



## CALIFORNIA EXPANDED METAL PRODUCTS COMPANY

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## VIPER-X COLD-FORMED STEEL FRAMING MEMBERS

CSI Section: 05 40 00 Cold Formed Metal Framing  
CSI Section: 05 41 00 Structural Metal Stud Framing  
CSI Section: 05 42 00 Cold Formed Metal Joist Framing

CSI Section: 09 21 16 Gypsum Board Assemblies  
CSI Section: 09 22 00 Supports for Plaster and Gypsum Board  
CSI Section: 09 22 16 Non-Structural Metal Stud Framing

### 1.0 RECOGNITION

California Expanded Metal Products Company (CEMCO) Viper-X Cold-Formed Steel Framing Members described in this report were evaluated for use in cold-formed steel light-frame construction. The dimensional and structural properties of the Viper-X Cold-Formed Steel Framing Members were evaluated for compliance to the following codes:

- 2015 and 2012 International Building Code® (IBC)
- 2015 and 2012 International Residential Code® (IRC)

### 2.0 LIMITATIONS

Use of the Viper-X framing members recognized in this report is subject to the following conditions:

**2.1** The Viper-X framing members shall be installed and identified in accordance with this report, codes listed in Section 1.0 of this report, and the manufacturer's instructions. Where conflicts occur, the more restrictive shall govern.

**2.2** Plans, calculations, and specifications verifying compliance with this report shall be submitted to the code official for approval. The documents shall be prepared and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

**2.3** Minimum uncoated base steel thickness of the framing members delivered to the jobsite shall be 95 percent of the design thickness shown in [Tables 1](#) and [2](#) of this report.

**2.4** Framing members with G40 galvanized coating are limited under the IBC to use as non-load bearing interior wall framing with maximum transverse load of 10 psf (480 Pa).

### 3.0 PRODUCT USE

**3.1 General:** CEMCO Viper-X Framing members (studs and tracks) are used for interior non-load bearing non-composite and composite wall framing and ceiling framing in compliance with IBC Sections 2210 and 2211 and Chapter 25. The framing members are also alternatives to framing complying with the IRC where an engineered design is performed in accordance with IRC Section R301.1.3.

#### 3.2 Design:

**3.2.1** Framing members shall be designed in accordance with AISI S220. Allowable moments in [Tables 1](#) and [2](#) of this report are for framing members with the compression flange continuously braced at a spacing less than, or equal to, the tabulated value of  $L_u$  for the member. The allowable moment shall be determined in accordance with AISI S100 if the spacing of compression flange bracing exceeds  $L_u$ . Flexural member design shall include all applicable failure modes in accordance with AISI S100 including: flexure, deflection, shear, web crippling, combined bending and web crippling, and combined bending and shear.

**3.2.2** Allowable web crippling capacities for concentrated loads and reactions are shown in [Table 3](#) of this report. [Figure 4](#) of this report provides associated web crippling load and support condition definitions.

**3.3 Installation:** Steel framing installation shall be in accordance with ASTM C754, the approved construction documents, the codes listed in Section 1.0 of this report, AISI S220, as applicable, and this report. Where differences occur between these documents, the more restrictive shall govern.

**3.4 Fire-Resistance Rated Assemblies:** Viper-X framing members may be used in fire-resistance rated construction where permitted by Section 721 of the 2015 and 2012 IBC, including generic (not labeled proprietary) ratings in GA 600, and the approved construction documents.

### 4.0 PRODUCT DESCRIPTION

**4.1 Product information:** Viper-X framing members described in this report are limited to those section designations in [Tables 1](#) and [2](#) of this report and associated [Figures 1](#) and [2](#) of this report. Viper-X studs are roll-formed in a "C" shape with an offset (planking) in the web and knurling on the flanges. Viper-X tracks are channel-shaped with offset (planking) in the web. Stud shapes are manufactured with or without web punch-outs. Punch-outs,



when provided, are centered on the web and spaced at 24 inches (610 mm) on center with maximum sizes noted in [Figure 3](#) of this report. The minimum distance from each end of the stud to the nearest edge of the punch-out is 10 inches (254 mm). Stud properties listed in this report are for members with punch outs unless otherwise noted. Track properties listed in this report are for members without punch-outs.

#### 4.2 Material information:

**4.2.1 Steel:** Framing members are provided with a minimum G40 coating. Steel used for the manufacture of CEMCO Viper-X framing members is as follows:

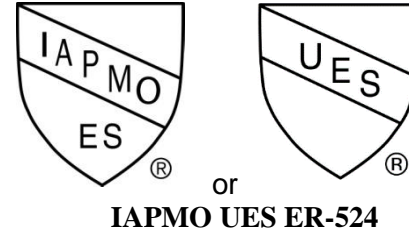
**4.2.1.1:** The Viper-X 15mil, 18mil, 22 mil (and 28 mil) studs and tracks are cold formed from steel coils with a minimum yield strength ( $F_y$ ) of 57 ksi (393 MPa) and a minimum tensile strength ( $F_u$ ) of 65 ksi (448 MPa). The studs and tracks are cold formed from steel complying with ASTM A 1003 Type NS and coating conforming to ASTM A653\_Grade 33 steel coils with a minimum yield strength ( $F_y$ ) of 33 ksi (227 MPa) and a minimum tensile strength ( $F_u$ ) of 45 ksi (310 MPa).

**4.2.2 Fasteners:** Screws attaching the gypsum board to the studs in composite wall assemblies shall be No. 6, Type S, fine thread, bugle head drywall screws conforming to ASTM C1002.

#### 5.0 IDENTIFICATION

Viper-X framing members are stamped, stenciled or embossed at a maximum of 96 inches (2438 mm) on center with the manufacturer's name, the section designation, the minimum uncoated steel thickness, the minimum specified yield strength if over 33 ksi (230 Mpa), the metallic coating designation if over G40, and the evaluation report number (ER-524).

The identification includes the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown below:



#### 6.0 SUBSTANTIATING DATA

Calculations in accordance with the ICC-ES Acceptance Criteria for Cold Formed Steel Framing Members (AC46) dated June 2012 (editorially revised June 2017).

#### 7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on California Expanded Metal Products Company Viper-X Cold-Formed Steel Framing Members to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification.

*Brian Gerber*

**Brian Gerber, P.E., S.E.**  
**Vice President, Technical Operations**  
**Uniform Evaluation Service**

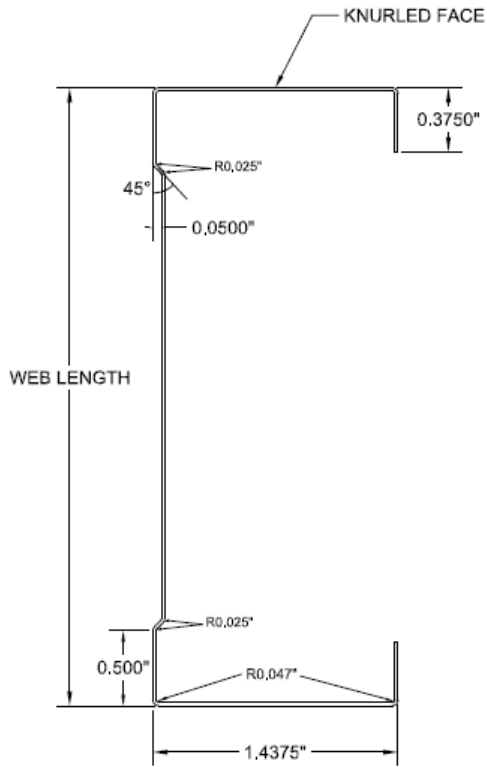
*Richard Beck*

**Richard Beck, PE, CBO, MCP**  
**Vice President, Uniform Evaluation Service**

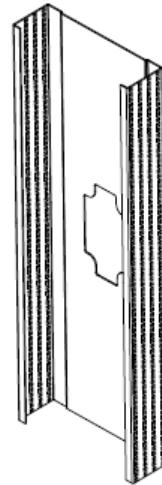
*Russ Chaney*

**GP Russ Chaney**  
**CEO, The IAPMO Group**

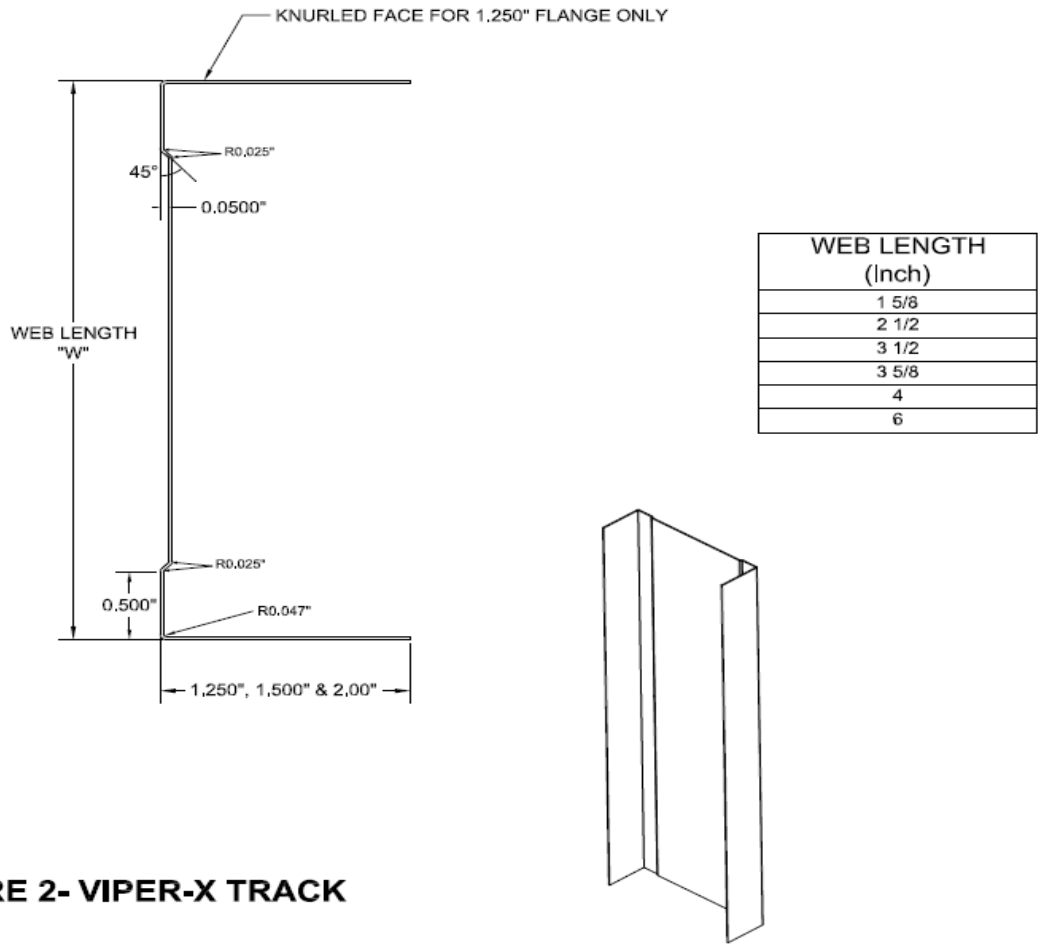
For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)



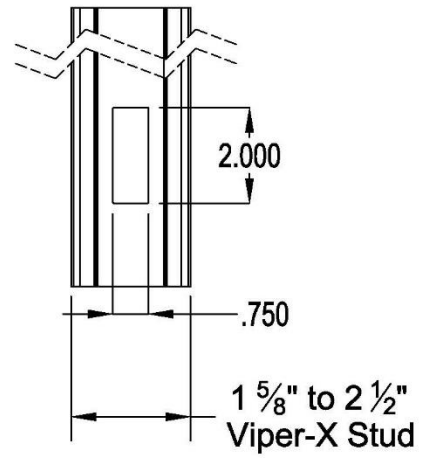
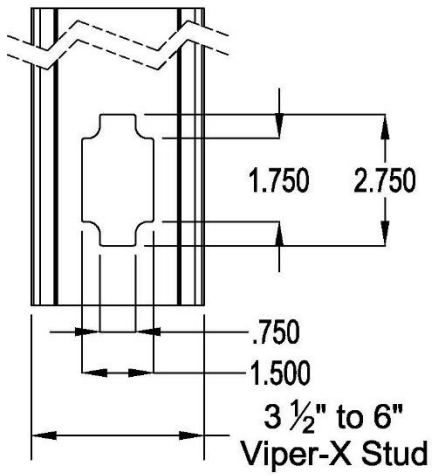
WEB LENGTH (inch)
1 5/8
2 1/2
3 1/2
3 5/8
4
6



**FIGURE 1- VIPER-X STUD**

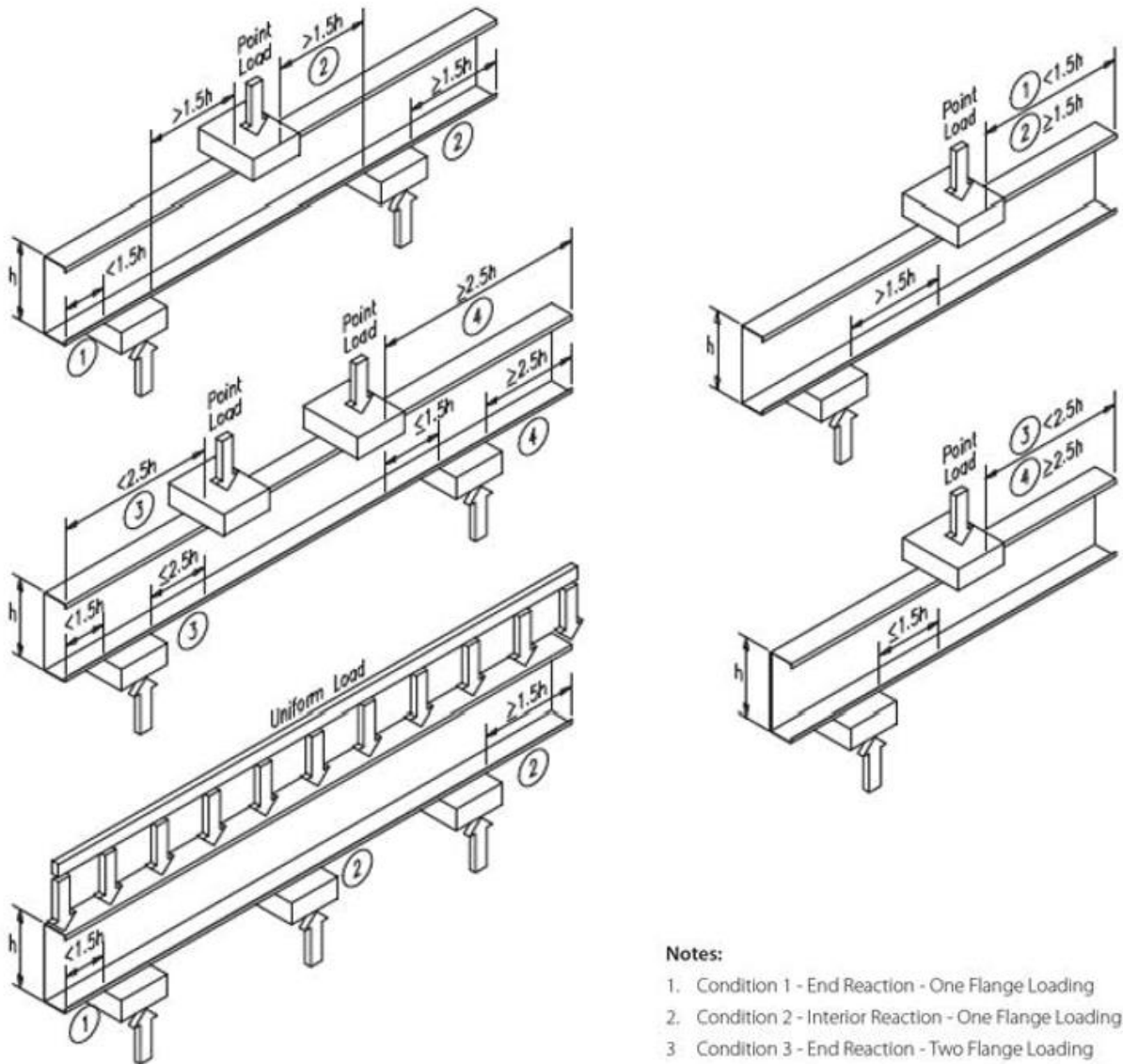


**FIGURE 2- VIPER-X TRACK**



**FIGURE 3- PUNCH-OUT CONFIGURATION**

FIGURE 4- WEB CRIPPLING CONDITIONS



**Notes:**

1. Condition 1 - End Reaction - One Flange Loading
2. Condition 2 - Interior Reaction - One Flange Loading
3. Condition 3 - End Reaction - Two Flange Loading
4. Condition 4 - Interior Reaction - Two Flange Loading





### Table 1

#### SECTION AND STRUCTURAL PROPERTIES OF CEMCO VIPER-X (VXS) STUDS

Viper-X Member	Yield Stress (ksi)	Web Height, h (in.)	Design Thickness, 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> )	M <sub>a-l</sub> (k-in.)	M <sub>a-d</sub> (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.)	R <sub>o</sub> (in.)	β	
162VXS144-15	57	1.625	0.0155	0.271	0.080	0.038	0.687	0.024	0.545	0.033	0.026	0.857	0.964	0.099	6.379	0.018	-1.332	1.595	0.303	28.8
250VXS144-15	57	2.500	0.0155	0.317	0.093	0.099	1.030	0.027	0.538	0.088	0.050	1.499	1.572	0.405	7.471	0.040	-1.167	1.647	0.498	27.72
350VXS144-15 <sup>1</sup>	57	3.500	0.0155	0.370	0.109	0.213	1.400	0.029	0.524	0.193	0.076	2.265	2.210	0.389	8.710	0.078	-1.033	1.817	0.677	27.12
362VXS144-15 <sup>1</sup>	57	3.625	0.0155	0.376	0.111	0.231	1.445	0.030	0.522	0.210	0.079	2.371	2.296	0.395	8.860	0.084	-1.019	1.843	0.694	27.12
400VXS144-15 <sup>1</sup>	57	4.000	0.0155	0.396	0.116	0.290	1.578	0.031	0.515	0.263	0.088	2.704	2.552	0.411	9.331	0.104	-0.979	1.927	0.742	26.88
600VXS144-15 <sup>2</sup>	57	6.000	0.0155	0.501	0.147	0.753	2.260	0.035	0.482	-	-	-	-	-	11.810	0.250	-0.815	2.450	0.889	26.16
162VXS144-19	57	1.625	0.0188	0.327	0.096	0.045	0.686	0.028	0.543	0.041	0.036	1.186	1.263	0.145	11.347	0.022	-1.328	1.590	0.302	28.8
250VXS144-19	57	2.500	0.0188	0.383	0.113	0.119	1.029	0.032	0.537	0.110	0.067	2.071	2.060	0.498	13.280	0.047	-1.163	1.643	0.499	27.6
350VXS144-19	57	3.500	0.0188	0.447	0.132	0.257	1.398	0.036	0.522	0.241	0.100	3.115	2.906	0.487	15.501	0.094	-1.029	1.813	0.678	27.12
362VXS144-19	57	3.625	0.0188	0.455	0.134	0.279	1.443	0.036	0.520	0.262	0.105	3.271	3.020	0.496	15.780	0.101	-1.015	1.839	0.695	27.00
400VXS144-19 <sup>1</sup>	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
600VXS144-19 <sup>2</sup>	57	6.000	0.0188	0.607	0.179	0.910	2.258	0.041	0.480	-	-	-	-	-	21.042	0.301	-0.812	2.447	0.890	26.04
162VXS144-22	57	1.625	0.0235	0.407	0.120	0.056	0.684	0.035	0.541	0.045	0.045	1.563	1.569	0.151	22.060	0.026	-1.322	1.584	0.303	28.80
250VXS144-22	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
350VXS144-22	57	3.500	0.0235	0.557	0.164	0.319	1.396	0.044	0.520	0.309	0.135	4.466	3.976	0.634	30.170	0.116	-1.024	1.807	0.679	27.00
362VXS144-22	57	3.625	0.0235	0.567	0.167	0.346	1.440	0.045	0.518	0.336	0.141	4.680	4.135	0.649	30.710	0.124	-1.009	1.834	0.697	26.88
400VXS144-22	57	4.000	0.0235	0.597	0.176	0.435	1.574	0.046	0.512	0.423	0.159	5.355	4.611	0.686	32.341	0.153	-0.970	1.918	0.744	26.76
600VXS144-22 <sup>1</sup>	57	6.000	0.0235	0.757	0.223	1.132	2.255	0.051	0.478	1.097	0.261	7.605	6.667	0.662	40.991	0.371	-0.807	2.442	0.891	25.88
162VXS144-28	57	1.625	0.0295	0.509	0.150	0.069	0.681	0.043	0.538	0.067	0.064	2.481	2.316	0.210	43.390	0.032	-1.315	1.576	0.304	28.8
250VXS144-28	57	2.500	0.0295	0.596	0.175	0.184	1.024	0.050	0.532	0.178	0.115	4.343	3.839	0.736	50.870	0.071	-1.151	1.629	0.501	27.48
350VXS144-28	57	3.500	0.0295	0.697	0.205	0.397	1.393	0.055	0.517	0.391	0.175	6.361	5.453	0.838	59.430	0.142	-1.017	1.800	0.681	26.88
362VXS144-28	57	3.625	0.0295	0.709	0.209	0.431	1.438	0.055	0.515	0.424	0.183	6.655	5.680	0.861	60.500	0.153	-1.003	1.827	0.699	26.88
400VXS144-28	57	4.000	0.0295	0.747	0.220	0.542	1.570	0.057	0.509	0.535	0.207	7.572	6.339	0.919	63.710	0.189	-0.963	1.911	0.746	26.64
600VXS144-28	57	6.000	0.0295	0.947	0.279	1.412	2.251	0.063	0.475	1.400	0.344	10.693	9.551	1.054	80.830	0.457	-0.801	2.436	0.892	25.8
162VXS144-30	33	1.625	0.0312	0.536	0.158	0.073	0.680	0.046	0.537	0.073	0.080	1.856	1.703	0.542	51.160	0.034	-1.316	1.576	0.303	38.04
250VXS144-30	33	2.500	0.0312	0.630	0.185	0.194	1.023	0.052	0.531	0.194	0.140	3.240	2.850	0.869	60.110	0.075	-1.149	1.627	0.501	36.24
350VXS144-30	33	3.500	0.0312	0.736	0.216	0.419	1.392	0.058	0.516	0.419	0.212	4.729	4.092	1.187	70.230	0.150	-1.015	1.798	0.681	35.28
362VXS144-30	33	3.625	0.0312	0.749	0.220	0.455	1.437	0.058	0.514	0.454	0.223	4.986	4.292	1.188	71.500	0.161	-1.001	1.825	0.699	35.28
400VXS144-30	33	4.000	0.0312	0.789	0.232	0.572	1.570	0.060	0.508	0.572	0.254	5.653	4.802	1.187	75.290	0.199	-0.961	1.909	0.747	35.04
600VXS144-30	33	6.000	0.0312	1.001	0.294	1.491	2.250	0.066	0.474	1.491	0.425	8.110	7.402	0.914	95.540	0.481	-0.799	2.434	0.892	33.96
162VXS144-33	33	1.625	0.0346	0.593	0.175	0.081	0.679	0.050	0.536	0.080	0.091	2.177	1.934	0.584	69.652	0.037	-1.309	1.569	0.304	38.28
250VXS144-33	33	2.500	0.0346	0.696	0.205	0.214	1.022	0.057	0.529	0.214	0.157	3.802	3.253	0.959	81.740	0.082	-1.145	1.623	0.502	36.24
350VXS144-33	33	3.500	0.0346	0.814	0.239	0.463	1.390	0.063	0.514	0.463	0.238	5.541	4.718	1.387	95.540	0.164	-1.011	1.794	0.682	35.28
362VXS144-33	33	3.625	0.0346	0.828	0.243	0.501	1.434	0.064	0.512	0.502	0.250	5.774	4.903	1.413	97.270	0.176	-0.997	1.821	0.700	35.28
400VXS144-33	33	4.000	0.0346	0.873	0.257	0.631	1.568	0.066	0.506	0.631	0.286	6.568	5.521	1.414	102.450	0.218	-0.957	1.905	0.748	35.04
600VXS144-33	33	6.000	0.0346	1.108	0.326	1.647	2.248	0.073	0.473	1.647	0.486	9.459	8.549	1.153	130.060	0.528	-0.796	2.431	0.893	33.84

#### Table 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.

#### General Notes

1. The yield strength, F<sub>y</sub>, is 57 ksi for 15 mil, 19 mil, 22 mil & 28 mil steel and 3 ksi for 30 & 33 mil steel.
2. Tabulated gross properties are based on full, unreduced section away from punchouts.
3. Punch-out sizes are 0.75" x 2.00" inch for stud depths 1.625" and 2.50", and 1.50" x 2.75" for stud depths 3.50" and deeper.
4. Factory punchouts are in accordance with section C5 of AISI S201-12. The distance from the center of the last punchout to the end of the stud is 12 inches.
5. For Allowable Stress Design (ASD) method, factors of safety of 1.67 and 1.6 respectively, are used for moment and shear capacities as per AISI S100-2016.
6. Design stiffening lip is 3/8" for all studs.

#### Notations

I <sub>x</sub>	-	Moment of Inertia about the X axis of Gross Section
I <sub>y</sub>	-	Moment of Inertia about the Y axis of Gross Section
R <sub>x</sub> , R <sub>y</sub>	-	Radius of Gyration about the X and Y axes, respectively of Gross Section
J	-	St. Venant Torsion Constant
C <sub>w</sub>	-	Torsional Warping Constant
X <sub>o</sub>	-	Distance from Shear Center to Centroid Along the X-Axis
R <sub>o</sub>	-	Polar Radius of Gyration about the Shear Center
β	-	Torsional-Flexural Constant
I <sub>xe</sub>	-	Effective Moment of Inertia at Punch-out about the X axis (for deflection calculation)
S <sub>xe</sub>	-	Effective Section Modulus about the X axis at Punch-out
M <sub>a-l</sub>	-	Allowable Moment based on Local Buckling
M <sub>a-d</sub>	-	Allowable Moment based on Distortional Buckling
V <sub>ag</sub>	-	Allowable Shear at Gross Section



Table 2

SECTION AND STRUCTURAL PROPERTIES OF CEMCO BLUE MOON VIPER X (VXT) TRACKS																			
Member	Yield (ksi)	Design Thickness (in.)	Gross Properties								Effective Properties				Torsional Properties				
			Weight (lb./ft.)	Area (in. <sup>2</sup> )	I <sub>x</sub> (in. <sup>4</sup> )	S <sub>x</sub> (in. <sup>3</sup> )	R <sub>x</sub> (in.)	S <sub>y</sub> (in. <sup>3</sup> )	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> )	M <sub>b</sub> (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.)	R <sub>o</sub> (in.)	β
162VXT125-15	57	0.0155	0.217	0.064	0.031	0.038	0.699	0.027	0.011	0.406	0.015	0.013	0.359	0.484	5.118	0.005	-0.858	1.179	0.471
250VXT125-15	57	0.0155	0.263	0.077	0.081	0.064	1.022	0.035	0.012	0.390	0.041	0.024	0.680	0.558	6.204	0.014	-0.731	1.315	0.691
350VXT125-15 <sup>1</sup>	57	0.0155	0.316	0.093	0.174	0.099	1.369	0.045	0.013	0.370	0.089	0.037	1.042	0.457	7.450	0.030	-0.632	1.552	0.834
362VXT125-15 <sup>1</sup>	57	0.0155	0.323	0.095	0.189	0.104	1.411	0.046	0.013	0.368	0.096	0.038	1.088	0.450	7.600	0.032	-0.622	1.585	0.846
400VXT125-15 <sup>2</sup>	57	0.0155	0.342	0.101	0.238	0.118	1.536	0.049	0.013	0.361	-	-	-	-	8.070	0.041	-0.593	1.686	0.876
600VXT125-15 <sup>2</sup>	57	0.0155	0.448	0.132	0.628	0.208	2.183	0.065	0.014	0.328	-	-	-	-	10.550	0.102	-0.480	2.259	0.955
162VXT125-19	57	0.0188	0.263	0.077	0.038	0.046	0.701	0.033	0.013	0.405	0.020	0.017	0.489	0.819	9.129	0.006	-0.856	1.178	0.472
250VXT125-19	57	0.0188	0.319	0.094	0.098	0.078	1.023	0.043	0.014	0.389	0.055	0.033	0.945	0.779	11.067	0.017	-0.729	1.315	0.692
350VXT125-19	57	0.0188	0.383	0.113	0.211	0.120	1.369	0.054	0.015	0.369	0.119	0.051	1.458	0.630	13.280	0.036	-0.631	1.552	0.835
362VXT125-19	57	0.0188	0.39129	0.115	0.229	0.125	1.412	0.055	0.016	0.367	0.129	0.053	1.522	0.443	13.560	0.039	-0.621	1.585	0.847
400VXT125-19 <sup>1</sup>	57	0.0188	0.415	0.122	0.289	0.143	1.537	0.059	0.016	0.360	0.162	0.060	1.718	0.413	14.390	0.049	-0.592	1.686	0.877
600VXT125-19 <sup>2</sup>	57	0.0188	0.543	0.160	0.761	0.253	2.183	0.078	0.017	0.327	-	-	-	-	18.820	0.123	-0.479	2.259	0.955
162VXT125-22	57	0.0235	0.329	0.097	0.048	0.057	0.702	0.040	0.016	0.404	0.027	0.025	0.703	0.728	17.819	0.008	-0.853	1.177	0.474
250VXT125-22	57	0.0235	0.399	0.117	0.123	0.097	1.024	0.053	0.018	0.388	0.076	0.048	1.358	1.092	21.600	0.021	-0.727	1.314	0.694
350VXT125-22	57	0.0235	0.479	0.141	0.265	0.149	1.370	0.066	0.019	0.368	0.167	0.075	2.138	0.955	25.930	0.045	-0.629	1.552	0.836
362VXT125-22	57	0.0235	0.490	0.144	0.287	0.157	1.413	0.068	0.019	0.366	0.181	0.078	2.235	0.931	26.470	0.049	-0.619	1.585	0.848
400VXT125-22	57	0.0235	0.519	0.153	0.361	0.179	1.538	0.073	0.020	0.359	0.227	0.089	2.528	0.871	28.090	0.061	-0.590	1.686	0.877
600VXT125-22 <sup>1</sup>	57	0.0235	0.679	0.200	0.952	0.315	2.184	0.096	0.021	0.326	0.569	0.144	4.103	0.660	36.750	0.153	-0.477	2.259	0.955
162VXT125-28	57	0.0295	0.413	0.121	0.060	0.072	0.704	0.050	0.020	0.403	0.038	0.036	1.019	0.908	35.223	0.010	-0.850	1.175	0.477
250VXT125-28	57	0.0295	0.501	0.147	0.155	0.121	1.026	0.066	0.022	0.387	0.104	0.067	1.915	1.460	42.710	0.026	-0.724	1.314	0.696
350VXT125-28	57	0.0295	0.601	0.177	0.333	0.187	1.372	0.082	0.024	0.367	0.233	0.110	3.130	1.536	51.270	0.056	-0.626	1.552	0.837
362VXT125-28	57	0.0295	0.613	0.180	0.361	0.196	1.414	0.084	0.024	0.365	0.253	0.115	3.277	1.489	52.340	0.061	-0.616	1.585	0.849
400VXT125-28	57	0.0295	0.651	0.191	0.454	0.224	1.539	0.090	0.025	0.358	0.317	0.130	3.719	1.371	55.550	0.076	-0.588	1.686	0.878
600VXT125-28 <sup>1</sup>	57	0.0295	0.852	0.250	1.196	0.395	2.185	0.118	0.027	0.325	0.805	0.214	6.098	1.049	72.660	0.191	-0.475	2.260	0.956
162VXT125-30	33	0.0312	0.426	0.125	0.058	0.071	0.681	0.051	0.020	0.404	0.058	0.071	1.180	0.000	40.156	0.009	-0.863	1.171	0.457
250VXT125-30	33	0.0312	0.518	0.152	0.154	0.123	1.003	0.067	0.023	0.388	0.154	0.123	2.026	0.855	48.850	0.026	-0.733	1.302	0.683
350VXT125-30	33	0.0312	0.624	0.183	0.335	0.191	1.351	0.085	0.025	0.368	0.335	0.191	3.155	1.166	58.780	0.057	-0.632	1.536	0.830
362VXT125-30	33	0.0312	0.637	0.187	0.363	0.201	1.393	0.087	0.025	0.366	0.363	0.201	3.308	1.166	60.020	0.061	-0.622	1.569	0.843
400VXT125-30	33	0.0312	0.677	0.199	0.459	0.229	1.518	0.093	0.026	0.359	0.459	0.229	3.784	1.166	63.740	0.077	-0.593	1.669	0.874
600VXT125-30	33	0.0312	0.887	0.261	1.223	0.408	2.165	0.123	0.028	0.326	1.010	0.337	5.557	0.893	83.601	0.196	-0.479	2.241	0.954
162VXT125-33	33	0.0346	0.484	0.142	0.071	0.084	0.706	0.058	0.023	0.402	0.054	0.054	1.070	0.614	56.795	0.011	-0.847	1.174	0.479
250VXT125-33	33	0.0346	0.587	0.173	0.182	0.142	1.027	0.076	0.026	0.386	0.143	0.098	1.932	0.988	68.880	0.031	-0.722	1.313	0.698
350VXT125-33	33	0.0346	0.704	0.207	0.391	0.219	1.373	0.095	0.028	0.366	0.316	0.159	3.146	1.413	82.680	0.066	-0.624	1.552	0.838
362VXT125-33	33	0.0346	0.719	0.212	0.424	0.230	1.415	0.097	0.028	0.364	0.344	0.209	3.314	1.413	84.410	0.071	-0.614	1.585	0.850
400VXT125-33	33	0.0346	0.763	0.225	0.533	0.262	1.540	0.104	0.029	0.357	0.436	0.194	3.207	1.413	89.590	0.089	-0.586	1.686	0.879
600VXT125-33	33	0.0346	0.999	0.294	1.403	0.463	2.186	0.137	0.031	0.324	1.141	0.335	5.525	1.142	117.200	0.224	-0.474	2.260	0.956

<sup>1</sup>Web height-to-thickness ratio exceeds 200. Web Stiffeners are required at all support points and concentrated loads.

<sup>2</sup>Web height-to-thickness ratio exceeds 260. Section is not in compliance with AISI S100 section B1, so effective properties are not provided.

**Table Notes**

1. Section properties are in accordance with AISI S100-12.
2. Web depth for track sections is equal to the nominal height plus 2 times the design thickness plus the bend radius.
3. For deflection calculations, use the effective moment of inertia.





**Table 3-Allowable Web Crippling Loads**

Stud Designation	Design Thickness	F <sub>y</sub> (ksi)	Condition 1 (E1F)				Condition 2 (I1F)				Condition 3 (E2F)				Condition 4 (I2F)			
			Bearing Length (in)				Bearing Length (in)				Bearing Length (in)				Bearing Length (in)			
			1	3.5	4	6	1	3.5	4	6	1	3.5	4	6	1	3.5	4	6
162VXS -15	0.0155	57	73	119	125	149	117	171	179	207	74	111	116	135	159	210	217	243
162VXS -19	0.0188	57	105	165	181	215	175	253	265	304	139	117	122	139	225	297	308	345
162VXS -22	0.0235	57	160	257	272	322	279	394	412	471	135	186	194	220	358	465	481	536
162VXS -28	0.0295	57	244	388	409	483	442	615	641	730	218	297	308	349	573	731	754	836
162VXS -30	0.0312	33	157	248	262	308	286	397	413	470	142	192	200	225	372	473	488	540
162VXS -33	0.0346	33	190	299	315	370	352	485	504	572	176	237	246	277	459	580	598	660
250VXS -15	0.0155	57	68	112	119	141	114	166	174	201	41	59	62	71	132	178	184	208
250VXS -19	0.0188	57	99	161	171	203	171	247	258	297	67	94	98	112	202	267	277	310
250VXS -22	0.0235	57	152	244	258	306	272	385	402	461	113	156	162	185	327	425	439	490
250VXS -28	0.0295	57	234	371	391	461	433	603	628	715	188	256	266	301	529	676	698	773
250VXS -30	0.0312	33	151	237	250	295	281	389	405	461	123	167	173	196	345	438	452	501
250VXS -33	0.0346	33	183	286	301	355	346	475	494	561	155	208	216	243	428	540	557	614
350VXS -15	0.0155	57	64	105	111	132	111	162	169	196	30	43	45	51	116	156	162	183
350VXS -19	0.0188	57	94	152	161	191	167	240	251	289	52	73	76	87	181	177	242	272
350VXS -22	0.0235	57	145	233	246	291	266	377	393	451	91	128	133	152	298	388	401	447
350VXS -28	0.0295	57	224	355	374	442	425	591	616	701	161	219	227	257	490	626	646	716
350VXS -30	0.0312	33	144	228	240	283	276	382	398	452	106	144	150	169	320	401	420	465
350VXS -33	0.0346	33	175	275	290	342	340	467	486	552	135	182	188	212	399	504	520	573
362VXS -15	0.0155	57	63	104	110	131	110	161	169	195	49	41	43	49	115	154	160	180
362VXS -19	0.0188	57	93	151	160	190	167	240	251	289	50	71	74	84	179	237	245	275
362VXS -22	0.0235	57	144	231	244	289	266	376	392	449	90	125	130	148	295	383	396	442
362VXS -28	0.0295	57	223	353	372	439	424	590	614	700	158	215	223	252	485	620	640	709
362VXS -30	0.0312	33	144	227	239	282	275	381	396	451	105	141	147	166	317	403	416	461
362VXS -33	0.0346	33	175	274	289	340	339	466	485	551	133	179	185	209	396	500	515	569
400VXS -15	0.0155	57	62	102	108	128	109	160	167	193	24	35	36	42	109	146	152	171
400VXS -19	0.0188	57	91	148	157	186	165	238	249	286	45	64	66	76	172	227	236	264
400VXS -22	0.0235	57	141	227	240	284	2364	373	390	446	83	116	121	137	286	371	384	428
400VXS -28	0.0295	57	219	348	367	433	421	586	610	695	149	202	210	238	472	603	623	690
400VXS -30	0.0312	33	141	224	236	278	273	379	394	449	99	134	139	157	309	393	405	449
400VXS -33	0.0346	33	172	271	285	334	337	464	482	547	127	170	176	199	387	488	503	555
600VXS -15	0.0155	57	55	91	96	115	105	153	160	184	7	10	11	12	85	114	118	133
600VXS -19	0.0188	57	83	135	142	169	159	229	239	275	22	32	33	38	140	185	192	215
600VXS -22	0.0235	57	130	209	221	261	255	360	376	431	53	73	76	88	242	314	325	362
600VXS -28	0.0295	57	204	324	342	403	408	568	592	674	107	146	151	171	412	526	542	601
600VXS -30	0.0312	33	132	209	220	259	265	368	383	435	72	98	102	115	271	345	356	393
600VXS -33	0.0346	33	161	253	267	315	328	450	469	532	96	129	134	151	343	432	446	492

<sup>1</sup> Bearing length to web height ratio, N/h exceeds NASPEC limit of 2.

<sup>2</sup> Bearing length to thickness ratio, N/t exceeds NASPEC limit of 210.

<sup>1,2</sup> Bearing length to web height ratio, N/h exceeds NASPEC limit of 2 and Bearing length to thickness ratio, N/t exceeds NASPEC limit of 210.

\*Punchout reductions only needed when  $x < X_{max}$

**Table Notes**

- Listed allowable loads are based on members fastened to supports.
- tabulated web crippling capacities are for single members only.
- Listed allowable loads are for unpunched webs. Capacity reductions for end and interior one-flange loading (condition 1 and 2) near punchouts may be calculated per AISI S100 specification section C3.4.2.
- Listed allowable loads apply only to stud members with stiffened or partially stiffened flanges.
- h refers to the flat dimension of the web.