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* C & P is Carpenter & Paterson

Introduction

Eaton is a leading manufacturer and fabricator of B-Line series metal products used in the support of pipe and equipment for industrial, residential, commercial, utility, and OEM installations. Eaton is proud of the exacting standards of research, design, engineering, and manufacturing that go into each and every product that comprise our pipe hanger product line. Our customers have access to one of the most complete support systems offered in the industry, including pipe hangers, strut system, cable tray, slotted angle, seismic bracing, fasteners, communications, enclosures and anchors.

Many of Eaton B-Line series products are listed by Underwriters' Laboratories, Inc. and FM Global approved for fire sprinkler system installations. All Eaton B-Line series products are manufactured to meet or exceed industry standards.

Eaton B-Line series products are produced in plants consisting of over 1,000,000 square feet. These facilities are located in Highland, Illinois; Troy, Illinois; Reno, Nevada; and Sherman, Texas. Regional sales and distribution centers are located throughout the United States and stock standard B-Line series products for quick service and delivery.

This catalog is designed to help engineers and contractors in the application and selection of pipe hangers, supports and seismic bracing for construction and maintenance.

If a unique application requires a special product not included in this catalog, Eaton engineering personnel are ready to furnish design consultation and material estimates. In addition, engineering sales representatives are located throughout the United States and abroad for your convenience.



WARNING

All hanger products in this catalog should be installed and serviced only as illustrated or described. Do not use them for any purpose other than those described in this catalog. Products that are used for unintended purposes could fail, resulting in severe personal injury or death.

Examples of misapplications which could cause severe personal injury or death include, but are not limited to:

- Using a beam clamp on a beam other than those described in the catalog;
- Using concrete inserts as anchors for pulling pipe up to the required elevation;
- Suspending clevis hangers, one under another, which could result in an accumulative load that is greater than that which the pipe hanger will support.

Eaton B-Line series pipe hanger and support products are manufactured in accordance with industry standards. Our customers should exercise care in using these products properly as to avoid potential damage or injury. Contact us if you have any questions about proper installation and use of the products in this catalog.

NOTICE

Eaton reserves the right to change the specifications, materials, equipment, prices or the availability of products at any time without prior notice. While every effort has been made to assure the accuracy of information contained in this catalog at the time of publication, Eaton is not responsible for inaccuracies resulting from undetected errors or omissions.



Manufacturers Standardization Society
of the
Valve and Fitting Industry, Inc.



ISO 9001:2008



B-Line Division
509 West Monroe Street
Highland, Illinois 62249-0326
Phone: 800-851-7415

www.eaton.com/pipehangers

Beam Clamps



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Steel C-Clamp
With Locknut
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B3036L
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Fig. 65
Reversible
Steel C-Clamp
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Fig. 65XT-3/8
Reversible
Steel C-Clamp
With Locknut
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Fig. 68SS
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Pipe Hangers



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Clevis Hanger
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B3170CT
Copper Tubing
Adjustable Swivel Ring
◆ Page 60



B3170CTC
Plastic Coated
Copper Tubing
Adjustable Swivel Ring
◆ Page 60

◆ **DURA-COPPER™ Finish**

★ **Available in DURA GREEN™ Finish** (Other hangers may be available with the DURA-GREEN finish, contact factory)

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Fig. 200 H
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◆ DURA-COPPER™ Finish

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B3180FL
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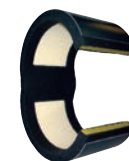


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◆ **DURA-COPPER™ Finish**

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*★ Available in DURA GREEN™ Finish

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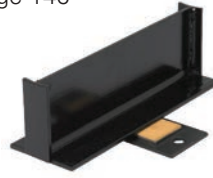
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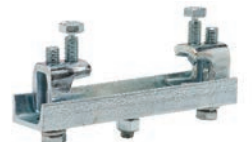


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◆ DURA-COPPER™ Finish

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FW
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LW
Lock Washer
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FFW
Flat Fender Washer
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ATB
Toggle Bolt
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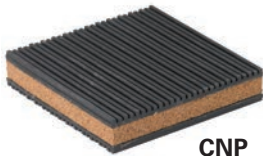


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VIBRATION ISOLATION



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Neoprene Pad
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CNNK
Cork, Ribbed
Neoprene and Steel
Page 269



VRP
Rubber Cube Pad
Page 270



BVS Type
1 5/8" Wide Vibra Strip™
Page 271



RM & RM-D Type
Neoprene Mounts
Page 272



OS Type
Steel Spring Isolator Restraints
1", 2", & 3" Deflection
Pages 273 & 274



JQ Type
Isolator Restraints w/OPA-0070
Pre-Approved Seismic Protection
1", 2", & 3" Deflection
Pages 275 & 277



JQ-TQN Type
Neoprene Isolator Restraints
w/OPA-0070
Pre-Approved Seismic Protection
1/2" Deflection
Pages 278 & 279



RQ & RQD Type
Neoprene Mount w/Integrak
Seismic Restraints
1/4" & 1/2" Deflection
Pages 280 & 281



RH & RHD Type
Neoprene Hanger
1/4" & 1/2" Deflection
Page 282



CHSCS Type
Spring Hanger
w/Seismic Cushion Stop
1" & 2" Deflection
Pages 283 & 284



HHSCS Type
Combination Hanger
Spring & Neoprene w/
Seismic Cushion Stop
1 1/2" & 2 1/2" Deflection
Pages 287 & 288



CH30SCS Type
Deflection Combination Hanger
15° Tilt Spring & Neoprene w/
Seismic Cushion Stop
1" & 2" Deflection
Pages 285 & 286



HH30SCS Type
Deflection Combination Hanger
15° Tilt Spring & Neoprene w/
Seismic Cushion Stop
1 1/2" & 2 1/2" Deflection
Pages 289 & 290

DURA-BLOK™ Rooftop Supports



DBP
Base
Page 293



DBM
Base
Page 293



DB Series
Base & Short Channel
Page 294



DB6 Series
Base & Tall Channel
Page 295



DB10 Series
Double Base & Long Channel
Page 296



DBM Series
Base & Clamp Riser
Page 297



DB_DS Series
Bases & Harness
Assembly
Pages 298 & 299



DBR Series
Base & Fixed Height
Roller Assembly
Page 300



DBR Series
Base & Adjustable Height
Roller Assembly
Page 301



DBE Series
Base & Adjustable
Height Channel
Page 301



CLDP10
Load Distribution Plate
Page 302

KwikWire™ System



KwikWire Clamp
Page 307



Wire Rope
Page 307



KwikPak™ Kit
Page 308



Wire Rope Cutter
Page 308



KwikWire Hanger
Page 309



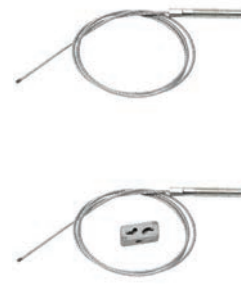
BKL & BCLK Series
Loop Termination
Page 311



BKH & BKHK Series
Single Hook Termination
Page 312



BKYH & BKYHK Series
Double Hook
Termination
Page 313



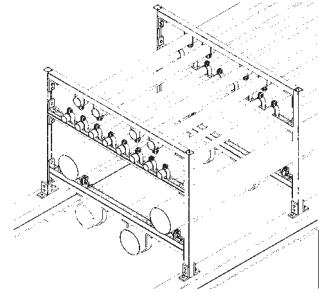
BKB & BKBK Series
Bolt Termination
Page 314



BKA & BKAK Series
Angle Bracket
Termination
Page 315








Strut Systems

The B-Line series metal framing support system is designed with many time-saving features. Fully adjustable and reusable, with a complete line of channels, fittings, and accessories for multi-purpose applications.

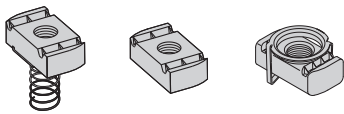


Strut Systems Information

SELECTION CHART for Channels, Materials and Hole Patterns

Channel	Channel Dimensions		Material & Thickness				Channel Hole Pattern				
	Height 	Width 	Steel <u>1</u>	Alum. <u>2</u>	Stainless Steel		SH 	S 	H17/8 	TH 	KO6 
					Type 304 <u>3</u>	Type 316 <u>4</u>					
B11	3 1/4" (82.5)	1 5/8" (41.3)	12 Ga.	--	--	--	<u>1</u>	<u>1</u>	<u>1</u>	--	<u>1</u>
B12	2 7/16" (61.9)	1 5/8" (41.3)	12 Ga.	.105	--	--	<u>1 2</u>	<u>1</u>	<u>1 2</u>	--	<u>1 2</u>
B22	1 5/8" (41.3)	1 5/8" (41.3)	12 Ga.	.105	12 Ga.	12 Ga.	<u>1 2 3 4</u>	<u>1</u>	<u>1 2 3 4</u>	<u>1</u>	<u>1 2</u>
B24	1 5/8" (41.3)	1 5/8" (41.3)	14 Ga.	.080	14 Ga.	14 Ga.	<u>1 2 3 4</u>	<u>1</u>	<u>1 2 3 4</u>	--	<u>1 2</u>
B26	1 5/8" (41.3)	1 5/8" (41.3)	16 Ga.	--	--	--	<u>1</u>	<u>1</u>	<u>1</u>	--	<u>1</u>
B32	1 3/8" (34.9)	1 5/8" (41.3)	12 Ga.	--	12 Ga.	--	<u>1 3</u>	<u>1</u>	<u>1 3</u>	--	<u>1</u>
B42	1" (25.4)	1 5/8" (41.3)	12 Ga.	--	12 Ga.	--	<u>1 3</u>	<u>1</u>	<u>1 3</u>	--	<u>1</u>
B52	1 3/16" (20.6)	1 5/8" (41.3)	12 Ga.	--	--	--	<u>1</u>	<u>1</u>	<u>1</u>	--	<u>1</u>
B54	1 3/16" (20.6)	1 5/8" (41.3)	14 Ga.	.080	14 Ga.	14 Ga.	<u>1 2 3 4</u>	<u>1</u>	<u>1 2 3 4</u>	--	<u>1 2</u>
B56	1 3/16" (20.6)	1 5/8" (41.3)	16 Ga.	--	--	--	<u>1</u>	<u>1</u>	<u>1</u>	--	<u>1</u>

Channel Nuts



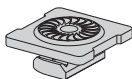
Size and Part Number

Thread Size	With Spring	Without Spring	Twirl Nut
1/4"-20	N224	N224WO	TN224
3/8"-16	N228	N228WO	TN228
1/2"-13	N225	N225WO	TN225
5/8"-11	N255	N255WO	--
3/4"-10	N275	N275WO	--

Available Finishes: Electro-Galvanized

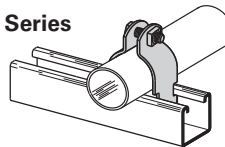
Combo Nut Washers

Part Number	Thread Size
NW524	1/4"-20
NW528	3/8"-16
NW525	1/2"-13



Available Finishes: Electro-Galvanized

B2000 Series



Copper Tubing Clamps DURA-COPPER™

Part No.	Nominal Tubing Size	Mat'l Ga.
B2026DCU	1/2" (15)	16
B2008DCU	3/4" (20)	16
B2030DCU	1" (25)	14
B2032DCU	1 1/4" (32)	14
B2011DCU	1 1/2" (40)	14
B2038DCU	2" (50)	12
B2042DCU	2 1/2" (60)	12
B2046DCU	3" (80)	12
B2050DCU	3 1/2" (90)	12
B2054DCU	4" (100)	11

Available Finishes: Electro-Galvanized, Aluminum, Stainless, DURA-COPPER Painted, Hot-Dip Galvanized and PVC coated.

Nut and bolts are included with all two-piece clamps.

** Add "PA" to Part No. for Pre-assembled

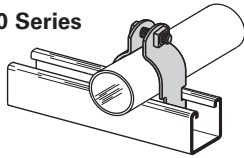
Schedule 40 Pipe Clamps

Part No.	Nominal Pipe Size	Mat'l Ga.
B2001	3/8" (10)	16
B2008	1/2" (15)	16
B2009	3/4" (20)	14
B2010	1" (25)	14
B2011	1 1/4" (32)	14
B2012	1 1/2" (40)	12
B2013	2" (50)	12
B2014	2 1/2" (60)	12
B2015	3" (80)	12
B2016	3 1/2" (90)	11
B2017	4" (100)	11
B2018	4 1/2" (115)	11
B2019	5" (125)	11
B2020	6" (150)	11
B2021	7" (175)	11
B2022	8" (200)	11

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

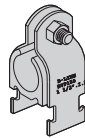
Below are some basic clamp and cushions to be used with a strut system. For the industry's most complete line of strut and strut fittings, refer to B-Line series Strut Systems catalog.

B2000 Series



O.D. Pipe Clamps

Part No.	O.D. Size (Outside Dia.)	Mat'l Ga.
B2023	1/4" (6.3)	16
B2024	3/8" (9.5)	16
B2025	1/2" (12.7)	16
B2026	5/8" (15.9)	16
B2027	3/4" (19.0)	16
B2028	7/8" (22.2)	16
B2029	1" (25.4)	14
B2030	1 1/8" (28.6)	14
B2031	1 1/4" (31.7)	14
B2032	1 3/8" (34.9)	14
B2004	1 1/2" (38.1)	14
B2011	1 5/8" (41.3)	14
B2005	1 3/4" (44.4)	12
B2036	1 7/8" (47.6)	12
B2037	2" (50.8)	12
B2038	2 1/8" (54.0)	12
B2039	2 1/4" (57.1)	12
B2013	2 3/8" (60.3)	12
B2041	2 1/2" (63.5)	12
B2042	2 5/8" (66.7)	12
B2043	2 3/4" (69.8)	12
B2014	2 7/8" (73.0)	12
B2045	3" (76.2)	12
B2046	3 1/8" (79.4)	12
B2047	3 1/4" (82.5)	12
B2048	3 3/8" (85.7)	12
B2015	3 1/2" (88.9)	12
B2050	3 5/8" (92.1)	11
B2051	3 3/4" (95.2)	11
B2016	4" (101.6)	11
B2054	4 1/8" (104.8)	11
B2055	4 1/4" (107.9)	11
B2056	4 3/8" (111.1)	11
B2017	4 1/2" (114.3)	11
B2058	4 5/8" (117.5)	11
B2059	4 3/4" (120.6)	11
B2060	4 7/8" (123.8)	11
B2061	5" (127.0)	11
B2062	5 1/8" (130.2)	11
B2063	5 1/4" (133.3)	11
B2064	5 3/8" (136.5)	11
B2065	5 1/2" (139.7)	11



BVT & BVP Series Vibra-Clamp™

For Copper Tubing & OD Sizes

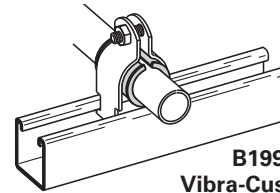
Catalog No.	Copper & OD Tubing Size	Nominal Copper Size
BVT025	1/4" (6.3)	—
BVT037	3/8" (9.5)	1/4" (6)
BVT050	1/2" (12.7)	3/8" (10)
BVT062	5/8" (15.9)	1/2" (15)
BVT075	3/4" (19.0)	5/8" (17)
BVT087	7/8" (22.2)	3/4" (20)
BVT100	1" (25.4)	—
BVT112	1 1/8" (28.6)	1" (25)
BVT125	1 1/4" (31.7)	—
BVT137	1 3/8" (34.9)	1 1/4" (32)
BVT150	1 1/2" (38.1)	—
BVT162	1 5/8" (41.3)	1 1/2" (40)
BVT175	1 3/4" (44.4)	—
BVT187	1 7/8" (47.6)	—
BVT200	2" (50.8)	—
BVT212	2 1/8" (54.0)	2" (50)
BVT225	2 1/4" (57.1)	—
BVT250	2 1/2" (63.5)	—
BVT262	2 5/8" (66.7)	2 1/2" (65)
BVT300	3" (76.2)	—
BVT312	3 1/8" (79.4)	3" (80)
BVT362	3 5/8" (92.1)	3 1/2" (90)
BVT412	4 1/8" (104.8)	4" (100)
BVT612	6 1/8" (155.6)	6" (150)

Available for tubing and pipe sizes 1/4" to 6", OD sizes 1/4" to 6 5/8". Easy one tool installation, dampens vibration and noise, secures tubing firmly, and protects against galvanic reaction.

Stainless Steel available

For Pipe Sizes

Catalog No.	Nominal Pipe Size
BVP025	1/4" (6)
BVP037	3/8" (10)
BVP050	1/2" (15)
BVP075	3/4" (20)
BVP100	1" (25)
BVP125	1 1/4" (32)
BVP150	1 1/2" (40)
BVP200	2" (50)
BVP250	2 1/2" (65)
BVP300	3" (80)
BVP350	3 1/2" (90)
BVP400	4" (100)
BVP500	5" (125)
BVP600	6" (150)



B1999 Vibra-Cushion™

- Inhibits Galvanic Reaction
- Reduces Sound & Vibration
- Used on refrigeration, HVAC, copper tubing, glass pipes & hydraulic lines Available in 20 Ft. rolls.

For Rigid Conduit or Iron Pipe

Nominal Size	Length of Vibra-Cushion	Use Clamp No.
3/8" (10)	2 1/8" (54.0)	B2002
1/2" (15)	2 5/8" (66.7)	B2009
3/4" (20)	3 1/4" (82.5)	B2031
1" (25)	4 1/8" (104.8)	B2004
1 1/4" (32)	5 3/16" (131.8)	B2012
1 1/2" (40)	5 5/16" (150.8)	B2038
2" (50)	7 1/2" (190.5)	B2042
2 1/2" (65)	9" (228.6)	B2046
3" (80)	11" (279.4)	B2051
3 1/2" (90)	12 1/2" (317.5)	B2055
4" (100)	14 1/2" (368.3)	B2059
5" (125)	17 7/16" (442.9)	B2067
6" (150)	20 3/4" (527.0)	B2116

For Thinwall (EMT) Conduit

Nominal Size	Length of Vibra-Cushion	Use Clamp No.
3/8" (10)	1 13/16" (46.0)	B2027
1/2" (15)	2 3/16" (58.7)	B2002
3/4" (20)	2 7/8" (73.0)	B2003
1" (25)	3 5/8" (92.1)	B2032
1 1/4" (32)	4 3/8" (120.6)	B2036
1 1/2" (40)	5 7/16" (138.1)	B2012
2" (50)	6 7/8" (174.6)	B2013

For Thinwall (EMT) Conduit

Nominal Size	Length of Vibra-Cushion	Use Clamp No.
1/4" (6)	1 3/16" (30.2)	B2026
3/8" (10)	1 9/16" (39.7)	B2027
1/2" (15)	1 7/8" (47.6)	B2028
5/8" (17)	2 5/16" (58.7)	B2029
3/4" (20)	2 3/4" (69.8)	B2030
1" (25)	3 1/2" (88.9)	B2032
1 1/4" (32)	4 5/16" (109.5)	B2011
1 1/2" (40)	5 1/8" (130.2)	B2036
2" (50)	6 1/16" (169.9)	B2013
2 1/2" (65)	8 1/4" (209.5)	B2014
3" (80)	9 13/16" (249.2)	B2048
3 1/2" (90)	11 3/8" (288.9)	B2052
4" (100)	12 15/16" (328.6)	B2056
5" (125)	16 1/8" (409.6)	B2064
6" (150)	19 1/4" (488.9)	B2112
8" (200)	25 1/2" (647.7)	B2128

All dimensions in charts and on drawings are in inches. Dimensions shown in parentheses are in millimeters unless otherwise specified.

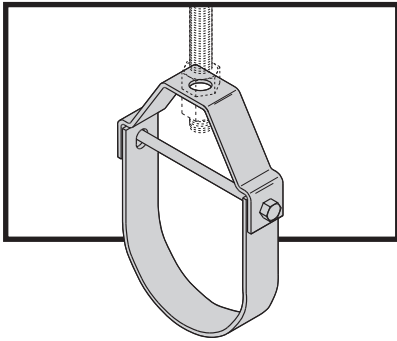
MATERIALS

Carbon Steel

Carbon steel is used in the manufacture of B-Line series pipe hangers and supports. Excellent strength characteristics and adaptability to cold forming provide a well engineered design. By cold forming the steel, mechanical properties are increased, adding to the structural integrity of the fabricated hanger.

Stainless Steel

AISI Type 304 and Type 316 are non-magnetic members of the austenitic stainless steel group. Several conditions make the use of stainless steel ideal. These include reducing long term maintenance costs, high ambient temperatures, appearance, and stable structural properties such as yield strength, and high creep resistance.



CORROSION

All metal surfaces exposed to the environment are affected by corrosion. Depending on the physical properties of the metal and its proximity to other dissimilar metals, an electrochemical reaction may occur which causes an attack on the metal itself, resulting in corrosion. Chemical corrosion is limited to highly corrosive environments, high temperatures, or a combination of both.

FINISHES

Zinc Coatings

Protective zinc coatings are available on a number of pipe hangers and accessories in three basic forms: Electro-galvanized, pre-galvanized, and hot-dip galvanized after fabrication. In all cases, the zinc protects the steel first as a sacrificial anode to repair bare areas on cut edges and gouges.

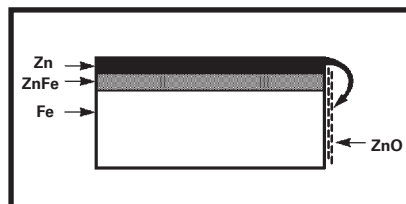
When exposed to air and moisture, zinc forms a tough, adherent protective film consisting of a mixture of zinc oxides, hydroxides, and carbonates. The corrosion resistance of zinc is directly related to its thickness and the environment. For example a 0.2 mil (5 μm) coating will last twice as long as a 0.1 mil (2.5 μm) coating in the same environment.

Electro-Galvanized (ASTM B633 SC1 or SC3)

An electro-galvanized process deposits a coating of zinc on the steel by electrolysis from a bath of zinc salts. This coating is pure zinc and adheres to the steel with a molecular bond. A maximum of 0.5 mils (12.7 μm) of zinc can be applied by this method. This coating is recommended for in-door use in relatively dry areas.

Pre-Galvanized Zinc (ASTM A653 Coating Designation G90)

Pre-galvanized zinc is produced by continuously rolling the steel coils or sheets through molten zinc at the steel mills. This is also known as "mill-galvanized" or "hot-dipped mill galvanized". Coils are then slit to size for fabrication of pipe hangers. Coating thicknesses of G90, is 0.90 ounces per square foot (0.27 kg/m^2) of steel surface.



Protection of cut edges with zinc coatings.

Cut edges and welded areas are not zinc coated; however, zinc near the uncoated metal becomes a sacrificial anode which protects the bare areas after a short period of time.

Pre-galvanized steel is not generally recommended for use outdoors in industrial environments, but is suitable for extended exposure in dry or mildly corrosive atmospheres.

Hot-Dip Galvanized After Fabrication (ASTM A123)

After a pipe hanger or fitting has been fabricated, it is completely immersed in a bath of molten zinc. A metallurgical bond is formed, resulting in a zinc coating that completely coats all surfaces, including edges. Zinc coatings of this specification have a minimum thickness of 1.50 ounces per square foot (0.45 kg/m^2) on each side or a total of 3.0 ounces per square foot (0.9 kg/m^2) of steel.

Hot-dip galvanized after fabrication is recommended for outdoor exposure. For best results, a zinc rich paint (available from Eaton) should be applied to field cuts. The zinc rich paint will provide immediate protection for field cuts and eliminate the short time period for galvanic action to "heal" the damaged coating.

Plastic Coating

Some products offered by Eaton are plastic or vinyl coated for prevention of galvanic reaction between materials or for noise reduction. These coated products can also be used where contact between glass pipe and hanger is not desirable. Felt lined hangers may be substituted for same purpose.

Red Primer

A corrosion resistant metal primer containing rust inhibitive pigments.

DURA-COPPER and DURA GREEN Epoxy Coatings

DURA-COPPER™ and DURA GREEN™ are water borne epoxy coatings applied to B-Line series products by a precisely controlled cathodic electro-deposition process. This process is accomplished using a conveyor to transport parts through several cleaning, phosphatizing and application stages prior to being baked (See diagram below).

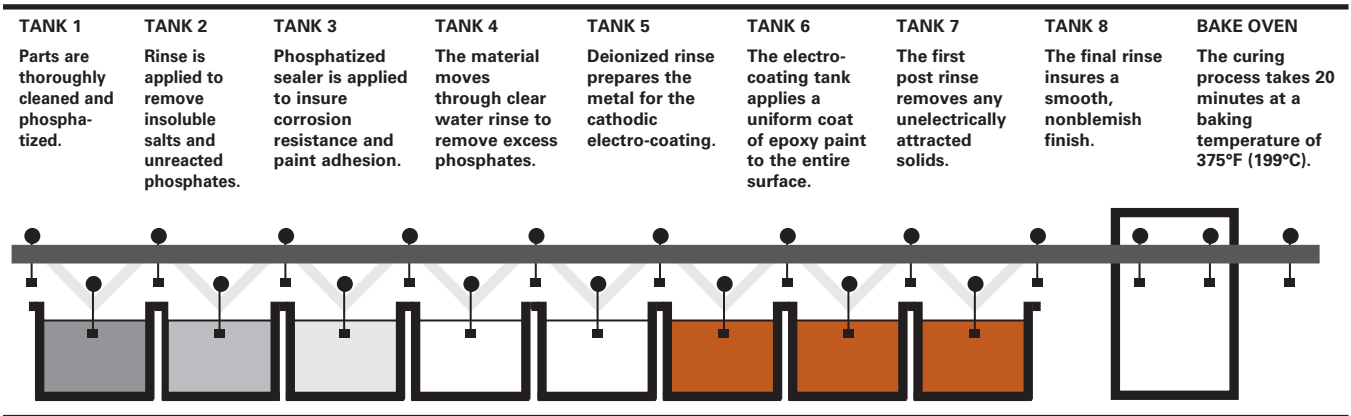
This custom designed paint system is used for painting all copper painted hanger parts and all green channel, slotted angle and fittings.

Samples are selected on a routine basis for Salt Spray (fog) testing to verify the quality of the finish. These tests are performed in accordance with ASTM B117-73 and evaluated and rated according to ASTM D1654-79 (Tables 1 & 2). The DURA-COPPER and DURA GREEN Epoxy coatings have been tested and listed by Underwriters Laboratories in accordance with "Standard for Pipe Hanger Equipment for Fire Protection Service, UL 203" and meet or exceed all requirements of Federal Specification TT-C-490B Paragraph 3.

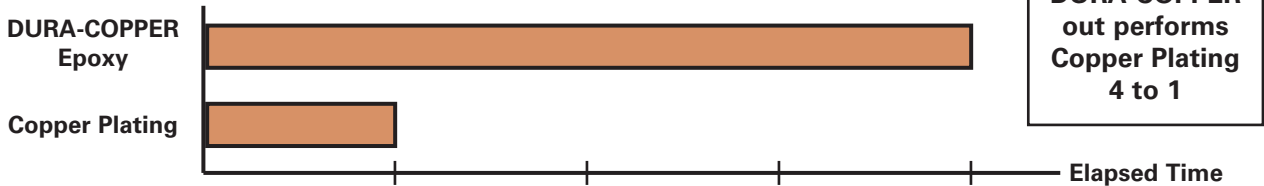
Quality Assurance

Eaton's Quality Assurance Program has been developed and implemented for compliance to various industry standards and specifications.

DURA-COPPER & DURA GREEN EPOXY COATING PROCESS



SALT SPRAY TEST RESULTS



(1) All salt spray (fog) tests conducted in accordance with ASTM B117-73 and evaluated and rated according to ASTM D1654-79 Tables 1 & 2. Tests were performed and certified by an independent testing laboratory.

General Information

Torque

The torque values in this catalog are to be used as a guide only. The relationship between the applied torque or torque wrench reading and the actual tension created in the bolt may be substantially different. Important factors affecting torque-tension relationships include friction under the bolt head or nut, hole tolerances, and torque wrench tolerances. Accuracy of many commercial torque wrenches may vary as much as plus or minus 25%.

Charts and Tables

Charts and tables in this section are compiled from information published by nationally recognized organizations and are intended for use as a guide only. Eaton recommends that users of this information determine the validity of such information as applied to their own applications.

Eaton reserves the right to make specification changes without notice.

SECTION 15140 - PIPE HANGERS AND SUPPORTS

Part I - GENERAL

1.01 SECTION INCLUDES

- A. The work covered under this section consists of the furnishing of all necessary labor, supervision, materials, equipment, and services to completely execute the pipe hanger and supports as described in this specification.

1.02 REFERENCES

- A. ASTM B633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
- B. ASTM A123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. ASTM A1011 - Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
- E. ANSI/MSS SP-58 - Manufacturers Standardization Society: Pipe Hangers and Supports - Materials, Design, and Manufacture.
- F. ANSI/MSS SP-69 - Manufacturers Standardization Society: Pipe Hangers and Supports - Selection and Application.
- G. NFPA 13 - Installation of Sprinkler Systems.

1.03 QUALITY ASSURANCE

- A. Hangers and supports used in fire protection piping systems shall be listed and labeled by Underwriters Laboratories.
- B. Steel pipe hangers and supports shall have the manufacturers name, part number, and applicable size stamped in the part itself for identification.
- C. Hangers and supports shall be designed and manufactured in conformance with ANSI/MSS SP-58.
- D. Supports for sprinkler piping shall be in conformance with NFPA 13.

1.04 SUBMITTALS

- A. Submit product data on all hanger and support devices, including shields and attachment methods. Product data to include, but not limited to materials, finishes, approvals, load ratings, and dimensional information.

Part II - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Manufacturer: Subject to compliance with these specifications, pipe hanger and support systems shall be as manufactured by Eaton.

2.02 PIPE HANGERS AND SUPPORTS

- A. Hangers
 - 1. Uninsulated pipes 2 inch and smaller:
 - a. Adjustable steel swivel ring (band type) hanger, B-Line series Fig. 200.
 - b. Adjustable steel swivel J-hanger, B-Line series B3690.
 - c. Malleable iron ring hanger, B-Line series B3198R or hinged ring hanger, B3198H.
 - d. Adjustable steel clevis hanger, B-Line series B3104 or B3100.

2. Uninsulated pipes 2¹/₂ inch and larger:
 - a. Adjustable steel clevis hanger, B-Line series B3100.
 - b. Pipe roll with sockets, B-Line series B3114.
 - c. Adjustable steel yoke pipe roll, B-Line series B3110.
 3. Insulated pipe - Hot or steam piping:
 - a. 2 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield, B-Line series B3100 with B3151 or B3153 series.
 - b. 2¹/₂ inch and larger pipes:
 - i. Adjustable steel yoke pipe roll with pipe covering protection saddle, B-Line series B3110 with B3160 - B3165 series.
 - ii. Pipe roll with sockets with pipe covering protection saddle, B-Line series B3114 with B3160 - B3165 series.
 4. Insulated pipe - Cold or chilled water piping:
 - a. 5 inch and smaller pipes: use adjustable steel clevis with galvanized sheet metal shield, B-Line series B3100 with B3151 or B3153 series.
 - b. 6 inch and larger pipes:
 - i. Adjustable steel yoke pipe, B-Line series B3110, with B3380CW - B3384CW calcium silicate shield.
 - ii. Pipe roll with sockets, B-Line series B3114, with B3380CW - B3384CW calcium silicate shield.
- B. PIPE CLAMPS**
1. When flexibility in the hanger assembly is required due to horizontal movement, use pipe clamps with weldless eye nuts, B-Line series B3140 or B3142 with B3200. For insulated lines use double bolted pipe clamps, B-Line series B3144 or B3146 with B3200.
- C. MULTIPLE OR TRAPEZE HANGERS**
1. Trapeze hangers shall be constructed from 12 gauge roll formed ASTM A1011 SS Gr. 33 structural steel channel, 1⁵/₈" x 1⁵/₈" minimum, B-Line series B22 strut or stronger as required.
 2. Mount pipes to trapeze with two piece pipe straps sized for outside diameter of pipe, B-Line series B2000 series.
 3. For pipes subjected to axial movement:
 - a. Strut mounted roller support, B-Line series B3126. Use pipe protection shield or saddles on insulated lines.
 - b. Strut mounted pipe guide, B-Line series B2417.
- D. WALL SUPPORTS**
1. Pipes 4 inch and smaller:
 - a. Carbon steel hook, B-Line series B3191.
 - b. Carbon steel J-hanger, B-Line series B3690.
 2. Pipes larger than 4 inch:
 - a. Welded strut bracket and pipe straps, B-Line series B3064 and B2000 series.
 - b. Welded steel brackets, B-Line series B3066 or B3067, with roller chair or adjustable steel yoke pipe roll. B-Line series B3120 or B3110. Use pipe protection shield or saddles on insulated lines.

E. FLOOR SUPPORTS

1. Hot piping under 6 inch and all cold piping:
 - a. Carbon steel adjustable pipe saddle and nipple attached to steel base stand sized for pipe elevation, B-Line series B3093 and B3088T or B3090 and B3088. Pipe saddle shall be screwed or welded to appropriate base stand.
2. Hot piping 6 inch and larger:
 - a. (Adjustable) Roller stand with base plate, B-Line series B3117SL (or B3118SL).
 - b. Adjustable roller support and steel support sized for elevation, B-Line series B3124

F. VERTICAL SUPPORTS

1. Steel riser clamp sized to fit outside diameter of pipe, B-Line series B3373.

G. COPPER TUBING SUPPORTS

1. Hangers shall be sized to fit copper tubing outside diameters.
 - a. Adjustable steel swivel ring (band type) hanger, B-Line series B3170CT.
 - b. Malleable iron ring hanger, B-Line series B3198CT or hinged ring hanger B3198HCT.
 - c. Adjustable steel clevis hanger, B-Line series B3104CT.

H. PLASTIC PIPE SUPPORTS

1. V-bottom clevis hanger with galvanized 18 gauge continuous support channel, B-Line series B3106 and B3106V, to form a continuous support system for plastic pipe or flexible tubing.

I. SUPPLEMENTARY STRUCTURAL SUPPORTS

1. Design and fabricate supports using structural quality steel bolted framing materials as manufactured by Eaton. Channels shall be roll formed, 12 gauge ASTM A1011 SS Grade 33 steel, $1\frac{5}{8}$ " x $1\frac{5}{8}$ " or greater as required by loading conditions. Submit designs for pipe tunnels, pipe galleries, etc., to engineer for approval. Use clamps and fittings designed for use with the strut system.

2.04 UPPER ATTACHMENTS

A. BEAM CLAMPS

1. Beam clamps shall be used where piping is to be suspended from building steel. Clamp type shall be selected on the basis of load to be supported, and load configuration.
2. C-Clamps shall have locknuts and cup point set screws, B-Line series B351L, B3036L or Fig. 65XT Top flange C-clamps shall be used when attaching a hanger rod to the top flange of structural shapes, B-Line series B3034 or B3033. Refer to manufacturers' recommendation for setscrew torque. Retaining straps shall be used to maintain the clamp's position on the beam where required (Fig. 69, Fig. 69R).
3. Center loaded beam clamps shall be used where specified. Steel clamps shall be B-Line series B3050 or B3055. Malleable iron or forged steel beam clamps with cross bolt shall be B-Line series B3054 or B3291 - B3297 series as required to fit beams.

B. CONCRETE INSERTS

1. Cast in place spot concrete inserts shall be used where applicable, either steel or malleable iron body, B-Line series B2500 or B3014. Spot inserts shall allow for lateral adjustment and have means for attachment to forms. Select insert nuts to suit threaded hanger rod sizes, B-Line series N2500 or B3014N series.

2. Continuous concrete inserts shall be used where applicable. Channels shall be 12 gauge, ASTM A 1011 SS Grade 33 structural quality carbon steel, complete with styrofoam inserts and end caps with nail holes for attachment to forms. The continuous concrete insert shall have a load rating of 2,000 lbs/ft. in concrete, B-Line series B221, B321, or B521 (B521 is limited to 1,500 lbs/ft.). Select channel nuts suitable for strut and rod sizes.

2.05 VIBRATION ISOLATION AND SUPPORTS

- A. For refrigeration, air conditioning, hydraulic, pneumatic, and other vibrating system applications, use a clamp that has a vibration dampening insert and a nylon inserted locknut. For copper and steel tubing use B-Line series BVT Vibra-Clamp™, for pipe sizes use BVP Vibra-Clamp.
- B. For larger tubing or piping subjected to vibration, use neoprene or spring hangers as required.
- C. For base mounted equipment use vibration pads, molded neoprene mounts, or spring mounts as required.
- D. Vibration isolation products as provided by Eaton's B-Line series.

2.06 ACCESSORIES

- A. Hanger rods shall be threaded both ends, B-Line series B3205, or continuous threaded rods of circular cross section. Use adjusting locknuts at upper attachments and hangers. No wire, chain, or perforated straps are allowed.
- B. Shields shall be 180° galvanized sheet metal, 12 inch minimum length, 18 gauge minimum thickness, designed to match outside diameter of the insulated pipe, B-Line series B3151.
- C. Pipe protection saddles shall be formed from carbon steel, 1/8 inch minimum thickness, sized for insulation thickness. Saddles for pipe sizes greater than 12 inch shall have a center support rib.

2.07 FINISHES

INDOOR FINISHES

- A. Hangers and clamps for support of bare copper piping shall be coated with copper colored epoxy paint, B-Line series DURA-COPPER™. Additionally a plastic coating or a felt lining in hanger can be used.
- B. Hangers for other than bare copper pipe shall be zinc plated in accordance with ASTM B633 - SC3 or shall have an electro-deposited green epoxy finish, B-Line series DURA GREEN™.
- C. Strut channels shall be pre-galvanized in accordance with ASTM A653 G90 or have an electro-deposited green epoxy finish, B-Line series DURA GREEN.

OUTDOOR AND CORROSIVE AREA FINISHES

- D. Hangers and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot-dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.
- E. Hangers and strut located in corrosive areas shall be Type 304 (316) stainless steel with stainless steel hardware.

Part III - EXECUTION

3.01 PIPE HANGERS AND SUPPORTS

- A. Pipe shall be adequately supported by pipe hanger and supports specified in PART II - PRODUCTS. Hangers for insulated pipes shall be sized to accommodate insulation thickness.
- B. Horizontal steel piping shall be supported in accordance with ANSI/MSS SP-69 & SP-58 Tables 3 and 4, excerpts of which follow below:

NOMINAL PIPE SIZE	ROD DIAMETER	MAXIMUM SPACING
3/8" - 1 1/4"	3/8"	7'-0"
1 1/2"	3/8"	9'-0"
2"	3/8"	10'-0"
2 1/2"	1/2"	11'-0"
3"	1/2"	12'-0"
3 1/2"	1/2"	13'-0"
4"	5/8"	14'-0"
5"	5/8"	16'-0"
6"	3/4"	17'-0"
8"	3/4"	19'-0"
10"	7/8"	22'-0"
12"	7/8"	23'-0"
14"	1"	25'-0"
16"	1"	27'-0"

- C. Horizontal copper tubing shall be supported in accordance with ANSI/MSS SP-69 & SP-58 Tables 3 and 4, excerpts of which follow below:

NOMINAL TUBING SIZE	ROD DIAMETER	MAXIMUM SPACING
1/4" - 3/4"	3/8"	5'-0"
1"	3/8"	6'-0"
1 1/4"	3/8"	7'-0"
1 1/2"	3/8"	8'-0"
2"	3/8"	8'-0"
2 1/2"	1/2"	9'-0"
3"	1/2"	10'-0"
3 1/2"	1/2"	11'-0"
4"	1/2"	12'-0"
5"	1/2"	13'-0"
6"	5/8"	14'-0"
8"	3/4"	16'-0"

- D. Provide means of preventing dissimilar metal contact such as plastic coated hangers, copper colored B-Line series DURA-COPPER™ epoxy paint, or non-adhesive isolation tape (B-Line series Iso-Pipe™). Galvanized felt isolators sized for copper tubing may also be used, B-Line series B3195CT.

- E. Support horizontal cast iron pipe adjacent to each hub, with 10 feet maximum spacing between hangers.
- F. Install hangers to provide a minimum of 1/2 inch space between finished covering and adjacent work.
- G. Place a hanger within 12 inches of each horizontal elbow.
- H. Support vertical piping independently of connected horizontal piping. Support vertical pipes at every (other) floor. Wherever possible, locate riser clamps directly below pipe couplings or shear lugs.
- I. Where several pipes can be installed in parallel and at the same elevation, provide trapeze hangers as specified in Section 2.02 C. Trapeze hangers shall be spaced according to the smallest pipe size, or install intermediate supports according to schedule in Section 3.01 B.
- J. Do not support piping from other pipes, ductwork or other equipment which is not building structure.

3.02 CONCRETE INSERTS

- A. Provide inserts for placement in formwork before concrete is poured.
- B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- C. Where concrete slabs form finished ceilings, provide inserts to be flush with slab surface.
- D. For inserts carrying 5" nominal pipe and larger, provide hooked rod to concrete reinforcement.