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About This Catalog

This catalog contains information about Harmer Steel's most frequently specified products, which are summarized in the Table of Contents. Basic information is given for each product. More detailed specifications, or data about custom and specialty items are available upon request.

For easy reference, this catalog is divided into five sections,

(I) Tee Rails
(II) Crane Rails
(III) Crane Rail Fasteners
(IV) Track Accessories and Tools
(V) Frogs, Switches and Turnout Material

About Harmer Steel

Harmer Steel Products Co. began in 1928 as a supplier of rail and track accessories. Today, as one of North America's leading rail products suppliers, Harmer maintains a large inventory and provides a wide variety of rail fabrication services. Both new and used rail and accessories are stocked for prompt shipment to railroads, mines, crane jobs, and other industries.

The people at Harmer Steel are a dedicated team of professionals who work together to ensure that your order is handled promptly and with the utmost care.

Be sure to visit our website at www.HarmerSteel.com or www.HarmerSteel.ca. Our sales department can be reached via email: sales@HarmerSteel.com

A knowledgeable sales representative will promptly assist you.

George Webb
President

Table of Contents

Section I – TEE RAILS

Introduction - New and Relay I-1
Splice Bars, Curved Rails I-2
Table of Tee Rail Sections ..... I-3 and I-4
Tee Rails 12-lb. to 141-lb. ..... I-5 thru I-21

Section II – CRANE RAILS

American Crane Rails II-1
Crane Rails 104-lb. to 175-lb. ..... II-2 thru II-6
European Crane Rail II-7
Weight and Measure Conversion Table II-8

Section III – CRANE RAIL FASTENERS

Hook Bolts III-1
One-Piece Rail Clips ..... III-2 and III-3
Crane Stops III-3
Soft-Mount Crane Rail Systems III-4
Soft-Mount Crane Rail System Clips III-5
Crane Rail Pads, Girder Tie-Back Linkages III-6
Application Data Sheet III-7
Rail Clamps for Crane Rails ..... III-8 and III-9
Rail Clamps for Tee Rails III-10

Section IV – TRACK ACCESSORIES AND TOOLS

Gage Rods IV-1
Bolts and Washers IV-2
Spikes IV-3
Rail Anchors, Tie Plates IV-4
Direct Fixation Tie Plates, Steel Ties IV-5
Steel Mine Ties ..... IV-6 thru IV-8
Wood Ties, Tie Plugs IV-9
Compromise and Insulated Joint Bars IV-10
Portable Track Signs IV-11
Bumping Posts ..... IV-12 and IV-13
Derails ..... IV-14 and IV-15
Adjustable Derail, Rerailers IV-16
Wheel Stops IV-17
Wheel Chocks IV-18
Track Repair Equipment IV-19
Track Gaging Tools IV-20
Rail Benders IV-21
Track Tools ..... IV-22 and IV-23
Track Jacks, Track Liners IV-24

Section V – FROGS, SWITCHES, TURNOUT MATERIAL

Introduction - Turnout Diagram V-1
Determining Frog Number V-2
Frogs for Light Rails V-3
Solid Manganese Self-Guarded Frogs V-4
Railbound Manganese Frogs V-5

continued

Table of Contents (cont.)

Section V – FROGS, SWITCHES, TURNOUT MATERIAL (cont.)

Rigid Bolted and Manganese Flat-Top Frogs V-6
Guard Rails V-7
One-Piece Guard Rails V-8
Switch Point Details V-9
16'6" Straight Split Switch with Graduated Risers ..... V-10 and V-11
Switch Point Protectors and Guards V-12
Preassembled Light Rail Turnouts V-13
Heel Joints V-14
Plates and Braces V-15
Twin Tie Plates ..... V-16 and V-17
Switch Stands ..... V-18 and V-19
Switch Stands for Light Rails V-20
American Mining Congress Turnout Data ..... V-21 thru V-28

TEE RAILS

TEE RAILS

This portion of our catalog provides a comprehensive list of “tee rails” available from Harmer Steel. All of the rail sections shown on pages I-5 through I-21 are standard ASCE (American Society of Civil Engineers), ARA–A (American Railway Association Type A), and AREMA (American Railway Engineering and Maintenance-of-Way Association) designs mostly in current manufacture. ASCE rails are primarily designed for light overhead cranes, mining track, automated warehouse retrieval systems, and other industrial applications. ARA–A and AREMA rails are primarily designed for railroad tracks, including sidings and spur tracks. Rail weighing 60 pounds per yard or more is normally manufactured to ASTM A–1 or AREMA specifications.

Relay Rail

In addition to new rail, Harmer Steel also stocks a wide range of good quality used rail. Used rail in good enough condition to be re-laid is called “relay rail.” Relay rail is often used for industrial sidings and spur tracks, where the slower speed and infrequent traffic do not warrant the expense of new rail. Relay rail is graded and classified according to the type and number of flaws and the amount of wear exhibited. Harmer Steel takes pride in grading relay rail carefully to ensure that all material shipped will meet each customer’s exact specifications.

There are several different types of rail wear that are usually measured when grading relay rail. “Top wear” and “side wear” are measured by comparing the difference between the height and head-width of the relay rail with a newly manufactured rail section of the same weight and size. (Side wear is sometimes referred to as “gage wear” or “curve wear”). “End batter” is the term for the difference in height measured at the end of a rail and the height of the same rail measured behind the joint. “Flow” is the term used to describe a small lip sticking out at the side of the rail head. Flow can be present on one or both sides of the head, however, the highest quality relay rail exhibits only a small amount of flow on one side only. Relay rail with flow on one side is often turned around when re-laid so that the lip is then on the field side (outside) of the track.

Relay rail is generally classified as “Number One” or “Number Two Relay.” The definitions of Number One and Number Two Relay vary somewhat according to whose specifications are used. Different railroads and associations have developed different classification systems for grading relay rail. Generally speaking, Number One Relay allows a maximum of 1/8” top wear for rails up to and including 115–lb., a maximum of 3/16” top wear for rails between 119 & 133, and 1/4" for rails 136–lb. and heavier. Please contact your Harmer representative for more complete specifications.

In addition to the rail sections shown on pages I-5 to I-21, a great number of relay rail sections, even those not currently manufactured, can be supplied by Harmer Steel. The table on pages I-3 and I-4 provides an extensive list of new and older rail sections.

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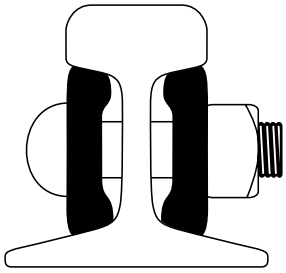
SPLICE BARS, CURVED RAILS

Splice Bars

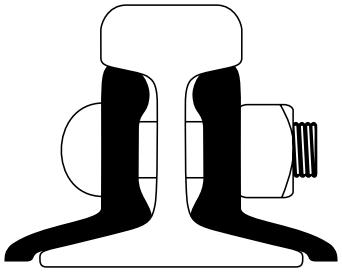
Often rails are joined together by welding, but most rail for industry use is connected by means of a bolted splice. There are usually two or three holes drilled in the end of the rails for these splices. The hole spacing pattern is called the “drilling” and is measured from the end of the rail to the center of the first hole, and from the center of the first hole to the center of the second hole, etc. Thus a drilling might be 2-1/2” X 5” or 3-1/2” X 6” X 6”.

The standard drillings for tee rails and corresponding splice bars provide for a 1/8” gap between rail ends. This is standard construction for railroad track and light crane service. For best service in bolted splices for rails in crane service, it is recommended that “tight joints” be stipulated. (See page II-1 for a description of a tight joint.) Although tight joints are not standard for tee rails, Harmer Steel can supply tight joints in the ASCE sections from 30-lb. to 85-lb.

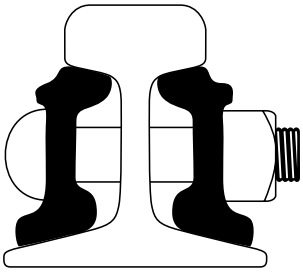
The term “splice bar” refers to only one type of connector bar and frequently is confused with other types. The drawings below provide clarification of the proper term for each type of connector bar.



Splice Bars



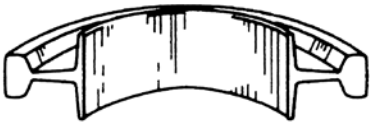
Angle Bars



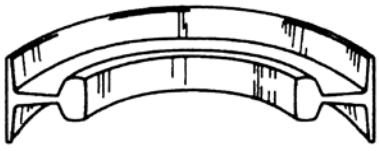
Joint Bars

Curved Rail

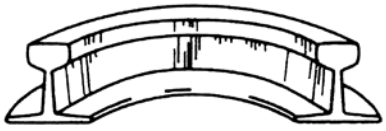
Curving of tee rails and crane rails is available in a variety of ways to suit various applications.



Ball Out
Specify Inside Diameter



Ball In
Specify Outside Diameter



Ball Up
Specify Centerline Diameter of Head

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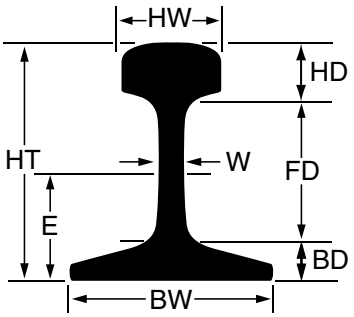
TEE RAIL SECTIONS — DATA

Nominal Weight Per Yard	Type of Rail	Dimensions in Inches								Section Designation		
		HT	BW	HW	W	HD	FD	BD	E			
12 lb.	ASCE	2	2	1	3/16	9/16	1-3/32	11/32	57/64	1240	12 AS	–
16 lb.	ASCE	2-3/8	2-3/8	1-11/64	7/32	41/64	1-23/64	3/8	1-1/16	1640	16 AS	–
20 lb.	ASCE	2-5/8	2-5/8	1-11/32	1/4	23/32	1-15/32	7/16	1-11/64	2040	20 AS	–
25 lb.	ASCE	2-3/4	2-3/4	1-1/2	19/64	25/32	1-31/64	31/64	1-15/64	2540	25 AS	–
30 lb.	ASCE	3-1/8	3-1/8	1-11/16	21/64	7/8	1-23/32	17/32	1-25/64	3040	30 AS	–
35 lb.	ASCE	3-5/16	3-5/16	1-3/4	23/64	61/64	1-25/32	37/64	1-15/32	3540	35 AS	–
40 lb.	ASCE	3-1/2	3-1/2	1-7/8	25/64	1-1/64	1-55/64	5/8	1-9/16	4040	40 AS	–
45 lb.	ASCE	3-11/16	3-11/16	2	27/64	1-1/16	1-31/32	21/32	1-41/64	4540	45 AS	–
50 lb.	ASCE	3-7/8	3-7/8	2-1/8	7/16	1-1/8	2-1/16	11/16	1-23/32	5040	50 AS	–
55 lb.	ASCE	4-1/16	4-1/16	2-1/4	15/32	1-11/64	2-11/64	23/32	1-103/128	5540	55 AS	–
56 lb.	MISC.	4	3-27/32	2-5/16	11/32	1-13/32	1-29/32	11/16	1-41/64	5607		
	MISC.	4-1/4	4-1/8	2-1/4	3/8	1-27/64	2-1/8	45/64	1-3/4	5633	56-M	5616
60 lb.	ASCE	4-1/4	4-1/4	2-3/8	31/64	1-7/32	2-17/64	49/64	1-29/32	6040	60 AS	603
	ARA-A	4-1/2	4	2-1/4	15/32	1-15/64	2-29/64	13/16	2-17/64	6020	60 RA	602
	MISC.	4-1/4	4-1/16	2-5/16	1/2		2-1/8			6001		6051
65 lb.	ASCE	4-7/16	4-7/16	2-13/32	1/2	1-9/32	2-3/8	25/32	1-31/32	6540	65 AS	653
70 lb.	ASCE	4-5/8	4-5/8	2-7/16	33/64	1-11/32	2-15/32	13/16	2-3/64	7040	70 AS	701
72 lb.	C&NW	4-3/4	4-3/4	2-3/8	9/16	1-13/32	2-1/2	27/32	2-3/32	7201	72 NP	7250
75 lb.	ASCE	4-13/16	4-13/16	2-15/32	17/32	1-27/64	2-35/64	27/32	2-15/128	7540	75 AS	753
	MO. PAC.	4-3/4	4-3/4	2-9/16	9/16	1-7/16	2-15/32	27/32	2-5/64	7550	75 MP	–
	S. PAC.	4-15/16	4-7/16	2-7/16	33/64	1-3/8	2-5/8	15/16	2-1/4	7524	75 SP	754
	U. PAC.	5	5	2-9/16	1/2	1-3/8	2-13/16	13/16	2-5/8	7523	75 CS	754
	U. PAC.	4-15/16	4-7/16	2-7/16	33/64	1-3/8	2-5/8	15/16	2-1/2	7524	75 CSR	757
80 lb.	ASCE	5	5	2-1/2	35/64	1-1/2	2-5/8	7/8	2-3/16	8040	80 AS	800
	DUDLEY	5-1/8	5	2-21/32	17/32	1-1/2	2-3/4	7/8	2-1/4	8022	80 DY	–
85 lb.	ASCE	5-3/16	5-3/16	2-9/16	9/16	1-35/64	2-3/4	57/64	2-17/64	8540	85 AS	851
	CAN. PAC.	5-1/8	5	2-1/2	9/16	1-7/16	2-11/16	1	2-11/32	8524	85 CP	–
	CB&Q	5-3/16	5-3/16	2-21/32	9/16	1-35/64	2-3/4	57/64	2-17/64	8543	85 CB	852
	GRT. NO.	5	5	2-21/32	21/32	1-19/32	2-1/2	29/32	2-5/32	8509	85 GN	8553
	MO. PAC.	5-7/32	5-1/4	2-15/32	75/128	1-3/4	2-39/64	55/64	2-21/128	8550	–	–
	PS	5-1/8	4-5/8	2-1/2	17/32	1-21/32	2-15/32	1	2-15/64	8531	85 PS	–
	PRR	5	5	2-9/16	17/32	1-3/4	2-3/8	7/8	2-1/16	8533	85 PR	–
	SOO LINE	5-3/8	4-7/8	2-1/2	9/16	1-15/32	2-29/32	1	2-29/64	8520	–	–
90 lb.	ASCE	5-3/8	5-3/8	2-5/8	9/16	1-35/64	2-55/64	59/64	2-45/128	9040	90 AS	–
	ARA-A	5-5/8	5-1/8	2-9/16	9/16	1-15/32	3-5/32	1	2-37/64	9020	90 RA	902
	ARA-B	5-17/64	4-49/64	2-9/16	9/16	1-39/64	2-5/8	1-1/32	2-11/32	9030	90 RB	905
	AT&SF	5-5/8	5-3/16	2-9/16	9/16	1-15/32	3-5/32	1	2-37/64	9021	90 SF	903
	C&NW	5-17/32	5-3/32	2-1/2	1/2	1-17/32	2-31/32	1-1/32	2-23/64	9035	90 OM	–
	D&RG	5-1/2	5-1/8	2-9/16	9/16	1-5/8	2-7/8	1	2-5/8	–	–	906
	GRT. NO.	5-3/8	5	2-5/8	9/16	1-15/32	2-7/8	1-1/32	2-15/32	9024	90 GN	904
	INTRBGH	5	5	2-7/8	11/16	1-25/32	2-11/32	7/8	2-3/64	9050	90 RT	–
	U. PAC.	5-3/4	5-3/8	2-3/4	17/32	1-1/2	3-3/8	7/8	2-9/16	9023	90 UP	901
	DUDLEY	5-1/2	5	2-21/32	9/16	1-1/2	3-1/32	31/32	2-3/8	–	90 DY	–



(Dimensions for Tee Rail Data Table)

HT – Height
BW – Width of Base
HW – Width of Head
W – Web (at center point)
HD – Depth of Head
FD – Fishing
BD – Depth of Base
E – Bolt Hole Elevation

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TEE RAIL SECTIONS — DATA

Nominal Weight Per Yard	Type of Rail	Dimensions in Inches								Section Designation		
		HT	BW	HW	W	HD	FD	BD	E			
100 lb.	ASCE	5-3/4	5-3/4	2-3/4	9/16	1-45/64	3-5/64	31/32	2-65/128	10040	100 AS	–
	PS	5-11/16	5	2-43/64	9/16	1-13/16	2-25/32	1-3/32	2-31/64	10031	100 PS	–
	PRR	5-1/2	5-1/2	2-13/16	5/8	1-7/8	2-11/16	15/16	2-9/32	10033	100 PR	–
	ARA-A	6	5-1/2	2-3/4	9/16	1-9/16	3-3/8	1-1/16	2-3/4	10020	100 RA	1003
	ARA-B	5-41/64	5-9/64	2-21/32	9/16	1-45/64	2-55/64	1-5/64	2-65/128	10030	100 RB	1002
	AREMA	6	5-3/8	2-11/16	9/16	1-21/32	3-9/32	1-1/16	2-45/64	10025	100 RE	10025
	ARA-A HF	6-5/32	5-1/2	2-11/16	9/16	1-23/32	3-3/8	1-1/16	2-15/16	–	100 RA-HF	–
	AREA HF	6-1/16	5-3/8	2-39/64	9/16	1-23/32	3-9/32	1-1/16	2-31/32	10027	100 RE-HF	–
	C&NW	5-45/64	5-9/64	2-9/16	9/16	1-39/64	2-61/64	1-9/64	2-79/128	10035	100 DM	–
	GRT. NO.	5-3/4	5	2-3/4	9/16	1-5/8	3	1-1/8	2-5/8	10036	100 GN	–
	INTRBGH	5-3/4	5-3/4	2-7/8	9/16	1-45/64	3-5/64	31/32	2-65/128	10005	100 RT	–
	NY.NH&H	6	5-1/2	2-3/4	19/32	1-23/32	3-11/32	15/16	2-39/64	10034	100 NH	–
	READING	5-5/8	5-3/8	2-21/32	9/16	1-45/64	2-55/64	1-1/16	2-63/128	10032	100 RG	–
101 lb.	DL&W	5-7/16	5-3/8	2-3/4	5/8	1-23/32	2-11/16	1-1/32	2-3/8	10133	101 DL	–
105 lb.	DL&W	6	5-3/8	2-3/4	5/8	1-23/32	3-1/4	1-1/32	2-21/32	10533	105 DL	–
	DUDLEY	6	5-1/2	3	5/8	1-5/8	3-13/32	31/32	2-43/64	10524	105 DY	–
110 lb.	AREMA	6-1/4	5-1/2	2-25/32	19/32	1-23/32	3-13/32	1-1/8	2-53/64	11025	110 RE	1100
	GRT. NO.	6-1/2	5-1/2	2-3/4	19/32	1-5/8	3-3/4	1-1/8	3	11036	110 GN	–
	LE. VAL.	6	5-1/2	2-7/8	19/32	1-7/8	3-1/16	1-1/16	2-19/32	11033	110 LV	–
112 lb.	AREMA	6-5/8	5-1/2	2-23/32	19/32	1-11/16	3-13/16	1-1/8	2-7/8	11225	112 RE	1121
	TR.	6-3/4	5-1/2	2-1/2	5/8	1-3/4	3-7/8	1-1/8	3-1/8	11229	–	1122
113 lb.	HF	6-13/16	5-1/2	2-11/16	19/32	–	3-13/16	–	–	–	113 HF	–
115 lb.	AREMA	6-5/8	5-1/2	2-23/32	5/8	1-11/16	3-13/16	1-1/8	2-7/8	11525	115 RE	1150
	DUDLEY	6-1/2	5-1/2	3	5/8	1-11/16	3-3/4	1-1/16	3-3/8	11522	115 DY	–
119 lb.	AREMA	6-13/16	5-1/2	2-21/32	5/8	1-7/8	3-13/16	1-1/8	2-7/8	11925	119 RE	–
122 lb.	CHESSIE	6-25/32	6	2-15/16	21/32	1-15/16	3-39/64	1-15/64	3-21/64	–	122 CB	–
127 lb.	DUDLEY	7	6-1/4	3	21/32	1-11/16	4-5/32	1-5/32	3-1/8	12723	123 DYM	–
130 lb.	PS	6-5/8	5-1/2	3	11/16	2	3-13/32	1-7/32	2-3/4	13031	130 PS	–
	AREMA	6-3/4	6	2-15/16	21/32	1-27/32	3-11/16	1-7/32	3-1/16	13025	130 RE	1300
131 lb.	AREMA	7-1/8	6	3	21/32	1-3/4	4-3/16	1-3/16	3-1/4	13128	131 RE	1311
132 lb.	AREMA	7-1/8	6	3	21/32	1-3/4	4-3/16	1-3/16	3-3/32	13225	132 RE	1321
133 lb.	AREMA	7-1/16	6	3	11/16	1-15/16	3-15/16	1-3/16	3	13325	133 RE	1330
136 lb.	AREMA	7-5/16	6	2-15/16	11/16	1-15/16	4-3/16	1-3/16	3-3/32	13625	136 RE	–
140 lb.	AREMA	7-5/16	6	3	3/4	2-1/16	4-1/16	1-3/16	3	14025	140 RE	–
141 lb.	AREMA	7-7/16	6	3-1/16	11/16	2-5/32	4-3/32	1-3/16	3-3/32	14128	141 RE	–
152 lb.	PS	8	6-3/4	3	11/16	1-27/32	4-7/8	1-9/32	3-3/4	15222	152 PS	–
155 lb.	PS	8	6-3/4	3	3/4	2-1/16	4-21/32	1-9/32	3-3/8	15531	155 PS	–

Identifying Rail Sections

The weight and type of most rails can easily be identified by referring to the dimensional diagrams on pages I-5 through I-21 in this catalog. For these and other sections, the tee rail sections data table on the preceeding page and above lists basic dimensions and identifies mill marks usually rolled on rail web.

If a special section is not listed, simply place a piece of paper against the rail end, and impress its outline into the paper by pressing your fingers against the rail edges. Take note of the width of the base, rail height, and head dimensions as well as all numbers and letters on the side of the rail. With this information, Harmer can determine the best rail to meet your individual requirements.

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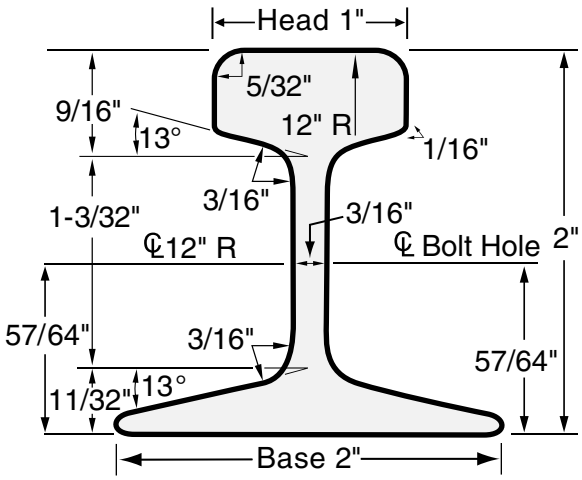
12–lb. ASCE

Shown Actual Size



Rail Type:	12 AS
Section Number:	1240
Nominal Weight:	12 lbs/yd
Standard Length:	30’
Standard Drilling:	2” X 4” with 5/8” dia. holes
Splice Bar Length:	16-1/8”
Splice Bar Weight:	2 lbs/pr **with hardware:** 3 lbs/pr
Track Bolt:	1/2” X 1-3/4”

Area in^2: 1.18
Section Modulus in^3:
Head: .58
Moment of Inertia in^4: .55

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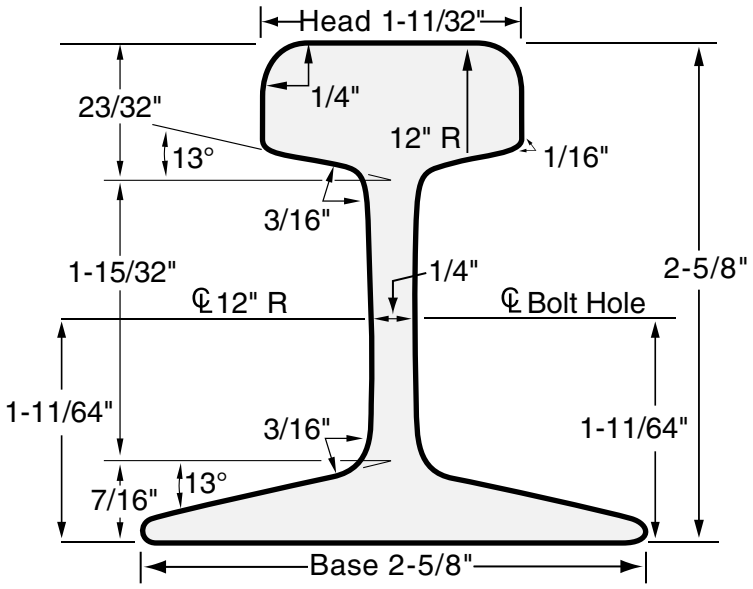
20–lb. ASCE

Shown Actual Size



Rail Type:	20 AS
Section Number:	2040
Nominal Weight:	20 lbs/yd
Standard Length:	30’ (20’ may also be available)
Standard Drilling:	2” X 4” with 5/8” dia. holes
Splice Bar Length:	16-1/8”
Splice Bar Weight:	6 lbs/pr **with hardware:** 7 lbs/pr
Track Bolt:	1/2” X 2”

Area in^2: 2.00

Section Modulus in^3:
Head: 1.41

Moment of Inertia in^4: 1.93

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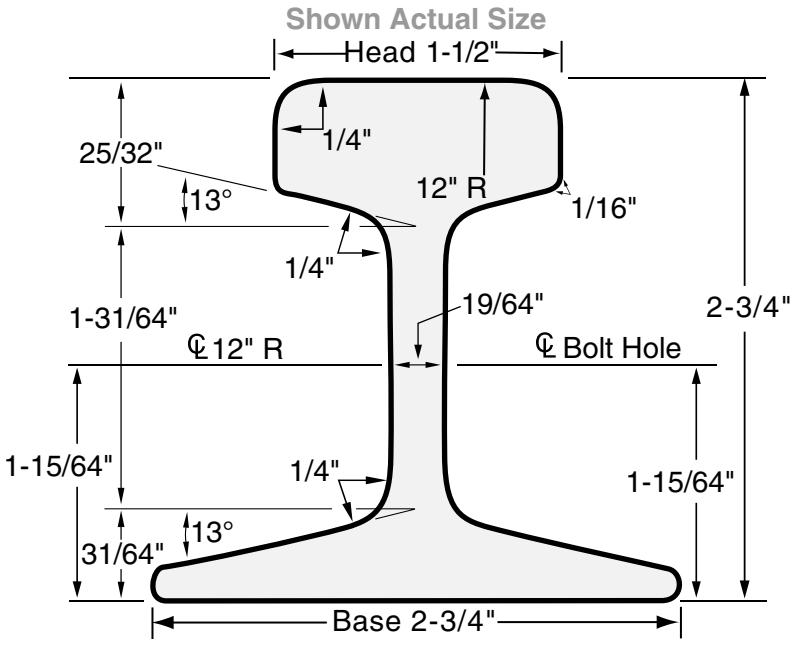
25–lb. ASCE



Rail Type:	25 AS
Section Number:	2540
Nominal Weight:	25 lbs/yd
Standard Length:	30’ (40’ may also be available)
Standard Drilling:	2” X 4” with 5/8” dia. holes
Splice Bar Length:	16-1/8”
Splice Bar Weight:	6 lbs/pr **with hardware:** 7 lbs/pr
Track Bolt:	1/2” X 2”

Area in^2: 2.4

Section Modulus in^3:
Head: 1.76

Moment of Inertia in^4: 2.5

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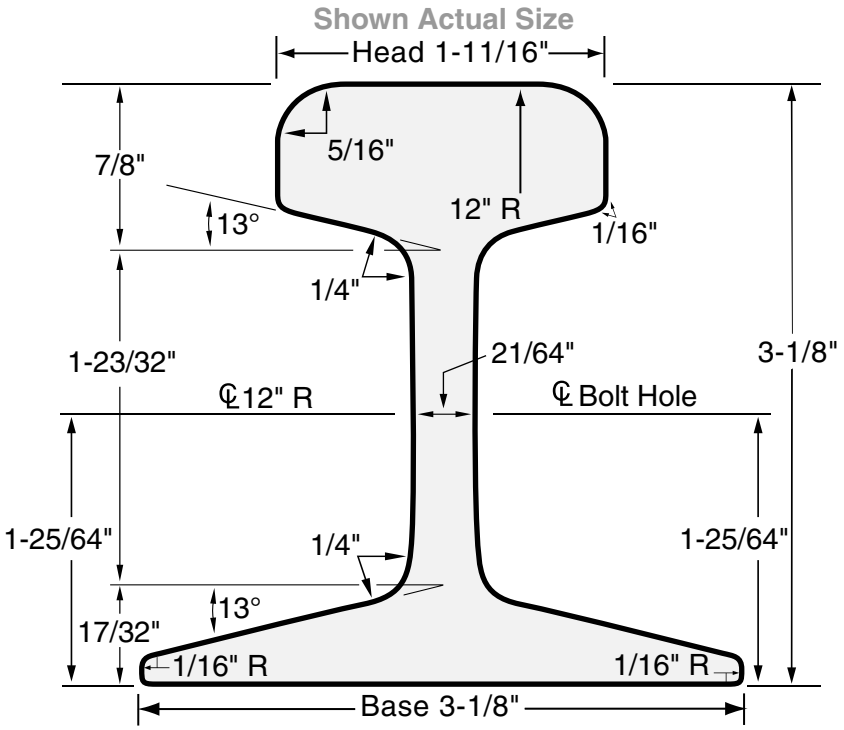
30–lb. ASCE



Rail Type:	30 AS
Section Number:	3040
Nominal Weight:	30 lbs/yd
Standard Length:	30’ (20’ and 40’ may also be available)
Standard Drilling:	2” X 4” with 3/4” dia. holes
Splice Bar Length:	16-1/8”
Splice Bar Weight:	6 lbs/pr **with hardware:** 8 lbs/pr
Track Bolt:	5/8” X 2-1/2”

Area in^2: 3.00
Section Modulus in^3:
Head: 2.55
Moment of Inertia in^4: 4.10

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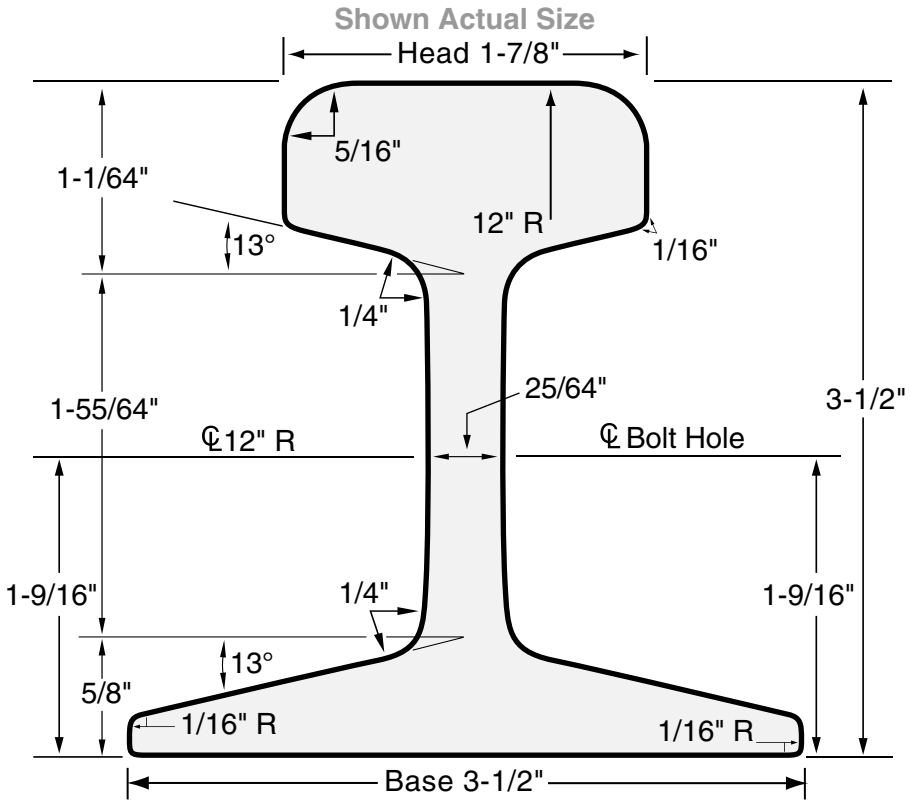
40–lb. ASCE



Rail Type:	40 AS
Section Number:	4040
Nominal Weight:	40 lbs/yd
Standard Length:	20', 30' & 40'
Standard Drilling:	2-1/2" X 5" with 7/8" dia. holes
Splice Bar Length:	20"
Splice Bar Weight:	8 lbs/pr **with hardware:** 11 lbs/pr
Track Bolt:	3/4" X 3-1/2"

Area in^2: 3.94
Section Modulus in^3:
Head: 3.59
Moment of Inertia in^4: 6.54

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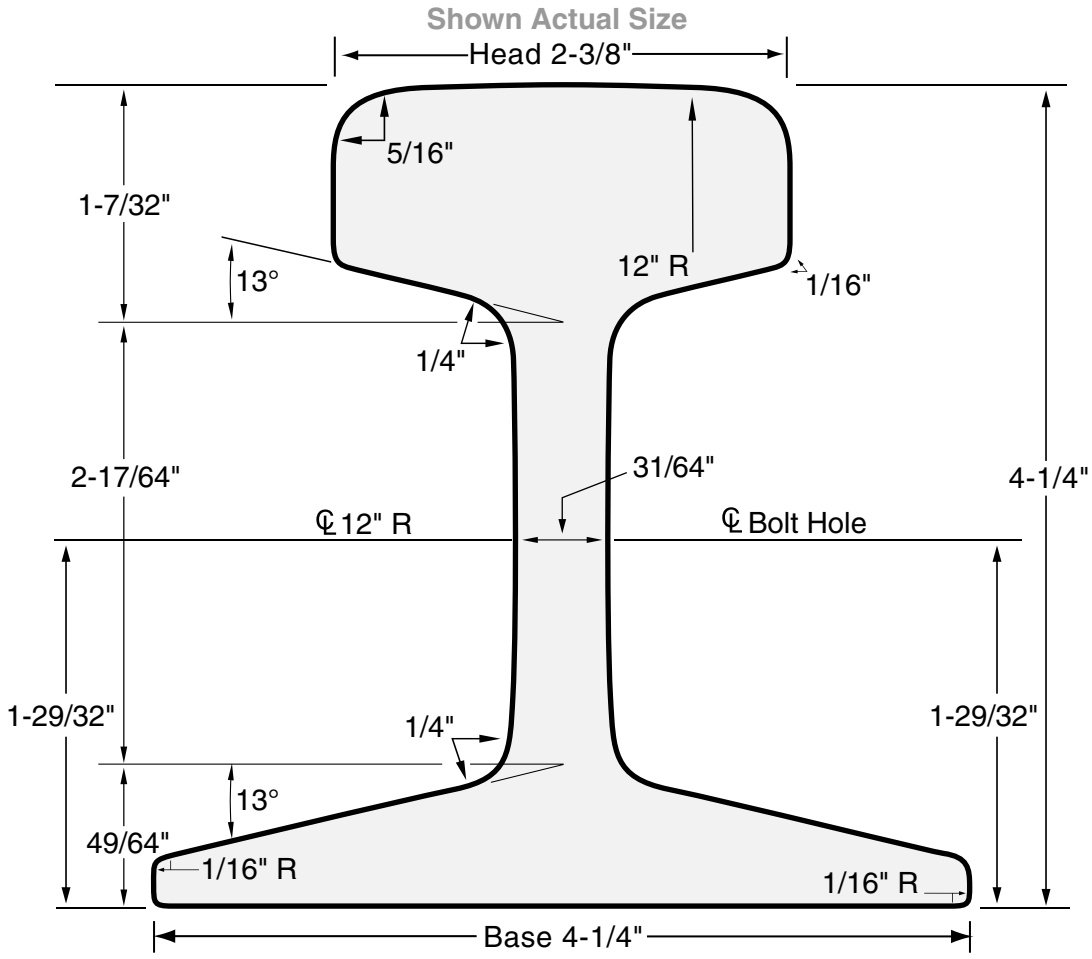
60–lb. ASCE



Rail Type:	60 AS
Section Number:	6040
Nominal Weight:	60 lbs/yd
Standard Length:	20’, 30’, 33’, & 40’
Standard Drilling:	2-1/2” X 5” with 15/16” dia. holes
Splice Bar Length:	20”
Splice Bar Weight:	13 lbs/pr **with hardware:** 16 lbs/pr
Track Bolt:	3/4” X 4”

Area in^2: 5.93

Section Modulus in^3:

Head: 6.62

Base: 7.10

Moment of Inertia in^4: 14.56

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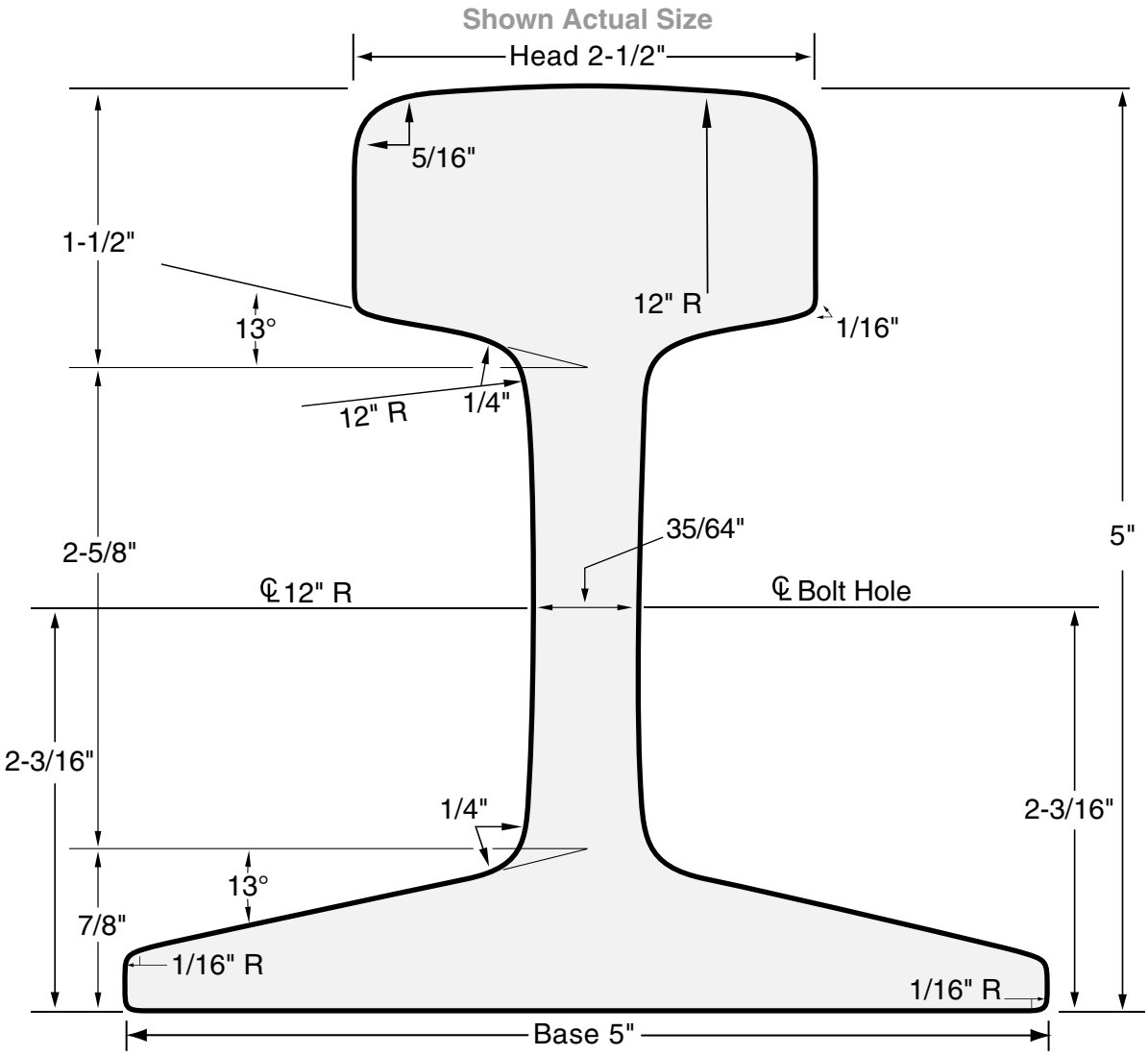
80–lb. ASCE



Rail Type:	80 AS
Section Number:	8040
Nominal Weight:	80 lbs/yd
Standard Length:	39’
Standard Drilling:	2-1/2” X 5” with 1” dia. holes
Splice Bar Length:	24”
Splice Bar Weight:	16 lbs/pr **with hardware:** 19 lbs/pr
Track Bolt:	7/8” X 4-1/2”

Area in^2: 7.86

Section Modulus in^3:

Head: 10.07

Base: 11.08

Moment of Inertia in^4: 26.38

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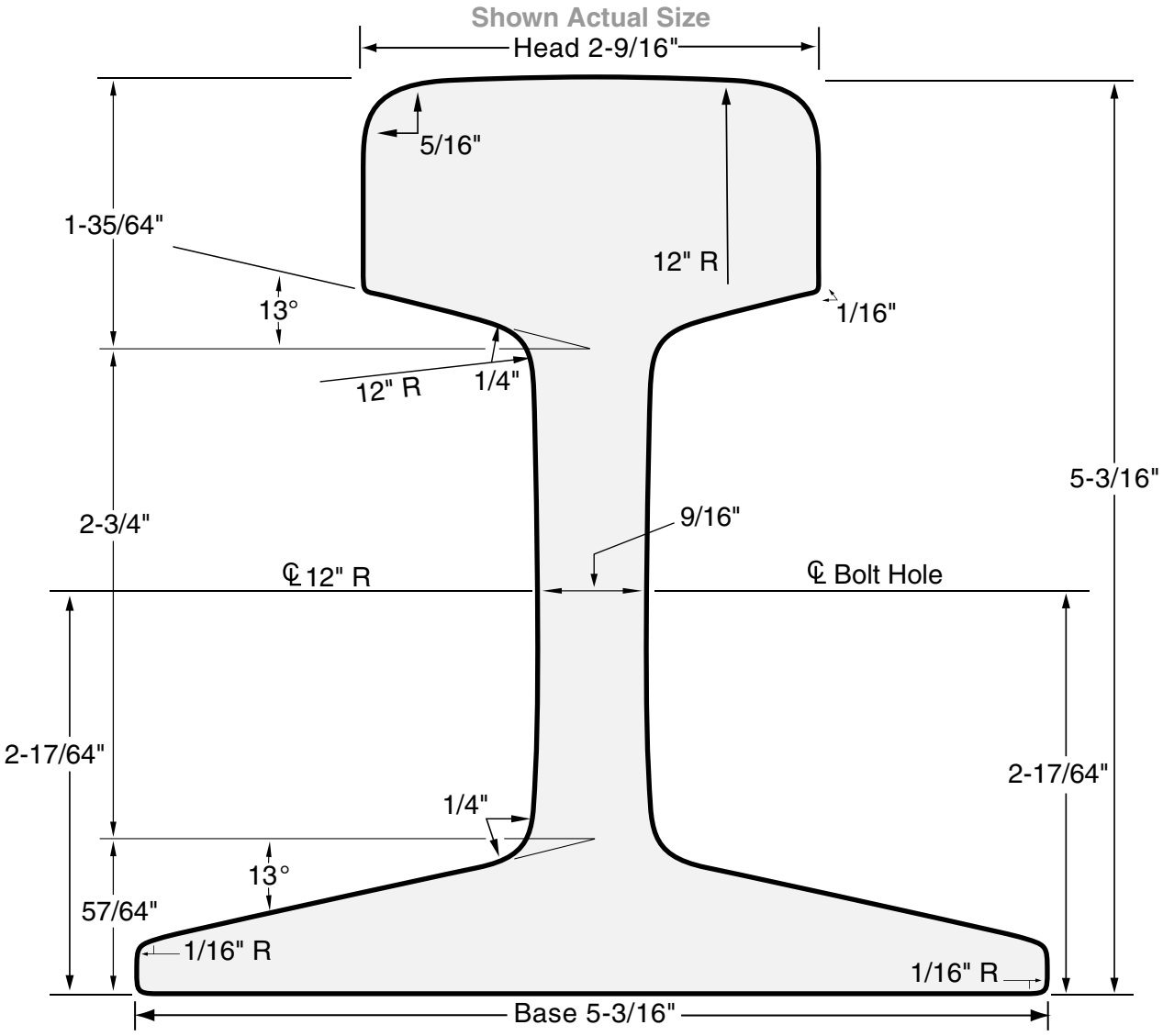
85–lb. ASCE



Rail Type:	85 AS
Section Number:	8540
Nominal Weight:	85 lbs/yd
Standard Length:	39’
Standard Drilling:	2-1/2” X 5” with 1” dia. holes
Splice Bar Length:	24”
Splice Bar Weight:	18 lbs/pr **with hardware:** 23 lbs/pr
Track Bolt:	7/8” X 4-1/2”

Area in^2: 8.33

Section Modulus in^3:

Head: 11.08

Base: 12.17

Moment of Inertia in^4: 30.07

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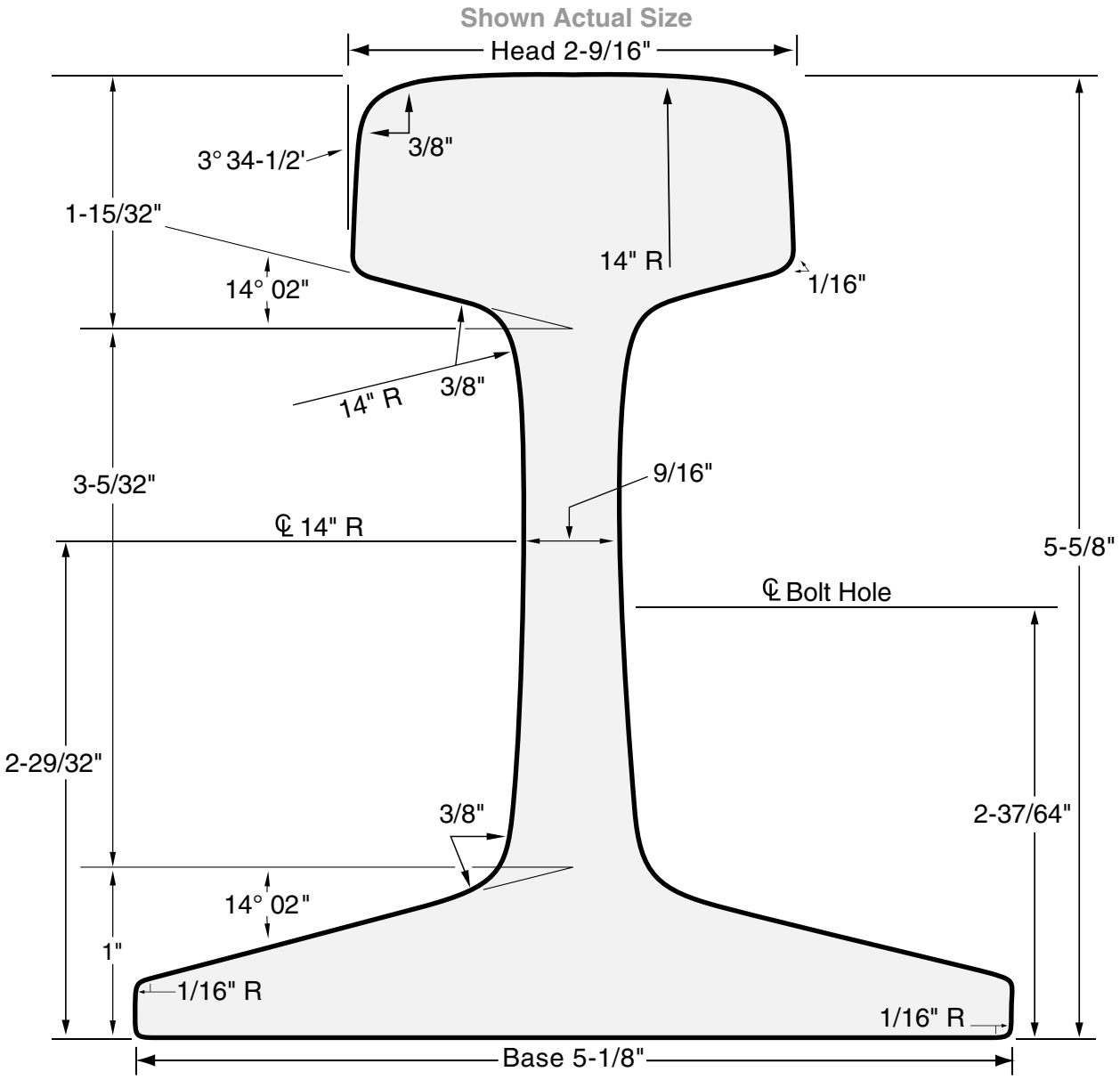
90–lb. ARA–A



Rail Type:	90 RA
Section Number:	9020
Nominal Weight:	90 lbs/yd
Standard Length:	39’
Standard Drilling:	2-11/16” X 5-1/2” with 1-1/8” dia. holes
Joint & Angle Bar Lgth:	24”
Angle Bar Weight:	60 lbs/pr **with hardware:** 67 lbs/pr
Joint Bar Weight:	46 lbs/pr **with hardware:** 53 lbs/pr
Track Bolt:	7/8” X 5”

Area in^2: 8.82

Section Modulus in^3:

Head: 12.6

Base: 15.2

Moment of Inertia in^4: 38.7

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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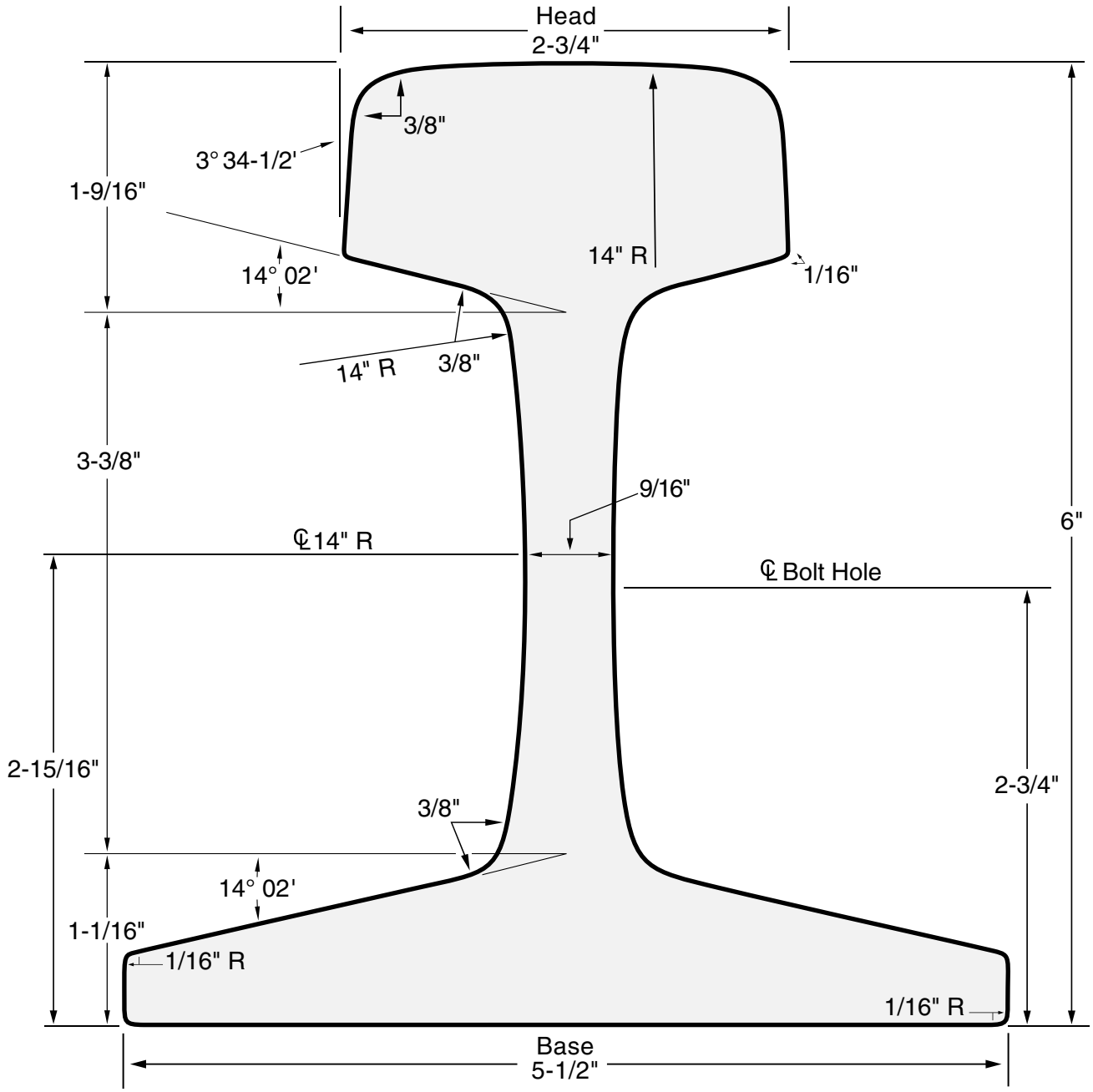
100–lb. ARA–A

Shown Actual Size



Rail Type:	100 RA
Section Number:	10020
Nominal Weight:	100 lbs/yd
Standard Length:	39’
Standard Drilling:	2-11/16” X 5-1/2” with 1-3/16” dia. holes
Joint Bar Length:	22”
Joint Bar Weight:	54 lbs/pr **with hardware:** 62 lbs/pr
Track Bolt:	1” X 5-1/2”

Area in^2: 9.84

Section Modulus in^3:

Head: 15.04

Base: 17.78

Moment of Inertia in^4: 48.94

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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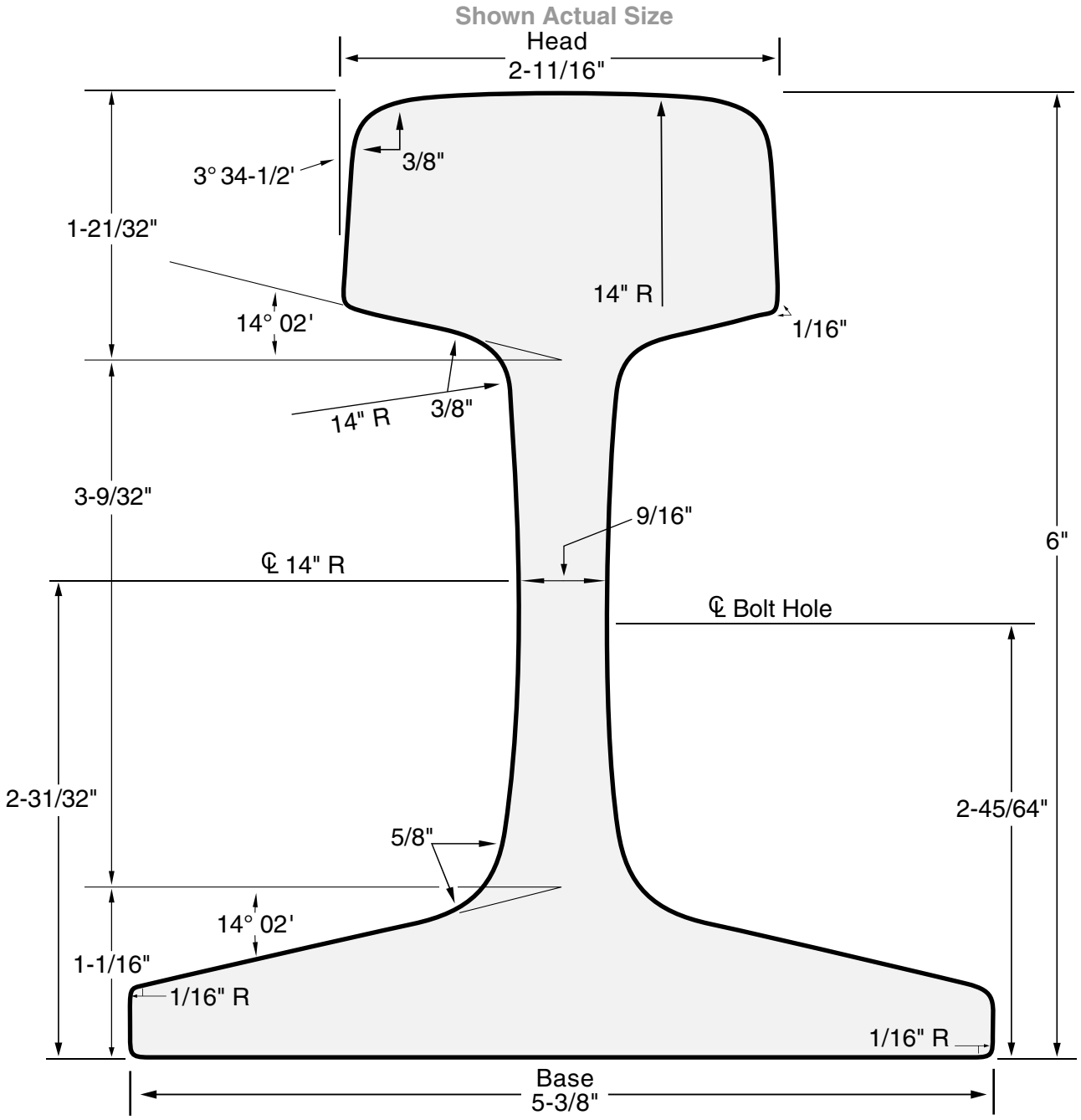
100–lb. AREMA



Rail Type:	100 RE
Section Number:	10025
Nominal Weight:	100 lbs/yd
Standard Length:	39’
Standard Drilling:	2-11/16” X 5-1/2” with 1-1/8” dia. holes
Joint Bar Length:	24”
Joint Bar Weight:	65 lbs/pr **with hardware:** 72 lbs/pr
Track Bolt:	1” X 5-1/2”

Area in^2: 9.95

Section Modulus in^3:

Head: 15.1

Base: 17.8

Moment of Inertia in^4: 49.0

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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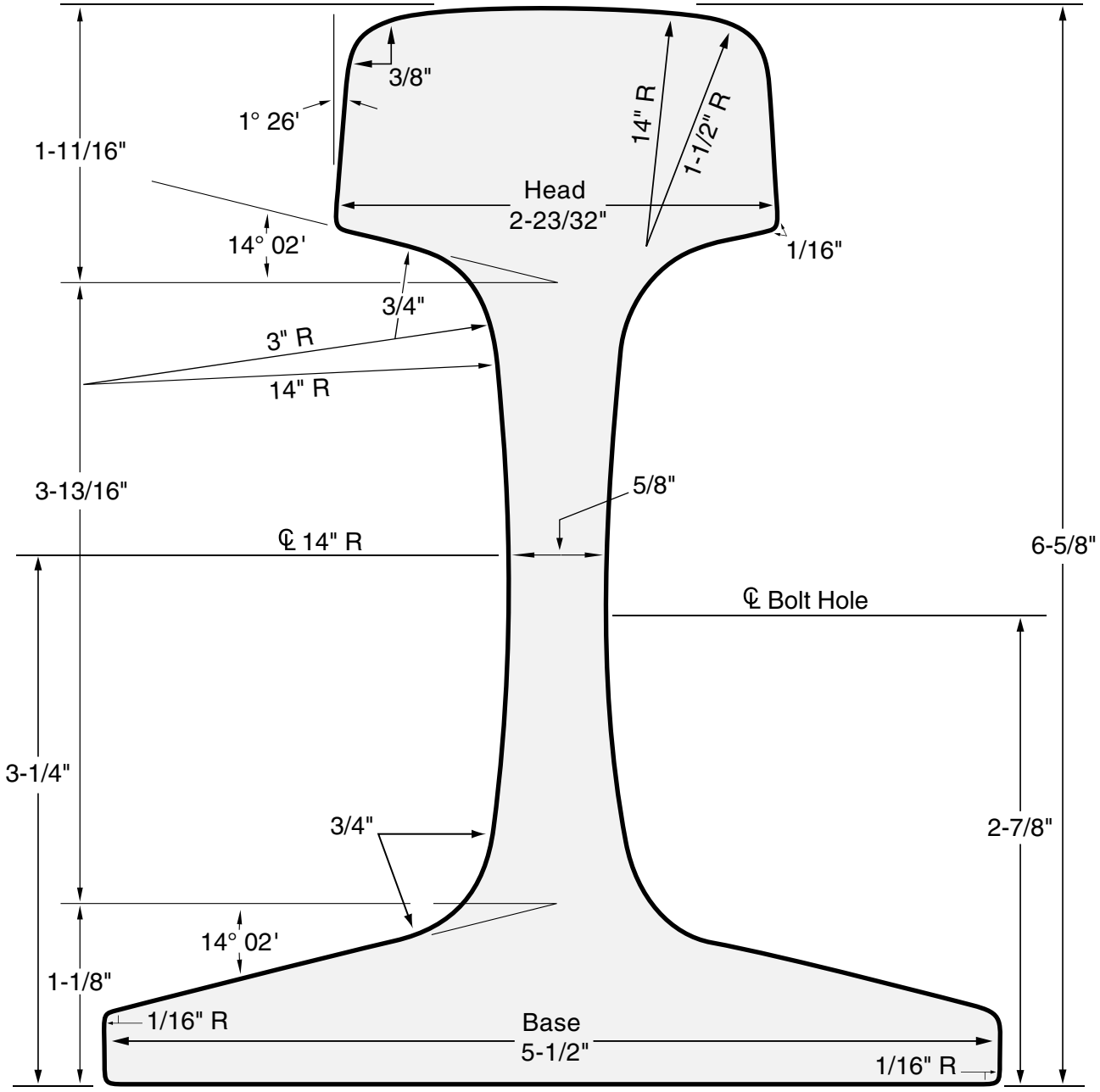
115–lb. AREMA

Shown Actual Size



Rail Type:	115 RE
Section Number:	11525
Nominal Weight:	115 lbs/yd
Standard Length:	39', 80'
Standard Drilling:	3-1/2" X 6" or 3-1/2" X 6" X 6" with 1-1/4" dia. holes
Joint Bar Length:	24" or 36"
Joint Bar Weight:	**4-Hole bars:** 68 lbs/pr **with hardware:** 76 lbs/pr **6-Hole bars:** 102 lbs/pr **with hardware:** 110 lbs/pr
Track Bolt:	1" X 6"

Area in^2: 11.25

Section Modulus in^3:

Head: 18.0

Base: 22.0

Moment of Inertia in^4: 65.6

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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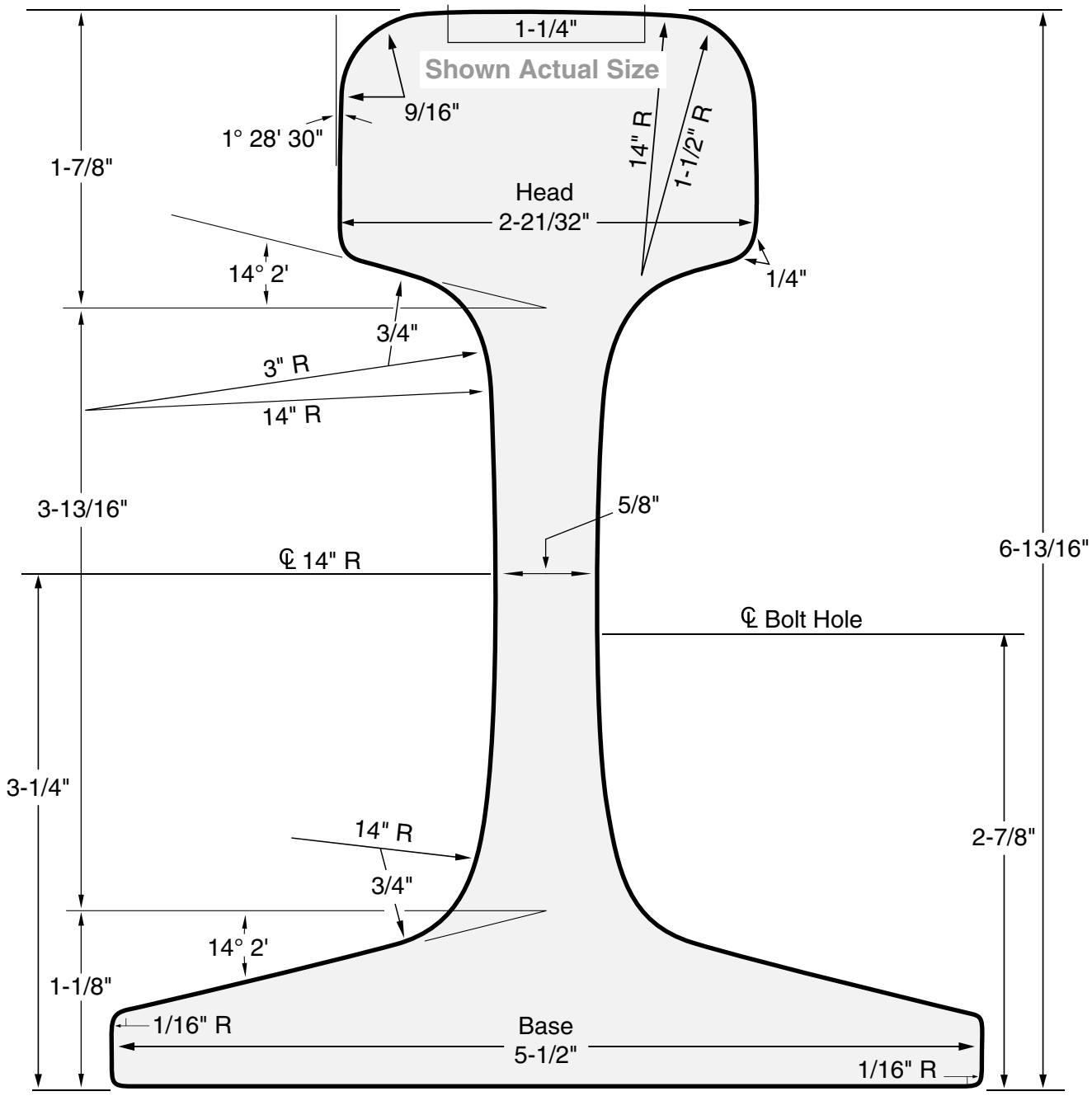
119–lb. AREMA



Rail Type:	119 RE
Section Number:	11925
Nominal Weight:	119 lbs/yd
Standard Length:	39’
Standard Drilling:	3-1/2” X 6” or 3-1/2” X 6” X 6” with 1-1/4” dia. holes
Joint Bar Length:	24” or 36”
Joint Bar Weight:	**4-Hole bars:** 68 lbs/pr **with hardware:** 76 lbs/pr **6-Hole bars:** 102 lbs/pr **with hardware:** 110 lbs/pr
Track Bolt:	1” X 6”

Area in^2: 11.65

Section Modulus in^3:

Head: 19.4

Base: 22.9

Moment of Inertia in^4: 71.4

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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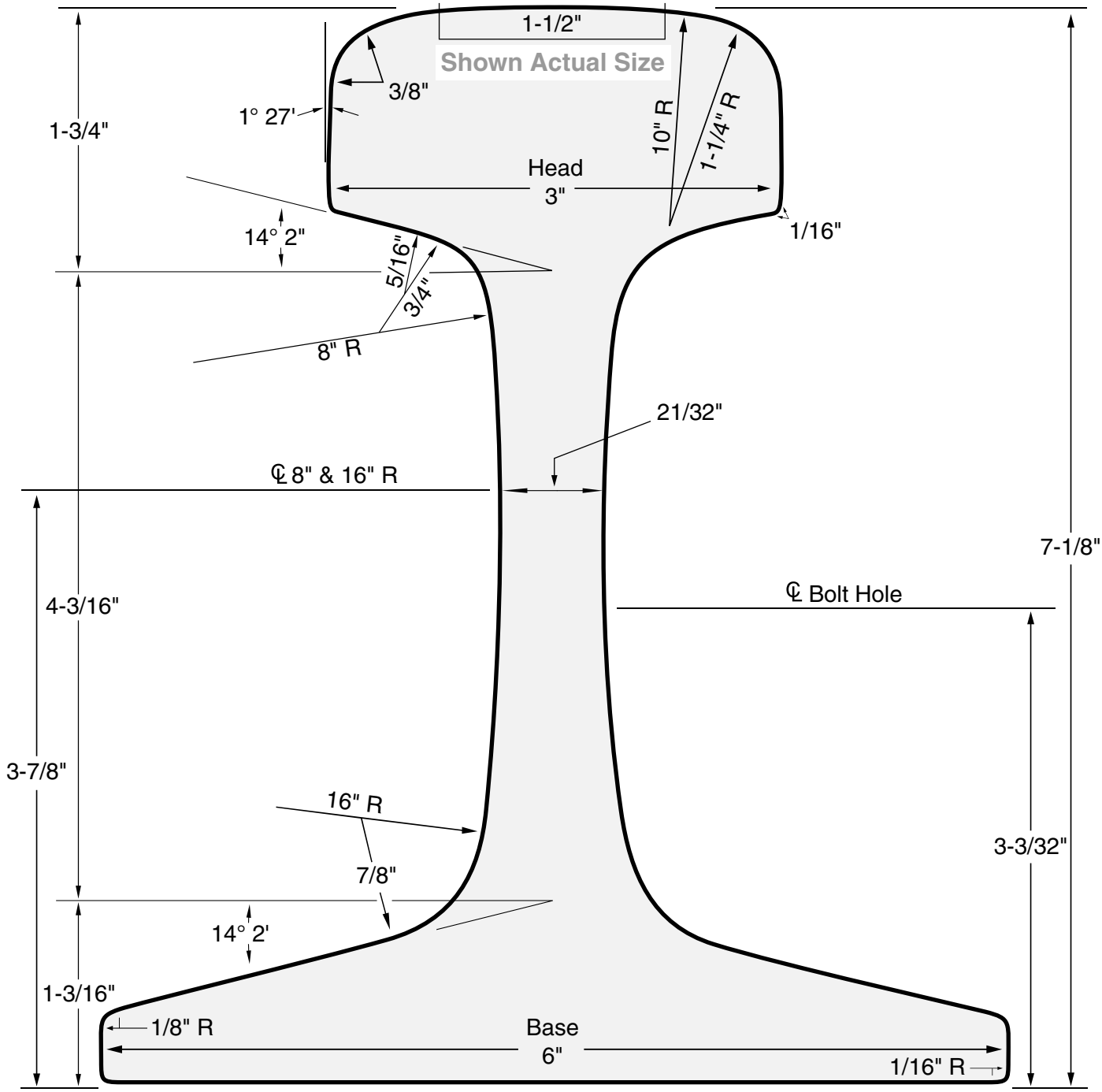
132–lb. AREMA



Rail Type:	132 RE
Section Number:	13225
Nominal Weight:	132 lbs/yd
Standard Length:	39’
Standard Drilling:	3-1/2” X 6” or 3-1/2” X 6” X 6” with 1-1/4” dia. holes
Joint Bar Length:	24” or 36”
Joint Bar Weight:	**4-Hole bars:** 70 lbs/pr **with hardware:** 79 lbs/pr **6-Hole bars:** 117 lbs/pr **with hardware:** 130 lbs/pr
Track Bolt:	1” X 6”

Area in^2: 12.95

Section Modulus in^3:

Head: 22.5

Base: 27.6

Moment of Inertia in^4: 88.2

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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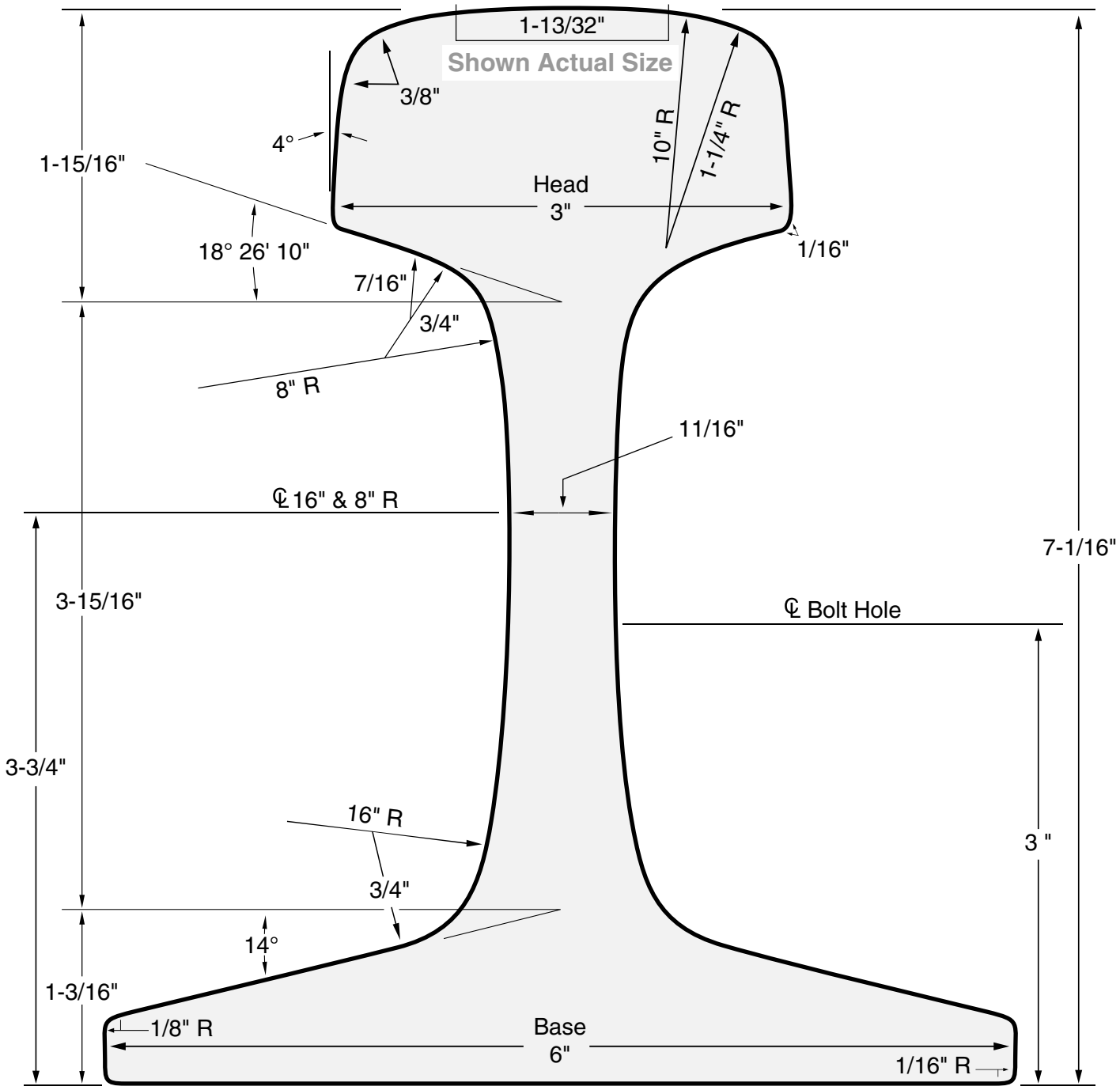
133–lb. AREMA



Rail Type:	133 RE
Section Number:	13325
Nominal Weight:	133 lbs/yd
Standard Length:	39’
Standard Drilling:	3-1/2” X 6” X 6” with 1-1/4” dia. holes
Joint Bar Length:	38”
Joint Bar Weight:	117 lbs/pr **with hardware:** 130 lbs/pr
Track Bolt:	1” X 6”

Area in^2: 13.10
Section Modulus in^3:
Head: 22.3
Base: 26.9
Moment of Inertia in^4: 86.3

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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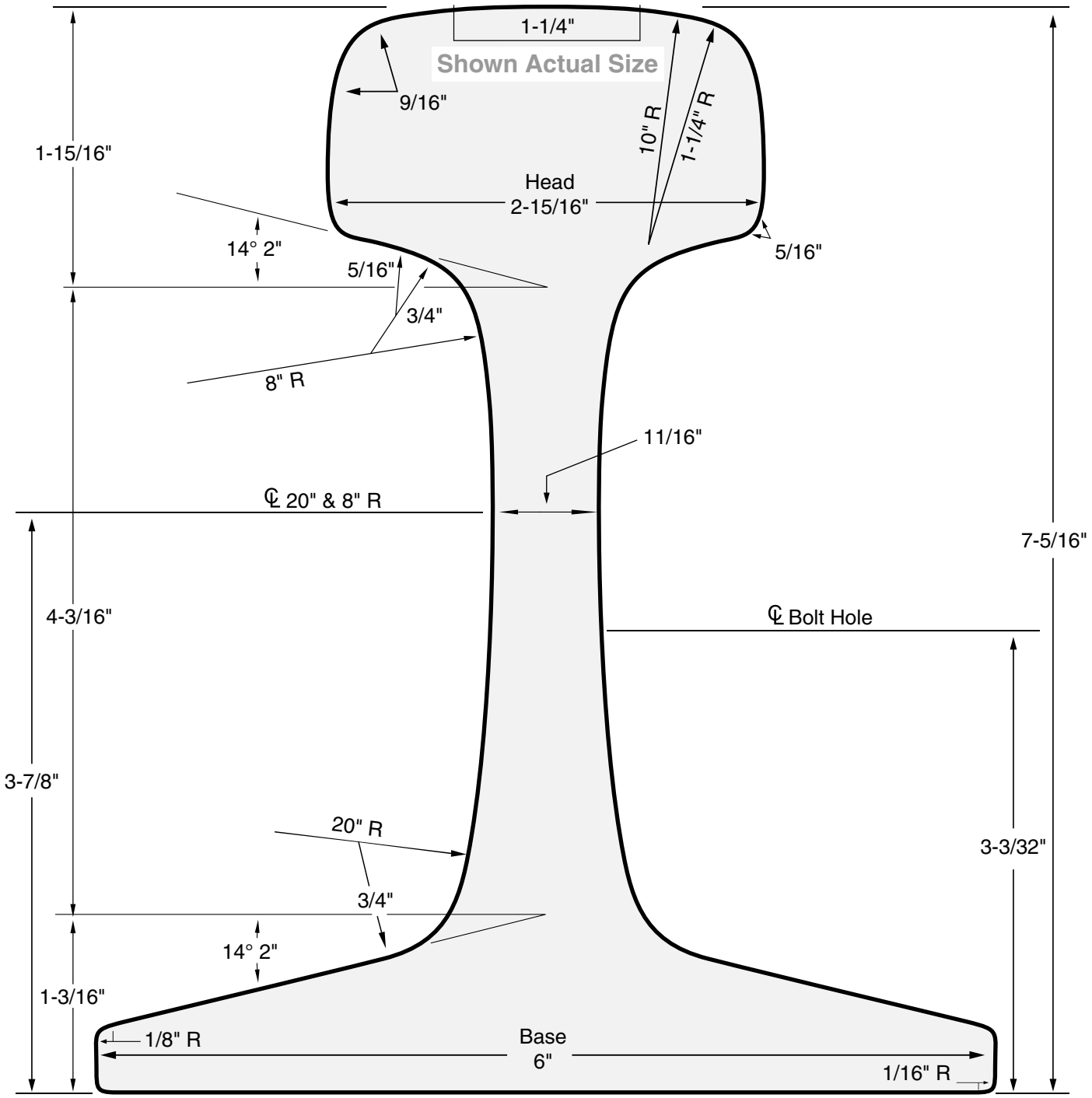
136–lb. AREMA



Rail Type:	136 RE
Section Number:	13625
Nominal Weight:	136 lbs/yd
Standard Length:	39', 80'
Standard Drilling:	3-1/2" X 6" or 3-1/2" X 6" X 6" with 1-1/4" dia. holes
Joint Bar Length:	24" or 36"
Joint Bar Weight:	**4-Hole bars:** 70 lbs/pr **with hardware:** 79 lbs/pr **6-Hole bars:** 117 lbs/pr **with hardware:** 130 lbs/pr
Track Bolt:	1" X 6"

Area in^2: 13.32

Section Modulus in^3:

Head: 23.78

Base: 28.3

Moment of Inertia in^4: 93.7

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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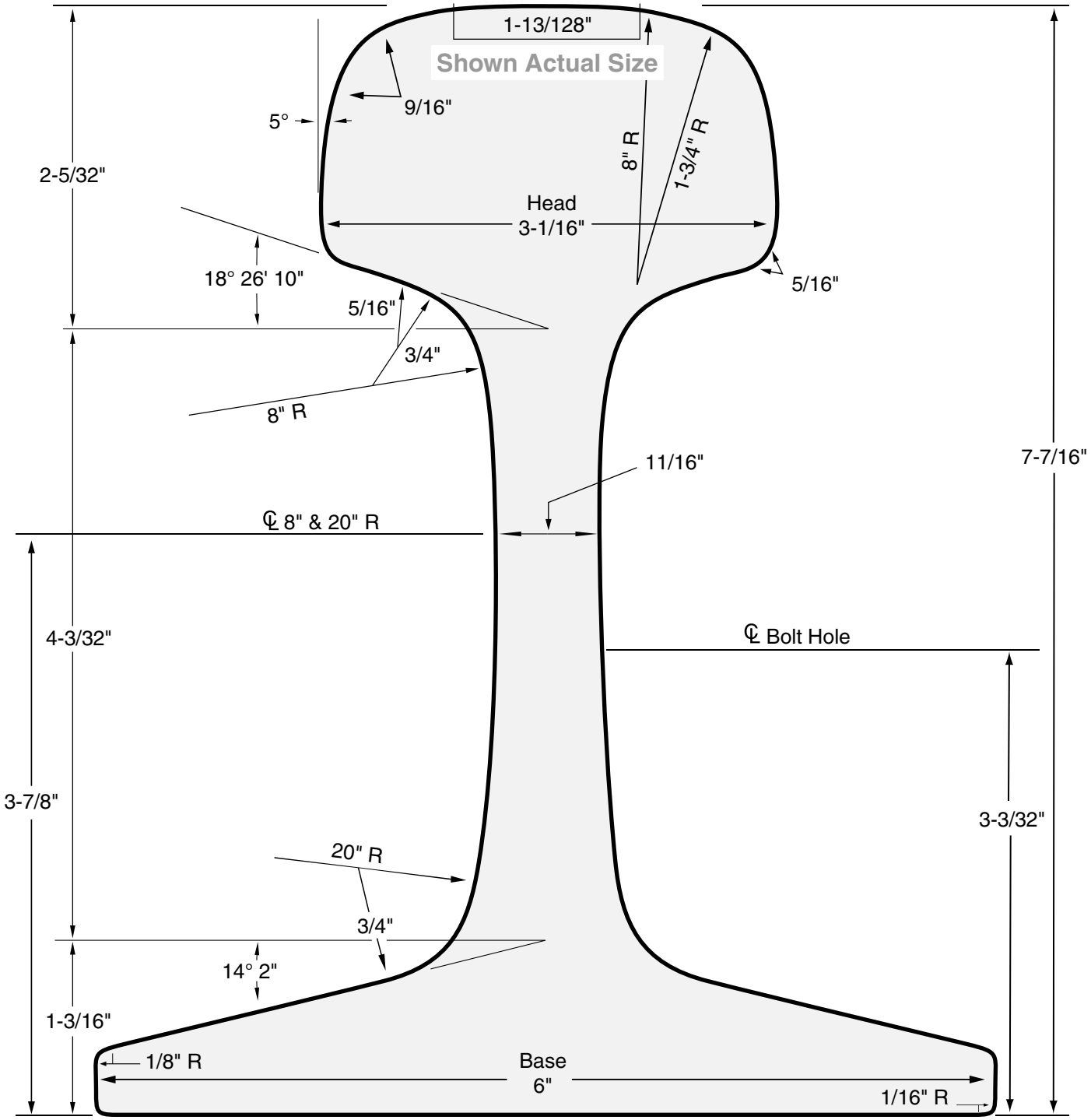
141–lb. AREMA



Rail Type:	141 RE
Section Number:	14128
Nominal Weight:	141 lbs/yd
Standard Length:	39', 80'
Standard Drilling:	3-1/2" X 6" or 3-1/2" X 6" X 6" with 1-1/4" dia. holes
Joint Bar Length:	24" or 36"
Joint Bar Weight:	**4-Hole bars:** 70 lbs/pr **with hardware:** 79 lbs/pr **6-Hole bars:** 117 lbs/pr **with hardware:** 130 lbs/pr
Track Bolt:	1" X 6"

Area in^2: 13.80

Section Modulus in^3:

Head: 25.24

Base: 28.97

Moment of Inertia in^4: 100.44

BOLT SIZE MAY VARY DEPENDING ON BAR MANUFACTURE & TYPE OF WASHER USED.

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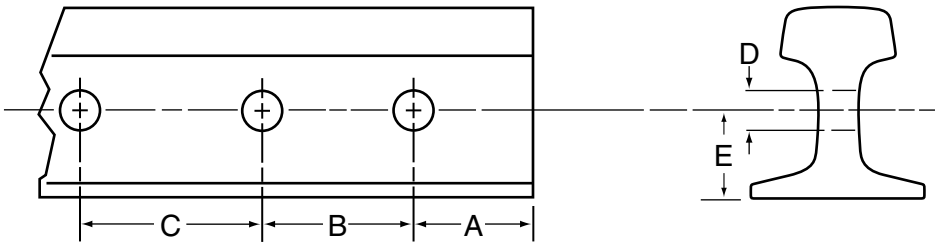
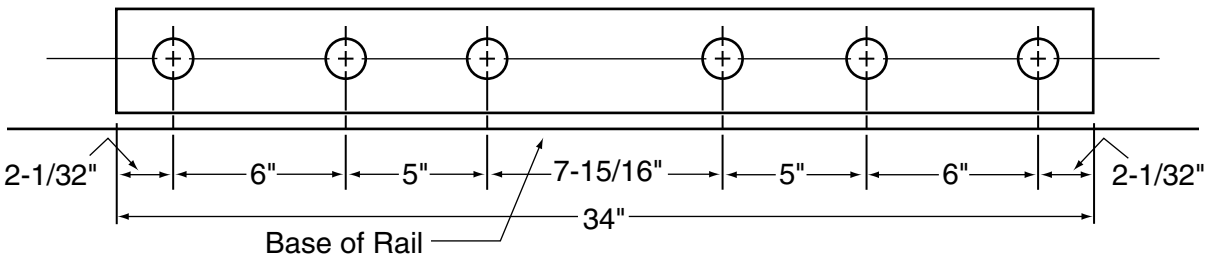
AMERICAN CRANE RAILS

This section covers carbon steel crane rails of special designs and nominal weights of 104, 105, 135, 171, and 175 lbs. per yard for crane runway use. All of these rail sections are manufactured to ASTM A-759 specifications. Standard Control Cooled crane rails have a Brinell hardness of 250 to 280. As a supplement to the normal manufacturing process, crane rails can be head-hardened to a hardness of 321 to 388 Brinell. Crane rails are usually stocked in standard 39' lengths and are pre-drilled for tight-fit joint bars (see below). However, they are also available in 60' or 78' lengths and can be supplied with “blank ends” (no splice bar holes) for welding.

The standard drilling on the five crane rail sections is 4" X 5" x 6" with hole diameter and elevation as shown in the table below. The joint bars are punched on corresponding centers, except for the spacing between the two middle holes. The actual distance between these two holes is 7-15/16", or 1/16" less than the accumulated length (8") of the two rail ends to be covered by this portion of the joint bar. This allows the rail ends to be held firmly together, resulting in a “tight joint.” Because of cumulative tolerance variations in holes, bolt diameters, and rail ends, a slight gap may sometimes occur in the so-called tight joints. Conversely, it may sometimes be necessary to ream holes through joint bar and rail to permit entry of bolts.

Crane Rail Section	Spacing Inches			Hole Dia.	Elev. Inches
	A	B	C	D	E
104 lb.	4	5	6	1-1/16	2-7/16
105 lb.	4	5	6	15/16	2-13/64
135 lb.	4	5	6	1-3/16	2-15/32
171 lb.	4	5	6	1-3/16	2-5/8
175 lb.	4	5	6	1-3/16	2-21/32





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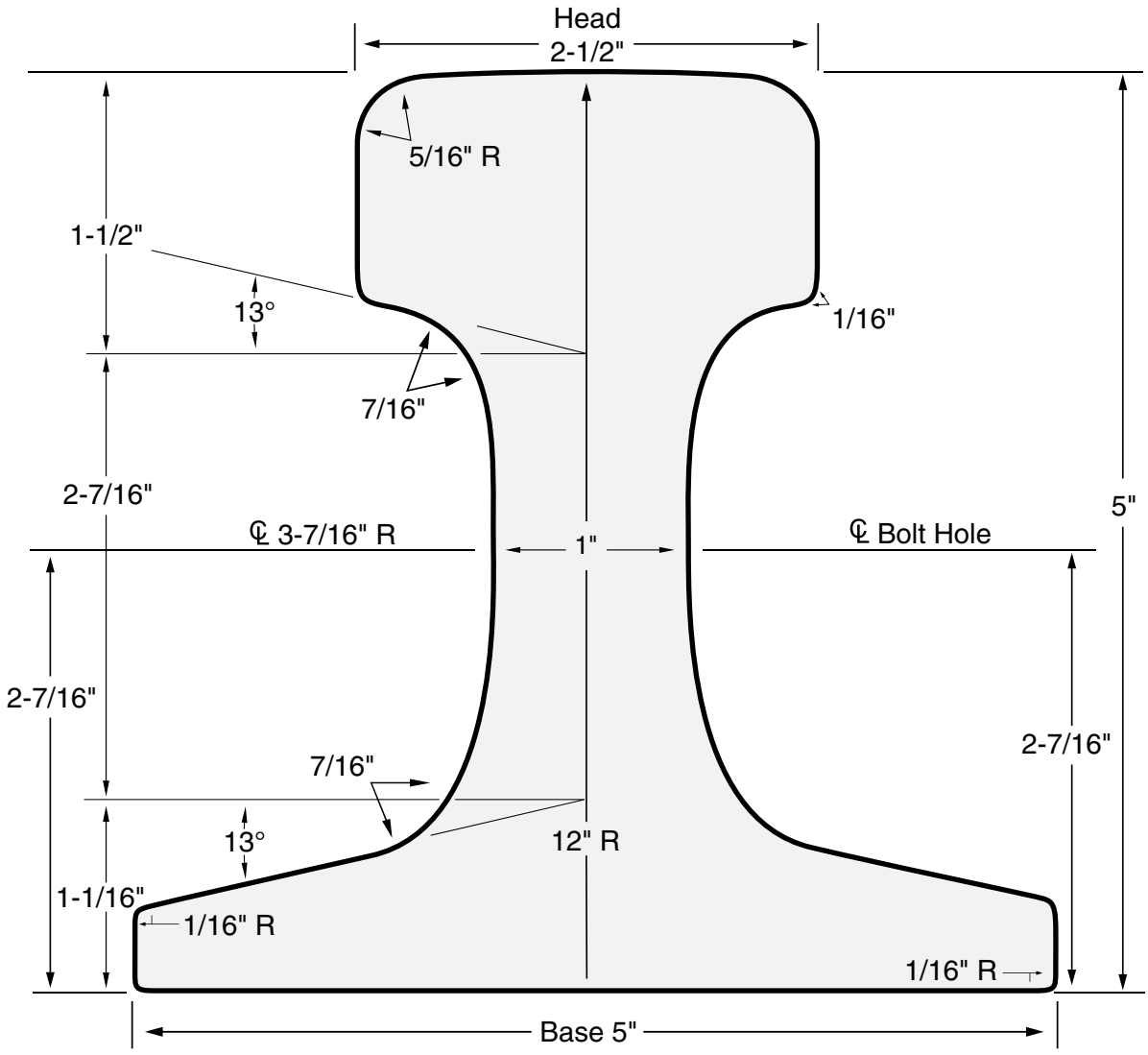
104–lb. CRANE RAIL

Shown Actual Size



Rail Type:	104 CR
Nominal Weight:	104 lbs/yd
Standard Length:	39'
Standard Drilling:	4" X 5" X 6" with 1-1/16" dia. holes
Splice Bar Length:	34"
Splice Bar Weight:	52 lbs/pr **with hardware:** 64 lbs/pr
A325 Hex Bolt:	1" X 5-1/2"

Area in^2: 10.287

Section Modulus in^3:
Head: 10.691
Base: 13.512

Moment of Inertia in^4: 29.843

TOE OF ANGLE BAR CAN BE CUT OFF (FORMING A SPLICE BAR) IF DESIRED

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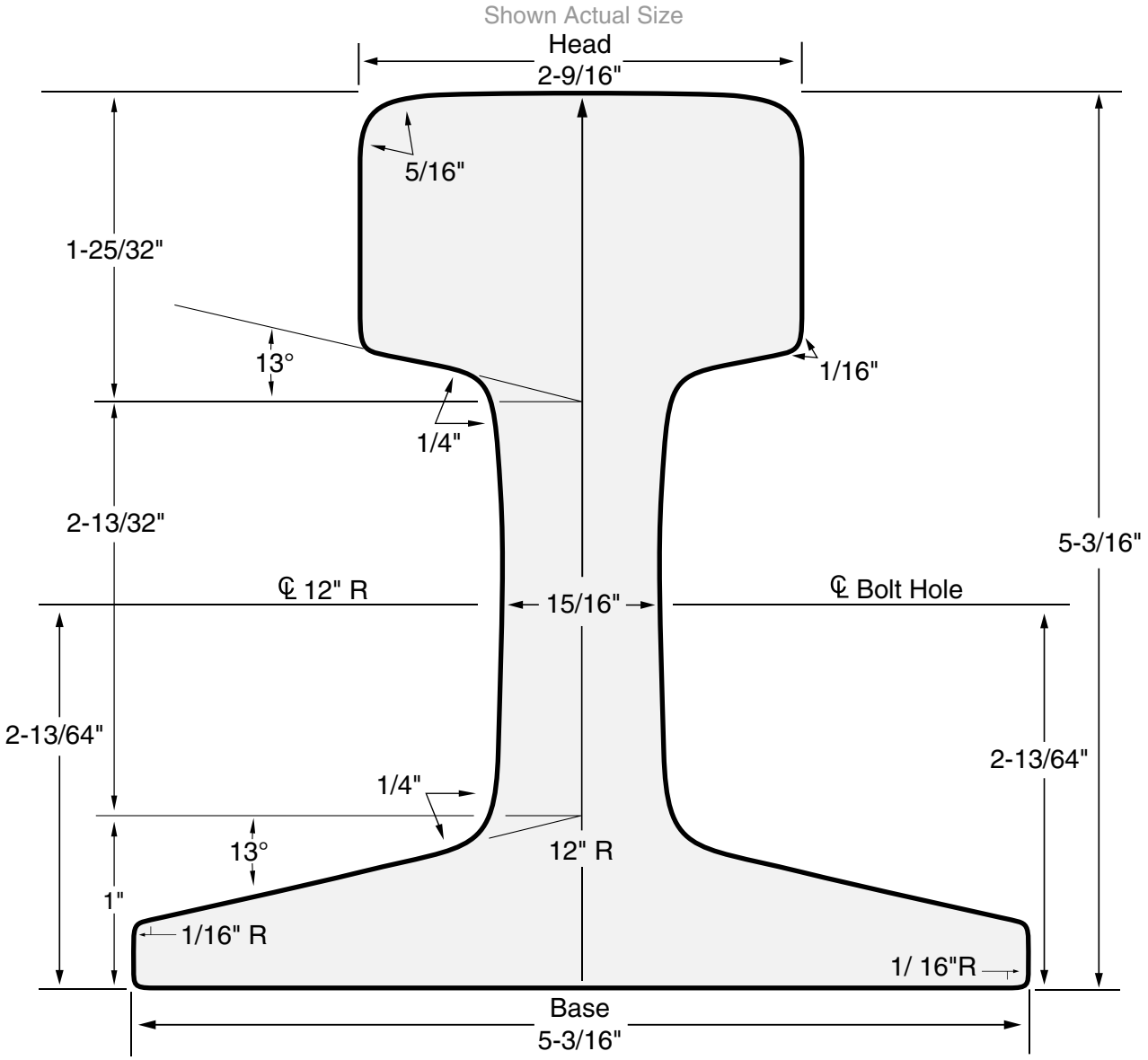
105–lb. CRANE RAIL



Rail Type:	105 CR
Nominal Weight:	105 lbs/yd
Standard Length:	39'
Standard Drilling:	4" X 5" X 6" with 15/16" dia. holes
Splice Bar Length:	34"
Splice Bar Weight:	52 lbs/pr **with hardware:** 61 lbs/pr
A325 Hex Bolt:	7/8" X 5"

Area in^2: 10.3
Section Modulus in^3:
Head: 12.39
Base: 14.28
Moment of Inertia in^4: 34.41

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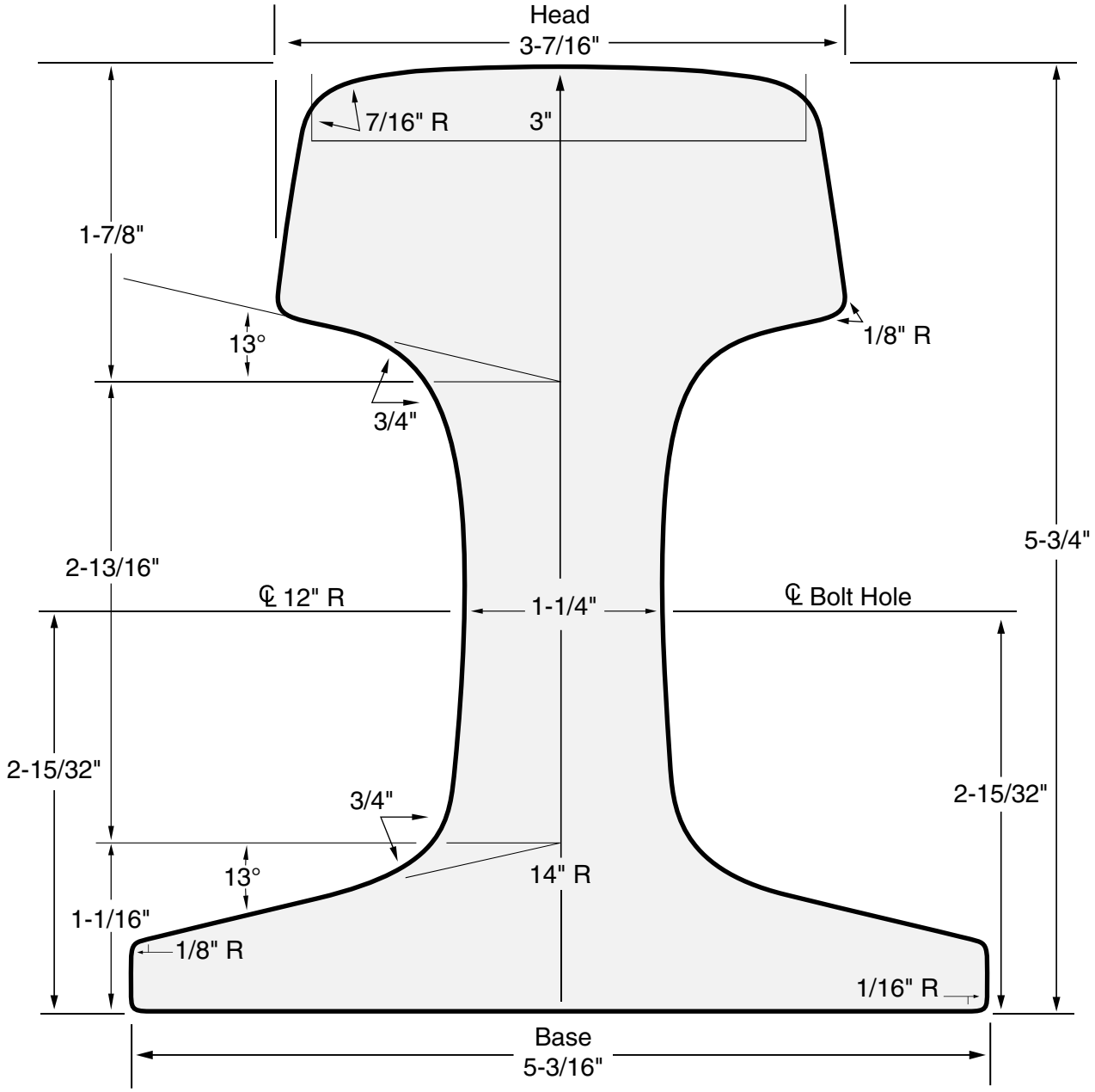
135–lb. CRANE RAIL

Shown Actual Size



Rail Type:	135 CR
Nominal Weight:	135 lbs/yd
Standard Length:	39'
Standard Drilling:	4" X 5" X 6" with 1-3/16" dia. holes
Splice Bar Length:	34"
Splice Bar Weight:	62 lbs/pr **with hardware:** 78 lbs/pr
A325 Hex Bolt:	1-1/8" X 5-1/2"

Area in^2: 13.32

Section Modulus in^3:

Head: 17.2

Base: 18.02

Moment of Inertia in^4: 50.59

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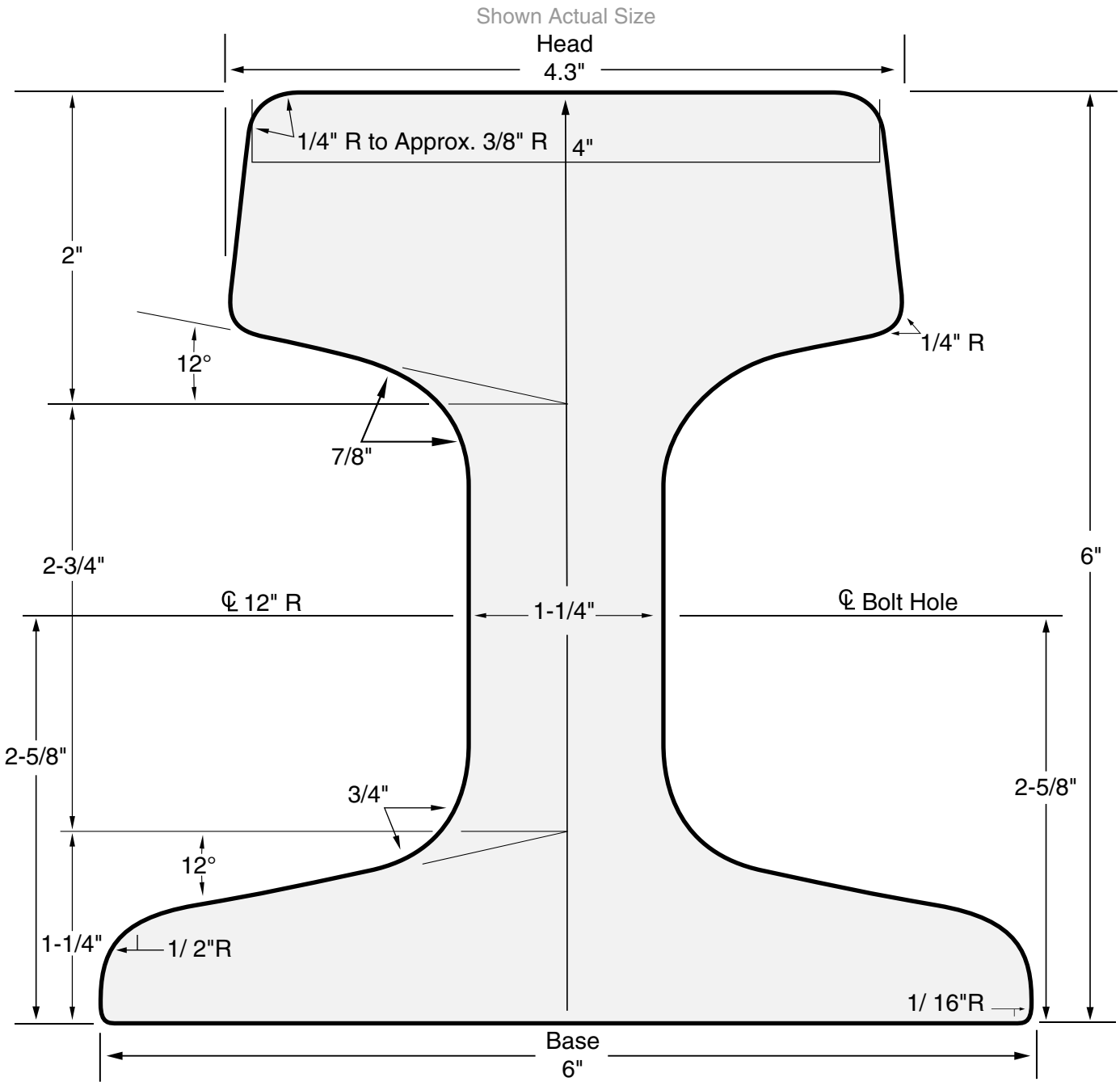
171–lb. CRANE RAIL



Rail Type:	171 CR
Nominal Weight:	171 lbs/yd
Standard Length:	39'
Standard Drilling:	4" X 5" X 6" with 1-3/16" dia. holes
Splice Bar Length:	34"
Splice Bar Weight:	62 lbs/pr **with hardware:** 78 lbs/pr
A325 Hex Bolt:	1-1/8" X 6-1/2"

Area in^2: 16.811

Section Modulus in^3:

Head: 24.51

Base: 24.42

Moment of Inertia in^4: 73.398

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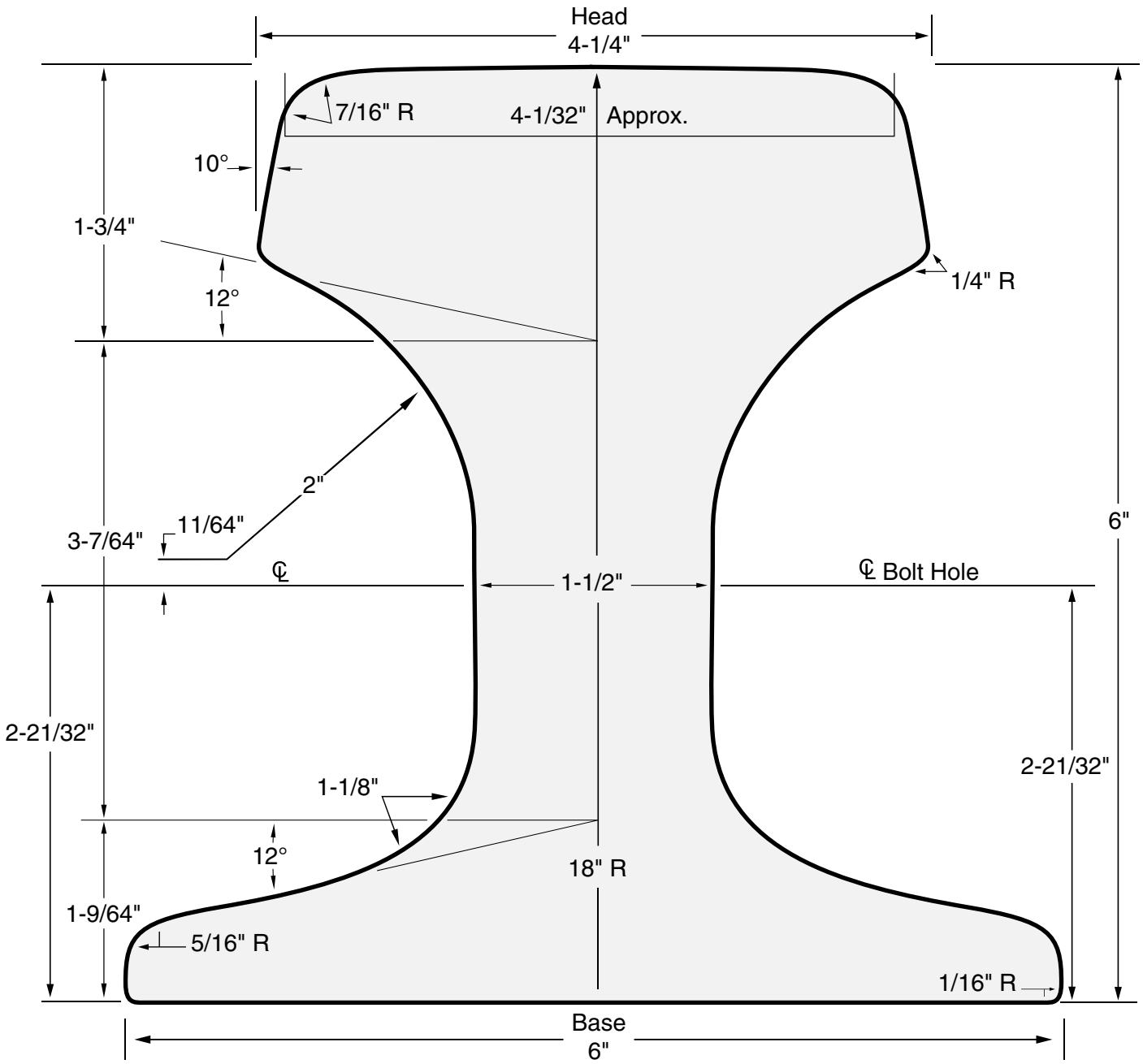
175–lb. CRANE RAIL

Shown Actual Size



Rail Type:	175 CR
Nominal Weight:	175 lbs/yd
Standard Length:	39'
Standard Drilling:	4" X 5" X 6" with 1-3/16" dia. holes
Splice Bar Length:	34"
Splice Bar Weight:	72 lbs/pr **with hardware:** 89 lbs/pr
A325 Hex Bolt:	1-1/8" X 6-1/2"

Area in^2: 17.12

Section Modulus in^3:

Head: 23.53

Base: 23.28

Moment of Inertia in^4: 70.22

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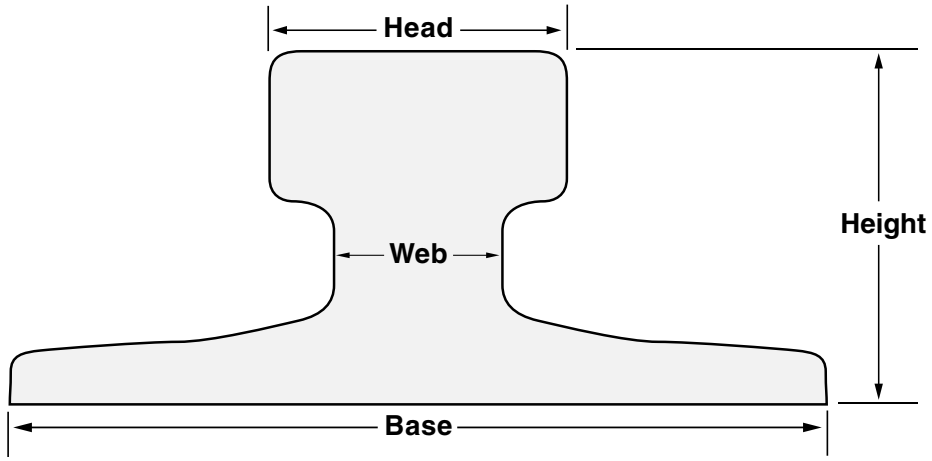
EUROPEAN CRANE RAIL

European Crane Rails have a very wide base, low center of gravity and thick web. This makes them ideal for supporting strong lateral forces. They are available in various section profiles from A45 to A150. The number refers to the width of the head in millimeters. Thus an A150 crane rail has a head width of 150 millimeters. These crane rails are manufactured in accordance with European technical specification DIN 536 and are available in three grades. The standard grade, S700, is the one most commonly ordered, but two higher grades are also available. See table below for minimum tensile strength for each grade. The strength and hardness of the S1100 grade is achieved by using a chrome-vanadium alloy steel.



Tensile Strength:	S700 Grade	690 N/mm^2	202 BHN
	S900A Grade	880 N/mm^2	261 BHN
	S1100 Grade	1080 N/mm^2	320 BHN
Standard Lengths:	10 Meters 12 Meters (most common) 15 Meters		
Rails are supplied with blank ends (no holes). All joints must be welded.			

Section	Weight		Head		Height		Base		Web		Area	Moment of Inertia	Section Modulus	
													Head	Base
	kg/m	lbs/yd	mm	inch	mm	inch	mm	inch	mm	inch	cm^2	cm^4	cm^3	cm^3
A45	22.10	44.55	45.00	1.77	55.00	2.17	125.00	4.92	24.00	0.94	28.20	90.00	41.50	27.00
A55	31.80	64.11	55.00	2.17	65.00	2.56	150.00	5.91	31.00	1.22	40.50	178.00	68.80	45.60
A65	43.10	86.88	65.00	2.56	75.00	2.95	175.00	6.89	38.00	1.50	54.90	319.00	105.40	71.30
A75	56.20	113.29	75.00	2.95	85.00	3.35	200.00	7.87	45.00	1.77	71.60	531.00	153.60	105.30
A100	74.30	149.78	100.00	3.94	95.00	3.74	200.00	7.87	60.00	2.36	94.70	856.00	203.40	161.80
A120	100.00	201.59	120.00	4.72	105.00	4.13	220.00	8.66	72.00	2.83	127.40	1361.00	289.10	235.00
A150	150.30	302.99	150.00	5.91	150.00	5.91	220.00	8.66	80.00	3.15	191.40	4373.00	601.50	565.70

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WEIGHT AND MEASURE CONVERSION TABLE

Weight		
1 Net Ton (NT)	=	2,000 lbs.
1 Gross Ton (GT)	=	2,240 lbs.
1 Metric Ton (MT)	=	2,204.6 lbs.
1 Metric Ton	=	1,000 kilograms
1 Kilogram	=	2.2046 lbs.
1 Pound	=	0.4536 kilograms

Linear Measure		
1 mil	=	0.001 inch
1 inch	=	1000 mils
12 inches	=	1 foot
3 feet	=	1 yard
5,280 feet	=	1 mile
1,760 yards	=	1 mile

Metric and English Conversion Table
Linear Measure

1 kilometer	=	0.6214 mile	1 mile	=	1.609 kilometer
1 meter	=	39.37 inches	1 yard	=	0.9144 meter
1 meter	=	3.2808 feet	1 foot	=	0.3048 meter
1 meter	=	1.0936 yard	1 foot	=	304.8 millimeters
1 centimeter	=	0.3937 inch	1 inch	=	2.54 centimeters
1 millimeter	=	0.03937 inch	1 inch	=	25.4 millimeters

Board Foot Calculator

1 Board Foot = a piece of wood that is 1" thick and 1' long and 1' wide.

Board Feet of railroad ties can be calculated as follows: (H x D x L)/12 where H and D are the height and depth in inches and L is the length in feet. Board Measure for 7" x 9" ties is as follows:

7" x 9" x 8'6" = 44.625 bf	7" x 9" x 13' = 68.25 bf
7" x 9" x 9' = 47.25 bf	7" x 9" x 14' = 73.50 bf
7" x 9" x 10' = 52.50 bf	7" x 9" x 15' = 78.75 bf
7" x 9" x 11' = 57.75 bf	7" x 9" x 16' = 84.00 bf
7" x 9" x 12' = 63.00 bf	7" x 9" x 17' = 89.25 bf

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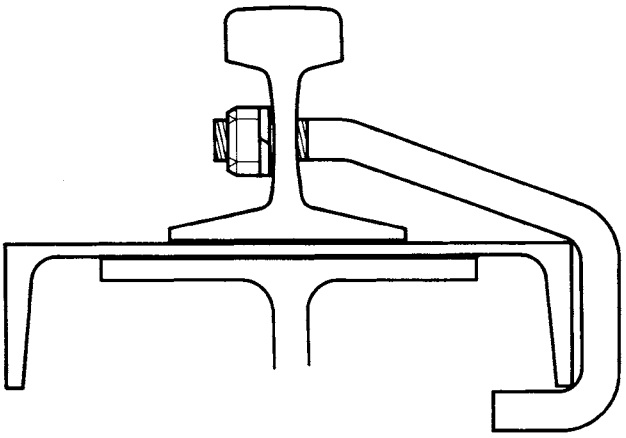
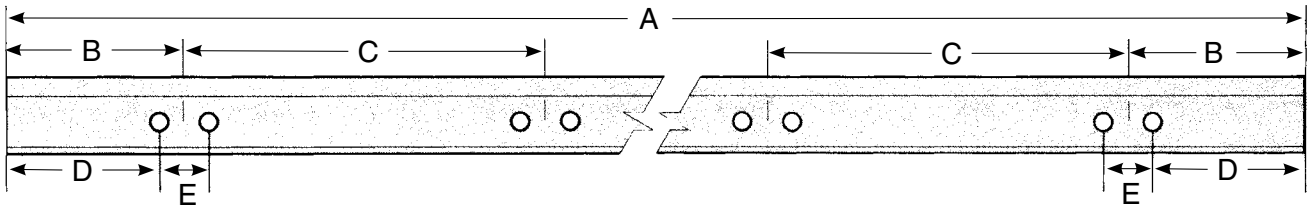
HOOK BOLTS



Hook bolts are very commonly used to attach lighter rails (usually up to 85 lbs.) to channels (as shown at left) or directly onto a crane rail beam. They are usually threaded to allow up to one half inch lateral adjustment in either direction, and come complete with hex nuts and lockwashers. When ordering, specify rail section, bolt diameter, and the size and weight of supporting beam or channel.

Hook bolts are typically drilled in pairs four inches apart every two feet. Unless otherwise specified, we drill these holes 1/8 inch larger than the diameter of the hook bolt, and the spacing will be as shown in the table below. Typically the hook bolts are the same diameter as that used for the splice bars. (Hole elevation is the same as for splice bar holes.)



Remaining holes on 24" centers

Hook Bolt Spacing *						
Rail Weight	**A**	**B**	**C**	**D**	**E**	**No. holes per rail**
12 lb to 60 lb	20'	14"	22"	12"	4"	20
12 lb to 60 lb	30'	14"	22"	12"	4"	30
25 lb to 60 lb	40'	14"	22"	12"	4"	40
60 lb to 80 lb	33'	18"	24"	16"	4"	32
80 lb to 85 lb	39'	18"	24"	16"	4"	38

*See pages I-5 thru I-12 for rail end drilling.

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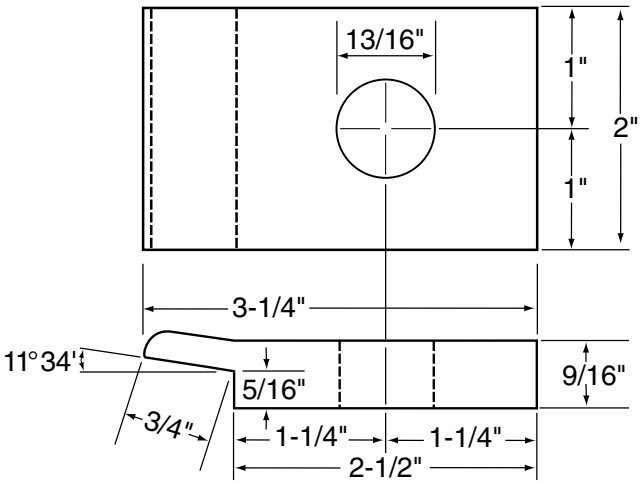
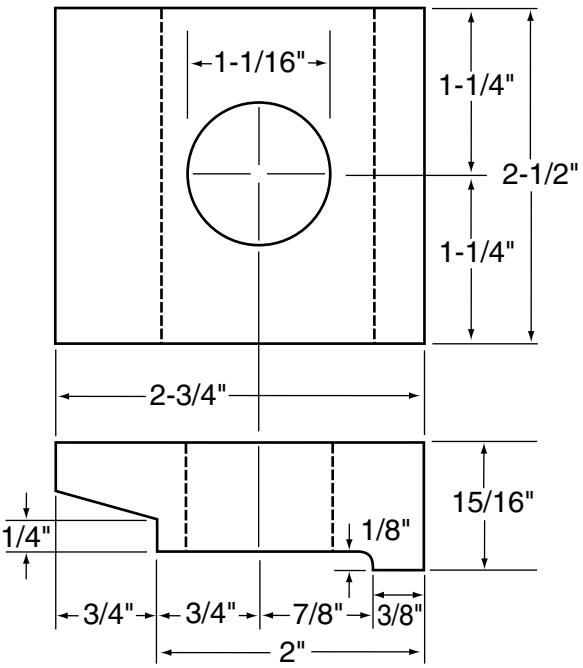
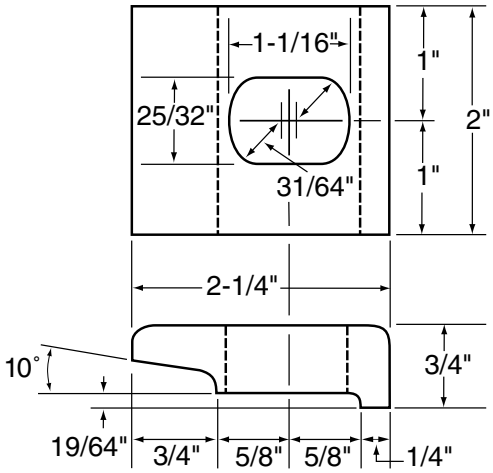
ONE-PIECE RAIL CLIPS



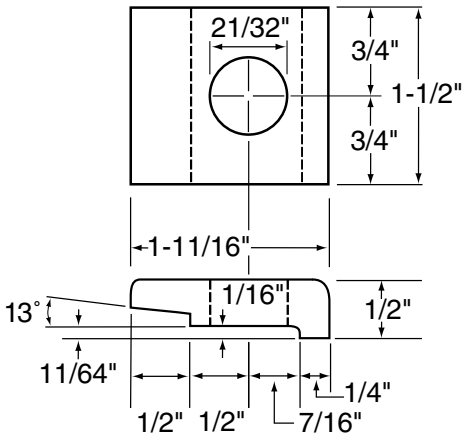
No. 120 Weight - .91 lbs.
For all sections 25 to 40 lb.



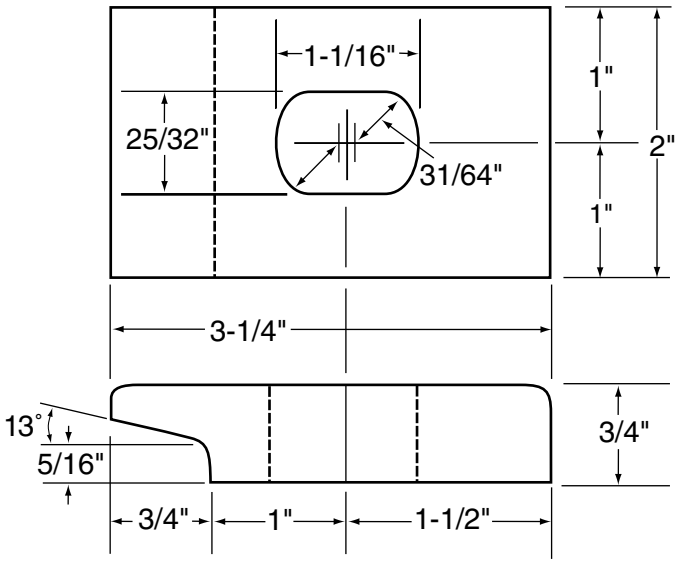
No. 62 Weight - 1.20 lbs.
For Crane rail sections 104, 105 & 135 Tee rail sections 90 - 136 lb.



No. 103 Weight - .60 lbs.
For all sections 40 - 100 lb.



No. 114 Weight - .23 lbs.
For all section 12 to 40 lb.



No. 106 Weight - 1.06 lbs.
For all sections 60 - 90 lb.

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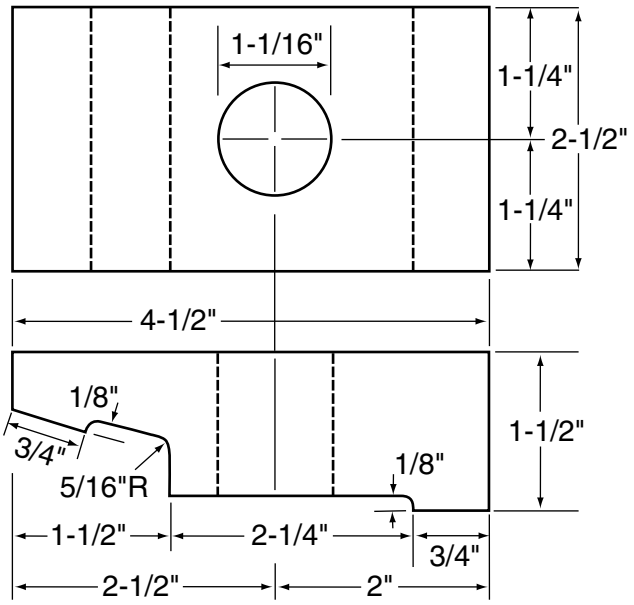
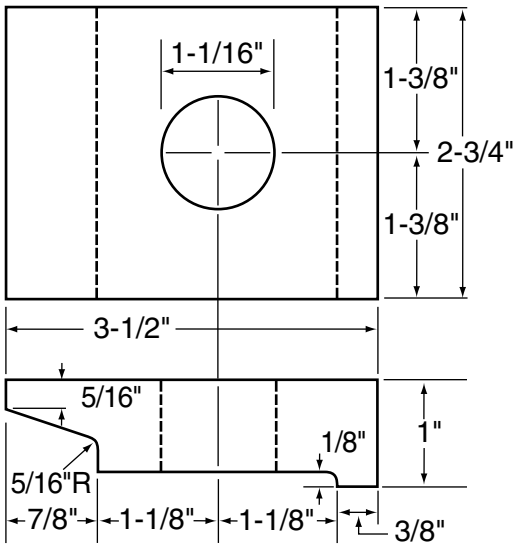
ONE-PIECE RAIL CLIPS, CRANE STOPS



No. 171 Weight - 3.60 lbs.
For 171 lb. Crane rail.

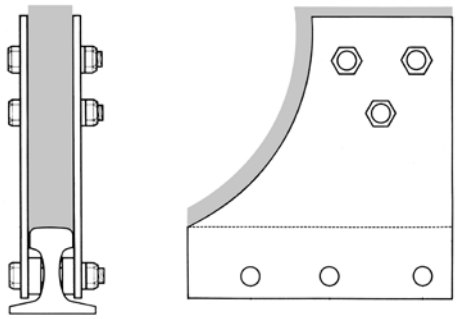


No. 175 Weight - 2.19 lbs.
For 175 lb. Crane rail.

Crane Stops

This **Heavy-Duty Crane Stop** is for use on all rail sizes (up to and including 175-lb.) and especially where large cranes are operating. It is fabricated to necessary height and contour to correspond with the wheel diameter of the crane. Specify rail size and wheel diameter when ordering.

Several other types of crane stops are also available. Lighter duty stops, and stops designed to contact a bumper mounted on the crane are two varieties commonly requested.



Cushion-Slide Crane Stops

Drag plates allow wedge to slide some distance to absorb impact. On smaller sizes of rail, plates may interfere with rail hook bolts. Allow sufficient sliding distance between cranes. Stopping distance depends on weight and speed of crane. Do not use at end of crane run.

Wheel Contact Type
Wedges are made for a specific wheel diameter. Plates are cut to fit a specific rail size and section.

Bumper Contact Type
Fits most standard crane bumpers. Wedge stands 15" above top of rail. Underside of crane bumpers should be no more that 12" above top of rail. Plates are cut to fit a specific rail size and section.

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SOFT-MOUNT CRANE RAIL SYSTEMS

Introduction

The ever growing demands by industry for increased automation and higher plant output rates resulted in the development of generation after generation of higher speed, heavier duty modern bridge cranes. While mechanical engineers concentrated their efforts on designing bigger and more efficient cranes, structural engineers maintained an equivalent pace in improving crane girder, support structure and foundation designs. Between these two fields of expertise lies the crane rail, which represents the hinge point of the installation. Traditional rail mounting methods have, in general, not kept pace with the ever increasing demands made on them.

The result can be that this relatively inexpensive area, in terms of initial outlay and design, can cause considerable operating expenses that manifest themselves in the short term by high wear rates in wheels, bearings, axles and rail breakage, with the associated down time, maintenance cost and high noise levels.

In the longer term, the impact and vibration transmitted to the girder structure and foundations can result in structural damage and possible girder failure due to excessive fatigue stressing.

Fatigue

The area of contact between a steel rail and the top flange of a crane girder can be as little as one percent of the projected area of the rail. Since both the rail and girder are stiff in compression, even heavy wheel loads will not substantially increase the contact area, and very large local stresses result. To compound this problem, these contact points are randomly distributed, leading to complex and indeterminate stress patterns in the supporting girder. Continuous movement and shock loads produced by the operations of the crane can and usually do result in fatigue and consequent damage to both the crane rail and the girder. The most common manifestation is cracking in the upper portion of the web.

Where rails are mounted on concrete, a similar rationale applies with resulting progressive disintegration of the concrete and loosening of the anchor bolts.

Crane Rail Mounting

Soft mounting crane rail systems have developed over 35 years in an effort to reduce the all too frequent problems associated with crane rail installations. Today's line of mounting pads and clips are sophisticated, proven and easy to install. They result in reduced mechanical wear, lower impact due to shock loading, less vibration and a quieter installation. These systems consist of steel reinforced, vulcanized, synthetic rubber pads and resilient clips designed specifically for the mounting of crane rails in light, medium or heavy duty applications.

Pads protect the installation by:

- Distributing and recentering the load
- Eliminating point contact
- Reducing impact, vibration and noise
- Absorbing relative motion between rail and girder
- Eliminating fretting of the top girder flange

Clips complement the pad by:

- Ensuring continuous and permanent contact between the rail, pad, and girder at all times
- Constraining the rail in the vertical and lateral planes while allowing controlled movement in the axial direction
- Allowing lateral adjustment during and after installation
- Performing consistently over many years without maintenance, loosening of the anchor bolts, or fatigue failure

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SOFT-MOUNT CRANE RAIL SYSTEM CLIPS

Soft-mount clips are specifically designed for the mounting of crane rails, with or without pad. Clips consist of two interacting components which allow easy lateral rail adjustment and, once correctly installed, are self-locking and self-tightening. A controlled vertical force is applied to the rail base through a synthetic rubber “nose,” which is vulcanized bonded to the appropriate clip component.

Technical Advantages of Soft–Mount Rail Clips

- Simple and positive lateral rail adjustment up to 3/4" (20mm), depending on type of clips
- Very high resistance to lateral loads through careful selection of clip component materials
- Controlled vertical force applied to rail and girder tolerances
- Accommodates rail and girder tolerances
- Eliminates fatigue effects on bolt (or stud)
- Minimizes crane runway maintenance and down time
- Ensures contact between rail and pad under the rail
- Controls axial movement of broken rail
- Eliminates loosening of bolts
- Reduces noise and vibration

Weldable Crane Rail Clips

Technical Advantages of Weldable Rail Clips:

- Simple and positive lateral rail adjustment up to 3/4" (20mm), depending on type of clips
- Self-locking and self-tightening features through system of double wedging action

Boltable (or Stud Mount) Crane Rail Clips

Technical Advantages of Boltable (or Stud Mount) Rail Clips:

- Simple and positive lateral rail adjustment up to 3/4" (20mm), depending on type of clips
- Cam adjustment is self-locking
- The true cam design ensures that the force is transmitted to the fastener (bolt or stud) in the most efficient means possible and is completely independent of friction.

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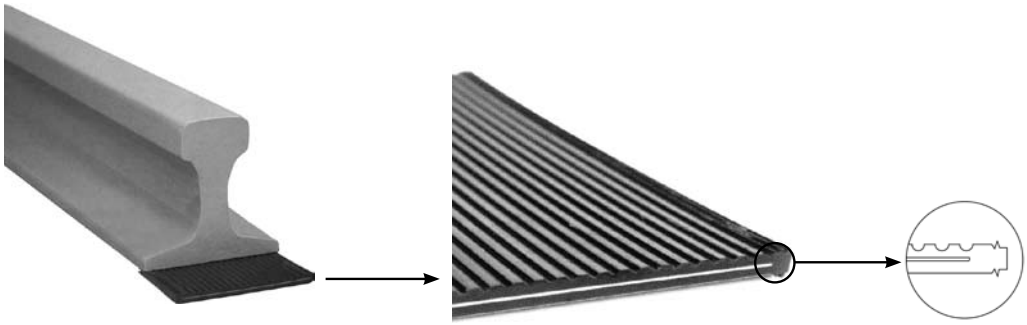
CRANE RAIL PADS, GIRDER TIE-BACK LINKAGES

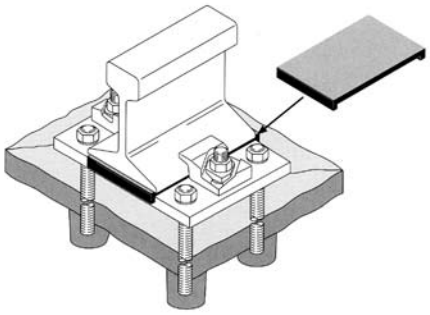


Heavy Duty Rail Applications

The heavy duty pad has been specifically designed for the soft mounting of crane rails. It is manufactured from a synthetic elastomer especially resistant to wear, shear and crushing as well as oil, grease, ozone, and ultraviolet rays. Its upper face is grooved in order to obtain a variable stiffness. This increases the pad's resistance to wear without introducing excessive bending in the rail. It is reinforced with a high strength steel strip and fully vulcanized to the rubber. The reinforcement acts as a diaphragm and gives the pad lateral stiffness, preventing it from deflecting under the side thrust of the rail, regardless of wheel load and loss of friction from oil or grease. Edge seals on both the top and bottom surfaces prevent the ingress of dirt and water which can cause premature failure of the pad, rail and support structure.

Features include:

- Distribute the wheel load over a larger surface area
- Eliminate load concentration and the resulting fatigue stresses
- Compensate for the uneven surface between the rail and its support
- Reduce impact, vibration, and noise
- Eliminate fretting corrosion (wear) of the support surface under the rail

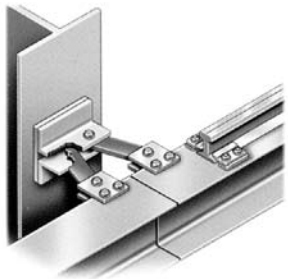


Discontinuous Rail Support

The discontinuous rail pad is specifically developed to overcome the problems associated with discontinuous rail support. The pad is available to suit all rails and is designed to be used on a steel soleplate with shim packs or grout.

- Crowned construction centers load on pedestal and eliminate edge load on concrete pedestals
- Molded end-stops prevent longitudinal creep
- Elastomer construction reduces shock and vibration, noise, and local bearing stress on concrete

A common area of failure with active crane runways is the crane girder to building column connection.



Girder Tie-Back Linkage

The Tie-Back System is designed to provide a proven solution to this problem. Some of the most important characteristics are:

- Spherical bearings allow girder end rotation, longitudinal and vertical movement without stressing the tieback linkage.
- A single linkage can transmit up to a 165 kip side thrust in tension or compression.
- Sizes are available to fit any girder and column configuration.
- The tie-back linkage assembly eliminates diaphragms and the associated maintenance from cracking.
- Designed to suit any application.

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APPLICATION DATA SHEET

Company _____ **Contact** _____ **Phone** _____

Address _____ **Fax** _____

Project Name _____ **Email** _____

Please supply the information requested below:

Soft-Mount Crane Rail Fastening System

Type of Industry & Application _____

❑ New runway ❑ Existing runway Existing fastening system _____

Runway: ❑ Inside ❑ Outside Length _____
❑ Concrete Supported ❑ Overhead Girder Width of Girder or Support _____
❑ Continous Support ❑ Discontinous Support

Environment: ❑ Damp ❑ Corrosive ❑ Excess of oil, grease
❑ Marine ❑ Acid Vapors ❑ Other _____

Ambient temperature range _____

Design of Structure: If possible, please supply crane runway structural or concrete beam drawing.

Crane: Crane capacity _____ Crane span _____
Number of cranes per track _____ Gantry speed _____
Maximum lift _____ Total weight of crane _____
Wheel drive design _____
Number of wheels per corner _____ Wheel diameter _____
Wheel center distance _____ See drawing No. _____
Wheel tread: ❑ Tapered ❑ Flat
Maximum vertical wheel load _____ Static _____ Dynamic _____
Maximum side thrust per wheel _____
Wheel guidance method: ❑ Flanged wheel ❑ Side rollers
(Provide dimensional drawings for clip clearance verification)

Rail: Size and profile _____

Rail Joint: ❑ Bolted ❑ Welded
Expansion joint: ❑ Yes ❑ No ❑ Quantity _____
Preferred attachment system: ❑ Weldable clip ❑ Boltable clips
❑ with Rail pad ❑ without Rail pad
Clip spacing _____

Comments: _____
_____
_____
_____

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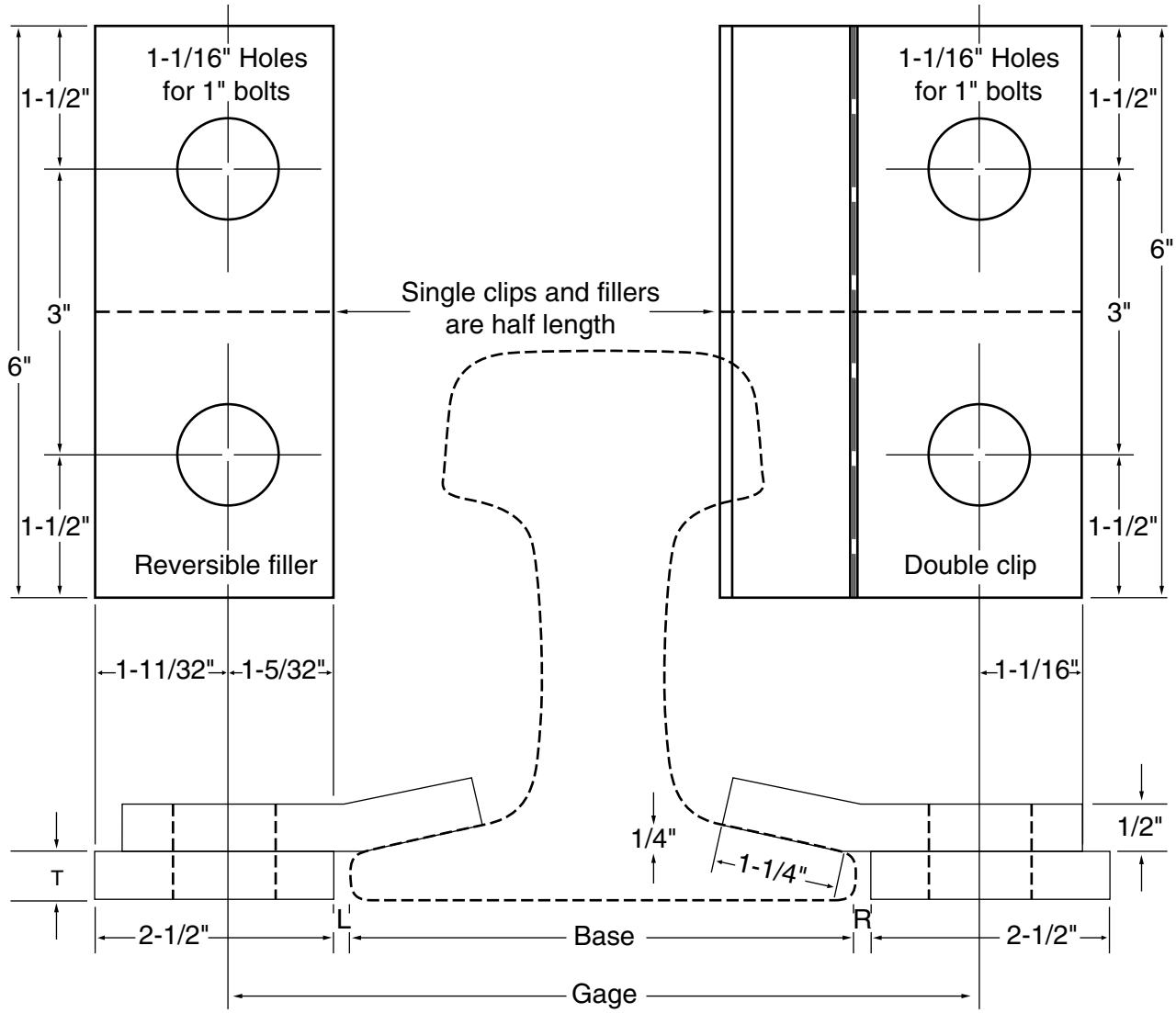
Clamp and Reversible Filler, Tight Fit

No. 203 – Single

No. 204 – Double



Rail Sec.	Base Width	Gage ℄ to ℄ Holes	Filler Thickness (T)	Est. Wt. Clamp		Est. Wt. Filler	
				Single	Double	Single	Double
104-CR	5"	7-3/4"	1/2"	1.6 lb	3.2 lb	1.05 lb	2.1 lb
105-CR	5-3/16"	8"	3/8"	1.6 lb	3.2 lb	.72 lb	1.44 lb
135-CR	5-3/16"	8"	1/2"	1.6 lb	3.2 lb	1.05 lb	2.1 lb
171-CR	6"	8-3/4"	5/8"	1.6 lb	3.2 lb	1.3 lb	2.6 lb
175-CR	6"	8-3/4"	1/2"	1.6 lb	3.2 lb	1.05 lb	2.1 lb

NOTE: Clearances L (left) and R (right) can be varied by reversing the filler.

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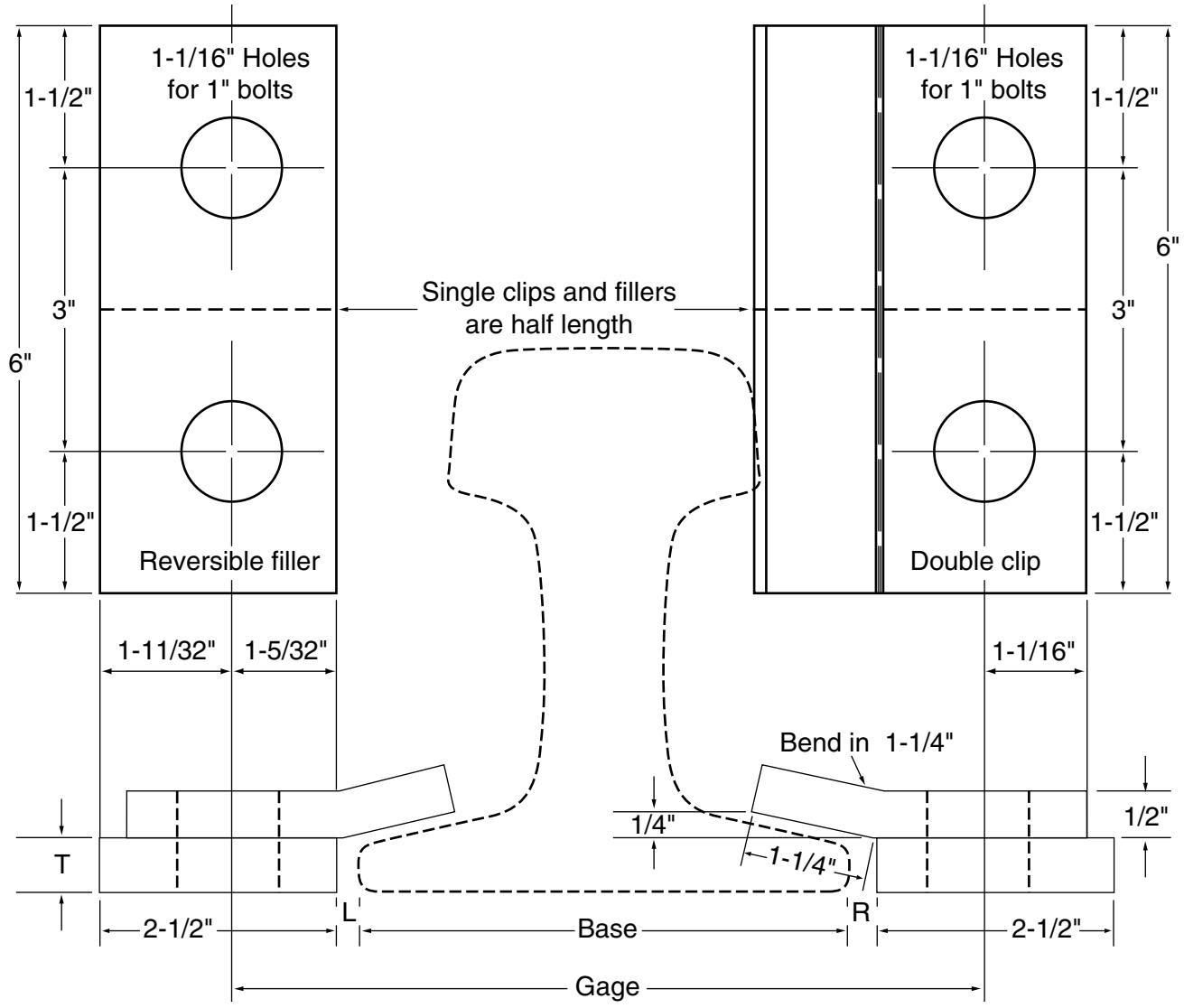
Clamp and Reversible Filler, Loose Fit ("Floating")

No. 205 – Single

No. 206 – Double



Rail Sec.	Base Width	Gage ℄ to ℄ Holes	Filler Thickness (T)	Est. Wt. Clamp		Est. Wt. Filler	
				Single	Double	Single	Double
104-CR	5"	7-3/4"	5/8"	1.6 lb	3.2 lb	1.3 lb	2.6 lb
105-CR	5-3/16"	8"	1/2"	1.6 lb	3.2 lb	1.05 lb	2.1 lb
135-CR	5-3/16"	8"	5/8"	1.6 lb	3.2 lb	1.3 lb	2.6 lb
171-CR	6"	8-3/4"	3/4"	1.6 lb	3.2 lb	1.6 lb	3.2 lb
175-CR	6"	8-3/4"	5/8"	1.6 lb	3.2 lb	1.3 lb	2.6 lb

NOTE: Clearances L (left) and R (right) can be varied by reversing the filler.

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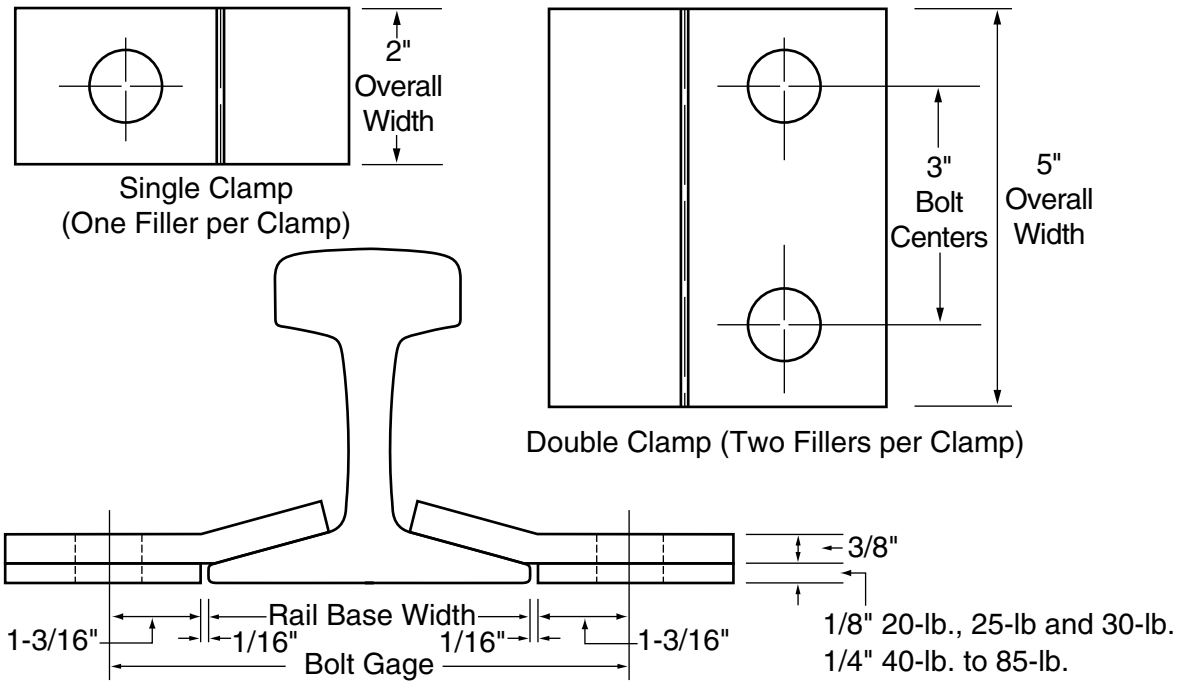
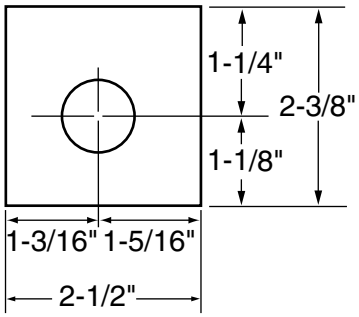
RAIL CLAMPS FOR TEE RAILS

Rail Clamps with Eccentric Fillers





Eccentric Filler

Note: 13/16" Diameter Holes are standard.

Rail Sec.	Bolt Gage	Single Clamp No.	Double Clamp No.
20 AS	5-1/8"	201	202
25 AS	5-1/4"	251	252
30 AS	5-5/8"	301	302
40 AS	6"	401	402
60 AS	6-3/4"	601	602
80 AS	7-1/2"	801	802
85 AS	7-11/16"	851	852

For conditions not listed, please specify:

A. Rail weight and section.
B. Bolt gage.
C. Bolt centers for double clip.
D. Bolt size (diameter) or hole size.
E. Width of clip.
F. If worn rail, width, thickness and taper of rail base.

Clamps with eccentric fillers are used where small gage adjustments are required. Through positioning of the eccentric fillers, the adjustment range is 3/16 in. Both single clamps (with one eccentric filler per clamp) and double clamps (with two fillers per clamp) are available for rail weights of 20 to 85 lbs.

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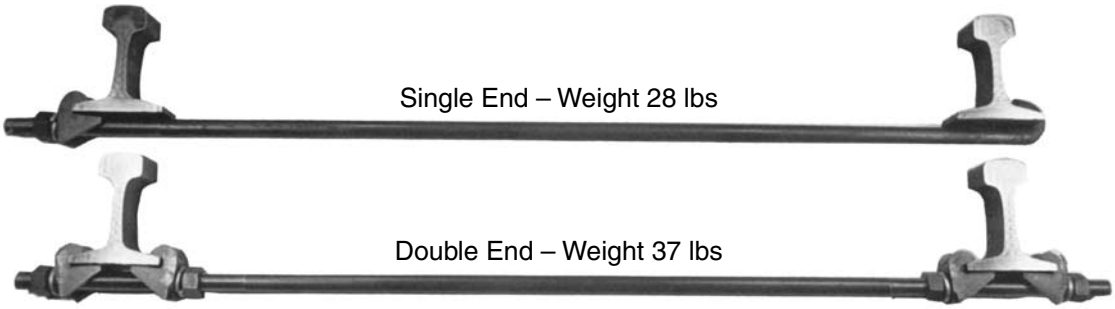
GAGE RODS

Gage Rods are designed for installation at weak points in track, sharp curves, switches, bad ties, temporary track, areas with poor ballast, etc. The rods hold tracks to gage by preventing spreading of rails. They will reduce the need to respike the track and will prevent tilting of rails. The standard rods are made of 1-1/4" diameter rod to fit all tee rail sections 70-lb. and above on a standard 56-1/2" gage.

Non-Insulated

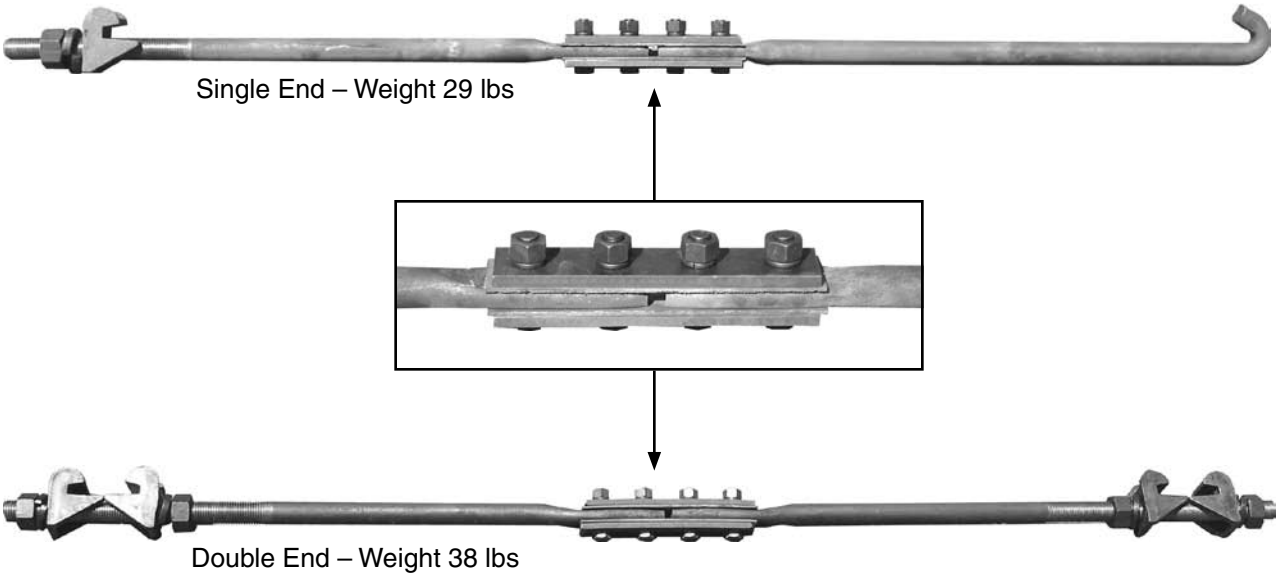
Single End Gage Rods have a hook on one end, and a single jaw with nut and spring lock washer on the other end.

Double End Gage Rods have two jaws, two nuts, and two washers on both ends of the rod.



Insulated

Insulated Gage Rods are available for track with signals or anywhere that electrical insulation is required. The most common style is shown below and features an insulation material in the center of the rod. Both single and double end insulated rods are available.



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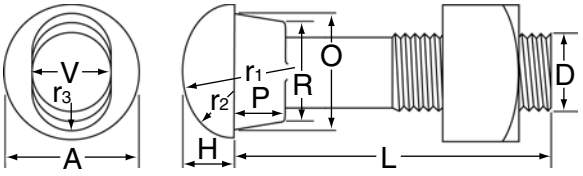
BOLTS, WASHERS

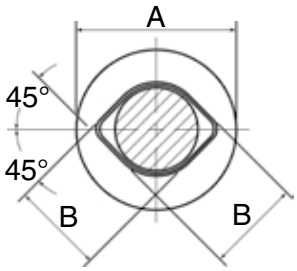
Track Bolts

Diam. "D"	Length "L"	Avg. no. in 200# can
inches	inches	pieces
1/2	1-3/4	925
1/2	2	885
1/2	2-1/4	845
5/8	2-1/2	470
3/4	3	277
3/4	3-1/2	259
3/4	4	242
7/8	4-1/2	159
7/8	5	149
1	5	108
1	5-1/2	104
1	6	100
1-1/16	6	93
1-1/8	6-1/2	72



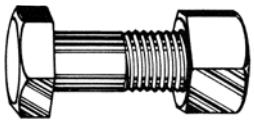
Button head oval neck track bolts are made with oval necks and button heads to be used for splice bar connections. The oval neck fits into the oval hole in the connector bar, thus allowing tightening of the nut without the use of a second wrench to keep the bolt from turning. These bolts are manufactured per ASTM A-183 specifications to both a heat-treated (Grade 2) and an untreated (Grade 1) designation.

Track bolts come with heavy square nuts, and are packed in cans containing 200 lbs. of bolts and nuts. The table at left shows the sizes normally stocked by Harmer. In addition, Harmer stocks longer length track bolts (for heel blocks and cast frogs), and can supply special size track bolts on request.



Diamond neck track bolts are stocked in the sizes shown below.

Diam.	Length	Avg. no. in 100# can
inches	inches	pieces
7/8	4-1/2	80
7/8	5-1/2	70
1	5-1/4	50
1	5-3/4	50



Hex head bolts are usually supplied to ASTM A-325 specifications and are mainly used for crane rail joint bars with tight joints.

Square head bolts are used for heel blocks and the toe end of self-guarded frogs, and can be supplied with cotter pins for use in switch rods. They are manufactured to SAE Grade 5 specifications.

Railway spring washers are made from high grade steel and are designed to maintain bolt tension under all conditions. They are available in two primary designs.

AREMA

Plain Pattern

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SPIKES

Track spikes are manufactured to AREMA specifications in both soft steel and high carbon varieties. In addition, good quality industrial grade spikes are stocked in the larger spike sizes. Industrial grade spikes are not guaranteed to meet AREMA specifications and may exceed AREMA dimensional tolerances. Although they generally will not work in automatic spiking machines, they are very popular with customers who do not use these machines. Top quality second-hand 5/8" x 6" track spikes (hand-sorted into drums) are readily available and offer a substantial savings when compared to the cost of new track spikes.

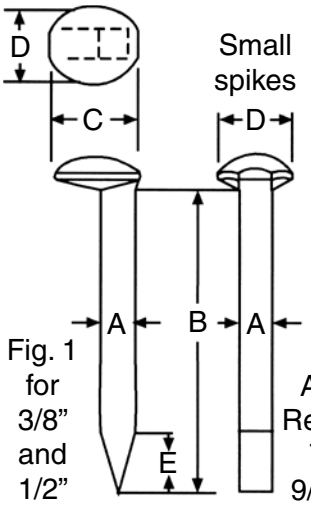


Fig. 1 for 3/8" and 1/2"

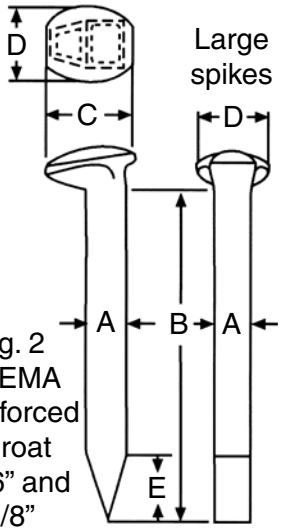


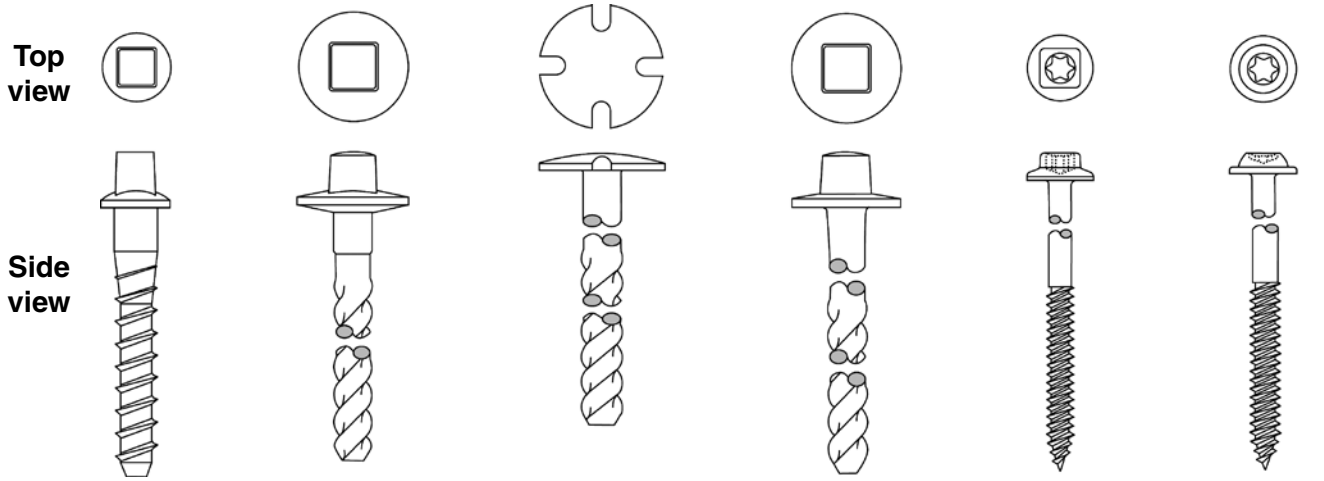
Fig. 2 AREMA Reinforced Throat 9/16" and 5/8"

Dimensions and Quantities

Size of spike			Head		Length of taper of point	Approximate number per keg of 100 lb.
Thickness		Length	Length	Width		
	A	B	C	D	E	
	in.	in.	in.	in.	in.	
Fig. 1	3/8	3	1-1/16	7/8	5/8	635
	3/8	3-1/2	1-1/16	7/8	5/8	568
	1/2	4-1/2	1-5/16	1-1/8	7/8	253
Fig. 2	9/16	5-1/2	1-1/2	1-1/4	1-1/8	161
	5/8	5-1/2	1-9/16	1-5/16	1-1/4	132
	5/8	6	1-9/16	1-5/16	1-1/4	121

Boat spikes are available both galvanized and "black." Common sizes are 3/8" X 6", 3/8" X 8", 3/8" X 10", 1/2" X 10", and 1/2" X 12".

Specialty screw spikes are available for a wide variety of installations for grade crossing, maintenance of way, and bridge timbers. The samples shown below represent a small part of the array that Harmer can provide.



Screw spike | Bevel head drive spike | Dome head drive spike 4 notch | Washer head drive spike | Recessed head square | Recessed head round

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RAIL ANCHORS, TIE PLATES

Improved Fair

Unit V

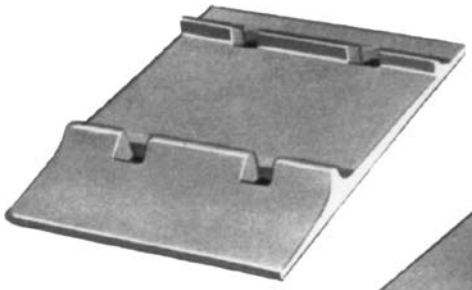
Channeloc

Rail anchors are manufactured in one-piece construction from spring steel or equal, heat-treated and designed to eliminate creepage of track. They provide a large bearing surface against both rail base and tie, avoiding undo cutting and wear, thus prolonging the life of wood ties. All anchors shown above are “drive-on” type anchors which are driven on using a standard spike maul.

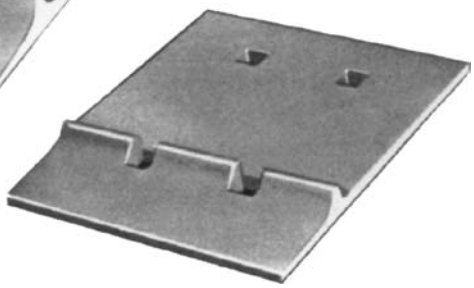
The use of single or double shoulder **tie plates** makes a more stable track and greatly lengthens the life of wood ties. Punched and sheared from hot-rolled steel sections, tie plates provide proper cant, uniform bearing surface for the rail, and better load distribution to the ties. They hold the rail to gage, providing more uniform wear to rail head, and protect against undue wear to ties. Tie plates are designed with a long end or field end to be located outside of the rails. In the case of single shoulder tie plates, the shoulder is placed on the field end of the plate. The gage end or short end of the plate is located inside of the rails.

When ordering, identification of the rail section or the width of the rail base should be specified. Top quality relay tie plates (hand-sorted and palletized) are readily available and offer a substantial savings when compared to the cost of new tie plates. Tie plates come in a variety of sizes and punching patterns. These patterns may include both “line holes” and “hold-down holes.” The plates shown above have four line holes punched to line up with the edge of the rail base. Many tie plates also feature hold-down (or “anchor”) holes that are between the line holes and the edges of the tie plate.

Double Shoulder



Single Shoulder



Standard Plate Sizes

Rail Base Width	AREMA Plan	SS DS	Plate Weight*	Plate Length
4-7/16 to 5-1/8	1	SS	11.63	10
5-1/8 to 5-1/2	2	SS	12.93	11
5-3/8	3	DS	15.86	12
5-1/2	4	DS	13.45	11
	5	DS	16.25	12
	7	DS	19.60	13
	8	DS	22.90	14
6	9	DS	14.94	12
	10	DS	17.87	13
	12	DS	21.47	14
	13	DS	23.32	14-3/4
	UP/CN	DS	27.67	16

*weight based on 8-hole 7-3/4” wide plate, except plan 1 and 2
UP/CN 16” plate is 6-hole

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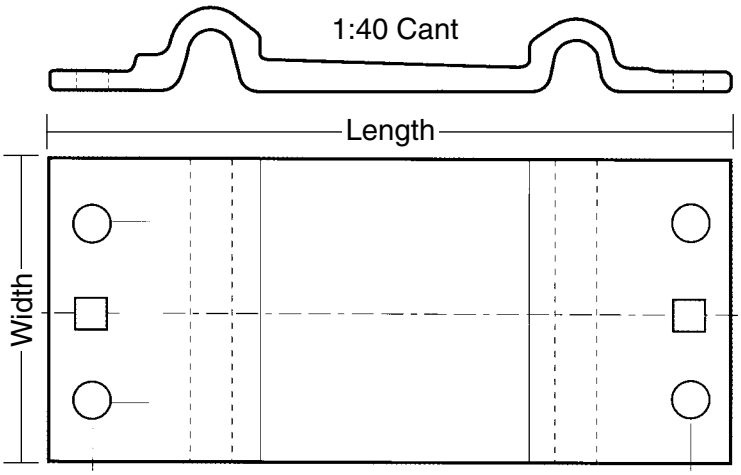
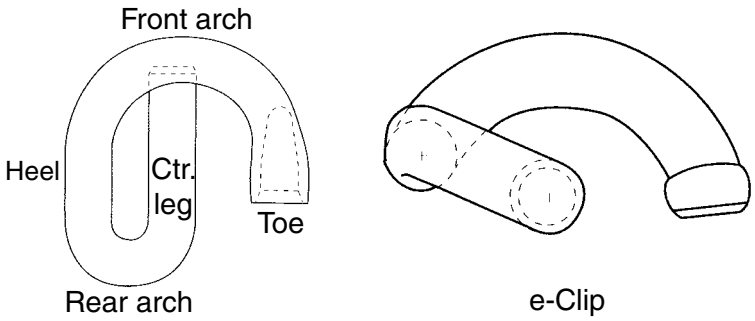
DIRECT FIXATION TIE PLATES, STEEL TIES



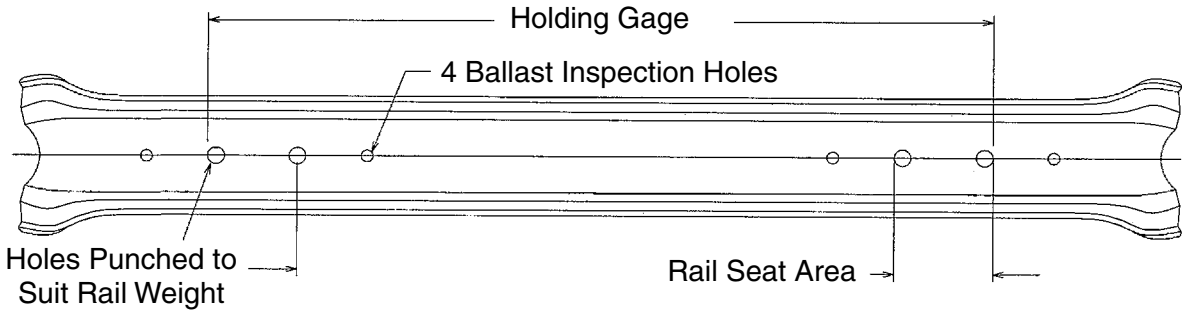


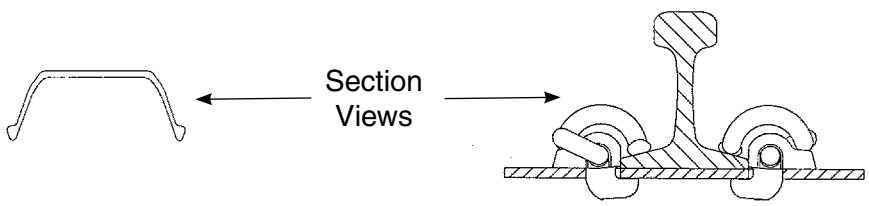
Direct fixation tie plates utilize an elastic clip ("e-Clip") design to secure the rail to the base plate. The spring and torsion work in unison to produce a high clamping force, aiding in preventing rail rollover and providing longitudinal restraint.

Plates are available for 5-1/2" and 6" rail base widths with a 1:40 cant. Standard punching includes four round holes and 2 square holes. Other designs may be available upon request.

Plates can be securely fastened to wooden ties by means of screw-spikes. Alternate design clips are available for use at track joints, where joint bars would obstruct the use of standard clips.

As an alternate to wooden ties, **steel ties** are available for traditional railroad applications. Utilizing a "hook-in shoulder" design, steel ties have superior gage and cant holding capabilities. Along with standard 56-1/2" gage, steel ties are available for switch installations as per AREMA or railroad specifications. Each set comes with prepunched labeled ties and all standard or speciality fasteners necessary to secure the points, rail, frog, guard rails, and switch machine to the ties. Steel track and turnout ties can be assembled efficiently even with an inexperienced crew. They can reduce the amount of ballast required up to 40% compared to other tie materials. Steel ties can also be used to extend the life of wooden ties when interspersed.





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STEEL MINE TIES

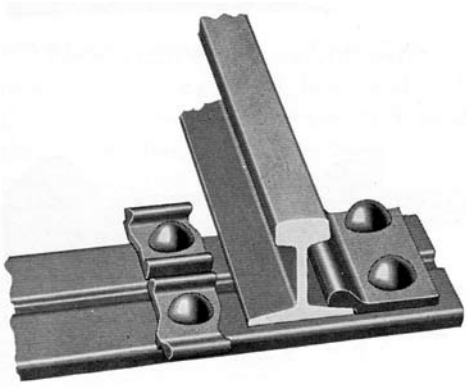
Steel ties have a decided advantage over wood ties in mining applications. They hold the rails securely, keeping them true to gage and the track in alignment. They have unusually long life, even under severe service conditions, and can never become spike-killed or rotted. Also, they are not a fire hazard.

The ties are light compared to wood. One man can easily handle a bundle of five ties. The ties are relatively shallow in section, thereby saving valuable head-room in low seams. The heavier ties are sometimes used for main-haulage tracks, and are often used in conjunction with wood ties in place of gage rods, by spacing them between every third or fourth tie. By adding a steel tie at 6' to 10' intervals, the service of wood ties will be prolonged through relief of strain during the early period of decay.

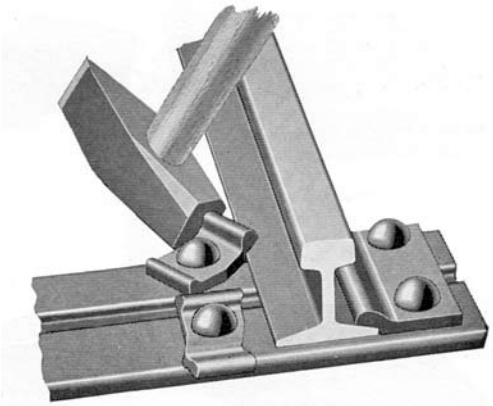
To provide even greater strength, steel ties can be supplied that are bolted to a wood base. The base is grooved (so that it will fit up under the tie) and bolted securely to the tie. Oak is usually used, and it can be treated or left untreated.

Installation of Steel Ties

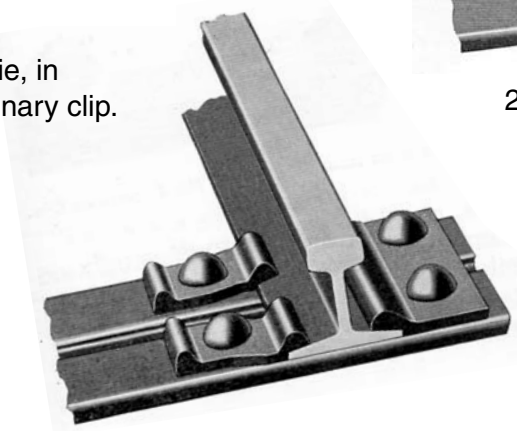
The installation of steel ties with riveted clips is simple and easy. Whether the ties are straight or upset end, they are installed in the same manner. No gaging of track is required.



1. The rail is placed on the tie, in position against the stationary clip.



2. Blows of a hammer turn the movable clips into position over the rail base.



3. The clips hold the rail firmly in place, to accurate gage.

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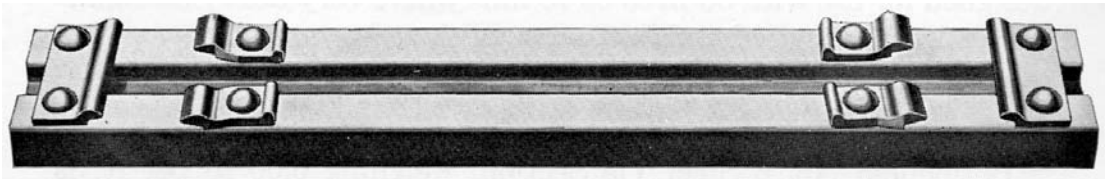
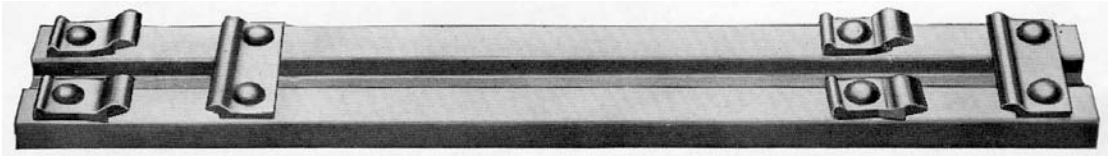
STEEL MINE TIES

Steel Ties with Outside Stationary Clips



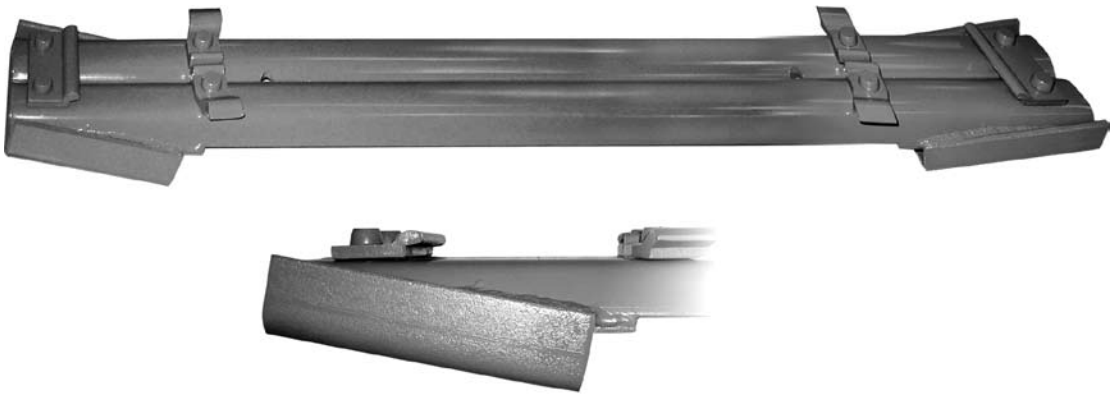
In all sections the most widely used tie is the **outside stationary clip tie**. It is equipped with four rolled-steel movable clips, and two stationary clips placed on the outside ends, as illustrated. The clips are spaced to fit one particular rail section.

Steel Ties with Staggered Clips



Also available is the **staggered clip tie,** which is equipped with four rolled-steel movable clips and two stationary clips, with a stationary clip on the inside at one end, and on the outside at the other end. This feature is especially useful when it is desired to insert or remove a tie without disturbing the track gage. The clips are spaced to fit one particular rail section.

Tunnel Ties



Tunnel Ties are specifically designed for use in tunneling projects where the bottom surface is not flat. These ties can be used without blocking and will maintain proper track gage. Each tie is designed specifically to meet the requirements for a particular job. Customers should specify the tunnel diameter, wheel load, and tie spacing. The design specifications are reviewed by an engineer to ensure tie construction will support the wheel loads required for a given project. Axle loads of 45,000 lbs on 30” tie spacing have been successfully implemented.

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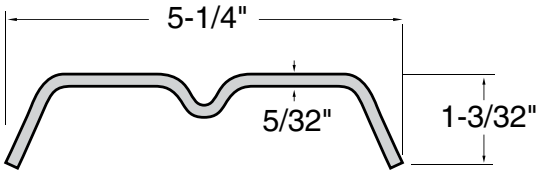
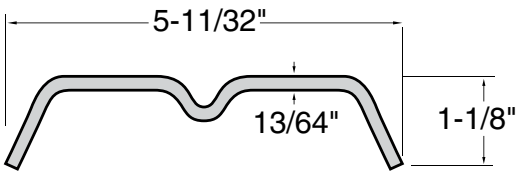
STEEL MINE TIES

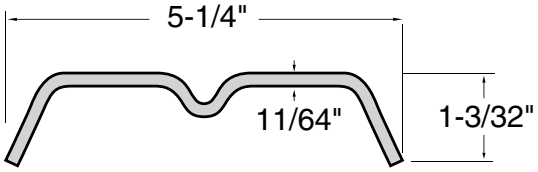
T-4



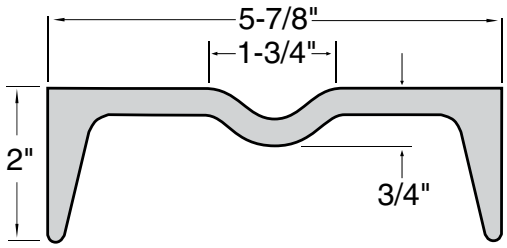
T-6



T-5



T-9



Drawings shown to scale
Not actual size

Shown on this page are some of the most common steel tie sections available today. Although the table below gives some general recommendations, there are several factors to be considered in choosing a steel tie. These include condition of the bottom, weight of cars and equipment, amount and speed of traffic, permanency of trackage, and weight of rail.

Tie Section	Weight	Rail Section
T – 4	3.85 lbs/ft	30 - 60 lb
T – 5	5.0 lbs/ft	30 - 60 lb
T – 6	6.0 lbs/ft	40 - 85 lb
T – 9	10.5 lbs/ft	60 - 100 lb

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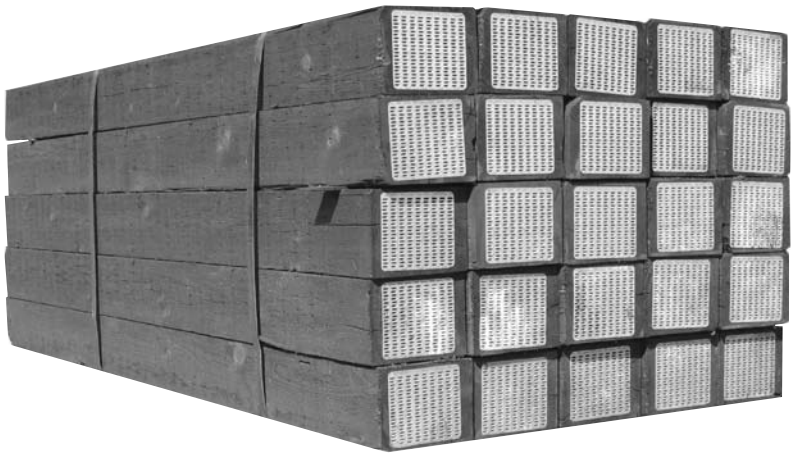
WOOD TIES, TIE PLUGS

Tie plugs are for filling holes in new or used cross ties where spikes have been removed. The plugs are sold in bundles of 500, and are normally 5/8" square and 4-3/4" long. They are available in both treated and untreated cedar.

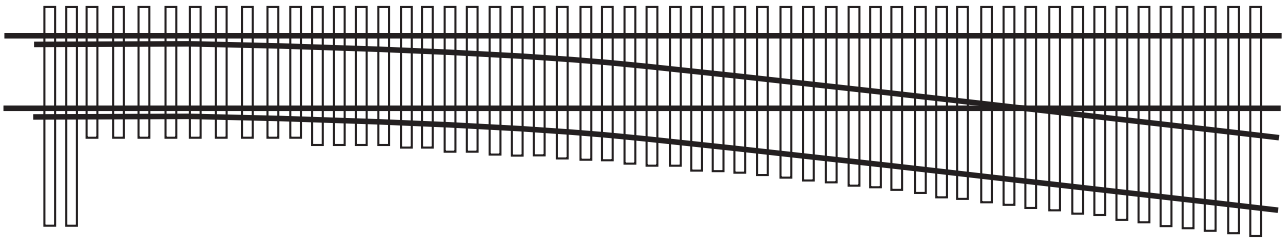
Weight 20 lbs/bndl. (treated)
18 lbs/bndl. (untreated)

We stock "headed" plugs as shown below.



Pressure treated **cross ties** for standard railroad gage are usually supplied in lengths of 8' or 8' 6". They are cut with cross sections of either 6" X 8", 7" X 8", or 7" X 9". Ties are available in several different species of wood, and hardwood ties are often furnished with end plates to reduce splitting. In addition to new ties, relay quality used ties are available.

The table below shows a bill of switch ties for standard gage turnouts with frog numbers between six and eleven. These quantities and lengths are per AREMA specifications with tie lengths rounded up to the nearest 1' multiple. (The board measure shown is based on ties of a 7" x 9" cross section.) Ties are also available in sets with slightly wider spacing between ties, which is usually sufficient for industrial trackage.



Bill of Switch Ties for Turnouts with Straight Switches*

Frog No.	Length of Switch Rail	Toe Length to 1/2" Pt.	Lead P.S. to 1/2" Pt.	Lengths and Quantities of Ties (Lengths in 1'-0" Multiples) 9'	10'	11'	12'	13'	14'	15'	16'	17'	Quant. of Ties	Board Measure
6	11'0"	3'9"	47'6"	4	9	5	5	3	3	5	5	2	41	2683
7	16'6"	4'8-1/2"	62'1"	7	13	6	5	3	4	6	6	2	52	3329
8	16'6"	5'1"	68'0"	7	13	6	6	4	5	7	6	3	57	3701
9	16'6"	6'4-1/2"	72'3-1/2"	7	13	7	7	6	5	8	6	4	63	4127
10	16'6"	6'5"	78'9"	7	15	8	7	6	6	7	8	4	68	4452
11	19'6"	7'0"	83'6"	9	14	9	8	7	6	8	8	4	73	4762

*No. 11 shown is for curved switch

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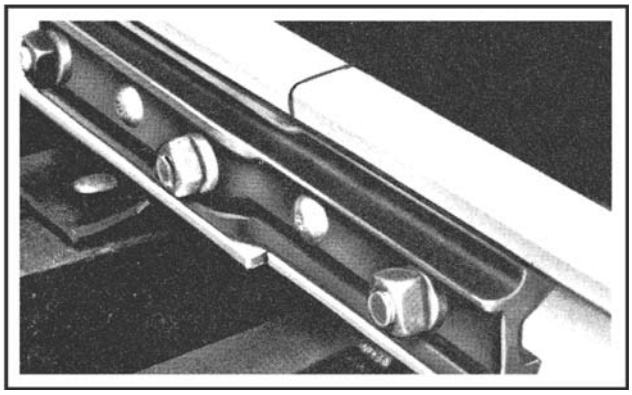
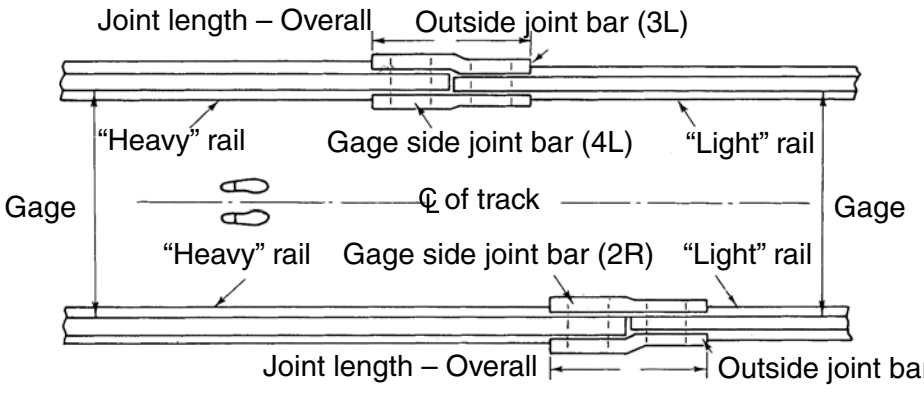
COMPROMISE AND INSULATED JOINT BARS

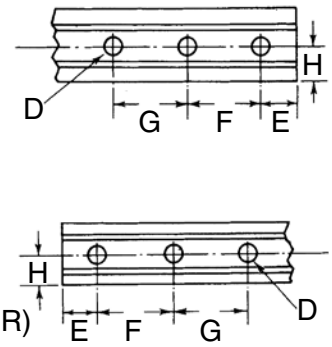


Compromise Joint Bars are designed to join rail sections of different sizes while keeping gage and running surfaces in alignment. Compromise joints consist of two bars – an "outside joint bar" and a "gage side joint bar." Generally speaking, unless the difference between the rail head widths is less than 3/16", right and left-hand joints are required. Unless otherwise specified:
1) bolt holes are alternately round and oval,
2) bolts are not provided, and
3) rail joint opening is 1/8".

To Determine Right-Hand or Left-Hand Joint



To Determine Bolt Hole Locations

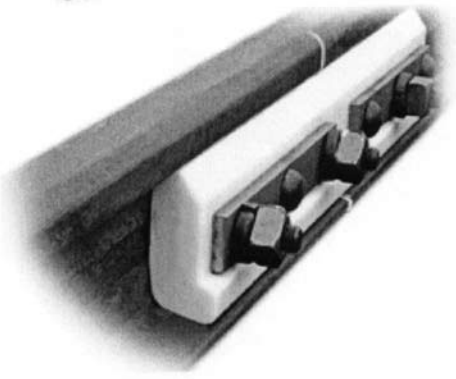


Stand between "Heavy" rails, facing direction of the "Light" rails. Indicate the joint to the right as "Right Hand" joint, and the joint to the left as the "Left Hand" joint.

Insulated Joint Bars

Steel bar core has exceptional strength, providing the fatigue resistance to withstand punishing loads and curve forces. Electrical integrity is derived from a high durable polyurethane coating that resists moisture and excessive temperature. Insulated rail joints are furnished with steel-lined bushings and insulated high-pressure end post.

- Strong heat-treated steel core provides full support for rail ends
- Polyurethane insulation completely surrounds the core - including the bolt bole - providing superior insulating properties
- Resistant to moisture, abrasion, cracking, grease, oil, brine, weather and insects
- Unaffected by temperature extremes
- Conforms to rail irregularities



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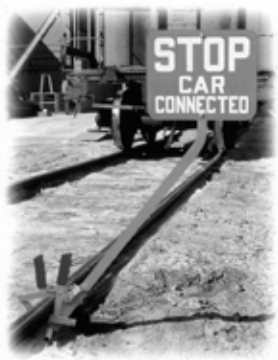
PORTABLE TRACK SIGNS

Portable Sign Holders

Clamp-On, Non Locking
Steel Holder. Clamps to Rail Head.
Weight 7 lbs



Clamp-On Locking
Can be padlocked to rail sizes 85-lb to 140-lb. Lock included. Weight 10 lbs

Clamp-On Insulated
For use near electrified third rails.
Weight 4 lbs

Permanent Sign Holders

Spike Holder
For use in ballast, asphalt, or other soft ground. Pound spear base into ground and insert holder staff. Weight 20 lbs

Spike-Down Hinged
Tie plate base is spiked to tie. Hinged sign holder folds down.
Weight 16 lbs

Permanent Hinged
Bolts to base of rail. Holder folds down flat.
Weight 15 lbs

Sign plates meet OSHA regulations §1910.261(c): 1910(b) and must be ordered separately from sign holders. Sign plates are 12” x 15” and made of .080” aluminum plate, in either blue or red, with white reflectorized letters. All signs are in English, and some are also available in Spanish and French. Please contact a Harmer representative for more information.

STOP EMPLOYEES WORKING	**STOP**	**SAFETY FIRST**	**STOP CAR CONNECTED**
STOP TANK CAR CONNECTED	**STOP CREW AT WORK**	**STOP MEN AT WORK**	**DERAIL**

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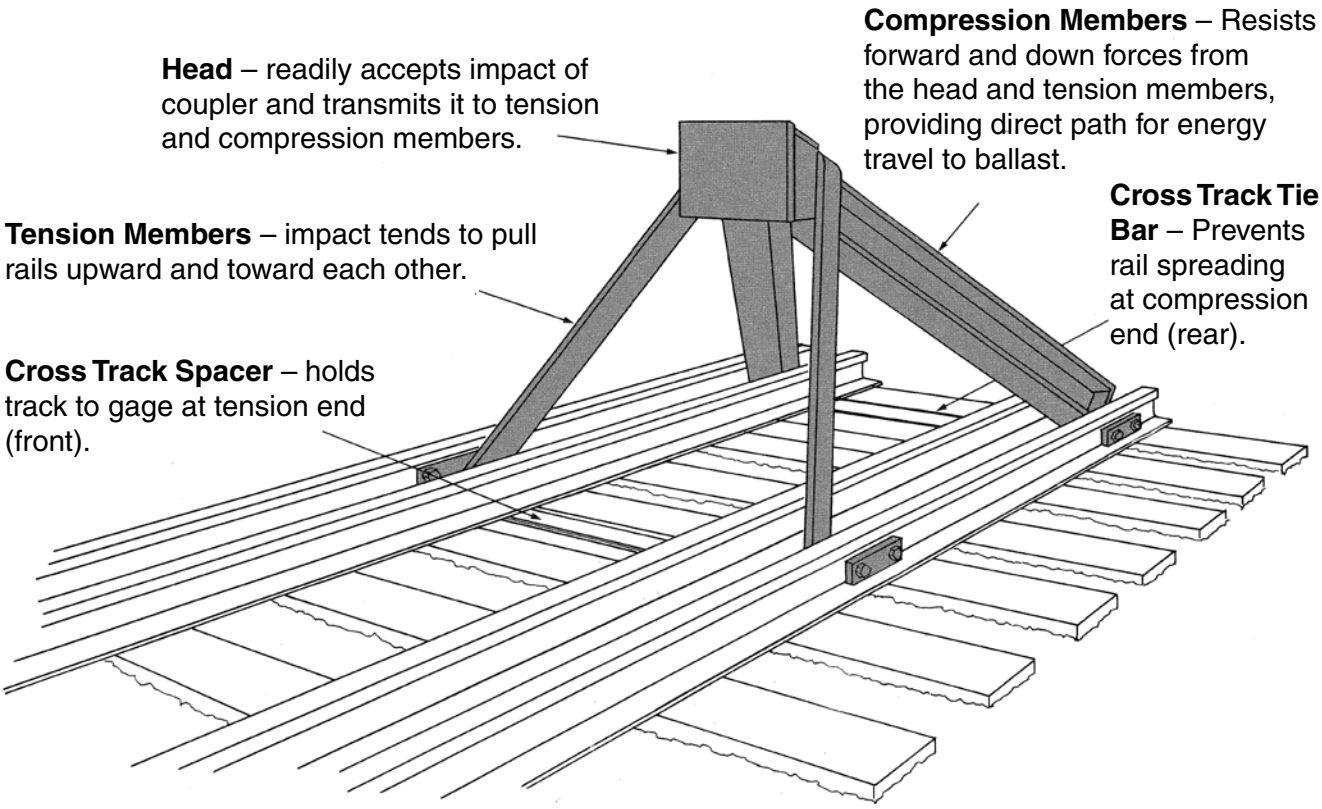
BUMPING POSTS



TYPE BUMPING POST	APPLICATION
WK	Recommended for industry stub end tracks with three car capacity or less, without descending grades to track end. Weight – 705 lbs.
WD	General service. Long industrial tracks outside of buildings, flat switching yards, no descending grades or hazards at track end. Installation-strengthening “middle rails” can be used with this post. Weight – 800 lbs.
WG	For active track, where frequent striking face contact demands greater car stopping ability; any spur downgrade towards post; within buildings; metropolitan flat switching yards and TOFC track-ends. Installation-strengthening “middle rails” can be used with this post. Weight – 1250 lbs.
WA	The strongest post ever built as a standard product. For track-end service where greatest car-stopping ability is needed. Lay track with the heaviest rail available, use full-spike ties and plenty of good ballast, and tamp thoroughly. Installation-strengthening “middle rails” can be used with this post. Weight – 1655 lbs.
	All standard Bumping Posts are made in one size which will fit any rail from 5 to 7-1/2 inches high (except Type WA which fits any rail from 5-3/8 to 8 inches high). For rail smaller than 5 inches or larger than 7-1/2, inches please give height of rail.

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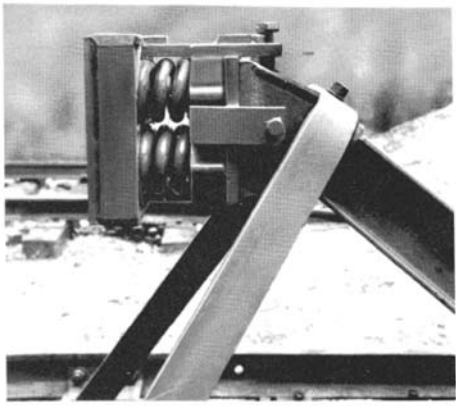
BUMPING POSTS

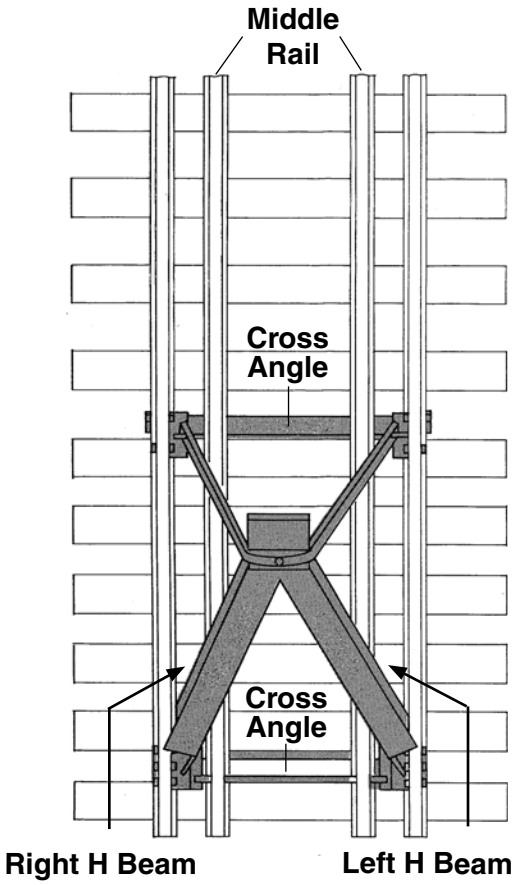


The **Shock-Free Head** pays for itself at every installation by prolonging bumper post life, cutting equipment damage at track-ends, and doing its share to decrease Loss & Damage claims.

This rugged unit takes about thirty minutes to install, but can mean the difference between a troublesome and trouble-free track-end. Thousands are proving it every day around the world.

The **Shock-Free Head** is a 435 pound cushioning unit which is applied to a railroad bumping post after it is in track. It slips over the regular bumping post head and is made a part of the post by tightening the six cap screws that come with it.

Train impact is absorbed by compressing eight heavy springs which "float" between laminated rubber and fiber shock pads. As the head compresses 1-5/8" from first coupler contact, the draft gear mechanism in the car comes into operation. At normal switching speed, the result is a shock-free final impact, protecting the bumping post, the car and the lading.



Specific installation instructions are included with each unit. However, time and experience have established several measures that must be taken to insure a maximum service life from your bumping post investment.

Much of the car-stopping effectiveness of any bumping post depends upon the track to which it is secured. This is the post's "foundation" and it should be as adequate to the job as the foundation for any other type of structure.

Generally, the heavier the rail, the better the foundation. Use sound ties, fully spiked, and full-bolted rail joints ahead of the post. Be sure you have good, well-tamped ballast.

A special feature (rail clips on rear crossmember) furnished with types WD, WG and WA Bumping Posts allows the use of "middle rails." These "helper" rails are supplied by the customer and should be spiked between the running rails to increase track strength. Two pieces of heavy rail not less than 18 feet long should be used. These pieces of rail should extend about three feet beyond the post toward the rear and should be spiked for their entire length. A drawing displaying a typical installation with "middle rails" is shown at left.

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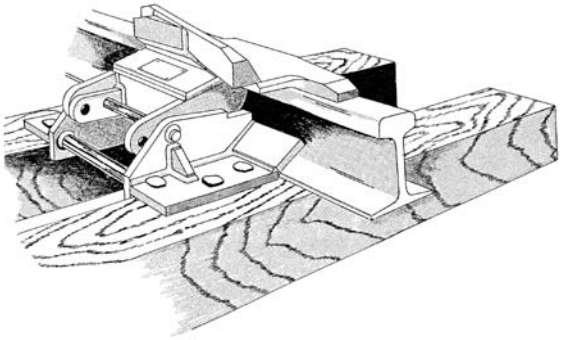
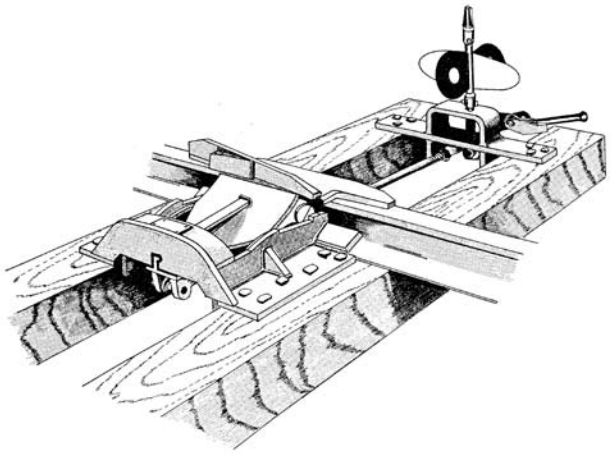
DERAILS

Derails are safety devices designed to limit the movement of a car or locomotive beyond a fixed point. They operate with the use of a “shoe” that sits on top of the rail and causes any wheels passing over it to derail. When travel into the restricted area is necessary, the shoe is removed. Derails are frequently used to protect areas where people are working, loading docks, or to prevent cars from rolling out of an industrial track onto the railway mainline.

The two derails shown on this page are of welded steel construction and are the heaviest models available. Somewhat lighter models are also available, as well as portable derails, and derails equipped with blue warning flags. Most derails can be padlocked in position to protect against vandalism.

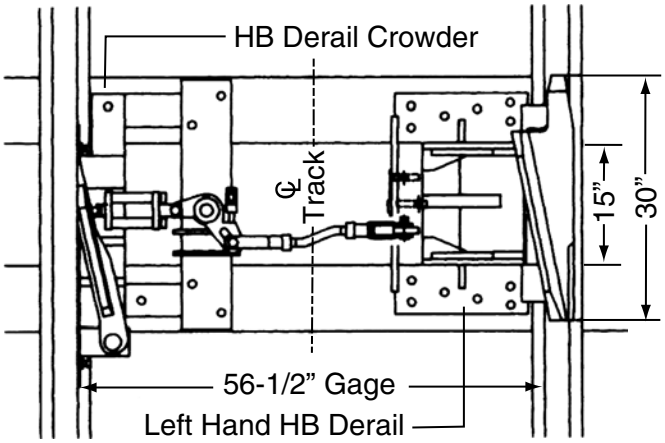
Model EB Hinged Derail is a very common and economical derail. It has a steel base which is spiked to the ties. The shoe is on a hinge connected to the base. This derail is designed for **hand throw only.** The shoe is flopped over on its back in the center of the track when in the inactive position. A target stand may be used to indicate the position of the shoe. Weight - 146 lbs.





Model HB Sliding Derail is a heavy-duty derail designed for durability and to minimize stress on wheels and derail. It is operated from the side of the track with a stand that slides the shoe from the base to the upper (active) position. Pictured at left is model HB with a standard two-tie operating stand. Other types of stands are available. The stands require a connecting rod, and must be ordered separately. Weight (w/o stand) - 277 lbs.

Derail Wheel Crowder
In special locations where it is absolutely necessary to derail to the inside rail of a curve or where higher speeds are anticipated, Harmer Steel recommends the use of the Derail Wheel Crowder, which assists derails by crowding the wheels into the throat or entering toe of the derail. This is significantly lower in cost than switch point and stock rail type derails.



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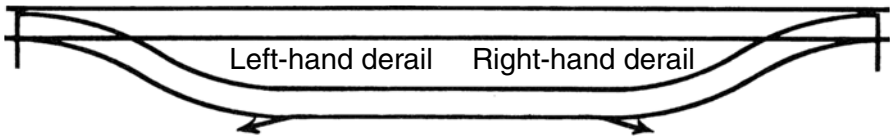
Derails are designed to derail to the right or the left. A right-hand or left-hand derail must be specified when ordering. Looking in the direction of movement of a car to be derailed, a right-hand derail goes on the right-hand rail and derails towards the right. A left-hand derail goes on the left-hand rail and derails toward the left. “Double End” derails are available and may be used as right or left hand.



Model EB and HB derails come in five sizes (No. 4 through No. 8). The correct derail size is determined by the vertical distance in even inches from the top of the rail to the tie. (If tie plates are used, add the thickness of the plate under the rail to the height of the rail to determine the correct derail size. Crop the tie plate at the rail base so the derail is not partially mounted on the tie plate; the derail must sit level.) Adjustments to make the vertical distance correspond in even inches to the derail size should be made by adzing the tie under the derail or shimming up the derail with a steel shim. A derail may be used on rail 1/2” lower to 1/2” higher than the rail to which its size number refers, but the distance from the top of the rail to the surface on which the derail is secured must be even inches and must correspond to the size number of the derail.

Model HRS-100
(with U.P. target)

The **High Rise Derail Operating Stand** is primarily a one piece weldment and is shipped assembled ready for installation. The only replaceable parts are the targets, connecting rod, lamp tip (if used) and the adjustable 1 inch diameter eyebolt.

Each HRS-100 is shipped in three pieces; the primary welded unit, one connecting rod complete with adjustable clevis ends and pins, and a protective carton for the target. Weight - 180 lbs.

The standard units are equipped with red and white targets that are positioned 41-5/8” above the top of the ties. The model shown at left has the Union Pacific style purple target with white “D” which is positioned 58” above the ties. The standard unit comes with an 8’ 2” adjustable connecting rod which places the center of the target staff 8’ 10-1/4” from the center of the track.

- Ergonomic design
- Allows movement of sliding derail without bending or stooping
- Handle: 34” above top of tie
- Stroke adjusts for any sliding derail
- Stand can be pad-locked in on and off-rail position

When ordering specify:

1. Target colors if other than standard
2. Connecting rod length if other than standard
3. Lamp tip dimensions if other than AREMA standard

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ADJUSTABLE DERAIL, RERAILERS

Model HD Low Profile Derail meets the needs of those working in the more demanding railroad environment. All HD's in the series have been designed to meet the railroad industry's changing demands for increases in tonnage of locomotives and various types of rail cars, as well as increases in the trackage, speed and number of cars in rail yards.

HD-3 and HD-4

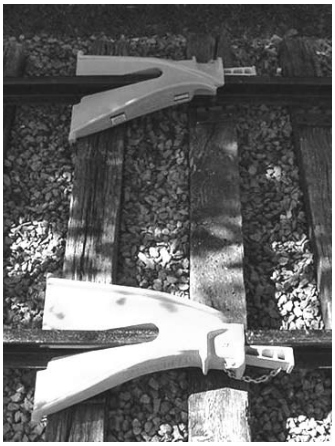
Decreased deflection angle of the derails allows a longer "travel run" which increases the derail's functionality at higher speeds. At a 2-3/4" height above the top of the railhead, the HD derail ensures effective derailments of all types of rail cars, including mainline locomotives, whose locomotive pilots are cleared by the derail's low profile height.

HD-5 and HD-6

Derails are NOT recommended for multiple derailments. A derailment may cause stress points which may result in a failure.

Model	Derail Type		Fits Rail	Weight
HD-3R	Single End	Right Hand	4-5/8" to 6-1/2"	150 lbs
HD-3L	Single End	Left Hand	4-5/8" to 6-1/2"	150 lbs
HD-4R	Single End	Right Hand	6-5/8" to 7-7/16"	150 lbs
HD-4L	Single End	Left Hand	6-5/8" to 7-7/16"	150 lbs
HD-5	Double End	Bidirectional	4-5/8" to 6-1/2"	182 lbs
HD-6	Double End	Bidirectional	6-5/8" to 7-7/16"	182 lbs

Model HDHF staff assembly consists of a connecting road and a mounting plate which is lagged to the ties in the center of the track. A 62" high staff "flips up" automatically when the derail is thrown onto the rail. Target stands, derail staff assemblies and derail flags are sold separately from derails to provide the most flexibility in choosing options.



Rerailers are used to put the wheels of derailed cars or locomotives back on the track. Pulling the car causes the wheels to climb the incline and fall into place. It is not necessary to stop to reset the rerailers at each wheel because every car binds the rerailers tighter in place. Rerailers must be used in pairs (left and right).

Model Number	For Use on Rails...	Load Capacity	Weight Per Pair
CW-3	30 to 60 lb.	15 ton	100 lbs.
CW-3-1/2	40 to 80 lb.	20 ton	132 lbs.
DW-5	70 to 100 lb.	100 ton	360 lbs.
DW-5-1/2	85 to 141 lb.	200 ton	344 lbs.

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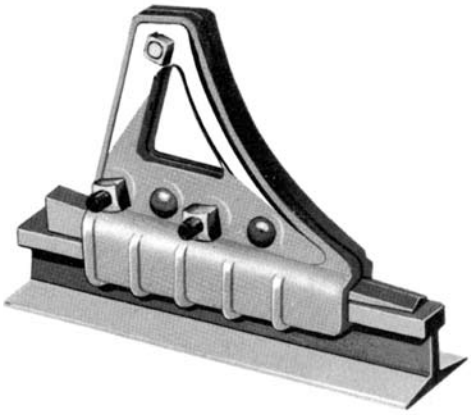
WHEEL STOPS

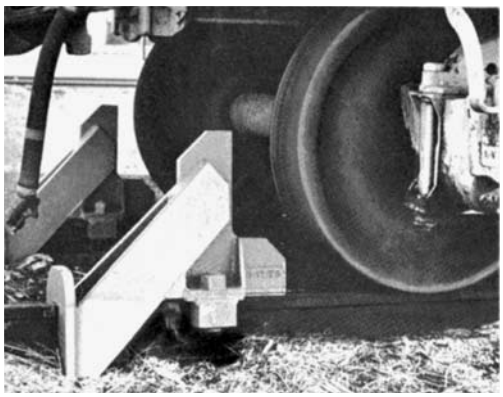


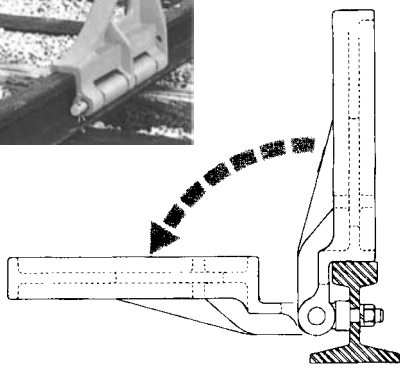
Model CS-2 Self Tightening Type

Durable self-tightening wheel stops use tapered wedges between the assembled castings and rail head, thus insuring perfect alignment to rail size and providing self-tightening action. This stop is assembled on head of rail by tightening five bolts, driving wedge from the rear between the assembled castings and rail head until tight. Spacer washers are provided to allow for varying head widths. Fits all rail sizes 60 to 141 lbs. Weight 220 lbs/pr.

Model SF Cushioned Type

Model SF is a heavy-duty wheel stop which utilizes the cushioning ability of the cross ties and ballast to absorb impact. It also employs the car's weight for additional braking friction on the rail. It is made of all welded steel construction and requires tightening only four bolts for installation of each pair. Fits all rail sizes 60 to 141 lbs. Weight 350 lbs/pr.





Model CS-60 Hinged Type

Model CS-60 is a hinged-type car stop designed for permanent installation on either flush or exposed rails. In the raised position, the CS-60 protects workers, warehouse doors, crossover walks, etc., or it swings down out of the way. The CS-60 may be padlocked in either the up or down position. Specify rail size when ordering. Weight 180 lbs/pr.

Caution For All Wheel Stops:

1. For use on level track only.
2. For use with standard size freight cars only. Do not use with wheels less than 33" diameter.
3. Do not use on overhead crane or other non-railroad vehicles.
4. If used on flush rail, rail must be fully exposed for proper installation.
5. Wheel stops must always be used in pairs with each stop in exact alignment with the other.
6. Car speed at impact must not exceed normal switching speeds.
7. Check stops periodically to be sure bolts are tight.
8. Failure to adhere to these instructions can cause product to fail.

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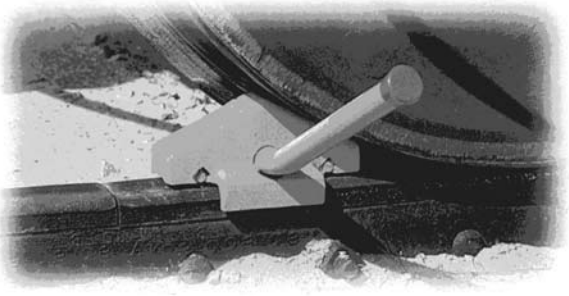
WHEEL CHOCKS

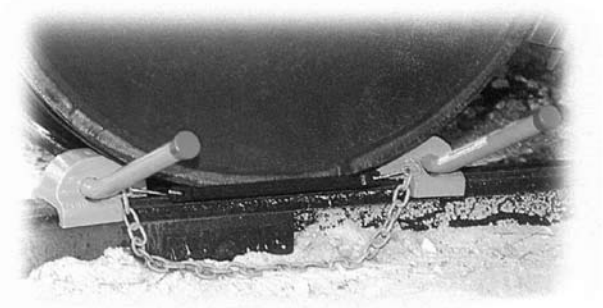
Single Chocks



Style D without Flag, Exposed Rails, 6 lbs
Style D-1 without Flag, Flush Rails, 8 lbs

Style A with Flag, Exposed Rails, 13 lbs
Style A-1 with Flag, Flush Rails, 13 lbs

Double Chocks



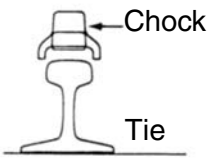
Style B without Flag, Exposed Rails, 12 lbs
Style B-1 without Flag, Flush Rails, 12 lbs

Style C with Flag, Exposed Rails, 16 lbs
Style C-1 with Flag, Flush Rails, 16 lbs

Style B-2 without Flag, w/Tightener, Exposed Rails, 16 lbs
Style C-2 with Flag & Tightener, Exposed Rails, 20 lbs

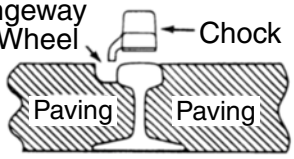
What Kind of Rail Do You Have?

Exposed



Use: A, B, B-2, C, C-2, D

Inside Flangeway for Wheel — Flush



Use: A-1, B-1, C-1, D-1

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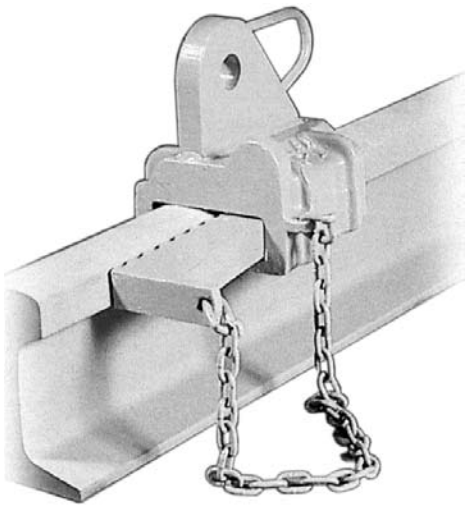
Anti-Slip Rail Tongs are used on cranes for rail handling projects. They will lift any 39 foot tee rail section up to and including 155 lb rail and crane rail up to 171 lb by either the head or the base. No adjustments are necessary to handle various sizes of rail. Tongs are designed for lifting, not dragging. The anti-slip feature of the tongs is due to the sliding toggle action of the links when a rail is lifted. In this way the angularity of the toggle links is never less than 90 degrees with respect to each other. Weight - 60 lbs.

Clamping Rail Tong for crane rail 135 lb., 171 lb. and 175 lb. Load capacity 4000 lbs. Lift only–no dragging. Weight 60 lbs.



Rail Tugger has a self-locking wedge to tightly grab rail for easy pulling and positioning of rail lengths. Handles rails from 100 to 141 lbs/yd. Weight 40 lbs.

Rail-Pull brings rail back into gage after derailment so rerailing can proceed. Cars can freely pass over rail-pull clamp plates. Weight 76 lbs.

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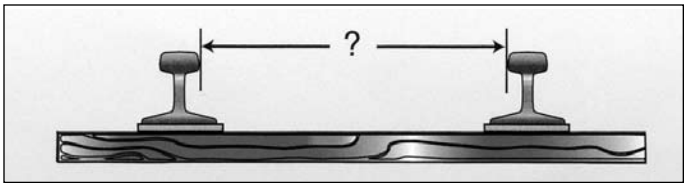
TRACK GAGING TOOLS

How to Measure Track Gage



Most North American track is built to a Standard Gage of 56-1/2" spacing between the inside faces of the rail heads, as measured from a point 5/8" down from the top of the rail head. Narrow gage track is less than 56-1/2", and is commonly found in applications such as mining railroads. Broad gage is more than 58", and is used by transit lines for wider, more comfortable passenger cars.

Levels & Gages


PG-2 Pipe Track Gage, 15 lbs

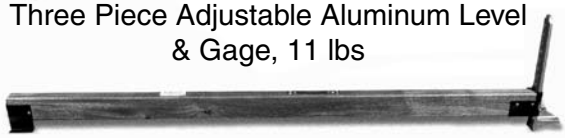

#3 Aluminum Track Gage, 6 lbs


#2 Combination Track Level, 5 lbs

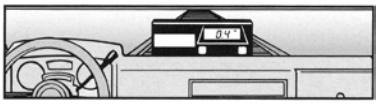

#23 Combination Level & Gage, 5 lbs

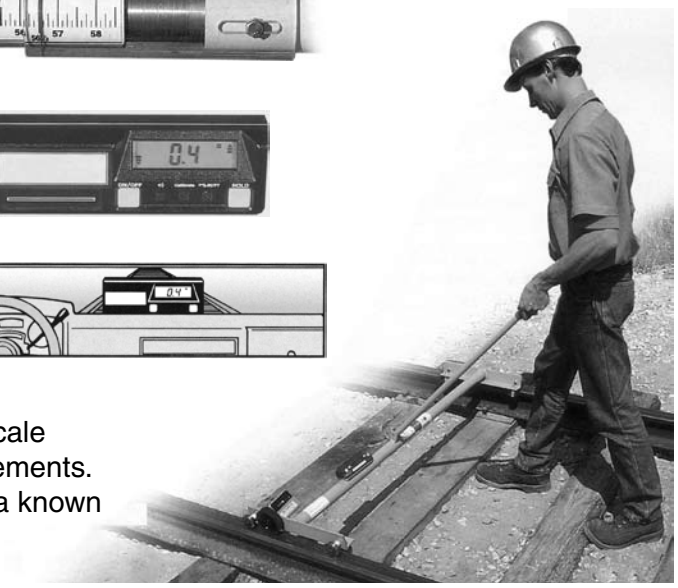

Two Piece Adjustable Aluminum Level & Gage, 11 lbs


Three Piece Adjustable Aluminum Level & Gage, 11 lbs


WL-2 Wood Track Level, 8 lbs

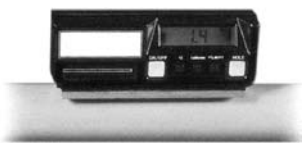
Rolling Track Gage Reader





With this product, the worker can check hundreds of yards of track without having to bend and stoop every few feet to check gage. Reader can measure up to 2" of gage variation (56" to 58" for standard gage track). The reader is a 2-piece, spring loaded telescoping steel assembly, quickly assembled on track. Hardened steel roller bearing completely insulated from the rails provide smooth travel. The side rollers make contact 5/8" below rail head to avoid runover burrs, yet pass over joint bars. Clear plastic lens has red line to indicate gage. Scale has large numerals and is subdivided to 1/8" increments. Knob on lens allows product to be "calibrated" to a known track gage before starting to inspect the track.

Accessories for Track Gage Reader


Digital Track Level, 5 lbs


Carrying Case, 19 lbs


Distance Counter, 5 lbs

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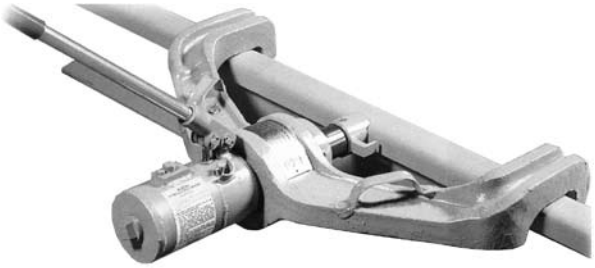
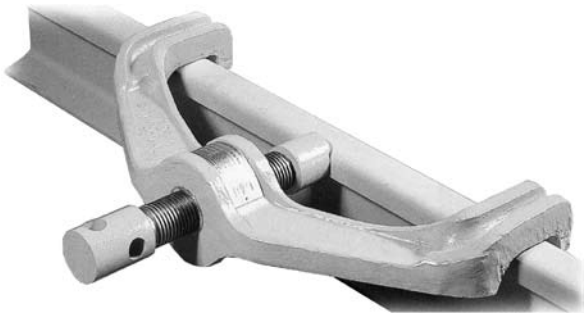
RAIL BENDERS





Hydraulic Rail Benders for light rails are the double hook type with a 25 ton hydraulic ram-pump or 50 ton ram with remote pump. They provide direct 90 degree pressure against the rail head between the hooks. The underlipped hooks of the frame have convex bearing surfaces to prevent crawling off the rail. The hydraulic benders are much easier to use than the manual screw type.

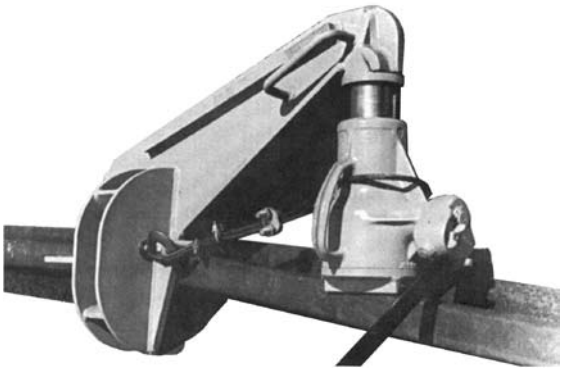
Do not use operating bar other than furnished.

Screw Type Rail Benders for light rails are designed with double-hook style cast steel frame and provide direct 90 degree bearing to the rail head. The operator uses a steel bar to turn the screw.

Model	Style	For Rails	Weight
3H50	50 ton ram	25-60 lbs/yd	127 lbs
2H50	50 ton ram	60-85 lbs/yd	170 lbs
MS2	Manual Screw	60-85 lbs/yd	100 lbs
3H	25 ton ram	25-60 lbs/yd	95 lbs
2H	25 ton ram	60-70 lbs/yd	138 lbs
MS1	Manual Screw	25-60 lbs/yd	72 lbs

Jack-Type Rail Benders are available in 25 ton, 35 ton, and 50 ton series. Benders consist of a steel frame, (one end of which fits over the ball of the rail, the other end is seated on the top of the jack), a safety cable, a jack, and a lever bar. They make stock and guard rail bends conveniently. A 50 ton bender will reliably generate 100,000 pounds of bending force and is especially well-suited to bending newer high-Brinell rail. A safety cable prohibits jack from slipping out of place. Rugged, but lighter weight than similar benders of same capacity. Built-in scale assures accurate duplication of bends.

Model	Max Bend	Max Rail Size	Weight
25 ton	5-1/2"	110 lbs/yd	180 lbs
35 ton	5-1/2"	132 lbs/yd	190 lbs
50 ton (T Rail)	6”	141 lbs/yd	361 lbs
50 ton (Undercut)	6”	141 lbs/yd	361 lbs



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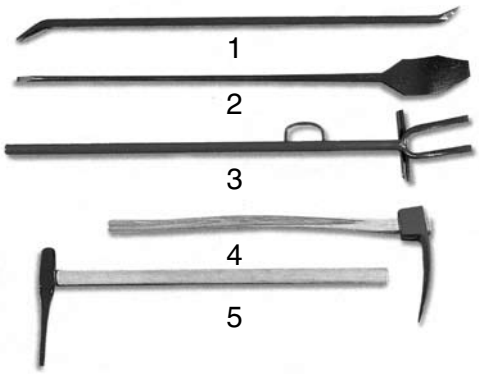
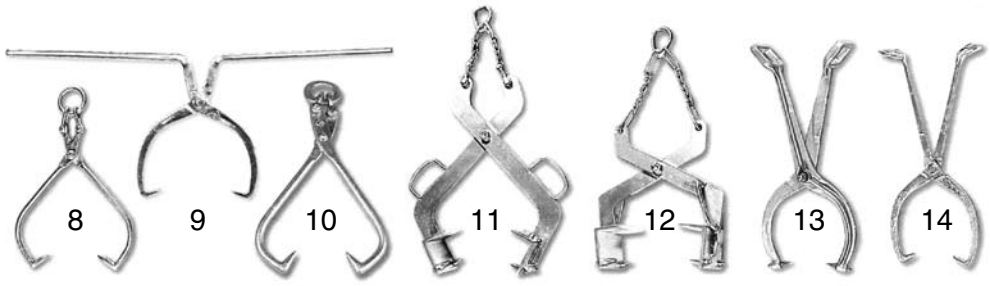
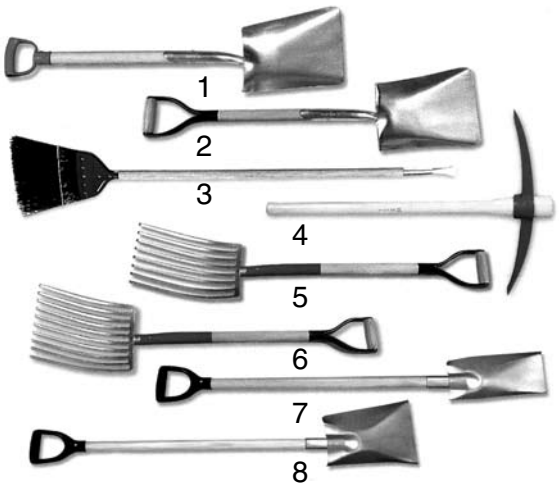
TRACK TOOLS

Tie & Timber Tools



Key	Description	Weight Lbs.	Jaw Opening
1	Timber Bar	17	–
2	Nipping Bar	18	–
3	Nipping Fork	17	–
4	Adze with handle	8	–
5	Tie Plug Punch	7	–
6	Tamping Bar	15	–
7	Hexagonal Telegraph Digging Bar	28	–
8	Skidding Tongs	10	21”
9	Two-Man Timber Tong	12	15-1⁄2”
10	Timber Dragging Tongs	15	20”
11	Tie Carrier (Crane Type)	37	19”
12	Timber Carrier (Crane Type)	51	29”
13	Aluminum Tie Tong With Replaceable Tips	9	15-1⁄2”
14	One-Man Tie Tongs	10	15-1⁄2”





Ballast Tools

Key	Description	Weight Lbs.
1	Ballast Shovel (Steel Handle)	10
2	Ballast Shovel (Wood Handle)	8
3	Switch Broom (Polypropylene Bristles)	5
4	Clay Pick	8
5	Ballast Fork (8 Tines)	6
6	Ballast Fork (10 Tines)	7
7	Aluminum Shovel (5-3⁄4” Blade)	2.6
8	Aluminum Shovel (9-1⁄4” Blade)	3.5

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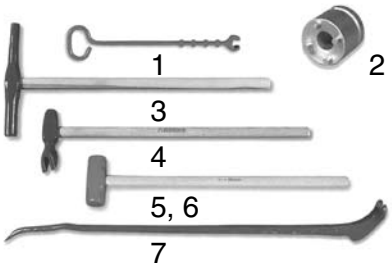
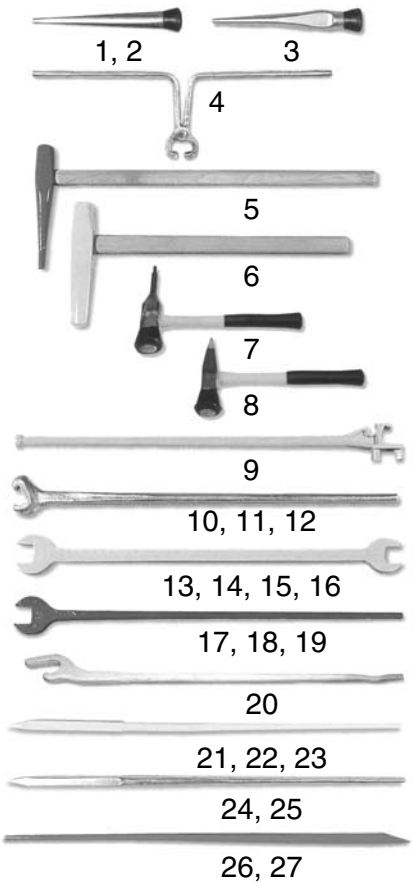
Spike Handling Tools

Key	Description	Weight/Lbs.	Jaw Opening
1	4-Knob Spike Puller	3	3/4”
2	Dome Head Spike Socket	5	–
3	Spike Maul	11	–
4	Track Spike Lifter	7.5	–
5	Sledge Hammer	8	–
6	Sledge Hammer	10	–
7	Claw Bar	27	9/16” x 5/8”



Rail Handling Tools

Key	Description	Weight Lbs.	Jaw Opening	Nut Size
1	Steel Drift Pin, Sml 3⁄8” Point	4	–	–
2	Steel Drift Pin, Med 9⁄16” Point	5	–	–
3	Steel Drift Pin, Lrg 3⁄4” Point	5	–	–
4	Two-Man Rail Tong	18	3-3/4”	–
5	Track Punch, Round C	8	–	–
6	Alloy Track Chisel	7	–	–
7	Bond Removal Punch	4	–	–
8	Cross-Cut Chisel	3	–	–
9	Rail Fork	13	–	–
10	Ratchet Action Track Wrench	8	1-1⁄2”	–
11	Ratchet Action Track Wrench	10	1-11⁄16”	–
12	Ratchet Action Track Wrench	10	1-7⁄8”	–
13	Double End Track Wrench	12	1-1/2” to 1-11⁄16”	1-7⁄16” to 1-5⁄8”
14	Double End Track Wrench	14	1-11⁄16” to 1-7⁄8”	1-5⁄8” to 1-13⁄16”
15	Double End Track Wrench	15	1-7⁄8” to 2-1⁄16”	1-13⁄16” to 2”
16	Double End Track Wrench	16	2-1⁄16” to 2-1⁄4”	2” to 2-3⁄16”
17	Single End Track Wrench	8	1-5⁄16”	1-1⁄4”
18	Single End Track Wrench	12	1-5⁄8”	1-5⁄8”
19	Single End Track Wrench	14	1-7⁄8”	1-13⁄16”
20	Rail Anchor Applicator	28	–	–
21	Wedge Point Lining Bar	18	–	–
22	Wedge Point Lining Bar	22	–	–
23	Wedge Point Lining Bar	26	–	–
24	Diamond Point Lining Bar	18	–	–
25	Diamond Point Lining Bar	26	–	–
26	Pinch Point Lining Bar	18	–	–
27	Pinch Point Lining Bar	26	–	–



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TRACK JACKS, TRACK LINERS

Ratchet Lever Jacks **"Quick-Trip" Jacks**


AL-87


AL-88


AL-89


Hydraulic


Manual

Track Jacks are used for a variety of track maintenance jobs such as surfacing, tamping, and lining track. Rugged construction permits full capacity to be used on the toe or cap of the jack. The jacks are designed to be used in conjunction with a lining bar (sold separately, see page IV-23) which fits into the square socket hole at the backside of the jack. Ratchet level jacks work on the same principle as automatic tire jacks: load is raised or lowered "tooth-by-tooth." Jack cannot be tripped under load. Quick-Trip jacks have "quick-trip" feature when under load. Requires **skilled operator.**

Model	Capacity	Cap/Retractor Height	Minimum Retractor Lift	Minimum Toe Height	Weight
AL-87	5 tons	17"	10"	1-5/8"	30 lbs
AL-88	10 tons	20-1/2"	12"	2"	42 lbs
AL-89	15 tons	23-1/4"	13"	2-1/2"	93 lbs
Hydraulic	10 tons	22"	9"	2"	50 lbs
Manual	15 tons	11"	5-1/4"	2"	30 lbs
Manual	15 tons	22-5/8"	13"	2"	49 lbs

Caution: Quick-Trip Track Jacks are intended for use only in railway track maintenance and are trip lowering. Trip lowering jacks quickly drop the load and cannot be safely lowered incrementally. They should not be used for general purpose lifting.

Track Liners are a husky, low-cost maintenance tool. Together with a lining bar (sold separately), this device is used to align tangent and curved track. Years of satisfactory service to the industry have identified these desirable features:

- Liners do not hump track
- No digging at end of ties is necessary
- Light, compact - liner weighs only 28 lbs
- Built for heavy duty and long life
- Forward movement comes from lifting on lining bar - safer and more effective than downward pull

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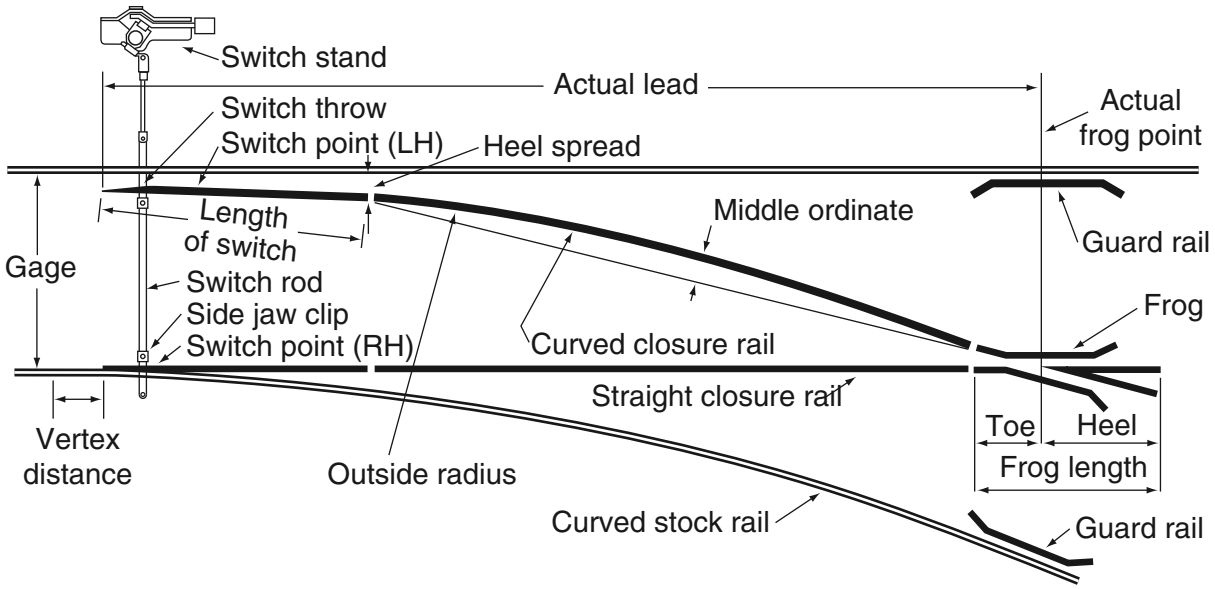
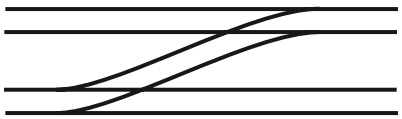
Standard Complete Turnout



The following pages show the standard design of the various components that make up a turnout. Designs shown are those most commonly specified, and can be modified to accommodate individual requirements. Turnouts for mining and tunneling applications can be mounted on steel ties and pre-assembled, or they can be shipped in components for assembly on site.

Track-Work Formations

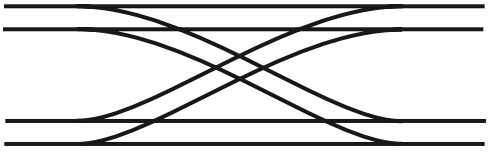
Diamond Crossing



Left Hand Crossover

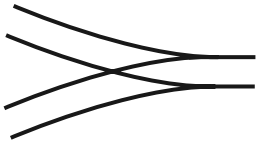
Straight Crossing

Left Hand Turnout

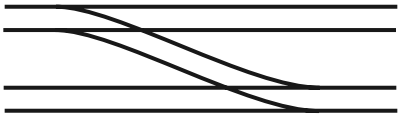


Double Hand Crossover

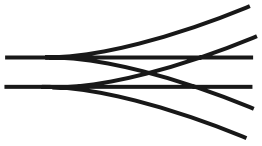
Right Hand Turnout



Equilateral Turnout



Right Hand Crossover



3 Way Turnout

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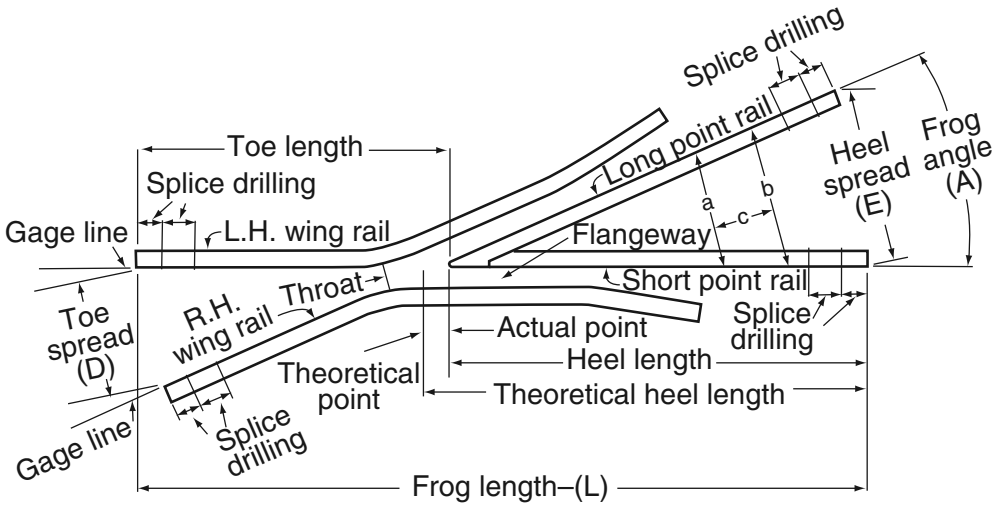
Determining Frog Number. Frogs are designated by numbers which correspond to certain angles called frog angles. The frog number is the ratio of its length to its width, or the number of inches in length necessary for it to spread one inch in width. For example, a No. 3 spreads 1 in 3, a No. 6 spreads 1 in 6, a No. 9 spreads 1 in 9, etc. By referring to trigonometric tables the frog angle (A) may be found if the frog number (N) is known. The formulas expressing the relationship between A and N are: N = 1/2 cot 1/2 A and cot 1/2 A = 2N.



In order to have good track, the angle of the frog must be suitable for the radius of the curve. Various rules and simple formulas which do not involve trigonometry may be used to eliminate guesswork in selecting proper frogs for various curves. The following formulas provide useful approximations, and the tables starting on page V - 21 give more exact information:

$$N = \sqrt{\frac{6R}{G}} \qquad R = \frac{GN^2}{6}$$

Here N is the frog number, R is the radius of the curve in feet, and G the gage in inches. The first of these enables the frog number to be found when the radius and track gage are known; the second gives the radius of curve corresponding to a certain frog number and track gage.

For example: What number frog should be used for a curve of 36 feet radius and a track gage of 36 inches?

$$N = \sqrt{\frac{6 \times 36}{36}} = 2.5 \text{ (approx.)}$$ Therefore, a No. 2-1/2 frog would be used.

What radius curve is proper with a No. 3 frog if the track gage is 42 inches?

$$R = \frac{42 \times 3^2}{6} = 63 \text{ feet}$$

The approximate frog number of any straight frog may be found by measuring the total length of the frog and dividing it by the sum of the spreads between gage lines at each end of the frog. Expressed as a formula,

$$N = \frac{L}{D + E}$$

where L, D and E are the measurements shown in the drawing above. These measurements should be made in the same units - either all in inches, or all in feet.

A Fast Method. The following method is also used to find the number of any frog. Measure across the frog at a place (a) where the distance between the gage lines is an even number of inches; measure again where the distance (b) is an inch greater than at (a); the number of inches (c) between the two measured sections (a and b) is the number of the frog. See drawing above.

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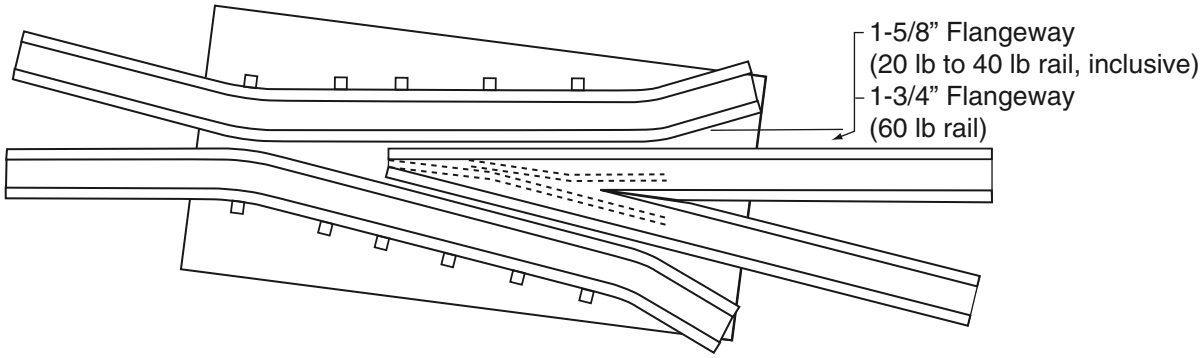
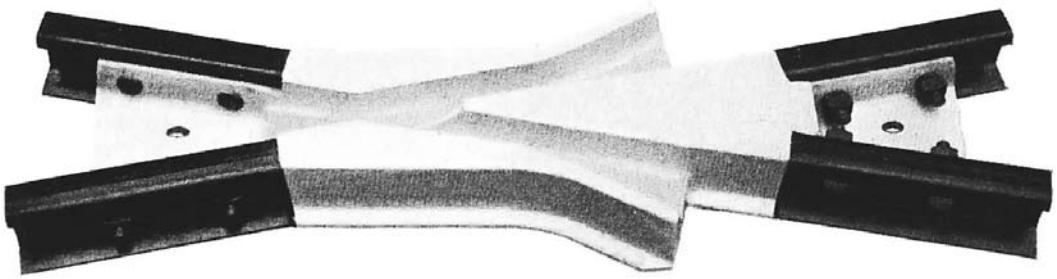
FROGS FOR LIGHT RAILS

Design 97



Welded Plate Frog Design 97 is recommended for use in mines, construction work and industrial plants where light rails are used.

Design 289



Design 289 is of one-piece construction, made of cast manganese steel. Being of one piece, it has no rivets or plates to work loose. It may be quickly installed, and will outwear several plate frogs. No splice bars are required, the rails being bolted directly to the plate arms, and special long heat-treated bolts with beveled washers are furnished where necessary. Frogs are made with 1/2 inch points.

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SOLID MANGANESE SELF-GUARDED FROGS

A **Solid Manganese Steel Self–Guarded Frog** is constructed with guides or flanges above its running surface. These flanges contact the tread rims of the wheels and safely guide the wheel flanges past the point of the frog. Thus, the self-guarded frog does not require the use of guard rails. This type of frog is used for yard tracks and main line tracks where the speed does not exceed 30 mph.

Standard AREMA Frog Lengths
Rails 112 lb. or Heavier

Frog No.	Total Length	Toe Length	Heel Length
4	5’11”	2’1”	3’10”
5	6’5”	2’1”	4’4”
6	7’4”	2’11”	4’5”
7	8’1-1/2”	2’11”	5’2-1/2”
8	8’11”	2’11”	6’0”
9	9’9”	2’11”	6’10”
10	11’4-1/2”	3’9”	7’7-1/2”

Quantities of Hook Twin Tie Plates

5-1/2” Base Rail									
Frog	L23	L27	H23	H27	H31	H35	LR23	LR27	LR31
5	4	2	4	2	0	2	0	2	0
6	4	2	4	2	0	2	0	2	2
7	4	4	2	4	0	2	2	2	2
8	6	4	4	4	2	0	0	4	2
9	6	4	4	6	0	0	2	4	2
10	6	4	6	6	2	0	2	4	2

6” Base Rail									
Frog	L23	L27	H23	H27	H31	H35	LR23	LR27	LR31
5	4	2	4	2	0	2	0	2	0
6	4	2	4	2	2	2	0	2	2
7	4	2	4	4	2	2	0	2	2
8	4	4	4	4	2	2	0	4	2
9	4	4	6	6	2	0	0	4	2
10	6	4	6	6	2	0	2	4	2

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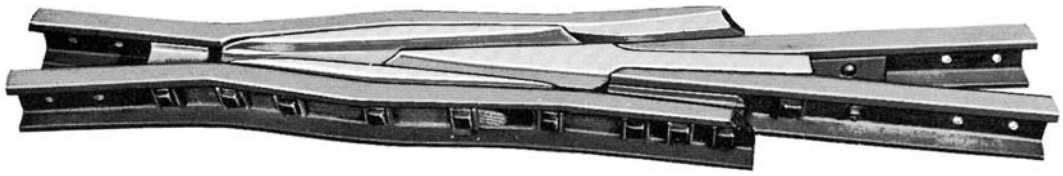
RAILBOUND MANGANESE FROGS



A **Railbound Manganese Steel Frog** is constructed with a manganese-steel body casting. This casting is fitted into and between four rails that are specially fabricated from standard tee rails. The assembly is fastened with heat-treated bolts. This type of frog is used for heavy and/or high-speed main line service, where the traffic is approximately equal on both sides of the frog.

Standard AREMA Frog Lengths
Rails 112 lb. or Heavier

Frog No.	Total Length	Toe Length	Toe Spread	Heel Length	Heel Spread
6	11'0"	3'9"	7"	7'3"	14-15/16"
7	12'0"	4'8-1/2"	7-9/16"	7'3-1/2"	13"
8	13'0"	5'1"	7-1/8"	7'11"	12-3/8"
9	16'0"	6'4-1/2"	8"	9'7-1/2"	13-5/16"
10	16'6"	6'5"	7-3/16"	10'1"	12-5/8"
11	18'8-1/2"	7'0"	7-1/8"	11'8-1/2"	13-1/4"

Quantities of Hook Twin Tie Plates

5-1/2"Base Rail						
Frog	L23	L27	L31	LR23	LR27	LR31
6	4	8	2	2	2	2
7	4	10	2	2	2	2
8	6	10	2	2	4	2
9	8	10	2	2	4	2
10	10	10	2	2	4	2
11	10	12	2	4	2	2

6" Base Rail						
Frog	L23	L27	L31	LR23	LR27	LR31
6	4	8	2	2	2	2
7	6	10	2	2	2	2
8	6	10	2	2	4	2
9	8	10	2	2	4	2
10	10	12	2	2	4	2
11	10	14	2	4	2	4

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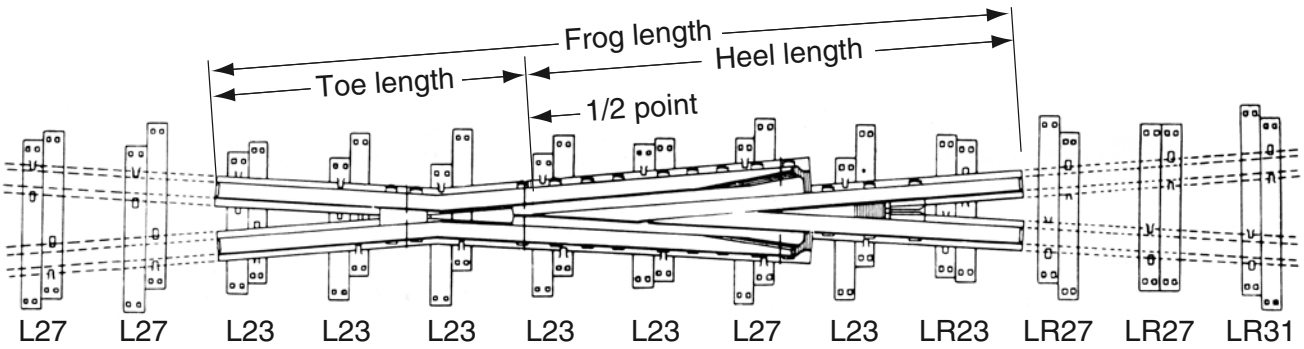
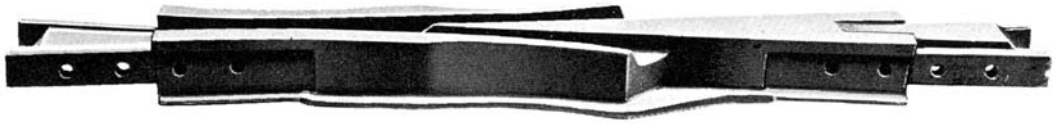
RIGID BOLTED & MANGANESE FLAT-TOP FROGS



This **Rigid Bolted Frog** is manufactured strictly in accordance with the AREMA specifications. It is durably constructed of rolled steel filler, steel rail heel riser, cast iron toe and heel blocks, and heat-treated bolts applied with driving fit in the holes. It is furnished with extended points and a 45 degree bevel on the wing rails. This frog is recommended for heavy duty yard use and medium speed turnouts. (Number of hook twin tie plates depends on frog number; above quantities shown for example only.)



A **Solid Manganese Steel Flat–Top Frog** is essentially a one-piece casting made of manganese-steel. This type of frog may be used as an alternative to a railbound manganese-steel frog for heavy main line slow-speed traffic.

Standard AREMA Frog Lengths
Rails 112 lb. or Heavier

Frog No.	Total Length	Toe Length	Heel Length	Toe Spread	Heel Spread
4	5’11”	2’1”	3’10”	5-11/16”	12”
5	6’5”	2’1”	4’4”	4-1/2”	10-7/8”
6	7’4”	2’11”	4’5”	5-5/16”	9-5/16”
7	8’1-1/2”	2’11”	5’2-1/2”	4-1/2”	9-13/32”
8	8’11”	2’11”	6’0”	3-7/8”	9-1/2”
9	9’9”	2’11”	6’10”	3-3/8”	9-19/32”
10	11’4-1/2”	3’9”	7’7-1/2”	4”	9-5/8”
11	12’2-1/2”	3’9”	8’5-1/2”	3-9/16”	9-23/32”
12	13’0”	3’9”	9’3”	3-1/4”	9-3/4”

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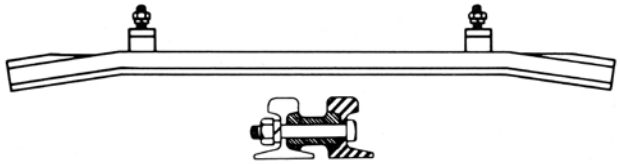
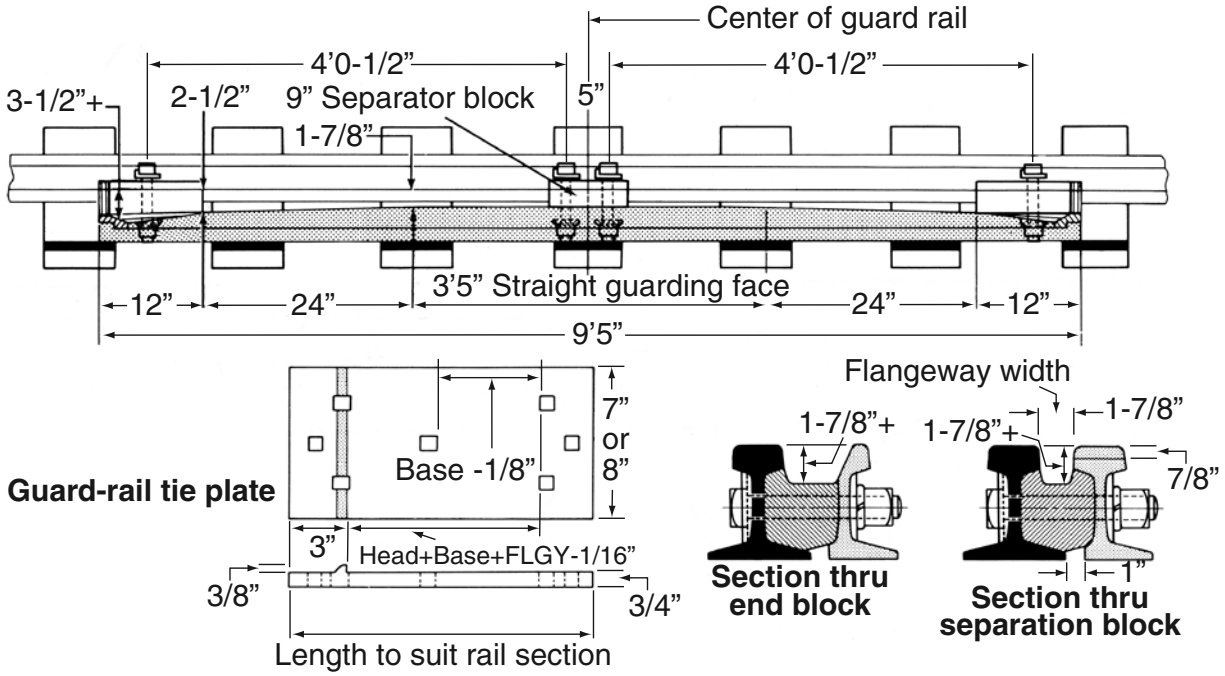
GUARD RAILS

A **Guard Rail** is a rail laid parallel with the running rails to hold wheels in correct alignment. Guard rails are most commonly used opposite a frog where they prevent derailments and protect the point of the frog.

American Mining Congress Design guard rails (shown below) are used with light rails in mines and industrial plants. They have the flares bent and the flanges removed, and are equipped with blocks and bolts for mounting onto the stock rails. American Mining Congress recommended lengths are 4' 6" for No. 2, 2-1/2 and 3 frogs; 6' 0" for No. 4, 5 and 6 frogs and 8' 3" for No. 7 and No. 8 frogs. A 1-5/8" flangeway width is standard for rails up to 75 lb. A 1-7/8" flangeway width is standard on 80 lb and above.



AREMA Design guard rails are planed and beveled, and are equipped with distinct end and separator blocks. These blocks come complete with bolts, nuts, spring washers, head locks and web washers. These guard rails are commonly used with single plates (either flat or shouldered) or twin tie plates (either flat or hook). The standard lengths, and quantities of blocks and single plates are given in the tables below.



AREMA Design Plan 504-71

Length	Separator Block	End Block	Plates
9'5"	1	2	7
12'6"	2	2	9
15'0"	2	2	10

AREMA Design Plan 504-89

Length	Separator Block	End Block	Plates
13'0"	2	2	9
16'6"	3	2	11
20'0"	4	2	13

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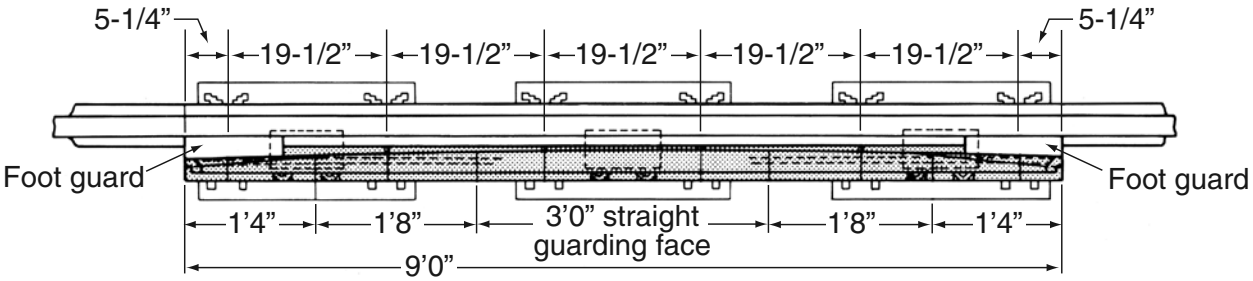
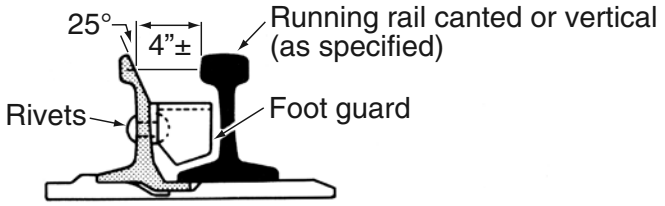
ONE–PIECE GUARD RAILS

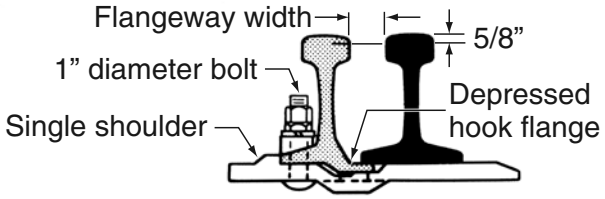
One-piece guard rails are manufactured with plates integral with the guard rail, and the unit is shipped in one piece ready to install. It is not necessary to field-drill holes in the running rail and there are no separator blocks to vibrate loose. Staggered holes in the plates generally allow leeway for gaging guard rail with frog, and use with more than one rail section. These guard rails can be supplied level with the running rail, but a height 1/4" higher than running rail is recommended where conditions permit. In any case, the height should not be more than 1" above the top of the running rail. Some railroads specify guard rails of different heights for the same turnout, with the high guard rail to be placed on the turnout side of the frog.

Hook-flange guard rails (below) are manufactured from rail sections rolled especially for this guard rail.



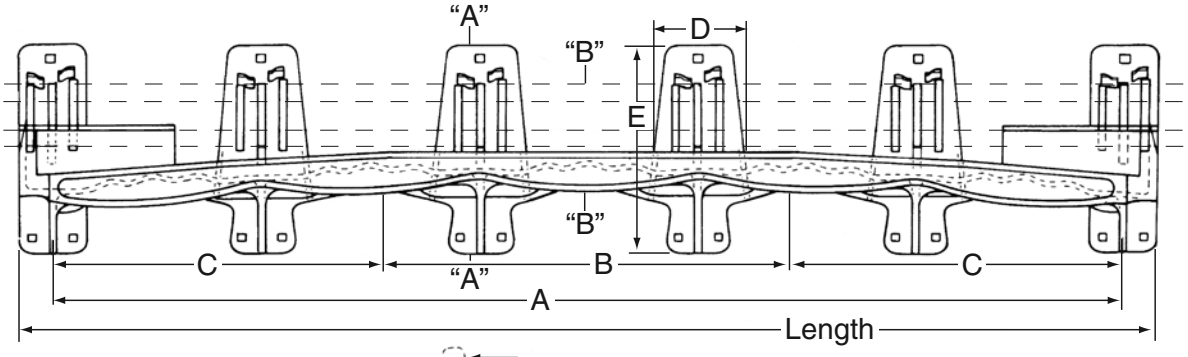


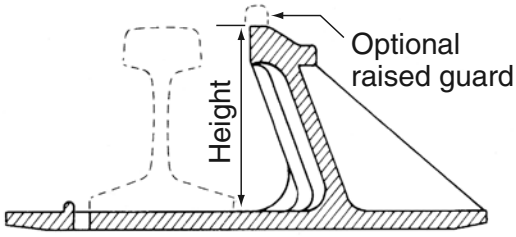
Section at end of guard rail



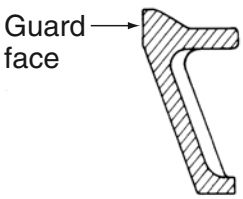
Section between ties

Manganese one-piece guard rails (below) consist of a single casting of manganese steel with a reinforced head and corrugated web. They come in a variety of lengths and are marked with the year cast and the height of the guard rail.





Cross section "A-A"



Cross section "B-B"

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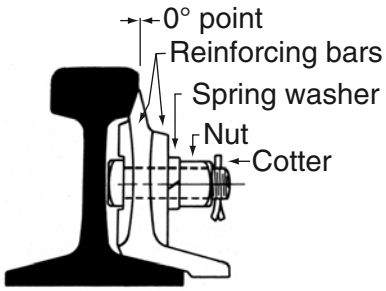
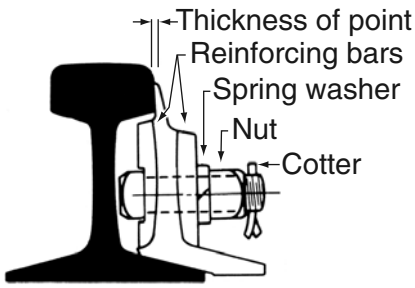
SWITCH POINT DETAILS

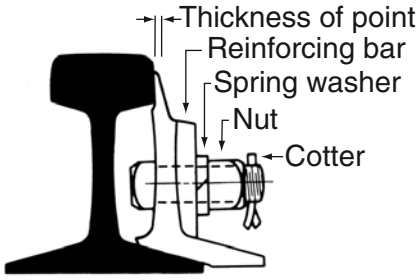
Shown below are end views of typical switch point constructions. The drawing on the top left shows a Samson (detail 5100) construction, while the other three show the standard Knife-blade (detail 6100) construction. Samson switch points are used on main line or heavy duty locations. Knife-blade points are generally used for industrial and yard applications. Non-reinforced switch points are typical for rails lighter than 90-lb. used for mining or tunneling. Single-reinforced switch points are commonly used for industrial tracks, and double reinforced are used in heavier duty locations.



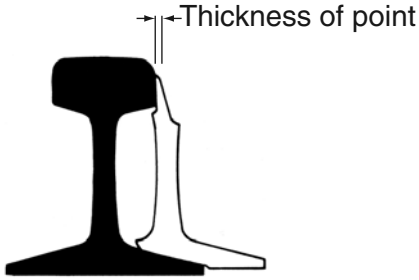
Double Reinforced Samson (Detail 5100)
(Note: undercut required on stock rail)



Double Reinforced Knife-Blade (Detail 6100)



Single Reinforced Knife-Blade (Detail 6100)



Non-Reinforced Knife-Blade (Detail 6100)

Shown below are the three most common types of switch point clips. These clips are attached to the switch point using the two upper holes. The lower holes are used for connecting to the switch rod, The proper switch rod is determined by the type of switch point clip used. Both the transit and Eureka clips allow for adjustment of the spacing between switch points. The side-jaw clips are not adjustable.

Transit Clip

Side-Jaw Clip

Adjustable Side Jaw Clip ("Eureka Clip")

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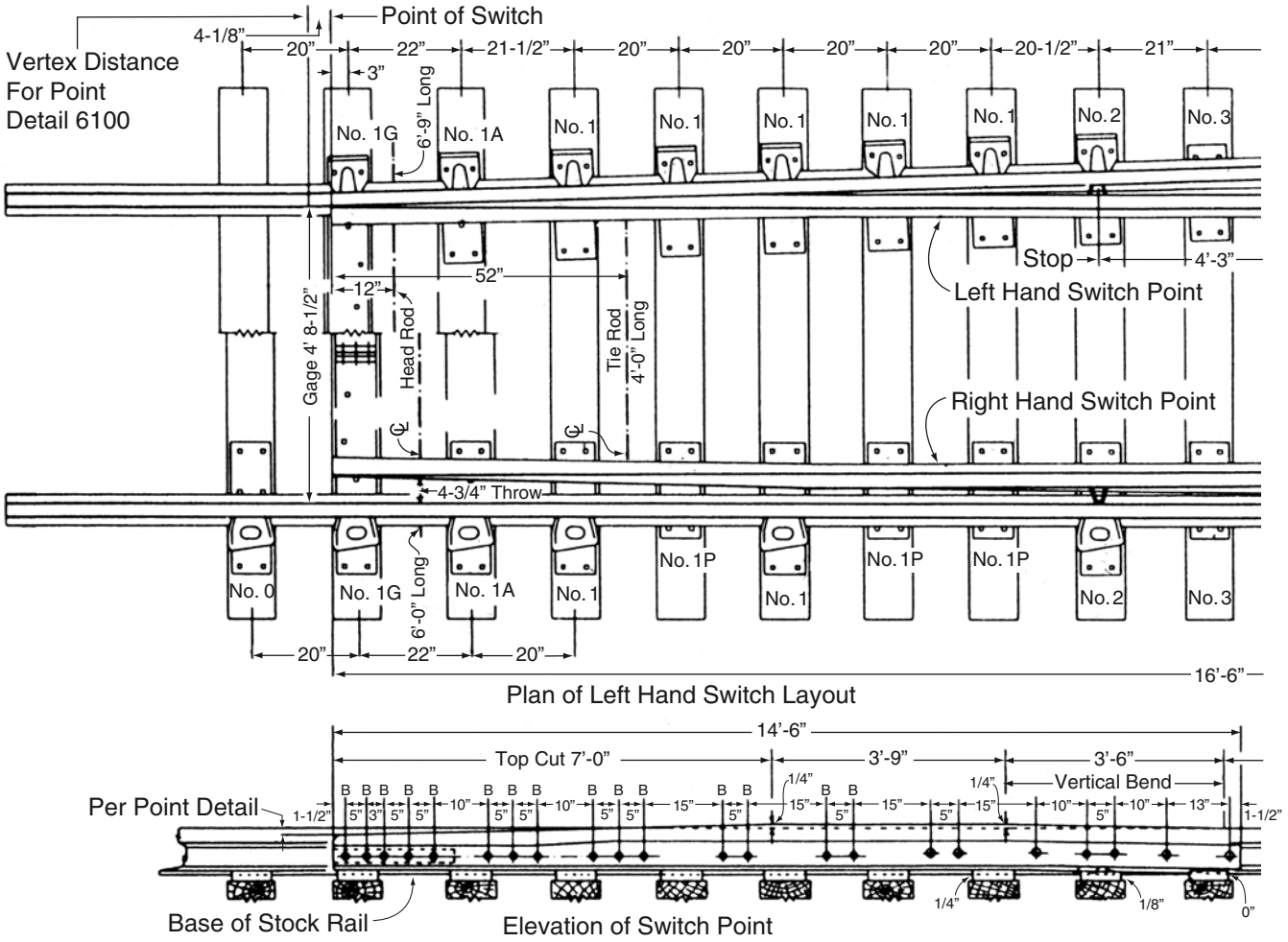
16’6” STRAIGHT SPLIT SWITCH WITH GRADUATED RISERS



Shown on these two pages is a typical switch layout for a 16’6” straight split switch with graduated risers. This switch is typically used for number seven through number ten turnouts. The layout here is shown for a left-hand turnout, but the components are the same for either a left or right-hand configuration. Switches like this one can be supplied with either rigid or adjustable braces. The adjustable braces are more expensive, but are preferred in heavier duty applications. The illustration above shows both rigid and adjustable brace options. The rigid brace plating pattern is shown on the rail at the top of the page and the adjustable brace pattern is shown on the rail below. The actual layout would follow one pattern or the other; either all rigid or all adjustable braces. Listed on the opposite page is a typical bill of materials for a 16’6” switch with adjustable braces. The gage plates and switch rods can be supplied with insulation if necessary. The bill of materials is frequently changed to accommodate specific customer preferences. Common changes include: substituting rigid for adjustable braces, adding the No. 0 plates, and using flat twin or fewer hook twin tie plates.

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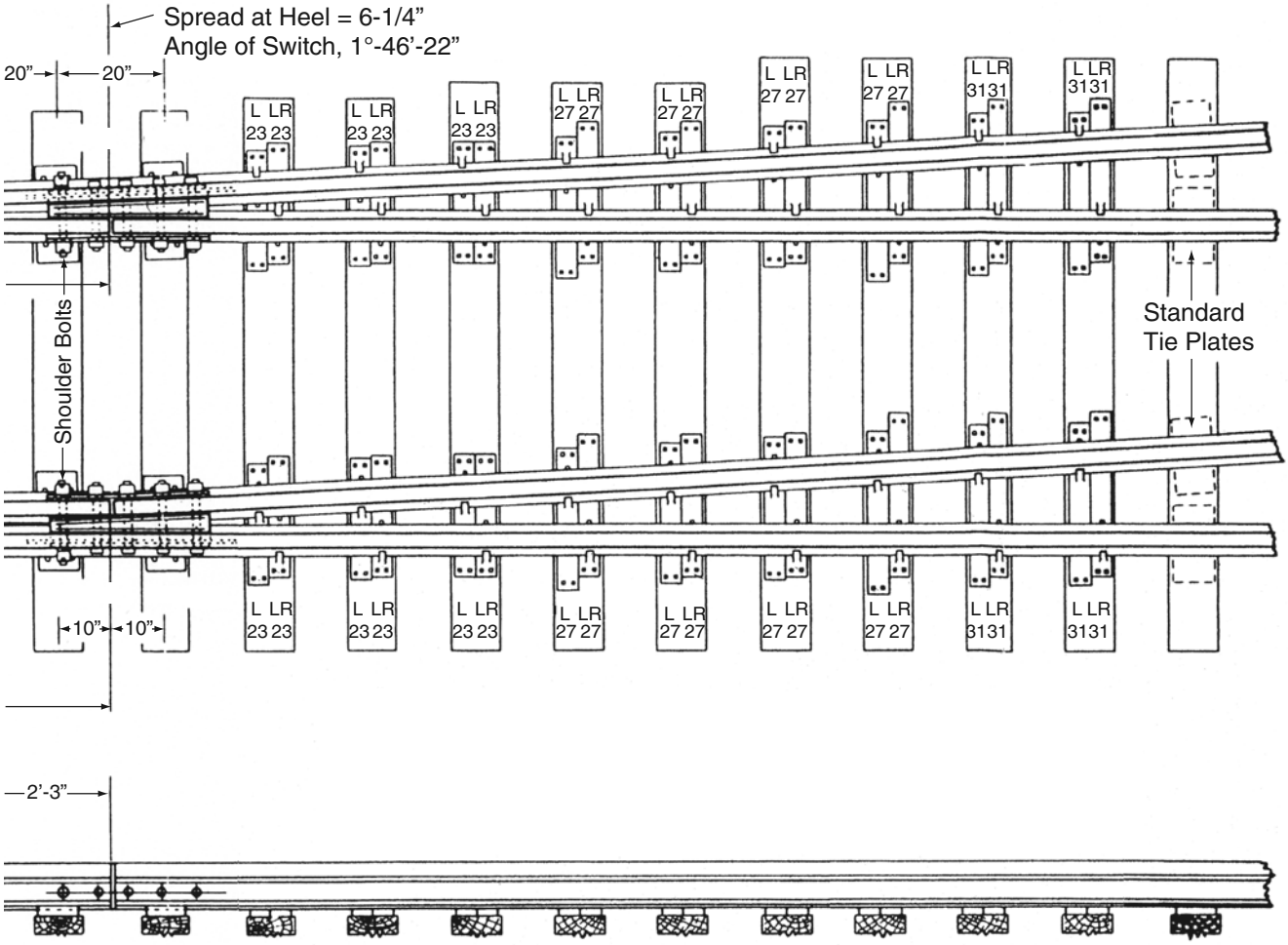
16’6” STRAIGHT SPLIT SWITCH WITH GRADUATED RISERS



Typical bill of materials:

1 pair	16’6” Single Reinforced Switch Points with transit clips
1 each	Non-Insulated Head Rod
1 each	Non-Insulated Tie Rod
1 each	Non-Insulated Gage Plate (No. 1G) with adjustable braces
8 each	Brace Plates with adjustable braces (2 ea. No. 1A, 4 ea. No. 1, and 2 ea. No. 2)
6 each	Shoulder Slide Plate (No. 1P)
2 each	Plain Plate (No. 3)
4 each	Heel Plates
36 each	Hook Twin Tie Plates (6-L23, 6-LR23, 8-L27, 8-LR27, 4-L31, 4-LR31)
1 pair	Single Hole Floating Heel Block Assemblies complete
1 each	Switch Stand with Connecting Rod

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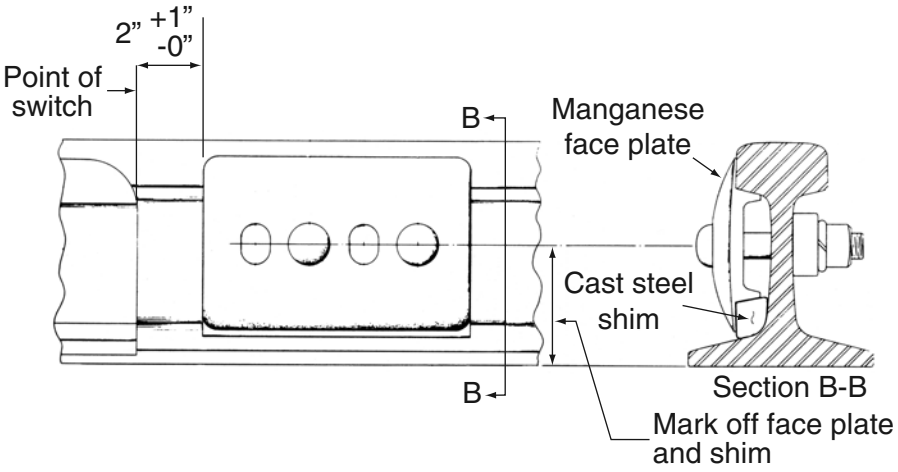
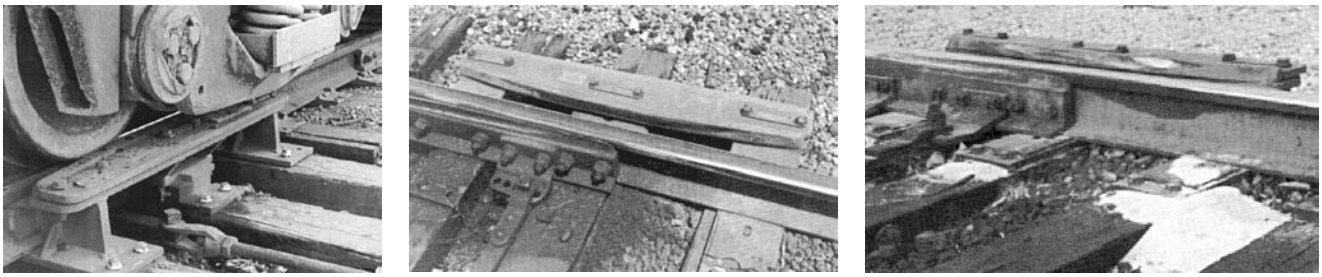
SWITCH POINT PROTECTORS & GUARDS



Switch Point Protector increases the service life of switch points by absorbing the impact of passing car wheels. The protector momentarily deflects the wheel flange so it misses the tip of the switch point. The protector is bolted to the inside of the straight stock rail leading into the switch. Normally, the protector is placed two inches ahead of the switch point tip, but this distance may vary due to speed and traffic conditions. This switch point protector is available in most standard rail sizes, and is reversible, to increase its useful service life. Furnished complete with manganese-steel face plate, bolts, nuts, spring washers and steel shim.

Model FM Switch Point Guard



Properly installed, well maintained, switch point guards are valuable maintenance aids and safety accessories. They extend the service life of costly switch points by deflecting the train wheels away from the vulnerable switch point tip. This same deflecting action enhances safety by helping to prevent a worn wheel flange from "picking the point" and causing a derailment. The reinforcement of the track structure that is achieved with the use of a switch point guard both lengthens the service life of the switch components and reduces the possibility of track spreading, or roll-over of the rail.

The model FM Switch Point Guard features an adjustable and replaceable wear bar made of manganese steel. As this bar wears, it can be moved outward to extend its service life. After it is completely worn out, it can be replaced easily without disturbing the track structure. Model FM comes in a basic unit for installations without a gage plate or it can be ordered to fit over most common gage plates. When ordering Model FM, please specify your tie spacing and whether or not you want it to fit over an existing gage plate. If so, specify the style of braces used with your gage plate.

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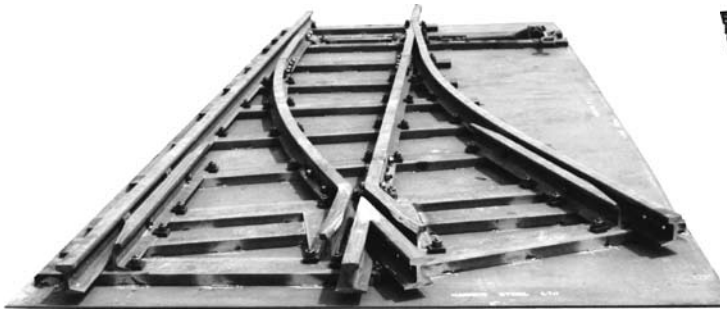
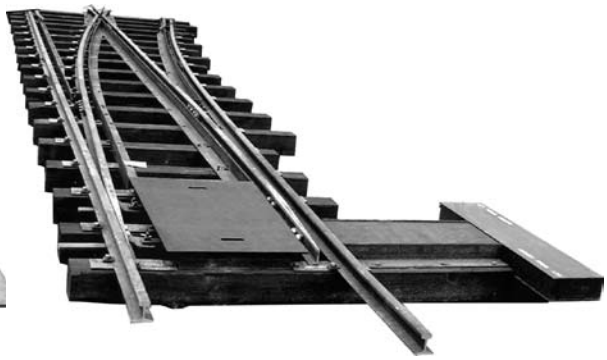
PREASSEMBLED LIGHT RAIL TURNOUTS

Preassembled turnouts utilizing steel ties provide many advantages. These turnouts are constructed by experienced personnel in a controlled shop environment which ensures quality and consistency. Rail is securely and accurately clipped to proper gage on steel ties. This not only provides a better quality, more durable turnout, but also eliminates costly on-site labor expense.

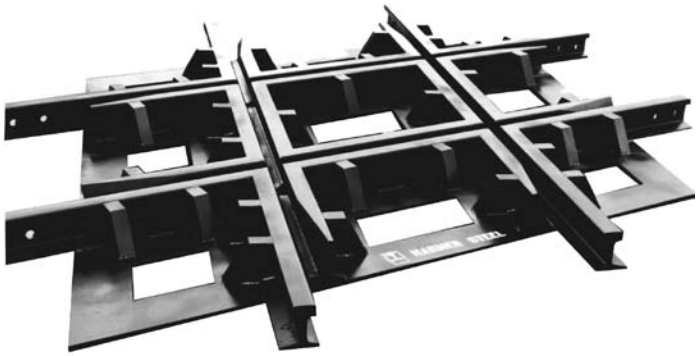
Shown below are several examples of preassembled turnouts. These turnouts can be made from all new rail, all relay rail, or a combination of the two. They can also be mounted on one large steel plate for even greater strength and durability. Preassembled turnouts are normally made for applications utilizing rail up to 90-lb. per yard. When ordering, specify rail size, track gage, frog number, and whether the turnout is right-hand, left-hand or equilateral. Harmer can supply drawings showing detailed dimensions for your approval. Special crossovers, diamond crossings and other special trackwork formations are also available.



Left-Hand Turnout on Plate



Right-Hand Pavement Turnout



70 Degree Diamond Crossing

Equilateral Turnout

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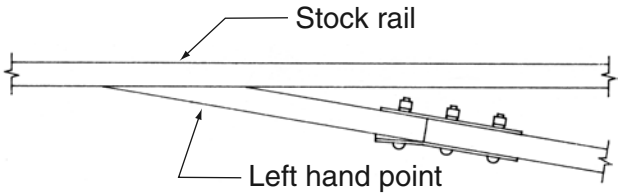
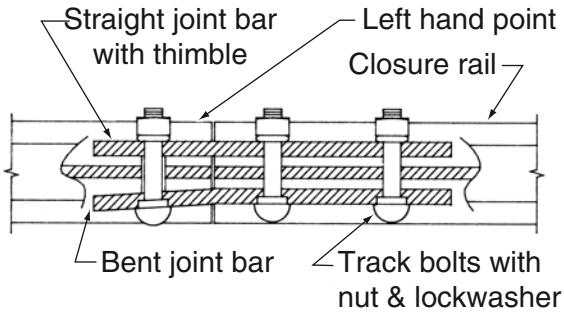
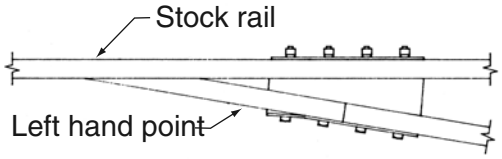
HEEL JOINTS

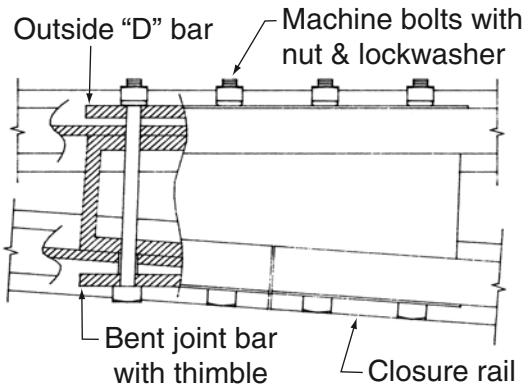
Design 990 Heel Joints are commonly used with narrow gage mining turnouts to prevent looseness at the heel of the switch point. Use of a pipe thimble permits the heel joint to be drawn up absolutely tight while at the same time allows the point to move freely. These heel joints are made of plain splice or angle bars only. A pipe thimble is welded to one bar, and the other bar is bent slightly. Normally three-hole bars are used when the switch is less than 5', and four-hole bars are used for switches that are 5' or longer.



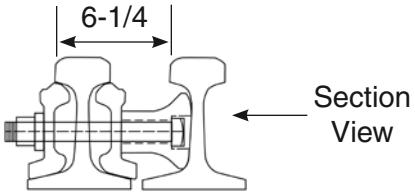


Standard Heel Block Assemblies are used in many standard gage industrial switches. They hold the switch point firm at the heel, maintain proper spread, and keep closure rail and switch point in correct alignment. These assemblies consist of a block, bent-and-planed bar, outside bar, thimble and bolts. The block can be made of cast iron or steel, or of welded steel construction. The outside bar can be a "D-bar" strap or a standard joint bar. Square-head bolts are usually used with the D-bar and track bolts are used with the joint bar. A shoulder-bolt is sometimes used instead of the thimble and standard bolt.





Floating heel blocks perform the same function as standard heel blocks, but they do not bolt through the stock rail. This type of heel block assembly is very versatile because the same block can be used for switches of various lengths. The **Single Hole Floating Heel Block Assembly** shown at right consists of a block that bolts to the joint bars and fits up against the stock rail. A thimble is not normally used so the hole in the switch point does not need to be oversized. Another style of floating heel block is used for switches in continuously welded rail. This "cwr" style block bolts directly to the switch point rail with two bolts and no joint bars are required.



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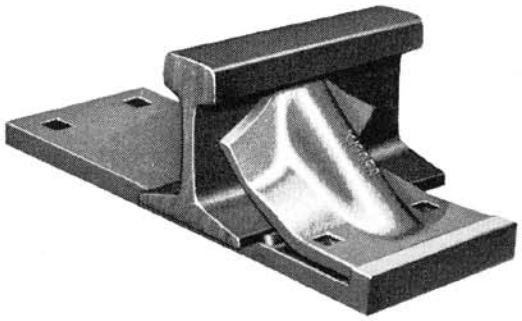
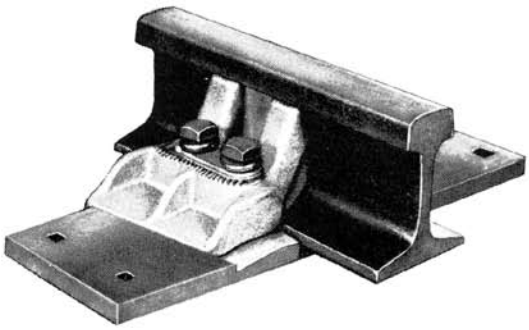
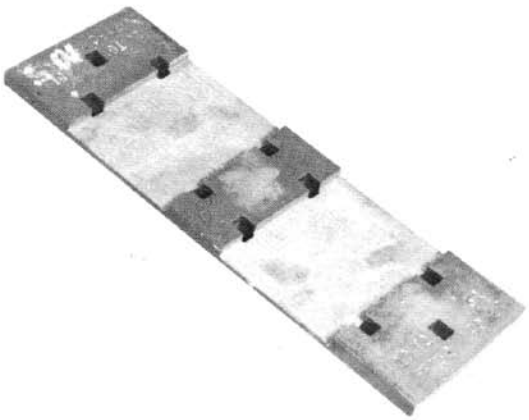
Rigid Brace & Brace Plate
The rigid brace is the most common brace for industrial switches. The brace plate is designed to fit a particular style brace and is often called a "combination plate," "riser plate," or "slide plate." The riser of this plate can be formed in several ways. A pressed riser is formed by pushing up the steel under the riser area. A welded riser utilizes an additional steel shim which is welded to the plate. A milled riser is formed when a "pocket" or "seat" for the rail is milled out of the plate.



Adjustable Rail Brace & Plate
Adjustable rail braces are used for heavy-duty and main line switches. They allow the brace to be installed and later adjusted without disturbing the stock rail or plate. Adjustable braces come in several different designs. Shown at right is a "2-bolt" AREMA type design.



Turnout Pocket Plate
This type of plate is used behind the heel of a switch in heavy-duty applications where it is preferred over twin tie plates. These plates are designed to fit a specific rail section, switch length, tie spacing, and turnout alignment. These plates can be milled right-hand, left-hand, or no-hand. The no-hand plates can be used in either a right or left-hand turnout, but the right and left-hand plates are not interchangeable.



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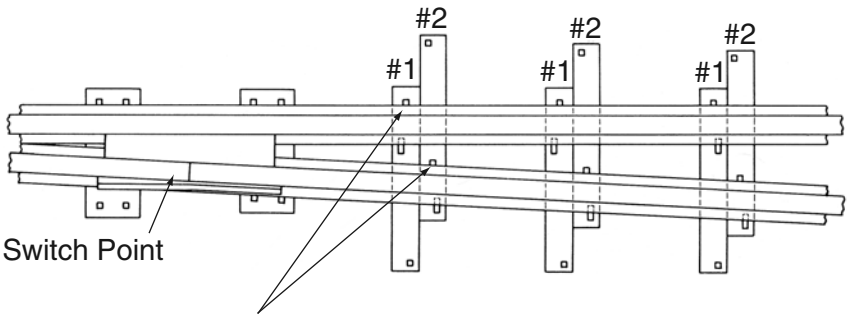
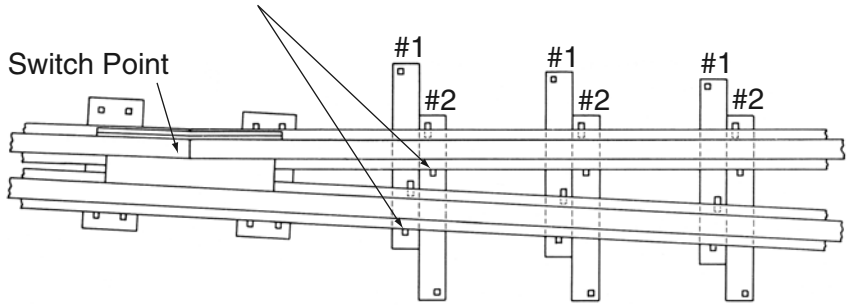
TWIN TIE PLATES

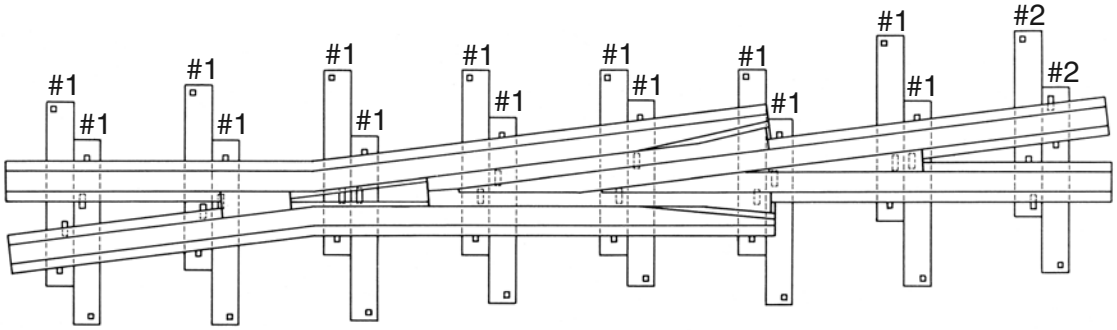
Twin Tie Plates are used for frogs, guard rails, and behind the heel of switches. They are produced to standard AREMA designs and are very versatile. The slotted hole allows them to fit almost any rail section. Their use in pairs, side by side on the same tie, allows them to adapt to different tie spacings, frog angles, etc. The standard AREMA thickness is 3/4", but a 5/8" thickness is common for industrial trackwork. Two typical applications are shown below.



Note: Square Spike Holes (or Hooks) Must Always be on Outside of Rail



Application of Twin Tie Plates No. 1 & No. 2 Behind the Heel of a Switch



Application of Twin Tie Plates No. 1 & No. 2 on Bolted Rigid Frog
Note: Twin Tie Plate No. 2 (or Type LR) to be used on Heel of Frog only
Where it is Possible to Spike Between Rails

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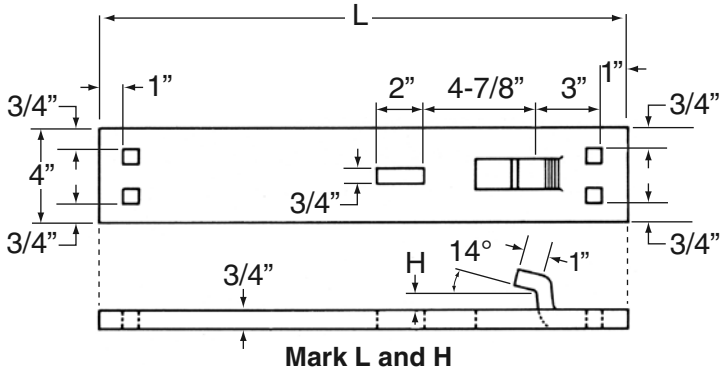
TWIN TIE PLATES

Hook Twin Tie Plates

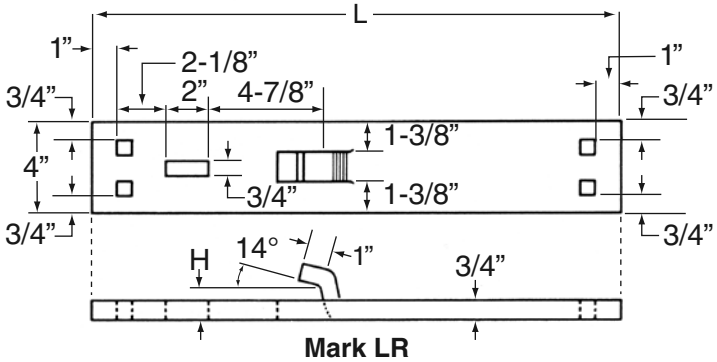
Hook Twin Tie Plates are manufactured per AREMA plan 241. Hook twin tie plates generally come with three types of hooks: Low – Type L, Low Reverse – Type LR, and High – Type H. Type H plates do not have the slotted hole and have a higher hook designed to fit over the base of a manganese frog. If the hook of a hook twin tie plate interferes with a joint bar, the hook can be cut off or bent to a vertical position.



Mark L and H

Hook Twin Tie Plates are manufactured per AREMA plan 241.

Mark	L	H	Wt. (lbs.)
L23	23"	9/16"	18.8
L27	27"	9/16"	22.2
L31	31"	9/16"	25.6
H23	23"	15/16"	19.1
H27	27"	15/16"	22.5
H31	31"	15/16"	25.9
LR23	23"	9/16"	18.8
LR27	27"	9/16"	22.2
LR31	31"	9/16"	25.6

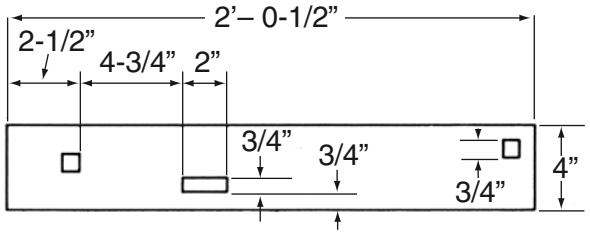


Mark LR

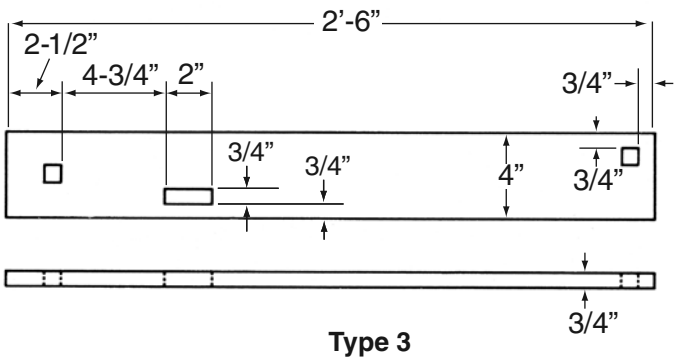
Flat Twin Tie Plates

Flat Twin Tie Plates are manufactured as shown.

Type	Weight (lbs.)	
	5/8" thick	3/4" thick
No. 1	16.9	20.3
No. 2	16.9	20.3
No. 3	20.8	24.9



Type 1



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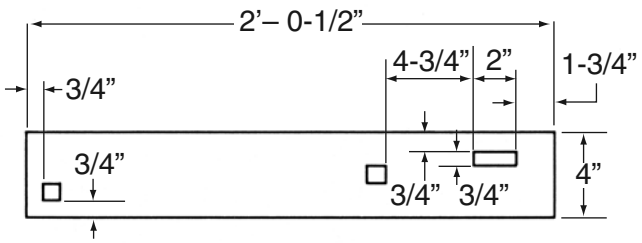

Type 2

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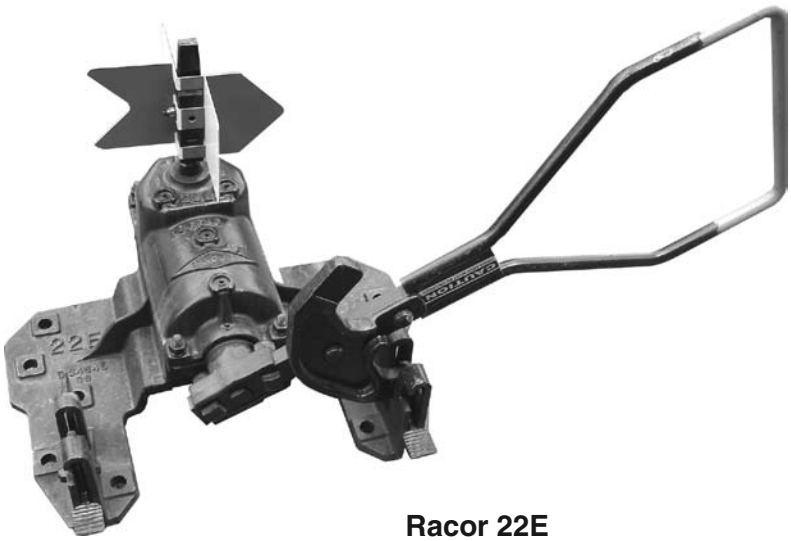
The **Racor 22E** and **22EH** are extra-heavy-duty trailable switch stands. The low stand 22E is for yard, ladder and busy switch turnouts, where trains often run through switches. The 22EH is constructed of identical base housing and operating parts, but features a high mast and target, providing increased visibility where needed. The 22E and 22EH can be trailed or thrown manually. When a train runs through the switch, switch points are partially opened by the wheel flanges, and the throw is completed automatically. This eliminates expensive repairs to stand, track and derailed equipment that result when a train runs through a switch with a rigid stand.



Racor 22E

Racor 36EH

The **Racor 36E** and **36EH** are extra-heavy-duty non-trailable switch stands for unrestricted use. Both models have identical base housing and operating parts. The 36E is most often used for yard operations, while the 36EH, with high mast and target, is suitable for mainline use.

All switch stands shown on this page are supplied with an adjustable connecting rod and screw eye crank which permits accurate setting of the points without re-spiking the stand. They also come with the ergonomic “trihandle.” This triangular hand lever has a grasp point that is 30” above the ground, helping to prevent risky bending and lifting. The typical 180° movement of the lever has been reduced to 120°, so the switch can be thrown with minimal operator motion.

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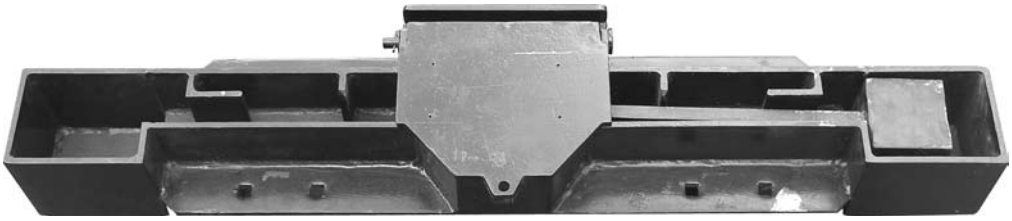
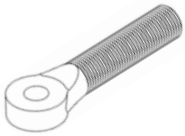
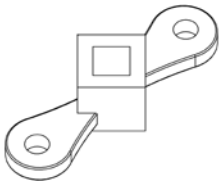
The **Harmer Pavement Switch Stand** is designed for use where switches are in paved areas. It is installed outside the tracks like any standard switch stand. When specified, it can be supplied with fabricated boxes to surround the connecting rod. This stand can be equipped with either a screw-eye or a breakable crank. The screw-eye allows for greater adjustment of the throw, but the breakable crank protects the installation from damage if the switch is accidentally trailed. The height of the stand is 6-1/4" inches, but it can be shimmed up for larger rail sections so that it will be flush with the top of the rail. In some cases, an offset connecting rod should be used. Contact a Harmer representative to help determine the best connecting rod and crank to use for your application.

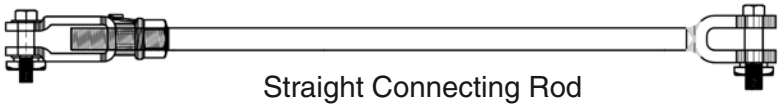




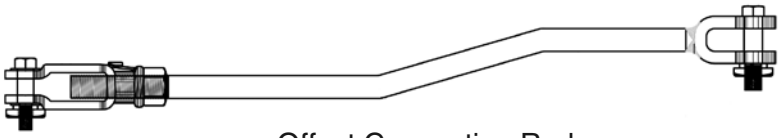
Screw Eye



Breakable Crank



Straight Connecting Rod



Offset Connecting Rod

Model 51A is a heavy duty non-trailable switch stand of gear-type construction. It utilizes a breakable crank so that if it is trailed through, the crank will break before other more expensive parts are damaged. The crank has two posts so that if one gets broken, the other can be utilized. The crank is available in various lengths, but the most common one yields a 4-3/4" throw. Small adjustments in the throw can be made from inside the stand without disconnecting the stand from the rods. Adjustments are made by means of shims which adjust (but do not entirely remove) the free play on either side of the spindle lug. The shims are easy to reach in storage spaces under the adjustment cover at the top of the stand. Model 51A is equipped with an ergonomic bow handle and non-integral foot latches.

Model 51A

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SWITCH STANDS FOR LIGHT RAILS

Design 10 and 11 switch stands are parallel throw stands of the cam operated type. They are flat bottomed and very low profile. All moving parts are above the ties where they are readily accessible and free from dirt. The amount of the throw is easily adjustable by means of the screw-eye crank. These stands are normally supplied without a target, but can be furnished with target upon request. They are available with either a rigid or spring connecting rod.

Design 10 Switch Stand is intended for use with rails weighing up to 60 lbs per yard. It weighs 38 lbs and can be ordered with either Design 8 spring connecting rod or a Design 8 rigid connecting rod.

Design 11 Switch Stand is intended for use with rails weighing 60 lbs or more per yard. It is provided with locking ears so that the lever may be padlocked in either position. It weighs 70 lbs and can be ordered with either Design 9 spring connecting rod or Design 10 rigid connecting rod.

Connecting Rods

The length of all connecting rods shown below can be adjusted by means of a threaded clevis. The rigid rods have adjustable clevises on both ends. Spring connecting rods are recommended for any installation where there is a chance that switches will be trailed through. When a switch equipped with a spring connecting rod is trailed through, the spring allows the wheels to force the point over, and then pulls the points back to the original position after each set of wheels has passed. If a switch equipped with a rigid rod is trailed through, it is very likely the switch stand will be damaged and there is a greater chance of derailment. The spring connecting rods shown below are of direct-acting concentric design with all working parts fully enclosed. This provides a strong structure as well as giving protection from any foreign substances that might hinder operation.

Design 8 Spring Connecting Rod
Weight 16 lbs.
Length 30”

Design 9 Spring Connecting Rod
Weight 35 lbs.
Length 39”

Design 10 Rigid Connecting Rod
Weight 24 lbs.
Length 41”

Design 8 Rigid Connecting Rod (not shown)
Weight 7 lbs.
Length 32”

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AMERICAN MINING CONGRESS TURNOUT DATA

Turnout Data for 18-in. Gage 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Cast Frog Design 269		Switch			Actual Lead	Closure Rails			
						Curved			Straight
Frog No.	Frog Angle	Length	Switch Angle	Vertex Distance		Radius	MO	Length	Length
2-1/2	22°37'12"	3'6"	6°19'20"	4"	7'5-1/16"	11'10-1/8"	1-7/16"	3'4-11/16"	3'2-3/16"
3	18°55'29"	5'0"	4°25'15"	5"	9'11-1/2"	17'2-1/8"	1-11/16"	4'4-7/16"	4'2-3/8"
4	14°15'00"	5'0"	4°25'15"	5"	11'3-5/8"	31'6-5/8"	1-13/32"	5'5-1/8"	5'3-9/16"
5	11°25'16"	7'6"	2°56'44"	8"	15'8-1/8"	47'4-13/16"	1-9/16"	7'0-5/16"	6'11-1/16"
6	9°31'38"	10'0"	2°12'32"	10"	20'0"	67'1-3/16"	1-11/16"	8'7"	8'5-15/16"

Turnout Data for 24-in. Gage 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Cast Frog Design 289		Switch			Actual Lead	Closure Rails			
						Curved			Straight
Frog No.	Frog Angle	Length	Switch Angle	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	3'6"	6°19'20"	4"	8'3-5/8"	12'1-5/32"	2-17/32"	4'5-31/32"	4'2-3/16"
2-1/2	22°37'12"	5'0"	4°25'15"	5"	11'2-5/16"	18'2-9/32"	2-11/16"	5'8-3/16"	5'5-3/16"
3	18°55'29"	5'0"	4°25'15"	5"	12'3-1/4"	27'1-21/32"	2-1/2"	6'8-13/16"	6'6-5/16"
		7'6"	2°56'44"	8"	15'3-1/2"	26'2-1/4"	3"	7'2-1/2"	6'11-7/8"
3-1/2	16°15'38"	5'0"	4°25'15"	5"	13'4-5/8"	37'2-1/2"	2-3/8"	7'8-1/4"	7'6-1/16"
		7'6"	2°56'44"	8"	16'5-13/16"	35'7-7/16"	2-7/8"	8'3-3/8"	8'1-1/4"
4	14°15'00"	5'0"	4°25'15"	5"	14'2-13/16"	50'1-23/32"	2-1/8"	8'4-15/32"	8'2-1/2"
		7'6"	2°56'44"	8"	17'5-7/8"	46'11-15/16"	2-21/32"	9'1-21/32"	8'11-9/16"
5	11°25'16"	7'6"	2°56'44"	8"	19'6-1/4"	75'0-13/16"	2-13/32"	10'10-15/32"	10'8-15/16"
		10'0"	2°12'32"	10"	22'7-21/32"	72'5-15/16"	2-3/4"	11'5-13/16"	11'4-11/32"
6	9°31'38"	7'6"	2°56'44"	8"	21'4-7/8"	111'7-11/16"	2-1/8"	12'5-25/32"	12'4-9/16"
		10'0"	2°12'32"	10"	24'8-9/16"	106'1"	2-17/32"	13'3-23/32"	13'2-1/4"

Turnout Data for 30-in. Gage Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 60	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	9'5"	13'0"	3-7/8"	5'9-1/2"	5'4-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	9'5"	13'0"	2-13/16"	4'11"	4'6"
		WPF	40 to 60	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	9'5"	13'0"	2-1/2"	4'8-1/4"	4'3"
2-1/2	22°37'12"	Cast	20 to 60	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	12'10"	21'0"	4"	7'5-3/4"	7'1-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	12'10"	21'0"	3-5/16"	6'9-1/2"	6'5-1/2"
		WPF	40 to 60	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	12'10"	21'0"	3"	6'6"	6'2"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	14'4"	32'0"	3-3/4"	8'11"	8'7-1/2"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	14'4"	32'0"	3-3/16"	8'2-3/4"	7'11-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	14'4"	32'0"	2-3/4"	7'7-1/2"	7'4"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	17'0"	60'0"	3-1/8"	11'3-1/2"	11'1"
		WPF	40 to 60	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	17'0"	60'0"	2-7/16"	9'11-1/2"	9'9"
5	11°25'16"	Cast	20 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	23'0"	93'0"	3-3/8"	14'6-1/4"	14'4-1/4"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	23'0"	93'0"	2-13/16"	13'2"	13'0"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	25'7"	139'0"	3-1/16"	16'10"	16'8-1/2"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	25'7"	139'0"	2-1/2"	15'2-3/4"	15'1"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	29'0"	133'0"	3-9/16"	17'9"	17'7-1/2"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	29'0"	133'0"	3"	16'1-3/4"	16'0"

Note: W.P.F. denotes "Welded Plate Frog."

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Turnout Data for 30-in. Gage (continued)
Heavy Rail – 70-lb. to 80-lb. ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	16'7"	30'0"	3-5/8"	8' 6-3/4"	8'3-1/2"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	16'7"	30'0"	2-5/16"	6'9-1/4"	6'6"
4	14°15'00"	Cast	70 to 80	1/2"	12-1/2"	7'6"	3°35'00"	3/8"	6"	6"	20'0"	55'0"	3-11/16"	11'7-15/16"	11'5-1/2"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	20'0"	55'0"	2-3/8"	9'4-7/16"	9'2"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	25'0"	87'0"	3-5/16"	13'10-1/4"	13'8-5/16"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	25'0"	87'0"	2-5/16"	11'7-9/16"	11'5-1/2"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	27'6"	130'0"	3"	16'0-7/8"	15'11-3/16"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	27'6"	130'0"	2-1/4"	13'10-3/4"	13'9"

Note: W.P.F. denotes "Welded Plate Frog."

Turnout Data for 36-in. Gage
Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 60	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	11'0"	17'0"	4-7/8"	7'5-1/2"	6'11-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	11'0"	17'0"	3-7/8"	6'7-1/4"	6'1"
		WPF	40 to 60	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	11'0"	17'0"	3-9/16"	6'4-1/4"	5'10"
2-1/2	22°37'12"	Cast	20 to 40	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	15'0"	28'0"	5-1/16"	9'8-1/2"	9'3-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	15'0"	28'0"	4-3/8"	9'0-1/4"	8'7-1/2"
		WPF	40 to 60	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	15'0"	28'0"	4-1/16"	8'8-3/4"	8'4"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	16'9"	42'0"	4-5/8"	11'4-3/4"	11'0-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	16'9"	42'0"	4-1/8"	10'8-1/2"	10'4-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	16'9"	42'0"	3-5/8"	10'1"	9'9"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	20'0"	78'0"	3-15/16"	14'4"	14'1"
		WPF	40 to 60	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	20'0"	78'0"	3-1/4"	13'0-1/4"	12'9"
5	11°25'16"	Cast	20 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	27'0"	120'0"	4-5/16"	18'6-3/4"	18'4-1/4"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	27'0"	120'0"	3-3/4"	17'2-1/2"	17'0"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	30'2"	179'0"	3-7/8"	21'5-1/2"	21'3-1/2"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	30'2"	179'0"	3-5/16"	19'10"	19'8"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	34'0"	171'0"	4-9/16"	22'9-1/2"	22'7-1/2"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	34'0"	171'0"	3-15/16"	21'2"	21'0"

Note: WPF denotes "Welded Plate Frog."

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AMERICAN MINING CONGRESS TURNOUT DATA

Turnout Data for 36-in. Gage (continued)

Heavy Rail – 70-lb to 100-lb rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	19'1"	39'0"	4-3/4"	11'1-7/16"	10'9-1/2"
		Cast	85 to 100	1/2"	11"	7'6"	3°44'35"	3/8"	6-1/4"	6"	18'10-5/8"	37'7-3/16"	4-5/8"	10'9-9/16"	10'5-5/8"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	19'1"	39'0"	3-3/8"	9'3-15/16"	9' 0"
		RBF	85 to 100	1/2"	31"	7'6"	3°44'35"	3/8"	6-1/4"	6"	18'10-5/8"	37'7-3/16"	3-3/8"	9'1-9/16"	8'9-5/8"
4	14°15'00"	Cast	70 to 80	1/2"	12-9/16"	7'6"	3°35'00"	3/8"	6"	6"	22'5"	73'0"	4-1/8"	14'1-1/2"	13'10-1/2"
		Cast	85 to 100	1/2"	14-5/8"	7'6"	3°44'35"	3/8"	6-1/4"	6"	22'2-1/2"	70'4-5/8"	4"	13'8-7/8"	13'5-7/8"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	22'5"	73'0"	2-7/8"	11'10"	11'7"
		RBF	85 to 100	1/2"	40"	7'6"	3°44'35"	3/8"	6-1/4"	6"	22'2-1/2"	70'4-5/8"	2-7/8"	11'7-1/2"	11' 4-1/2"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	29'0"	114' 0"	4-1/4"	17'10-11/16"	17'8-5/16"
		Cast	85 to 100	1/2"	18-3/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	28'9-1/8"	110'6"	4-1/8"	17'5-3/8"	17'2-15/16"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	29'0"	114'0"	3-1/4"	15'7-7/8"	15'5-1/2"
		RBF	85 to 100	1/2"	42-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	28'9-1/8"	110'6"	3-1/4"	15'5-1/16"	15'2-5/8"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	32'2"	169'0"	3-13/16"	20'9-3/16"	20'7-3/16"
		Cast	85 to 100	1/2"	21-13/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	31'10-1/2"	165' 4-3/16"	3-3/4"	20'2-3/4"	20'0-11/16"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	32'2"	169'0"	3-1/16"	18'7-1/16"	18'5"
		RBF	85 to 100	1/2"	45"	10'0"	2°48'23"	3/8"	6-1/4"	8"	31'10-1/2"	165'4-3/16"	3-1/16"	18'3-9/16"	18'1-1/2"
7	8°10'16"	Cast	70 to 80	1/2"	21-15/16"	10'0"	2°41'12"	3/8"	6"	8"	35'4-11/16"	238'11-11/16"	3-9/16"	23'8-1/2"	23'6-3/4"
		Cast	85 to 100	1/2"	25-7/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	34'9-3/8"	234'7-15/16"	3-5/16"	22'9-11/16"	22'7-15/16"
		RBF	70 to 80	1/2"	56-1/2"	10'0"	2°41'12"	3/8"	6"	8"	35'4-11/16"	238'11-11/16"	2-3/4"	20'9-15/16"	20'8-3/16"
		RBF	85 to 100	1/2"	56-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	34'9-3/8"	234'7-15/16"	2-5/8"	20'2-5/8"	20'0-7/8"
8	7°09'10"	Cast	70 to 80	1/2"	25-1/16"	15'0"	1°47'27"	3/8"	6"	12"	45'8-7/8"	298'8-11/16"	4-3/16"	28'9-1/2"	28'7-13/16"
		Cast	85 to 100	1/2"	29-1/16"	15'0"	1°52'14"	3/8"	6-1/4"	12"	45'0-3/8"	291'9-1/4"	3-15/16"	27'8-13/16"	27'7-5/16"
		RBF	70 to 80	1/2"	61"	15'0"	1°47'27"	3/8"	6"	12"	45'8-7/8"	298'8-11/16"	3-3/8"	25'9-11/16"	25'7-7/8"
		RBF	85 to 100	1/2"	61"	15'0"	1°52'14"	3/8"	6-1/4"	12"	45'0-3/8"	291'9-1/4"	3-1/4"	25'0-7/8"	24'11-3/8"

Note: RBF denotes "Rigid Bolted Frog."

Turnout Data for 42-in. Gage

The American Mining Congress has adopted 42-in. gage as the standard for mines. This gage should be used when it is possible to do so.

Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 40	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	12'7"	22'0"	5-5/8"	9'1-1/2"	8'6-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	12'7"	22'0"	4-3/4"	8'3-1/4"	7'8"
		WPF	40	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	12'7"	22'0"	4-1/2"	8'0-1/4"	7'5"
2-1/2	22°37'12"	Cast	20 to 40	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	16'11"	35'0"	5-13/16"	11'8-1/4"	11'2-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	16'11"	35'0"	5-1/4"	10'11-7/8"	10'6-1/2"
		WPF	40	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	16'11"	35'0"	4-7/8"	10'8-1/2"	10'3"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	52'0"	5-1/2"	13'8-1/2"	13'3-1/2"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	52'0"	5"	13'0-1/4"	12'7-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	52'0"	4-11/16"	12'5"	12'0"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	6'0"	3°40'59"	3/8"	5"	6"	20'6"	51'0"	5-7/8"	14'2-3/4"	13'9-1/2"
		WPF	20 to 30	1/4"	16-1/2"	6'0"	3°40'59"	3/8"	5"	6"	20'6"	51'0"	5-3/8"	13'6"	13'1-1/2"
		WPF	40 to 60	3/8"	24"	6'0"	3°40'59"	3/8"	5"	6"	20'6"	51'0"	4-7/8"	12'10-3/4"	12'6"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	23'0"	96'0"	4-5/8"	17'4-1/2"	17'1"
		WPF	40 to 60	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	23'0"	96'0"	4-1/16"	16'0-3/4"	15'9"
4	14°15'00"	Cast	40 to 60	1/4"	11-1/16"	6'0"	3°40'59"	3/8"	5"	6"	24'7"	94'0"	5-1/8"	17'11-1/4"	17'7-3/4"
		WPF	40 to 60	3/8"	27"	6'0"	3°40'59"	3/8"	5"	6"	24'7"	94'0"	4-7/16"	16'7-1/2"	16'4"
4	14°15'00"	Cast	40 to 60	1/4"	11-1/16"	7'6"	2°56'44"	3/8"	5"	8"	26'10"	91'0"	5-3/4"	18'8-1/4"	18'4-3/4"
		WPF	40 to 60	3/8"	27"	7'6"	2°56'44"	3/8"	5"	8"	26'10"	91'0"	5"	17'4-1/2"	17'1"
5	11°25'16"	Cast	40 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	31'0"	148'0"	5-3/16"	22'7"	22'4-1/4"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	31'0"	148'0"	4-11/16"	21'2-3/4"	21'0"
6	9°31'38"	Cast	40 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	34'9"	220'0"	4-5/8"	26'0-3/4"	25'10-1/2"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	34'9"	220'0"	4-1/8"	24'5-1/2"	24'3"
6	9°31'38"	Cast	40 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	38'10"	210'0"	5-7/16"	27'7-3/4"	27'5-1/2"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	38'10"	210'0"	4-3/4"	26'0-1/4"	25'10"

Note: WPF denotes "Welded Plate Frog."

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Turnout Data for 42-in. Gage (continued)
Heavy Rail – 70-lb to 100-lb rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Heel Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	21'7"	49'0"	5-3/4"	13'8-1/16"	13'3-1/2"
		Cast	85 to 100	1/2"	11"	7'6"	3°44'35"	3/8"	6-1/4"	6"	21'4-9/16"	47'2-3/4"	5-5/8"	13'4-3/16"	12'11-9/16"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	21'7"	49'0"	4-5/16"	11'10-9/16"	11'6"
		RBF	85 to 100	1/2"	31"	7'6"	3°44'35"	3/8"	6-1/4"	6"	21'4-9/16"	47'2-3/4"	4-5/16"	11'8-3/16"	11'3-9/16"
4	14°15"00"	Cast	70 to 80	1/2"	12-9/16"	7'6"	3°35'00"	3/8"	6"	6"	25'7"	90'0"	5"	17'4"	17'0-1/2"
		Cast	85 to 100	1/2"	14-5/8"	7'6"	3°44'35"	3/8"	6-1/4"	6"	25'4-3/8"	87'10-3/16"	4-7/8"	16'11-5/16"	16'7-3/4"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	25'7"	90'0"	3-3/4"	15'0-1/2"	14'9"
		RBF	85 to 100	1/2"	40"	7'6"	3°44'35"	3/8"	6-1/4"	6"	25'4-3/8"	87' 10-3/16"	3-3/4"	14'9-15/16"	14'6-3/8"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	33'1"	140'0"	5-3/16"	22'0-1/16"	21'9-5/16"
		Cast	85 to 100	1/2"	18-3/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	32'9-1/4"	137'4-9/16"	5"	21'5-7/8"	21'3-1/16"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	33'1"	140'0"	4-3/16"	19'9-1/4"	19'6-1/2"
		RBF	85 to 100	1/2"	42-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	32'9-1/4"	137'4-9/16"	4-1/8"	19'5-9/16"	19'2-3/4"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	36'10"	209'0"	4-5/8"	25'5-9/16"	25'3-3/16"
		Cast	85 to 100	1/2"	21-13/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	36'6"	205'0-3/4"	4-1/2"	24'10-5/8"	24'8-3/16"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	36'10"	209'0"	3-7/8"	23'3-3/8"	23'1"
		RBF	85 to 100	1/2"	45"	10'0"	2°48'23"	3/8"	6-1/4"	8"	36'6"	205'0-3/4"	3-7/8"	22'11-7/16"	22'9"
7	8°10'16"	Cast	70 to 80	1/2"	21-15/16"	10'0"	2°41'12"	3/8"	6"	8"	40'7-13/16"	294'1-3/4"	4-5/16"	28'11-7/8"	28'9-7/8"
		Cast	85 to 100	1/2"	25-7/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	39'11-3/4"	290'6-1/8"	4-1/16"	28'0-7/16"	27'10-5/16"
		RBF	70 to 80	1/2"	56-1/2"	10'0"	2°41'12"	3/8"	6"	8"	40'7-13/16"	294'1-3/4"	3-1/2"	26'1-5/16"	25'11-5/16"
		RBF	85 to 100	1/2"	56-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	39'11-3/4"	290'6-1/8"	3-3/8"	25'5-3/8"	25'3-1/4"
8	7°9'10"	Cast	70 to 80	1/2"	25-1/16"	15'0"	1°47'27"	3/8"	6"	12"	52'1-5/8"	367'3-3/4"	5-1/16"	35'2-1/2"	35'0-9/16"
		Cast	85 to 100	1/2"	29-1/16"	15'0"	1°52'14"	3/8"	6-1/4"	12"	51'4-7/16"	360'8-7/8"	4-13/16"	34'1-1/8"	33'11-3/8"
		RBF	70 to 80	1/2"	61"	15'0"	1°47'27"	3/8"	6"	12"	52'1-5/8"	367'3-3/4"	4-1/4"	32'2-9/16"	32'0-5/8"
		RBF	85 to 100	1/2"	61"	15'0"	1°52'14"	3/8"	6-1/4"	12"	51'4-7/16"	360'8-7/8"	4-1/8"	31'5-3/16"	31'3-7/16"

Note: RBF denotes "Rigid Bolted Frog."

Turnout Data for 44-in. Gage
Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 60	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	13'2"	24'0"	5-15/16"	9'8-3/4"	9'1-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	13'2"	24'0"	4-15/16"	8'10-1/2"	8'3"
		WPF	40 to 60	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	13'2"	24'0"	4-5/8"	8'7-1/2"	8'0"
2-1/2	22°37'12"	Cast	20 to 60	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	17'7"	37'0"	6-3/16"	12'4-1/2"	11'10-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	17'7"	37'0"	5-9/16"	11'8-1/4"	11'2-1/2"
		WPF	40 to 60	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	17'7"	37'0"	5-1/4"	11'4-3/4"	10'11"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	19'11"	55'0"	5-13/16"	14'7-1/4"	14'2-1/2"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	19'11"	55'0"	5-5/16"	13'11-1/4"	13'6-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	19'11"	55'0"	4-7/8"	13'4"	12'11"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	24'0"	102'0"	4-15/16"	18'4-3/4"	18'0-3/4"
		WPF	40 to 60	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	24'0"	102'0"	4-5/16"	17'0-3/4"	16'9"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	6'0"	3°40'49"	3/8"	5"	6"	25'8"	99'0"	5-1/2"	19'0-1/2"	18'8-3/4"
		WPF	40 to 60	3/8"	27"	6'0"	3°40'49"	3/8"	5"	6"	25'8"	99'0"	5-1/16"	18'3"	17'4-1/2"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	7'6"	2°56'44"	3/8"	5"	8"	28'0"	97'0"	6-1/8"	19'10-1/4"	19'6-3/4"
		WPF	40 to 60	3/8"	27"	7'6"	2°56'44"	3/8"	5"	8"	28'0"	97'0"	5-5/16"	18'6-3/4"	18'3"
5	11°25'16"	Cast	20 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	32'3"	156'0"	5-7/16"	23'10"	23'7"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	32'3"	156'0"	4-7/8"	22'6"	22'3"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	36'3"	233'0"	4-7/8"	27'6-3/4"	27'4-1/4"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	36'3"	233'0"	4-5/16"	25'11-1/2"	25'9"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	40'5"	223'0"	5-3/4"	29'2-1/2"	29'0-1/4"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	40'5"	223'0"	5-1/8"	27'7-1/2"	27'5"

Note: W.P.F. denotes "Welded Plate Frog."

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Turnout Data for 44-in. Gage (continued)
Heavy Rail – 70-lb to 100-lb rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	22'6"	52'0"	6-1/8"	14'7-1/4"	14'2-1/2"
		Cast	85 to 100	1/2"	11"	7'6"	3°44'35"	3/8"	6-1/4"	6"	22'2-9/16"	50'5-5/16"	5-15/16"	14'2-3/8"	13'9-9/16"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	22'6"	52'0"	4-3/4"	12'10"	12'5"
		RBF	85 to 100	1/2"	31"	7'6"	3°44'35"	3/8"	6-1/4"	6"	22'2-9/16"	50'5-5/16"	4-11/16"	12'6-3/8"	12'1-9/16"
4	14°15'00"	Cast	70 to 80	1/2"	12-9/16"	7'6"	3°35'00"	3/8"	6"	6"	26'10"	96'0"	5-3/8"	18'7"	18'3-1/2"
		Cast	85 to 100	1/2"	14-5/8"	7'6"	3°44'35"	3/8"	6-1/4"	6"	26'5"	93'8-1/16"	5-3/16"	18'0-1/8"	17'8-3/8"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	26'10"	96'0"	4-3/16"	16'3-3/4"	16'0"
		RBF	85 to 100	1/2"	40"	7'6"	3°44'35"	3/8"	6-1/4"	6"	26'5"	93'8-1/16"	4-1/16"	15'10-3/4"	15'7"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	34'7"	149'0"	5-9/16"	23'6"	23'3-1/4"
		Cast	85 to 100	1/2"	18-3/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	34'1-1/4"	146'4-1/16"	5-5/16"	22'10-1/16"	22'7-1/16"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	34'7"	149'0"	4-9/16"	21'3-1/2"	21'0-1/2"
		RBF	85 to 100	1/2"	42-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	34'1-1/4"	146' 4-1/16"	4-7/16"	20'9-3/4"	20'6-3/4"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	38'8"	222'0"	5-1/16"	27'3-1/2"	27'1"
		Cast	85 to 100	1/2"	21-13/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	38'0-1/2"	218'3-5/8"	4-13/16"	26'5-5/16"	26'2-11/16"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	38'8"	222'0"	4-1/4"	25'1-1/2"	24'11"
		RBF	85 to 100	1/2"	45"	10'0"	2°48'23"	3/8"	6-1/4"	8"	38'0-1/2"	218'3-5/8"	4-1/8"	24'6-1/8"	24'3-1/2"
7	8°10'16"	Cast	70 to 80	1/2"	21-15/16"	10'0"	2°41'12"	3/8"	6"	8"	42'4-7/8"	312'7-7/16"	4-9/16"	30'9-1/8"	30'6-15/16"
		Cast	85 to 100	1/2"	25-7/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	41'8-5/8"	309'1-1/2"	4-5/16"	29'9-5/16"	29'7-3/16"
		RBF	70 to 80	1/2"	56-1/2"	10'0"	2°41'12"	3/8"	6"	8"	42'4-7/8"	312'7-7/16"	3-3/4"	27'10-9/16"	27'8-3/8"
		RBF	85 to 100	1/2"	56-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	41'8-5/8"	309'1-1/2"	3-5/8"	27' 2-1/4"	27'0-1/8"
8	7°9'10"	Cast	70 to 80	1/2"	25-1/16"	15'0"	1°47'27"	3/8"	6"	12"	54'3-3/16"	390'2-1/16"	5-3/8"	37'4-3/16"	37'2-1/8"
		Cast	85 to 100	1/2"	29-1/16"	15'0"	1°52'14"	3/8"	6-1/4"	12"	53'5-3/4"	383'8-11/16"	5-1/8"	36'2-9/16"	36'0-11/16"
		RBF	70 to 80	1/2"	61"	15'0"	1°47'27"	3/8"	6"	12"	54'3-3/16"	390'2-1/16"	4-1/2"	34'4-1/4"	34'2-3/16"
		RBF	85 to 100	1/2"	61"	15'0"	1°52'14"	3/8"	6-1/4"	12"	53'5-3/4"	383'8-11/16"	4-7/16"	33'6-5/8"	33'4-3/4"

Note: R.B.F. denotes "Rigid Bolted Frog."

Turnout Data for 48-in. Gage
Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 60	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	14'3"	26'0"	6-3/4"	10'10-1/4"	10'2-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	14'3"	26'0"	5-3/4"	10'0-1/4"	9'4"
		WPF	40 to 60	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	14'3"	26'0"	5-1/2"	9'9-1/4"	9'1"
2-1/2	22°37'12"	Cast	20 to 60	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	41'0"	7"	13'10-1/4"	13'3-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	41'0"	6-5/16"	13'2"	12'7-1/2"
		WPF	40 to 60	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	19'0"	41'0"	6-1/16"	12'10-1/2"	12'4"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	21'7"	62'0"	6-7/16"	16'4"	15'10-1/2"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	21'7"	62'0"	5-15/16"	15'8"	15'2-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	21'7"	62'0"	5-1/2"	15'0-1/2"	14'7"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	26'0"	114'0"	5-1/2"	20'5"	20'1"
		WPF	40 to 60	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	26'0"	114'0"	4-13/16"	19'1-1/4"	18'9"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	7'6"	2°56'44"	3/8"	5"	8"	30'2"	108'0"	6-3/4"	22'0-1/2"	21'8-3/4"
		WPF	40 to 60	3/8"	27"	7'6"	2°56'44"	3/8"	5"	8"	30'2"	108'0"	6-5/16"	20'9"	20'5"
5	11°25'16"	Cast	20 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	35'0"	174'0"	6-1/16"	26'7-1/2"	26'4-1/4"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	35'0"	174'0"	5-1/2"	25'3-1/4"	25'0"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	39'4"	260'0"	5-7/16"	30'8-1/4"	30'5-1/2"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	39'4"	260'0"	4-7/8"	29'0-3/4"	28'10"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	43'8"	248'0"	6-7/8"	32'6-1/4"	32'3-1/2"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	43'8"	248'0"	5-3/4"	30'10-3/4"	30'8"

Note: WPF denotes "Welded Plate Frog."

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Turnout Data for 48-in. Gage (continued)
Heavy Rail – 70-lb to 100-lb rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	24'1"	58'0"	6-13/16"	16'2-13/16"	15'9-1/2"
		Cast	85 to 100	1/2"	11"	7'6"	3°44'35"	3/8"	6-1/4"	6"	23'10-1/2"	56'10-5/16"	6-11/16"	15'10-13/16"	15'5-1/2"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	24'1"	58'0"	5-3/8"	14'5-1/4"	14'0"
		RBF	85 to 100	1/2"	31"	7'6"	3°44'35"	3/8"	6-1/4"	6"	23'10-1/2"	56'10-5/16"	5-3/8"	14'2-13/16"	13'9-1/2"
4	14°15'00"	Cast	70 to 80	1/2"	12-9/16"	7'6"	3°35'00"	3/8"	6"	6"	28'10"	107'0"	5-15/16"	20'7-9/16"	20'3-1/2"
		Cast	85 to 100	1/2"	14-5/8"	7'6"	3°44'35"	3/8"	6-1/4"	6"	28'6-1/4"	105'3-3/4"	5-3/4"	20'1-3/4"	19'9-5/8"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	28'10"	107'0"	4-3/4"	18'4-1/16"	18'0"
		RBF	85 to 100	1/2"	40"	7'6"	3°44'35"	3/8"	6-1/4"	6"	28'6-1/4"	105'3-3/4"	4-5/8"	18'0-3/8"	17'8-1/4"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	37'1"	167'0"	6-1/8"	26'0-1/2"	25'9-5/16"
		Cast	85 to 100	1/2"	18-3/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	36'9-5/16"	164'3-1/8"	5-15/16"	25'6-3/8"	25'3-1/8"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	37'1"	167'0"	5-1/16"	23'9-3/4"	23'6-1/2"
		RBF	85 to 100	1/2"	42-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	36'9-5/16"	164'3-1/8"	5-1/16"	23'6-1/16"	23'2-3/16"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	41'6"	248'0"	5-1/2"	30'1-15/16"	29'11-3/16"
		Cast	85 to 100	1/2"	21-13/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	41'1-1/2"	244'9-5/16"	5-3/8"	29'6-9/16"	29'3-11/16"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	41'6"	248'0"	4-3/4"	27'11-3/4"	27' 9"
		RBF	85 to 100	1/2"	45"	10'0"	2°48'23"	3/8"	6-1/4"	8"	41'1-1/2"	244'9-5/16"	4-11/16"	27'7-3/8"	27'4-1/2"
7	8°10'16"	Cast	70 to 80	1/2"	21-13/16"	10'0"	2°41'12"	3/8"	6"	8"	45'10-15/16"	349'4-7/16"	5-1/16"	34'3-5/16"	34'1"
		Cast	85 to 100	1/2"	25-7/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	45'2-1/4"	346'4-1/4"	4-13/16"	33'3-3/16"	33'0-13/16"
		RBF	70 to 80	1/2"	56-1/2"	10'0"	2°41'12"	3/8"	6"	8"	45'10-15/16"	349'4-7/16"	4-1/4"	31'4-3/4"	31'2-7/16"
		RBF	85 to 100	1/2"	56-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	45'2-1/4"	346'4-1/4"	4-1/16"	30'8-1/8"	30' 5-3/4"
8	7°9'10"	Cast	70 to 80	1/2"	25-1/16"	15'0"	1°47'27"	3/8"	6"	12"	58'6-5/16"	435'10-3/4"	5-5/8"	41'7-1/2"	41'5-1/4"
		Cast	85 to 100	1/2"	29-1/16"	15'0"	1°52'14"	3/8"	6-1/4"	12"	57'8-7/16"	429'8-7/16"	5-3/4"	40'5-3/8"	40'3-3/8"
		RBF	70 to 80	1/2"	61"	15'0"	1°47'27"	3/8"	6"	12"	58'6-5/16"	435'10-3/4"	5-1/16"	38'7-9/16"	38'5-5/16"
		RBF	85 to 100	1/2"	61"	15'0"	1°52'14"	3/8"	6-1/4"	12"	57'8-7/16"	429'8-7/16"	5"	37'9-7/16"	37'7-7/16"

Note: RBF denotes "Rigid Bolted Frog."

Turnout Data for 56-1/2-in. Gage
Light Rail – 20-lb to 60-lb ASCE rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
2	28°04'21"	Cast	20 to 60	1/4"	6-11/16"	3'6"	6°19'20"	3/8"	5"	4"	16'7"	33'0"	8-1/16"	13'4"	12'6-1/4"
		WPF	20 to 30	1/4"	17"	3'6"	6°19'20"	3/8"	5"	4"	16'7"	33'0"	7-1/16"	12'5-3/4"	11'8"
		WPF	40 to 60	3/8"	20"	3'6"	6°19'20"	3/8"	5"	4"	16'7"	33'0"	6-3/4"	12'2-3/4"	11'5"
2-1/2	22°37'12"	Cast	20 to 60	1/4"	8-1/4"	5'0"	4°25'15"	3/8"	5"	5"	22'0"	51'0"	8-7/16"	16'11-1/4"	16'3-3/4"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	22'0"	51'0"	7-3/4"	16'3"	15'7-1/2"
		WPF	40 to 60	3/8"	20"	5'0"	4°25'15"	3/8"	5"	5"	22'0"	51'0"	7-1/2"	15'11-1/2"	15'4"
3	18°55'29"	Cast	20 to 60	1/4"	8-3/8"	5'0"	4°25'15"	3/8"	5"	5"	25'0"	76'0"	7-3/4"	19'10"	19'3-1/2"
		WPF	20 to 30	1/4"	16-1/2"	5'0"	4°25'15"	3/8"	5"	5"	25'0"	76'0"	7-1/4"	19'1-3/4"	18'7-1/2"
		WPF	40 to 60	3/8"	24"	5'0"	4°25'15"	3/8"	5"	5"	25'0"	76'0"	6-3/4"	18'6-1/2"	18'0"
4	00°15'00"	Cast	00 to 00	1/4"	11-1/16"	5'0"	4°25'15"	3/8"	5"	5"	30'4"	140'0"	6-9/16"	24'9-3/4"	24'5"
		WPF	00 to 00	3/8"	27"	5'0"	4°25'15"	3/8"	5"	5"	30'4"	140'0"	5-15/16"	23'6"	23'1"
4	14°15'00"	Cast	20 to 60	1/4"	11-1/16"	7'6"	2°56'44"	3/8"	5"	8"	34'10"	132'0"	8-3/16"	26'9-1/2"	26'4-3/4"
		WPF	40 to 60	3/8"	27"	7'6"	2°56'44"	3/8"	5"	8"	34'10"	132'0"	7-11/16"	25'6"	25'1-1/4"
5	11°25'16"	Cast	20 to 60	1/4"	13-13/16"	7'6"	2°56'44"	3/8"	5"	8"	40'7"	212'0"	7-3/8"	32'3"	31'11-1/4"
		WPF	40 to 60	3/8"	30"	7'6"	2°56'44"	3/8"	5"	8"	40'7"	212'0"	6-3/4"	30'10-3/4"	30'7"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	7'6"	2°56'44"	3/8"	5"	8"	45'10"	316'0"	6-9-16"	37'2-3/4"	36'11-1/2"
		WPF	40 to 60	3/8"	36"	7'6"	2°56'44"	3/8"	5"	8"	45'10"	316'0"	6"	35'7-1/4"	35'4"
6	9°31'38"	Cast	20 to 60	1/4"	16-9/16"	10'0"	2°12'32"	3/8"	5"	10"	50'7"	302'0"	7-3/4"	39'5-1/2"	39'2-1/2"
		WPF	40 to 60	3/8"	36"	10'0"	2°12'32"	3/8"	5"	10"	50'7"	302'0"	7-1/8"	37'10-1/4"	37'7"

Note: WPF denotes "Welded Plate Frog."

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Turnout Data for 56-1/2-in. Gage (continued)
Heavy Rail – 70-lb to 100-lb rail, inclusive

American Mining Congress Standards

Frog						Switch					Actual Lead	Closure Rails			
												Curved			Straight
No.	Angle	Type	Rail Weight	Point	Actual Toe Length	Length	Angle	Point	Heel Spread	Vertex Distance		Radius	MO	Length	Length
3	18°55'29"	Cast	70 to 80	1/2"	9-1/2"	7'6"	3°35'00"	3/8"	6"	6"	27'8"	72'0"	8-1/4"	19'10-3/4"	19'4-1/2"
		Cast	85 to 100	1/2"	11"	7'6"	3°44'35"	3/8"	6-1/4"	6"	27'4-15/16"	70'6-1/16"	8-1/16"	19'6-3/16"	18'11-15/16"
		RBF	70 to 80	1/2"	31"	7'6"	3°35'00"	3/8"	6"	6"	27'8"	72'0"	6-13/16"	18'1-1/4"	17'7"
		RBF	85 to 100	1/2"	31"	7'6"	3°44'35"	3/8"	6-1/4"	6"	27'4-15/16"	70'6-1/16"	6-3/4"	17'10-3/16"	17'3-15/16"
4	14°15'00"	Cast	70 to 80	1/2"	12-9/16"	7'6"	3°35'00"	3/8"	6"	6"	33'4"	132'0"	7-3/16"	25'2-5/16"	24'9-1/2"
		Cast	85 to 100	1/2"	14-5/8"	7'6"	3°44'35"	3/8"	6-1/4"	6"	32'11-15/16"	130'0-5/8"	7"	24'8-3/16"	24'3-5/16"
		RBF	70 to 80	1/2"	40"	7'6"	3°35'00"	3/8"	6"	6"	33'4"	132'0"	5-15/16"	22'10-13/16"	22'6"
		RBF	75 to 100	1/2"	40"	7'6"	3°44'35"	3/8"	6-1/4"	6"	32'11-15/16"	130'0-5/8"	5-7/8"	22'6-13/16"	22'1-15/16"
5	11°25'16"	Cast	70 to 80	1/2"	15-11/16"	10'0"	2°41'12"	3/8"	6"	8"	42'10"	205'0"	7-7/16"	31'10-1/16"	31'6-5/16"
		Cast	85 to 100	1/2"	18-3/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	42'5-7/16"	202 4-1/8"	7-1/4"	31'3-1/16"	30'11-1/4"
		RBF	70 to 80	1/2"	42-1/2"	10'0"	2°41'12"	3/8"	6"	8"	42'10"	205'0"	6-7/16"	29'7-1/4"	29'3-1/2"
		RBF	85 to 100	1/2"	42-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	42'5-7/16"	202'4-1/8"	6-3/8"	29'2-3/4"	28'10-15/16"
6	9°31'38"	Cast	70 to 80	1/2"	18-13/16"	10'0"	2°41'12"	3/8"	6"	8"	48'2"	304'0"	6-3/4"	36'10-7/16"	36'7-3/16"
		Cast	85 to 100	1/2"	21-13/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	47'8-3/16"	301'0-1/2"	6-1/2"	36'1-3/4"	35'10-3/8"
		RBF	70 to 80	1/2"	45"	10'0"	2°41'12"	3/8"	6"	8"	48'2"	304'0"	5-15/16"	34'8-1/4"	34'5"
		RBF	85 to 100	1/2"	45"	10'0"	2°48'23"	3/8"	6-1/4"	8"	47'8-3/16"	301'0-1/2"	5-13/16"	34'2-9/16"	33'11-3/16"
7	8°10'16"	Cast	70 to 80	1/2"	21-15/16"	10'0"	2°41'12"	3/8"	6"	8"	53'4-7/16"	427'7-1/4"	6-1/8"	41'9-3/16"	41'6-1/2"
		Cast	85 to 100	1/2"	25-7/16"	10'0"	2°48'23"	3/8"	6-1/4"	8"	52'6-11/16"	425'5-11/16"	5-7/8"	40'8-1/16"	40'5-1/4"
		RBF	70 to 80	1/2"	56-1/2"	10'0"	2°41'12"	3/8"	6"	8"	53'4-7/16"	427'7-1/4"	5-9/16"	38'10-5/8"	38'7-15/16"
		RBF	85 to 100	1/2"	56-1/2"	10'0"	2°48'23"	3/8"	6-1/4"	8"	52'6-11/16"	425'5-11/16"	5-1/8"	38'1"	37'10-3/16"
8	7°9'10"	Cast	70 to 80	1/2"	25-1/16"	15'0"	1°47'27"	3/8"	6"	12"	67'7"	533'0-3/4"	7-1/4"	50'8-5/8"	50'5-15/16"
		Cast	85 to 100	1/2"	29-1/16"	15'0"	1°52'14"	3/8"	6-1/4"	12"	66'8-3/16"	527'4-7/8"	7"	49'5-1/2"	49'3-1/8"
		RBF	70 to 80	1/2"	61"	15'0"	1°47'27"	3/8"	6"	12"	67'7"	533'0-3/4"	6-7/16"	47'8-11/16"	47'6"
		RBF	85 to 100	1/2"	61"	15'0"	1°52'14"	3/8"	6-1/4"	12"	66'8-3/16"	527'4-7/8"	6-1/4"	46'9-9/16"	46'7-3/16"

Note: RBF denotes "Rigid Bolted Frog."

Data For Turnouts With Long Switches
Light Rail – 20-lb to 60-lb ASCE rail, inclusive. With Cast Frogs

American Mining Congress Standards

Frog No.	Gage	Switch		Actual Lead	Closure Rails			
					Curved			Straight
		Length	Vertex Distance		Radius	MO	Length	Length
3	36"	6'0"	6"	18'0"	41'0"	4-15/16"	11'7-1/2"	11'3-1/2"
	42"	6'0"	6"	20'6"	51'0"	5-15/16"	14'2-3/4"	13'9-1/2"
	44"	6'0"	6"	21'4"	54'0"	6-1/4"	15'0-1/4"	14'7-1/2"
	48"	6'0"	6"	23'0"	60'0"	7"	16'8-3/4"	16'3-1/2"
	56-1/2"	6'0"	6"	26'6"	74'0"	8-3/8"	20'3-3/4"	19'9-1/2"
3	36"	7'6"	8"	19'10"	40'0"	5-3/8"	11'11-1/4"	11'7-1/2"
	42"	7'6"	8"	22'5"	50'0"	6-7/16"	14'7"	14'2-1/2"
	44"	7'6"	8"	23'4"	53'0"	6-13/16"	15'6-1/4"	15'1-1/2"
	48"	7'6"	8"	25'0"	59'0"	7-9/16"	17'2-3/4"	16'9-1/2"
	56-1/2"	7'6"	8"	28'8"	73'0"	9"	20'11-1/2"	20'5-1/2"
4	36"	6'0"	6"	21'5"	76'0"	4-5/16"	14'8-3/4"	14'5-3/4"
	42"	6'0"	6"	24'7"	94'0"	5-1/8"	17'11-1/4"	17'7-3/4"
	44"	6'0"	6"	25'8"	99'0"	5-1/2"	19'0-1/2"	18'8-3/4"
	48"	6'0"	6"	27'10"	111'0"	6-1/8"	21'2-3/4"	20'10-3/4"
	56-1/2"	6'0"	6"	32'3"	136'0"	7-5/16"	25'8-1/2"	25'3-3/4"
4	36"	7'6"	8"	23'7"	74'0"	4-13/16"	15'4-1/2"	15'1-3/4"
	42"	7'6"	8"	26'10"	91'0"	5-3/4"	18'8-1/4"	18'4-3/4"
	44"	7'6"	8"	28'0"	97'0"	6-1/8"	19'10-1/4"	19'6-3/4"
	48"	7'6"	8"	30'2"	108'0"	6-3/4"	22'0-1/2"	21'8-3/4"
	56-1/2"	7'6"	8"	34'10"	132'0"	8-3/16"	26'9-1/2"	26'4-3/4"
5	36"	10'0"	10"	30'5"	116'0"	4-7/8"	19'5-1/4"	19'3"
	42"	10'0"	10"	34'8"	143'0"	5-15/16"	23'8-3/4"	23'6"
	44"	10'0"	10"	36'0"	151'0"	6-1/4"	25'0-3/4"	24'10"
	48"	10'0"	10"	38'10"	169'0"	6-15/16"	27'11"	27'8"
	56-1/2"	10'0"	10"	44'9"	206'0"	8-3/8"	33'10-3/4"	33'7"

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Data For Turnouts With Long Switches (continued)
Heavy Rail – 70-lb to 100-lb rail, inclusive. With Cast Frogs

American Mining Congress Standards

Frog No.	Gage	Switch		Rail Weight	Actual Lead	Closure Rails			
		Length	Vertex Distance			Curved			Straight
						Radius	MO	Length	Length
4	36”	10’0”	10”	70 to 80	25’9-3/8”	70’1-1/16”	4-13/16”	14’11-3/4”	14’8-7/8”
		10’0”	10”	85 to 100	25’5-1/16”	68’1-13/16”	4-5/8”	14’5-3/8”	14’2-7/16”
	42”	10’0”	10”	70 to 80	29’1-11/16”	86’11-5/16”	5-7/8”	18’4-9/16”	18’1-3/16”
		10’0”	10”	85 to 100	28’9-1/16”	85’0-3/4”	5-5/8”	17’9-7/8”	17’6-7/16”
	44”	10’0”	10”	70 to 80	30’3-1/8”	92’6-11/16”	6-3/16”	19’3-3/16”	19’2-5/8”
		10’0”	10”	85 to 100	29’10-7/16”	90’8-3/8”	6”	18’11-3/8”	18’7-13/16”
	48”	10’0”	10”	70 to 80	32’6”	103’9-1/2”	6-7/8”	21’9-3/8”	21’5-1/2”
		10’0”	10”	85 to 100	32’1-1/16”	101’11-5/8”	6-5/8”	21’2-7/16”	20’10-7/16”
	56-1/2”	10’0”	10”	70 to 80	37’3-1/16”	127’8”	8-5/16”	26’7-3/16”	26’2-9/16”
		10’0”	10”	85 to 100	36’9-3/4”	125’11-1/8”	8-1/16”	25’11-13/16”	25’7-1/8”
5	36”	15’0”	12”	70 to 80	35’4-9/16”	109’7-13/16”	5-1/8”	19’3-3/16”	19’0-7/8”
		15’0”	12”	85 to 100	34’11-1/4”	106’7-15/16”	4-7/8”	18’7-3/8”	18’5-1/16”
	42”	15’0”	12”	70 to 80	39’8-3/8”	135’6-9/16”	6-3/16”	23’7-7/16”	23’4-11/16”
		15’0”	12”	85 to 100	39’2-3/4”	132’7-5/16”	6”	22’11-5/16”	22’8-9/16”
	44”	15’0”	12”	70 to 80	41’1-5/8”	144’2-1/8”	6-9/16”	25’0-13/16”	24’9-15/16”
		15’0”	12”	85 to 100	40’7-15/16”	141’3-1/8”	6-5/16”	24’4-9/16”	24’1-3/4”
	48”	15’0”	12”	70 to 80	44’0-3/16”	161’5-1/4”	7-5/16”	27’11-5/8”	27’8-1/2”
		15’0”	12”	85 to 100	43’6-1/4”	158’6-3/4”	7-1/16”	27’3-3/16”	27’0-1/16”
	56-1/2”	15’0”	12”	70 to 80	50’1-9/16”	198’1-7/16”	8-7/8”	34’1-5/8”	33’9-7/8”
		15’0”	12”	85 to 100	49’7-3/16”	195’3-7/8”	8-9/16”	33’4-11/16”	33’1”
6	36”	15’0”	12”	70 to 80	39’0-1/16”	161’2-7/16”	4-13/16”	22’7-1/4”	22’5-1/4”
		15’0”	12”	85 to 100	38’5-11/16”	156’11-15/16”	4-9/16”	21’9-13/16”	21’7-7/8”
	42”	15’0”	12”	70 to 80	44’0-5/8”	198’9-5/8”	5-13/16”	27’8-1/8”	27’5-13/16”
		15’0”	12”	85 to 100	43’5-13/16”	194’8-7/16”	5-9/16”	26’10-1/4”	26’8”
	44”	15’0”	12”	70 to 80	45’8-3/4”	211’4”	6-1/8”	29’4-7/16”	29’1-15/16”
		15’0”	12”	85 to 100	45’1-7/8”	207’3-5/16”	5-15/16”	28’6-7/16”	28’4-1/16”
	48”	15’0”	12”	70 to 80	49’1-1/8”	236’4-3/4”	6-13/16”	32’9-1/16”	32’6-5/16”
		15’0”	12”	85 to 100	48’5-15/16”	232’4-15/16”	6-5/8”	31’10-3/4”	31’8-1/8”
	56-1/2”	15’0”	12”	70 to 80	56’2-15/16”	289’7-13/16”	8-5/16”	39’11-3/8”	39’8-1/8”
		15’0”	12”	85 to 100	55’7-1/8”	285’10”	8”	39’0-3/8”	38’9-5/16”
7	36”	15’0”	12”	70 to 80	42’5-7/16”	223’10-1/16”	4-1/2”	25’9-1/8”	25’7-1/2”
		15’0”	12”	85 to 100	41’10”	218’5-1/4”	4-1/4”	24’10-1/4”	24’8-9/16”
	42”	15’0”	12”	70 to 80	48’2-1/4”	275’6-15/16”	5-7/16”	31’6-1/4”	31’4-5/16”
		15’0”	12”	85 to 100	47’6-5/16”	270’5-1/16”	5-3/16”	30’6-7/8”	30’4-7/8”
	44”	15’0”	12”	70 to 80	50’1-3/16”	292’9-7/8”	5-3/4”	33’5-5/16”	33’3-1/4”
		15’0”	12”	85 to 100	49’5-1/16”	287’9-1/16”	5-1/2”	32’5-3/4”	32’3-5/8”
	48”	15’0”	12”	70 to 80	53’11-1/16”	327’3-13/16”	6-3/8”	37 3-7/16”	37’1-1/8”
		15’0”	12”	85 to 100	53’2-5/8”	322’4-15/16”	6-3/16”	36’3-1/2”	36’1-3/16”
	56-1/2”	15’0”	12”	70 to 80	62’0-5/8”	400’7-3/8”	7-3/4”	45’5-3/8”	45’2-11/16”
		15’0”	12”	85 to 100	61’3-3/8”	396’0-11/16”	7-1/2”	44’4-11/16”	44’1-15/16”

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