed K<sub>Φ</sub> = 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 & S220 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
4	400VXS144-18'	0.0188	0.0179	57	12	20' 6"	16' 3"	14' 3"	17' 3" f	14' 3"	12' 5"	14' 11" f	13' 0"	11' 4"
	400VXS144-18'	0.0188	0.0179	57	16	18' 4" f	14' 11"	13' 0"	14' 11" f	13' 0"	11' 5"	12' 11" f	11' 10"	10' 4"
	400VXS144-18'	0.0188	0.0179	57	24	14' 11" f	12' 11"	11' 4"	12' 2" f	11' 4"	9' 10"	10' 6" f	10' 3"	9' 0"

**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 & S220 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  $M_{al}$  and  $M_{ad}$ . Stud distortional buckling based on an assumed  $K\phi = 0$ . 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  $L_u$ . See section properties table for  $L_u$  values. 8. Web crippling check is based on

AISI S100 & S220 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
4	400VXS144-18'	0.0188	0.0179	57	12	23'-7"	18'-8"	16'-4"	20'-7"	12'-11"	14'-3"	18'-8"	14'-10"	13'-0"
	400VXS144-18'	0.0188	0.0179	57	16	21'-5"	17'-0"	14'-10"	18'-9"	14'-10"	13'-0"	16'-9"	13'-6"	11'-10"
	400VXS144-18'	0.0188	0.0179	57	24	18'-8"	14'-10"	13'-0"	15'-10"	13'-0"	11'-4"	13'-9"	11'-10"	10'-0"

**Notes:** 1. Viper composite limiting heights are based on testing in accordance with ICC-ES acceptance criteria AC86. 2. Limiting heights are established by considering flexure, shear, web crippling, and deflection. 3. Mechanical fastening of gypsum panel to the stud and

track is required, except when installing a minimum 30 mil slotted track with 2-1/2" legs in lieu of standard track. 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, PABCO, CertainTeed, & American. 5. For deflection track usage contact Technical Services.

### Screw Allowable Loads (lbs.)

Member	Design Thickness (in)	Min. Thickness (in)	F <sub>y</sub> Yield (ksi)	F <sub>u</sub> 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
400VXS144-18	0.0188	0.0179	57	65	142'	48	150'	57	164'	66	109	75

**Notes:** 1. Shear values are tested per AISI S100, S220 & S905 procedure. 2. Capacities are based on section E4 of the AISI S100 & S220 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 & S220 Specification section E4.5 shall be used.

### Technical Services

Technical Services: 800.416.2278  
Structural Engineering/Design: 925.473.9340  
www.cemcosteel.com



This technical information reflects the most current information available and supersedes any and all previous publications effective September 15, 2023.

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