

Quality People. Building Solutions.

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Date: 1/11/2024

Return Request: 1/22/2024

Project: Anduril Industries – Bldgs. 301, 400, 600

Supplier: Ivey Mechanical

Manufacturer: Various

Submittal: Hangers & Supports (HVAV)

Submittal Number: 23 05 29-01

Drawing # and Installation: Mechanical Drawings

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Division 22/23

Ivey Submission #1 Revised

Buildings 301,400, and 600

**Specification Section 22 05 29 – Hangers and Supports for Plumbing
Piping and Equipment**

**Specification Section 23 05 29 - Hangers and Supports for HVAC Piping
and Equipment**

Submitted Date: 1/18/2024

Owner:

Anduril Industries
488 East McHenry Rd.
McHenry, MS 39561

Mechanical Engineer:

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1300 East 6th Street
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Kosciusko, MS
662.289.3646
Fax: 662.289.3713

VENDOR PART	VENDOR	DESCRIPTION	PAGE
GCHU	Anvil International	Galv. Clevis Hangers	64
Sammys-Steel	Sioux Chief	Sammy Screws for Steel	65
GSTHSM1420	ASC Engineered Solutions	1-5/8 x 1-5/8 14GA Galvanized Strut	66
GATR	Anvil	All Thread Rod	70

CLEVIS HANGERS



Fig. 260

Adjustable Clevis Hanger

Size Range: 1/2" through 30"

Material: Carbon steel

Finish: Plain, Galvanized, or Primed, also available in Plastic or Epoxy Coated

Service: Recommended for the suspension of stationary pipe lines.

Maximum Temperature: Plain 650° F, Galvanized and Epoxy 450° F

Approvals: Complies with Federal Specification A-A-1192A (Type 1), WW-H-171-E (Type 1), ANSI/MSS SP-69 and MSS SP-58 (Type 1), UL (Sizes 3/4" through 8"), ULC Listed (Sizes 3/4" through 4") and FM Approved (Sizes 3/4" through 8").

Installation: Hanger load nut above clevis must be tightened securely to assure proper hanger performance.

Adjustment: Vertical adjustment without removing pipe may be made from 3/8" through 5 1/8", varying with the size of clevis. Tighten upper nut after adjustment.

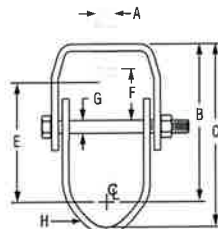
Features:

- Design has yoke on outside of lower U-strap so yoke cannot slide toward center of bolt, thus bending of bolt is minimized.
- Sizes 5" and up have rod and two nuts instead of bolt and nut; thread length on clevis rod is such that the thread locks the nuts in place, and threads are not in shear plane.

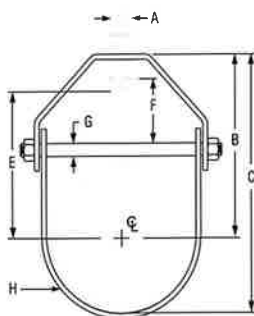
Ordering: Specify pipe size, figure number, name and finish.

Notes: Punched forming holes may be present on certain sizes of this clevis hanger. These holes are solely for the purpose of manufacturing, and do not effect the structural integrity or load carrying capacities of these hangers. For insulated line options without shields, see Figures 260 ISS and Figure 300. For insulated line options with shields, see Figures 167 and 168. For ductile iron pipe sizes, see Figure 590.

Caution: When an oversize clevis is used, a pipe spacer or multispacer should be placed over clevis bolt to ensure that the lower U-strap will not move in on the bolt.



Pipe Size 1/2" to 3/4"



Pipe Sizes 1" and Larger

FIG. 260: LOADS (LBS) • WEIGHTS (LBS) • DIMENSIONS (IN)

Pipe Size	Max Load	Span Ft.	Weight	Rod Size A	B	C	Rod Take Out E	Adjust. F	G	H Width Lower		
1/2	610	7*	0.34	3/8	2 3/16	2 1/16	1 1/2	5/8	1/4	1		
3/4			0.34		2		1 5/16					
1			0.35		3		1 5/8					
1 1/4	730	9*	0.40	1/2	2 5/16	3 1/4	1 11/16	7/8	3/8	1 1/4		
1 1/2			0.45		2 13/16		3 13/16				2 5/8	
2			0.50		3 5/16		4 1/2				2 5/8	1 1/8
2 1/2	1,350	11*	0.65	5/8	4 1/16	5 1/2	3 3/16	1 5/16	3/8	1 3/16		
3			0.85		4 3/4		6 1/2				4 1/16	1 5/8
3 1/2			1.10		5 1/16		7 1/16				4 3/16	1 13/16
4	1,430	14*	1.51	3/4	5 9/16	7 13/16	4 1/2	1 11/16	3/8	2		
5			1.70		6 9/16		8 15/16				5 1/2	1 15/16
6			3.10		6 15/16		10 1/4				5 3/4	1 11/16
8	1,940	17*	4.75	7/8	8 3/8	12 11/16	7 3/16	2	1/2	1 7/16		
10	3,600	22*	8.60		9 7/8		15 1/4				8 7/16	2 1/8
12	3,800	23*	11.20		11 9/16		17 15/16				10 1/8	2 13/16
14	4,200	25*	12.50	1	12 9/16	19 9/16	10 11/16	2 11/16	3/4			
16	4,600	27	19.85		14	22	12	2 3/4	1	2 1/2		
18	4,800	28	22.25		15 15/16	24 15/16	13 15/16	3 13/16				
20	4,800	30	40.33	17 9/16	27 9/16	15 3/16	3 7/8	1 1/4			3	
24	4,800	32	49.83	1 1/4	19 13/16	31 13/16			17 5/16			
30	6,000	33	70.18		24 3/16	39 3/16			21 9/16	5 5/8		

"Span" represents the maximum recommended distance between hangers on a continuous and straight run of horizontal standard weight steel pipe filled with water. In all cases, verify that chosen location of hangers does not subject hangers to a load greater than the maximum recommended load shown above. *Indicates that span represents the maximum span for water filled pipe as given in Table 1 of page 225.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		<input type="checkbox"/> Approved	
Address:		<input type="checkbox"/> Approved as noted	
Contractor:		<input type="checkbox"/> Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			

MECHANICAL ANCHORS FOR THREAD ROD

590-44 series

Sioux Chief Sammys®

SPECIFICATION

Sioux Chief Sammy Mechanical Anchors shall be used for suspended applications where 3/8" threaded rod is used on wood, steel or concrete, in either vertical or horizontal applications.

Sioux Chief Sammy XPress® anchors are specifically designed for use in metal deck or Z-purlin applications. Swivel models are designed for extreme or variant roof pitches.

INSTALLATION

These products should only be installed using original Sammy® nut drivers and XPress® Nut drivers. Using any other tool voids warranty. When the appropriate nut driver is used, the driver spins free on the screw after installation is complete and eliminates the expected wrist snap, reduces over-torque and prevents screw failure. Complete installation instructions are provided in each box of product. Contact factory for more information.

MATERIALS

Due to variations of hardness of certain metals, it should be noted that self-drilling screws for steel will experience different drill speeds. Drill speeds of 500-1500 RPM should be used.

Item # Submitted	_____
Job Name	_____
Location	_____
Engineer	_____
Contractor	_____
PO#	_____ TAG _____



MODEL NUMBERS AND LOAD RATINGS

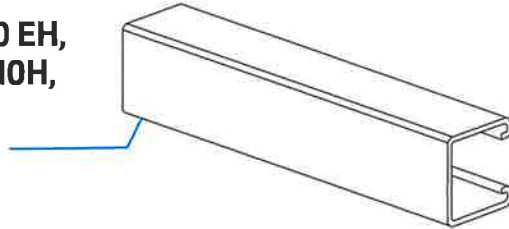
Item No.	Description	Application	Ultimate Pullout (lbs)	Testing		Approvals
				UL Test Load (lbs)	FM Test Load (lbs)	
590-4411	GST20 Vertical	Wood	1760 (fir)	850	1475	UL & FM
590-4411-3	GST30 Vertical	Wood	2060 (fir)	1500	1475	UL & FM
590-4421	SWG20 Horizontal	Wood	1725 (fir)	1050		UL
590-4421-3	SWG30 Horizontal	Wood	1884 (fir)			
590-4412	CST20 Vertical	Concrete	2400*	1475		FM
590-4422	SWC20 Horizontal	Concrete	2450*	1475		FM
590-4413	DST20 Vertical	Steel	1500 (3/16")	1500	1475	
590-4413-R	DSTR516 Vertical with nut	Steel	2200 (20 ga.)	1500	1475	UL & FM
590-4423	SWDR516 Horizontal with nut	Steel	2480 (20 ga.)	1500	1475	UL & FM
590-4433	XP20 X-Press	Metal Deck	1146 (22 ga)	850 (2½" pipe)	940 (2" pipe) 1475 (4" pipe)	UL & FM
				185 (luminaire)		
				250 (luminaire)		
				283 (conduit & cable)		
590-4434	XP35 X-Press	Purlin	1783 (16 ga)	1250 (3½" pipe)	940 (2" pipe) 1475 (4" pipe)	UL & FM
				85 (luminaire)		
				250 (luminaire)		
				416 (conduit & cable)		
590-4435	SXP20 Swivel X-Press	Metal Deck	1061 (22 ga vertical) 829 (45° off vertical)	750 (2" pipe)	635 (2" pipe)	UL & FM
				170 vert. (luminaire)		
				80 @ 45° off vert. (luminaire)		
				283 vert. (conduit & cable) 233 @ 45° off vert. (conduit & cable)		
590-4436	SXP35 Swivel X-Press	Purlin	1675 (16 ga vertical) 1558 (89° off vertical)	1250 (3½" pipe)	635 (2" pipe)	UL & FM
				250 vert. (luminaire)		
				80 @ 90° (luminaire)		
				500 vert. (conduit & cable) 333 @ 89° (conduit & cable)		

* Tested in 3000 PSI concrete

Channel



Channel
Figs. AS 210, 210 EH,
AS 210KO, AS 210H,
AS 210S

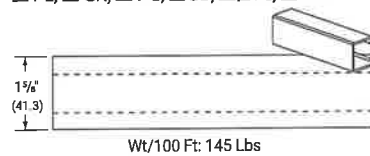


Description

Anvil-Strut channels are manufactured by a series of forming dies, or rolls, which progressively cold work the strip steel into the desired channel configuration. This method produces a cross section of uniform dimensions within a tolerance of plus or minus 0.015", on outside dimensions.

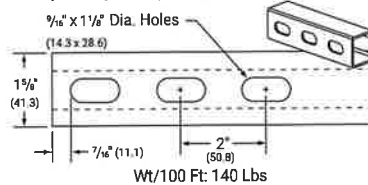
Solid AS 210

PL, GR, PG, SS, ZTC, HG



With Elongated Holes AS 210EH

PL, GR, PG, SS, ZTC, HG



Specifications

Size:

1 5/8" X 1 5/8" (41.3 x 41.3mm)
14 Gauge Channel • wt./100 ft. - 145 lbs.

Materials:

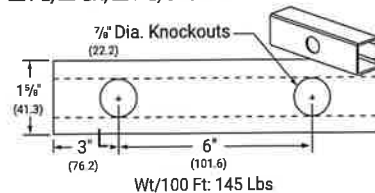
Carbon Steel
Stainless Steel
Aluminum

Finishes

Pre-Galvanized
Hot Dip Galvanized - Post Fabrication
Supr-Green Powder Coated
Zinc Trivalent Chromium
PVC

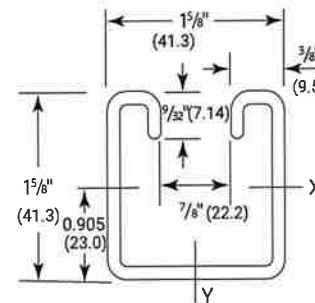
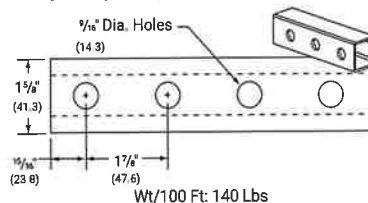
With Knock Out AS 210KO

PL, GR, PG, Other



With Holes AS 210H

PL, GR, PG, Other

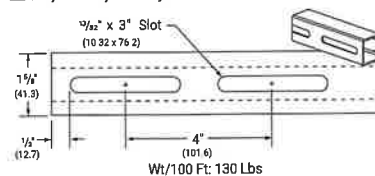


LEGEND:

GR: Powder Coated Supr-Green
EG: Electro-Galvanized
PG: Pre-Galvanized
AL: Aluminum
HG: Hot Dipped Galvanized
PL: Plain
SS: Stainless Steel
ZTC: Zinc Trivalent Chromium Stainless Steel (**SS**), Zinc Trivalent Chromium (**ZTC**) and Hot Dipped Galvanized (**HG**) are specialty finishes. Pricing is located in the Specialty Strut Section of the Anvil-Strut price book.

With Long Slots AS 210S

PL, GR, PG, Other



PROJECT INFORMATION	APPROVAL STAMP
Project:	<input type="checkbox"/> Approved
Address:	<input type="checkbox"/> Approved as noted
Contractor:	<input type="checkbox"/> Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

Channel



Channel
Figs. AS 210, 210 EH, AS 210KO,
AS 210H, AS 210S

1 5/8" X 1 5/8" (41.3 x 41.3mm)
14 Gauge Channel • wt./100 ft. - 145 lbs
Stocked in pre-galvanized, plain, powder coated
Supr-Green, zinc trivalent chromium, and hot dipped
galvanized, in 10 & 20 ft. lengths. Note: Also available
in Stainless Steel 304 & 316 Alloys. Other materials,
finishes & lengths are available upon request.

Properties of Section

Catalog Number	Wt./Ft.		Area of Selection		X-X Axis						Y-Y Axis					
	Lbs.	Kg.	Sq. In.	Sq. CM	I in ⁴	I cm ⁴	S in ³	S cm ³	r in	r cm	I in ⁴	I cm ⁴	S in ³	S cm ³	r in	r cm
AS 210	1.45	2.2	0.416	2.684	0.149	6.202	0.166	2.720	0.598	1.519	0.183	7.617	0.225	3.687	0.663	1.684

I = Moment of Inertia S = Section Modulus r = Radius of Gyration

Beam and Column Loads

Span or Unbraced Height	Max Allowable Uniform Load	Deflection at Uniform Load	Static Beam Load (X-X Axis)					Column Loading Data					
			Uniform Load at Deflection					Max. Allowable Load at Slot Face	Max. Column Load Applied at C.G.				
			Span/180 Deflection	Span/240 Deflection	Span/360 Deflection	Weight of Channel	k=.65		k=.80	k=1.0	k=1.2		
In	Lbs	In	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	Lbs	
12	2,790	0.01	2,790	2,790	2,790	1.5	3,050	9,230	9,000	8,640	8,230		
18	1,860	0.03	1,860	1,860	1,860	2.2	2,930	8,690	8,230	7,550	6,830		
24	1,400	0.06	1,400	1,400	1,400	2.9	2,770	8,010	7,310	6,350	5,420		
30	1,120	0.09	1,120	1,120	1,040	3.6	2,590	7,250	6,350	5,200	4,190		
36	930	0.13	930	930	720	4.4	2,390	6,470	5,420	4,190	3,210		
42	800	0.18	800	800	530	5.1	2,180	5,700	4,570	3,350	2,580		
48	700	0.23	700	610	410	5.8	1,980	4,990	3,830	2,760	2,160		
60	560	0.36	520	390	260	7.3	1,620	3,740	2,760	2,050	1,640		
72	470	0.51	360	270	180	8.7	1,370	2,860	2,160	1,640	1,330		
84	400	0.70	270	200	130	10.2	1,190	2,320	1,780	1,370	1,120		
96	350	0.91	200	150	100	11.6	1,050	1,950	1,520	1,180	960		
108	310	1.16	160	120	80	13.1	940	1,690	1,330	1,030	**		
120	280	1.43	130	100	70	14.5	850	1,500	1,180	**	**		
144	230	2.06	90	70	50	17.4	710	1,220	960	**	**		
168	200	2.80	70	50	30	20.3	**	1,020	**	**	**		
180	190	3.21	60	40	30	21.8	**	940	**	**	**		
192	170	3.66	50	40	30	23.2	**	**	**	**	**		
216	160	4.63	40	30	NR	26.1	**	**	**	**	**		
240	140	5.72	30	NR	NR	29.0	**	**	**	**	**		

Bearing Load may limit load
** Not recommended - KL/r exceeds 200

Notes

- The beam capacities shown above include the weight of the strut beam. The beam weight must be subtracted from these capacities to arrive at the net beam capacity.
- Allowable beam loads are based on a uniformly loaded, simply supported beam. For capacities of a beam loaded at midspan at a single point, multiply the beam capacity by 50% and deflection by 80%.
- The above chart shows beam capacities for strut without holes. For strut with holes, multiply by the following:
EH by 88%, S by 90%,
H (1/8 holes) by 88%, KO by 82%.
- Refer to the Anvil-Strut Catalog for reduction factors for unbraced lengths.



Channel



Channel
Figs. AS 210, 210 EH, AS 210KO, AS 210H, AS 210S

Beam and Column Loads - Metric

Span or Unbraced Height	Max Allowable Uniform Load	Deflection at Uniform Load	Static Beam Load (X-X Axis)					Column Loading Data			
			Uniform Load at Deflection				Max. Allowable Load at Slot Face	Max. Column Load Applied at C.G.			
			Span/180 Deflection	Span/240 Deflection	Span/360 Deflection	Weight of Channel		k=.65	k=.80	k=1.0	k=1.2
mm	Kn	mm	Kn	Kn	Kn	Kg	Kn	Kn	Kn	Kn	Kn
305	12.4	0.3	12.4	12.4	12.4	0.7	13.6	41.1	40.0	38.4	36.6
457	8.3	0.8	8.3	8.3	8.3	1.0	13.0	38.7	36.6	33.6	30.4
610	6.2	1.5	6.2	6.2	6.2	1.3	12.3	35.6	32.5	28.2	24.1
762	5.0	2.3	5.0	5.0	4.6	1.6	11.5	32.2	28.2	23.1	18.6
914	4.1	3.3	4.1	4.1	3.2	2.0	10.6	28.8	24.1	18.6	14.3
1,067	3.6	4.6	3.6	3.6	2.4	2.3	9.7	25.4	20.3	14.9	11.5
1,219	3.1	5.8	3.1	2.7	1.8	2.6	8.8	22.2	17.0	12.3	9.6
1,524	2.5	9.1	2.3	1.7	1.2	3.3	7.2	16.6	12.3	9.1	7.3
1,829	2.1	13.0	1.6	1.2	0.8	3.9	6.1	12.7	9.6	7.3	5.9
2,134	1.8	17.8	1.2	0.9	0.6	4.6	5.3	10.3	7.9	6.1	5.0
2,438	1.6	23.1	0.9	0.7	0.4	5.3	4.7	8.7	6.8	5.2	4.3
2,743	1.4	29.5	0.7	0.5	0.4	5.9	4.2	7.5	5.9	4.6	**
3,048	1.2	36.3	0.6	0.4	0.3	6.6	3.8	6.7	5.2	**	**
3,658	1.0	52.3	0.4	0.3	0.2	7.9	3.2	5.4	4.3	**	**
4,267	0.9	71.1	0.3	0.2	0.1	9.2	**	4.5	**	**	**
4,572	0.8	81.5	0.3	0.2	0.1	9.9	**	4.2	**	**	**
4,877	0.8	93.0	0.2	0.2	0.1	10.5	**	**	**	**	**
5,486	0.7	117.6	0.2	0.1	NR	11.8	**	**	**	**	**
6,096	0.6	145.3	0.1	NR	NR	13.2	**	**	**	**	**



Channel



Channel

Figs. AS 210, 210 EH, AS 210KO, AS 210H, AS 210S

Materials

Carbon Steel: Channels are formed from high-quality, structural grade carbon steel which has been manufactured in accordance with ASTM A-1011-04- SS Grade 33 (hot rolled), or ASTM 366 (cold rolled), with mechanical properties of 33 ksi minimum yield and 52 ksi minimum tensile strength. The precision roll-forming process by which the channels are formed "cold works" the steel, thereby increasing its mechanical properties.

Stainless Steel: Channels are formed from chromium-nickel stainless steel sheet manufactured in accordance with ASTM A-240 specification, offered in both AISI Type 304 and 316 material to provide protection in varying corrosive conditions.

Aluminum: Extruded aluminum channel is produced from 6063-T6 alloy, and fittings are produced from 5052-H32 alloy, both in accordance with ASTM B-221 specifications. Aluminum is suitable for use in various corrosive environments.

Finishes

Pre-Galvanized: Hot dip, mill galvanized coating produced through a process of continuously passing the steel through a bath of molten zinc. This process is performed in accordance with ASTM A-653. The thickness of the zinc coating conforms with ASTM G-90 which represents a coating thickness of .90 ounces of zinc per square foot. This coating is applied to the steel master coils prior to slitting and fabrication.

Hot Dip Galvanized - Post Fabrication: The finished channel is completely immersed in a bath of molten zinc, resulting in the complete coating of all surfaces of the product, including edges and welds. Strut channels that are hot dip galvanized, have a total coating weight of 3.0 ounces of zinc per square foot in accordance with ASTM A-123 specification. This coating provides superior results in applications calling for prolonged outdoor exposure.

Supr-Green Powder Coating: Strut channels are coated after fabrication with polyester powder finish. This coating is applied using an electrostatic spray process, beginning with cleaning and phosphating, through a bonderite pretreatment process, and ending with oven curing. The resulting finish provides a high quality appearance and durability. Powder Coating is in accordance with ASTM B-117 (standard practice for operating salt spray (fog) apparatus) to 500 hours with less than 1/8" scribe creep.

Zinc Trivalent Chromium: The finished channel undergoes a multi-step process consisting of electrogalvanizing, in accordance with ASTM B-633-85, followed by an application of zinc trivalent chromium, which provides the distinctive gold coloration of the finish. All surfaces are coated because the process is performed after fabrication.

PVC: A corrosive resistant PVC (polyvinyl chloride) coating is applied over the completed strut channel. The coating process consists of surface pretreatment, followed by preheating of the part, which is then passed through a fluidized bed of vinyl plastic powder. The powder melts onto the heated channel forming a smooth coating which undergoes a final heat curing.



HANGER RODS



Fig. 146

Continuous Threaded Rod

Size Range: 1/4" through 1 1/2" Stocked in six, ten, and twelve foot lengths. Other even foot lengths can be furnished to order.

Material: Carbon steel or Stainless Steel Gr 304

Threads: National Coarse (UNF), rod threaded complete length.

Finish: Plain or Zinc Plated (Hot-Dip Galvanized optional)

Maximum Temperature: 650° F.

Ordering: Specify rod diameter and length, figure number, name and finish.

Note: The acceptability of galvanized coatings at temperatures above 450°F is at the discretion of the end user.

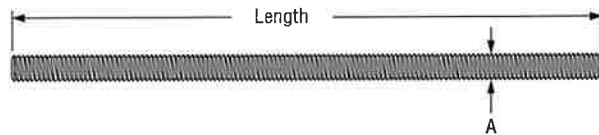


FIG. 146:
LOADS (LBS) • WEIGHTS (LBS) • DIMENSIONS (IN)

Rod Size A	Threads per Inch	Max Load 650° F	Weight per Ft.
1/4	20	240	0.12
3/8	16	730	0.30
1/2	13	1,350	0.53
5/8	11	2,160	0.84
3/4	10	3,230	1.20
7/8	9	4,480	1.70
1	8	5,900	2.30
1 1/4	7	9,500	3.60
1 1/2	6	13,800	5.10

Note: Other rod sizes available upon request. Class 2 fit is available upon request.

PROJECT INFORMATION		APPROVAL STAMP	
Project:		<input type="checkbox"/> Approved	
Address:		<input type="checkbox"/> Approved as noted	
Contractor:		<input type="checkbox"/> Not approved	
Engineer:		Remarks:	
Submittal Date:			
Notes 1:			
Notes 2:			

PH-1.15