UL LISTED

FM APPROVED

TEMBO SEVEN STAR®

SEISMIC BRACING & RETRO-FITTING



CERTIFICATES



ACCREDIUM CERTIFICATIONS

Certificate of Compliance

This is to Certify that the Quality Management System of

TEMBO GLOBAL INDUSTRIES LIMITED

PLOT NO. PAP D-146-147, TURBHE MIDC, TTC INDUSTRIAL ESTATE, OPP. BALMER LAWRIE VAN LEER CO., TURBHE, NAVI MUMBAI-400706, MAHARASHTRA (INDIA)

APL HOUSE B-1, BADRINATH, GROUND FLOOR, TUNGARESHWAR INDUSTRIAL COMPLEX, SR.NO-1, SURVEY NO-62, NEAR SHIV MANDIR, SATIVALI VILLAGE, VASAI (EAST), 401208, MAHARASHTRA (INDIA)

UNIT NO.1/B BADRINATH, GROUND FLOOR, TUNGARESHWAR INDUSTRIAL COMPLEX, SR.NO-1, SURVEY NO-62, NEAR SHIV MANDIR, SATIVALI VILLAGE, VASAI (EAST), 401208, MAHARASHTRA (INDIA)

has been assessed and registered by Accredium and found to be in compliance with the requirements applicable as per Quality Management System conforming:

ISO 9001:2015

For the scope of

MANUFACTURING & SUPPLY OF PIPE HANGERS AND SUPPORT SYSTEMS, ANTI VIBRATION PRODUCTS, RUBBER SUPPORT INSERTS, S.S FLOOR DRAINS, THREADED RODS & SLOTTED CHANNEL.

Certificate No.	**GACB5410**		
Date of Initial Registration	05th June 2019	*Issue Date*	05th June 2019
1st Surveillance on or before	05th June 2020	*Expiry Date*	04th June 2022
2nd Surveillance on or before	05th June 2021		

This Certificate is Valid for 3 years & will remain current subject to the company maintaining its system to the required standard(s). This will be monitored regularly by Accredium Certifications. The certification details & effectiveness are listed at www.acascert.com . The registration does not assure the quality of products produced by a quality system. This certificate is granted based on the limited sampling audit as per relevant ISO standard & Accredium Certifications is not responsible for client's failure to maintain documented quality systems.

Authorised Signatory

ACCREDITED

ZERTIFIKAT • CERTIFICAT • CERTIFICADO • BELGESI • CERTIFICATE

DFW QAA INTERNATIONAL MEMBER

CORPORATE MEMBER

To Verify this Certificate Status & Details Kindly log on | www.acascert.com and www.gacb.eu



ACCREDIUM CERTIFICATIONS

Certificate of Compliance

This is to Certify that the Environmental Management System of

TEMBO GLOBAL INDUSTRIES LIMITED

PLOT NO. PAP D-146-147, TURBHE MIDC, TTC INDUSTRIAL ESTATE, OPP. BALMER LAWRIE VAN LEER CO., TURBHE, NAVI MUMBAI-400706, MAHARASHTRA (INDIA)

APL HOUSE B-1, BADRINATH, GROUND FLOOR, TUNGARESHWAR INDUSTRIAL COMPLEX, SR.NO-1, SURVEY NO-62, NEAR SHIV MANDIR, SATIVALI VILLAGE, VASAI (EAST), 401208, MAHARASHTRA (INDIA)

UNIT NO.1/B BADRINATH, GROUND FLOOR, TUNGARESHWAR INDUSTRIAL COMPLEX, SR.NO-1, SURVEY NO-62, NEAR SHIV MANDIR, SATIVALI VILLAGE, VASAI (EAST), 401208, MAHARASHTRA (INDIA)

has been assessed by ACAS and found to be in compliance with the following Environmental Management Standard:

ISO 14001:2015

For the scope of

MANUFACTURING & SUPPLY OF PIPE HANGERS AND SUPPORT SYSTEMS, ANTI VIBRATION PRODUCTS, RUBBER SUPPORT INSERTS, S.S FLOOR DRAINS, THREADED RODS & SLOTTED CHANNEL.

Certificate No.	**GACB5691**		
Date of Initial Registration	01st Nov. 2019	*Issue Date*	01st Nov. 2019
1st Surveillance on or before	01st Nov. 2020	*Expiry Date*	31st Oct. 2022
2nd Surveillance on or before	01st Nov. 2021		

This Certificate is Valid for 3 years & will remain current subject to the company maintaining its system to the required standards (s). This will be monitored regularly by Accredium Certifications. The certification details & effectiveness are listed at www.acascert.com . The registration does not assure the quality of products produced by a quality system. This certificate is granted based on the limited sampling audit as per relevant ISO standard & Accredium Certifications is not responsible for client's failure to maintain documented quality systems.

Authorised Signatory

ACCREDITED

ZERTIFIKAT • CERTIFICAT • CERTIFICADO • BELGESI • CERTIFICATE

DFW QAA INTERNATIONAL MEMBER

CORPORATE MEMBER

To Verify this Certificate Status & Details Kindly log on | www.acascert.com and www.gacb.eu



CERTIFICATE OF COMPLIANCE

Certificate Number	EX16250
Report Reference	EX16250-20130628
Issue Date	2020-AUGUST-13

Issued to: Tembo Global Industries Ltd
Plt-Pap-D146/147-M.I.D.C
Turbhe - Indl Area
Opp- Balmer Lawrie Vannleer
Navi Mumbai Maharashtra 400407 INDIA

This certificate confirms that representative samples of HANGERS, PIPE
See addendum page

Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.

Standard(s) for Safety: UL 203 - Pipe Hanger Equipment for Fire Protection Service
Additional Information: See the UL Online Certifications Directory at https://iq.ulprospector.com for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Mark. Only the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Mark should be considered as being UL Certified and covered under UL's Follow-Up Services.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

Page 1 of 2



CERTIFICATE OF COMPLIANCE

Certificate Number	EX16250
Report Reference	EX16250-20130628
Issue Date	2020-AUGUST-13

This is to certify that representative samples of the product as specified on this certificate were tested according to the current UL requirements.

Product/Models:

SCH - Clevis Hanger, SH - Band Hanger, PC-1 - Pipe Clamp, PC-2 - Pipe Clamp, SE-USC - U Strap, SE-UB - U Bolt, SCH-A-02 - Clevis Hanger, SCH-A-2.50 - Clevis Hanger, SCH-A-03 - - Clevis Hanger, SCH-A-04 - Clevis Hanger, SCH-B-04 - Clevis Hanger, SCH-C-04 - Clevis Hanger, SCH-A-05 - Clevis Hanger, SCH-A-06 - Clevis Hanger, SCH-B-06 - Clevis Hanger, SCH-C-06 - Clevis Hanger, SCH-A-08 - Clevis Hanger, SCH-B-08 - Clevis Hanger, SCH-C-08 - Clevis Hanger, SH-A-03 - Band Hanger, SH-B-03 - Band Hanger, SH-A-04 - Band Hanger, SH-B-04 - Band Hanger, SH-C-04 - Band Hanger, SH-A-06 - Band Hanger, SH-A-08 - Band Hanger

Bruce Mahrenholz, Director North American Certification Program
UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

Page 2 of 2

CERTIFICATES



Certificate of Compliance

This certificate is issued for the following:

Pipe Hanger Components for Automatic Sprinkler Systems

Tembo Global, Pipe Clamps

Product Designation	Hanger Rod Size, in. (mm)	Component Description	For Nominal Pipe Sizes, in.	Remarks
NCR	3/8 (10)	Pipe Hanger with Lining	3/4, 1, 1 ¼, 1 ½, 2, 2 ½, 3, 4	-

Prepared for:

Tembo Global Industries Ltd
Plot No. 146/147 MIDC – Turbhe - TTC, Navi Mumbai, Maharashtra 400703, India

Manufactured by:

Tembo Global Industries Ltd
Unit No. 1/B – Badrinath, Ground Floor, Tungareshwar Industrial Complex Sativali Village, Vasai (East), Dist. Thane, Maharashtra 401208, India

FM Approvals Class: 1951, 1952, 1953 Issue Date December 2016

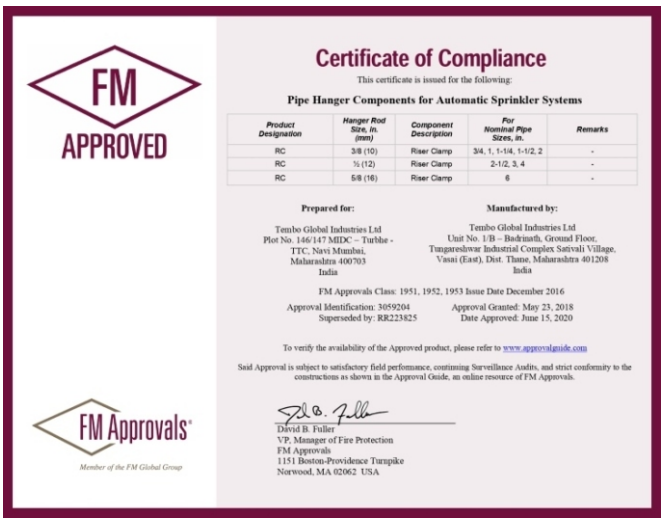
Approval Identification: 3056409
Superseded by: RR224763

Approval Granted: April 25, 2016
Date Approved: September 2, 2020

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA



Certificate of Compliance

This certificate is issued for the following:

Pipe Hanger Components for Automatic Sprinkler Systems

Product Designation	Hanger Rod Size, in. (mm)	Component Description	For Nominal Pipe Sizes, in.	Remarks
RC	3/8 (10)	Riser Clamp	3/4, 1, 1-1/4, 1-1/2, 2	-
RC	½ (12)	Riser Clamp	2-1/2, 3, 4	-
RC	5/8 (16)	Riser Clamp	6	-

Prepared for:

Tembo Global Industries Ltd
Plot No. 146/147 MIDC – Turbhe - TTC, Navi Mumbai, Maharashtra 400703 India

Manufactured by:

Tembo Global Industries Ltd
Unit No. 1/B – Badrinath, Ground Floor, Tungareshwar Industrial Complex Sativali Village, Vasai (East), Dist. Thane, Maharashtra 401208 India

FM Approvals Class: 1951, 1952, 1953 Issue Date December 2016

Approval Identification: 3059204
Superseded by: RR223825

Approval Granted: May 23, 2018
Date Approved: June 15, 2020

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA



Certificate of Compliance

This certificate is issued for the following:

Pipe Hanger Components for Automatic Sprinkler Systems

Product Designation	Hanger Rod Size, in (mm)	Component Description	For Nominal Pipe Sizes, in.	Remarks
USC	3/8 (10)	U-Strap Hangers	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2	-
USC	1/2 (12)	U-Strap Hangers	3, 3-1/2, 4, 5, 6	-

Prepared for:

Tembo Global Industries Ltd
Plot No. 146/147 MIDC – Turbhe - TTC, Navi Mumbai, Maharashtra 400703, India

Manufactured by:

Tembo Global Industries Ltd
Unit No. 1/B – Badrinath, Ground Floor, Tungareshwar Industrial Complex Sativali Village, Vasai (East), Dist. Thane, Maharashtra 401208, India

FM Approvals Class: 1951, 1952, 1953 Issue Date December 2016

Approval Identification: 3059204
Superseded by: RR223825

Approval Granted: May 23, 2018
Date Approved: June 15, 2020

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA



Certificate of Compliance

This certificate is issued for the following:

Pipe Hanger Components for Automatic Sprinkler Systems

Product Designation	Hanger Rod Size, in. (mm)	Component Description	For Nominal Pipe Sizes, in.	Remarks
SH	3/8 (10)	Loop Hanger	3/4, 1, 1-1/4, 1-1/2, 2, 2-1/2, 3, 4	-
SH	1/2 (12)	Loop Hanger	5, 6, 8	-

Prepared for:

Tembo Global Industries Ltd
Plot No. 146/147 MIDC – Turbhe - TTC, Navi Mumbai, Maharashtra 400703, India

Manufactured by:

Tembo Global Industries Ltd
Unit No. 1/B – Badrinath, Ground Floor, Tungareshwar Industrial Complex Sativali Village, Vasai (East), Dist. Thane, Maharashtra 401208 India

FM Approvals Class: 1951, 1952, 1953 Issue Date December 2016

Approval Identification: 3056409
Superseded by: RR223825

Approval Granted: April 25, 2016
Date Approved: June 15, 2020

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA



Certificate of Compliance

This certificate is issued for the following:

Pipe Hanger Components for Automatic Sprinkler Systems

Product Designation	Hanger Rod Size, in. (mm)	Component Description	For Nominal Pipe Sizes, in.	Remarks
CH	3/8 (10)	Clevis Hanger	3/4, 1, 1-1/4, 1-1/2	-
CH	1/2 (12)	Clevis Hanger	2-1/2, 3, 4	-
CH	5/8 (16)	Clevis Hanger	5, 6, 8	-

Prepared for:

Tembo Global Industries Ltd
Plot No. 146/147 MIDC – Turbhe - TTC, Navi Mumbai, Maharashtra 400703, India

Manufactured by:

Tembo Global Industries Ltd
Unit No. 1/B – Badrinath, Ground Floor, Tungareshwar Industrial Complex Sativali Village, Vasai (East), Dist. Thane, Maharashtra 401208, India

FM Approvals Class: 1951, 1952, 1953 Issue Date December 2016

Approval Identification: 3056409
Superseded by: RR223825

Approval Granted: April 25, 2016
Date Approved: June 15, 2020

To verify the availability of the Approved product, please refer to www.approvalguide.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

David B. Fuller
VP, Manager of Fire Protection
FM Approvals
1151 Boston-Providence Turnpike
Norwood, MA 02062 USA



MSS
Since 1924

MANUFACTURERS STANDARDIZATION SOCIETY
OF THE
VALVE AND FITTING INDUSTRY, INC.

HEREBY CERTIFIES THAT

TEMBO GLOBAL INDUSTRIES LTD.

IS A MEMBER IN GOOD STANDING FOR THE YEAR 2020

Frederic J. Washburn
President

David Thompson
Executive Director

INTRODUCTION

TEMBO GLOBAL INDUSTRIES LTD is an Industrial Powerhouse with a dominant presence in Manufacturing and Fabrication of Metal Products used in Pipe Support Systems, HVAC Anti Vibration System and Equipments for Industrial, Commercial, Utility and OEM Installation. It is Young, Agile and responsive company which is constantly expanding its capabilities to fuel its fairy tale journey that seen it grown its standards of research, design, Engineering and Manufacturing that go into each and every product that comprise our Pipe Hangers Products Line. Our customer have access to the most complete Support Systems offered in the Industry, including Pipe Hangers, Rubber Support Inserts, Threaded Rod, Fasteners, Slotted Channels, Angles, Anti Vibration Products and Flexible Connector.

Our products are listed by **UNDERWRITER'S LABORATORY INC. (U.S.A.) AND FM GLOBAL APPROVED (U.S.A.).** All Tembo products are manufactured to meet or exceed industry standards set for their design and manufacture.

Tembo products are produced in technologically most advanced modern plants. These facilities are located in Commercial Capital of the India i.e. Mumbai.

This catalogue is designed to be helpful to the engineers and contractors in the application and selection of pipe hangers, support and HVAC for construction, maintenance, fire & safety.

If a unique application require a special products not included in this catalogue, Tembo engineer personnel are ready to furnish design consultation and realistic material estimates in addition.

NOTICE

Tembo reserves the right to change the specification, materials and process or the availability of products at any time without prior notice. While every effort had been made to assure the accuracy of information contained in this catalogue at the time of publication, Tembo is not responsible for in accuracies resulting from undetected errors or omissions.

TECHNICAL DATA

MATERIALS

Mild Steel

Carbon steel is used in the manufacture of Tembo 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/m2) 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 bar 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/m2) on each side or a total of 3.0 ounces per square foot (0.9 kg/m2) of steel.

Hot dip galvanized after fabrication is recommended for outdoor exposure. For best results, a zinc rich paint (available from B-Line) 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 Tembo 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.

Quality Assurance

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

General

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. Tembo recommends that users of this information determine the validity of such information as applied to their own applications.

Saketh 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 FM APPROVALS.
B. Steel pipe hangers and supports shall have the manufacturer's BRAND name Tembo Seven star 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 Saketh Exim Ltd.

2.02 PIPE HANGERS AND SUPPORTS

A. HANGERS

1. Uninsulated pipes 2 inches and smaller:
   a. Sprinkler Hanger.
   b. Pipe Hanger.
   c. Clevis Hanger.

B. VERTICAL SUPPORTS

1. Steel Riser Clamp sized to fit outside diameter of pipe.

C. COPPER TUBING SUPPORTS

1. Hangers shall be sized to fit copper tubing outside diameters.
   a. Sprinkler Hanger.
   b. Pipe Hanger.
   c. Clevis Hanger.

D. SUPPLEMENTARY STRUCTURAL SUPPORTS

1. Design and fabricate supports using structural quality steel bolted framing materials as manufactured by Tembo. Channels shall be roll formed, 12 gauge ASTM A1011 SS Grade 33 steel, 15/8" x 15/8" 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.
3. Center loaded beam clamps shall be used where specified.

B. CONCRETE INSERTS

1. Cast in place spot concrete inserts shall be used where applicable; either steel or malleable iron body. Spot inserts shall allow for lateral adjustment and have means for attachment to forms. Select insert nuts to suit threaded hanger rod sizes.
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. suitable for strut and rod sizes.

2.05 VIBRATION ISOLATION AND SUPPORTS

A. For refrigeration, air conditioning, hydraulic, pneumatic, and other vibrating system applications, uses a clamp that has a vibration dampening insert and a nylon inserted locknut.

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 are manufactured by Tembo Global Industries Ltd.

2.06 ACCESSORIES

A. Hanger rods shall be threaded both ends. 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.

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. 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.

C. Strut channels shall be pre-galvanized in accordance with ASTM A653 G90 or have an electro-deposited green epoxy finish.

OUTDOOR AND CORROSIVE AREA FINISHES

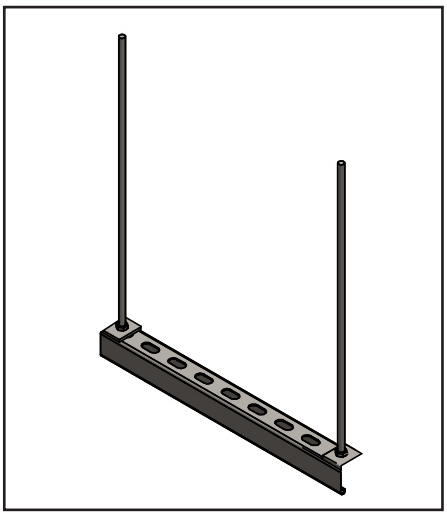
D. Hangers and strut located outdoors shall be hot dip galvanized after fabrication in accordance with ASTM A123. All hanger hardware shall be hot-dip galvanized or stainless steel. Zinc plated hardware is not acceptable for outdoor or corrosive use.

E. Hangers and strut located in corrosive areas shall be Type 304 (316) stainless steel with stainless steel hardware.

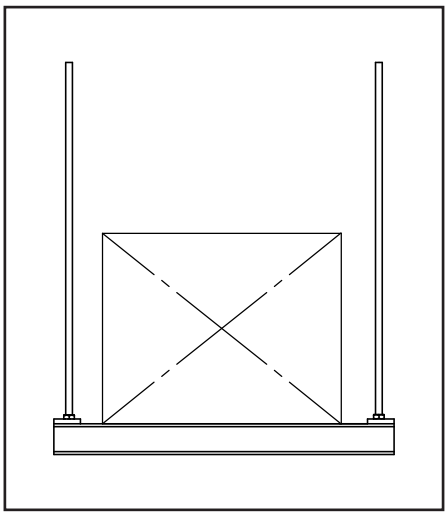
Channel Bracing

A trapeze pipe hanger, like the one shown in figure (A), can be braced in twodifferent ways using metal framing channel.

Figure (B) illustrates simple transverse bracing. The hanger is attached via strut to structural supports. Since the channel is rigid, the transverse brace is only required on one side of the trapeze.



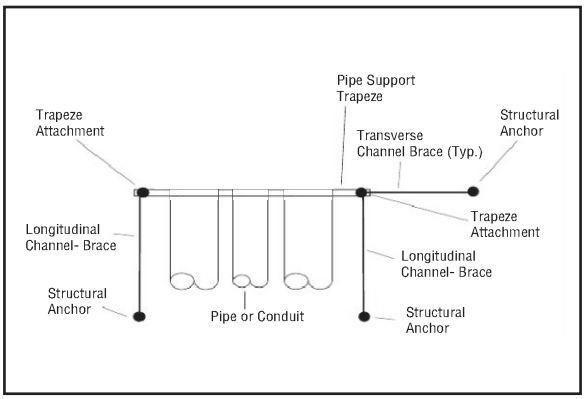
(A) Support System



(B) Transverse Brace

Figure (C) illustrates both transverse and longitudinal bracing. In this case. the hanger is attached via strut to three structural supports.

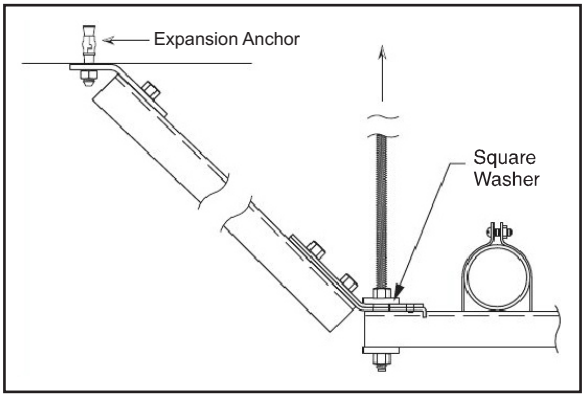
The are different methods for attaching the bracing strut to the hanger depending upon the hanger style. There are also different methods for attaching the bracing strut to structural supports depending upon the type of structure involved. Thus, a complete solution is obtained by selecting a hanger attachment and a corresponding structural attachment.



(C) Transverse & Longitudinal Brace

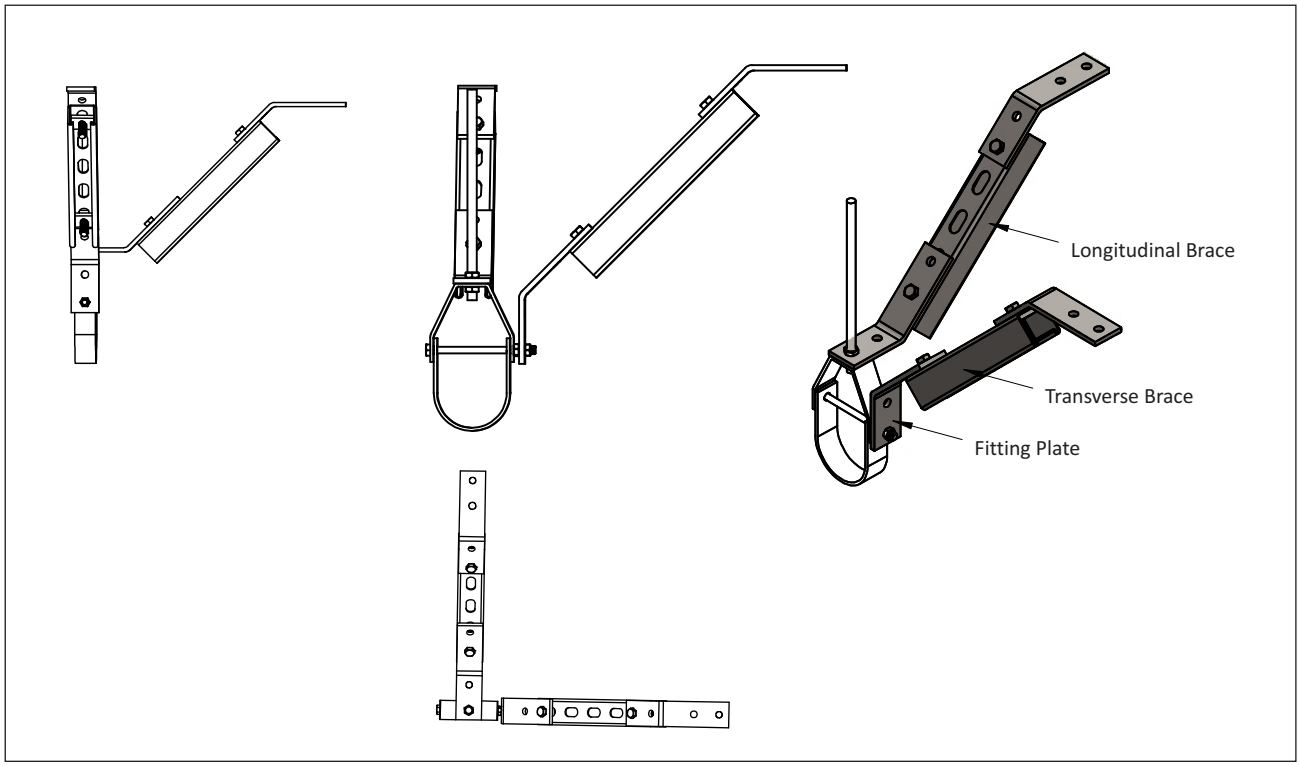
Figure (C) illustrates one example of combining the hanger attachment and the structural attachement.

The following pages illustrate various methods of attaching the bracing strut to the trapeze or other fixture.



(D) Braced Trapeze

Channel Bracing-single Pipe Seismic Support



APPLICATION:

Bracing systems are designed & constructed to resist virtually all code specified seismic forces in the event of an earthquake, there fore keeping non-building structural components operational and intact.

Actual application may very are not limited to support methods shown. However, any changes to the support methods, hardware & designs depicted in these guideline should only be made in accordance with standard engineering practices

MATERIAL:

Mild Steel, Carbon Steel. Also other materials can be provided on request

FINISH AVAILABLE:

Electro-Galvanized, Hot Dip Galvanized.

NOTE:

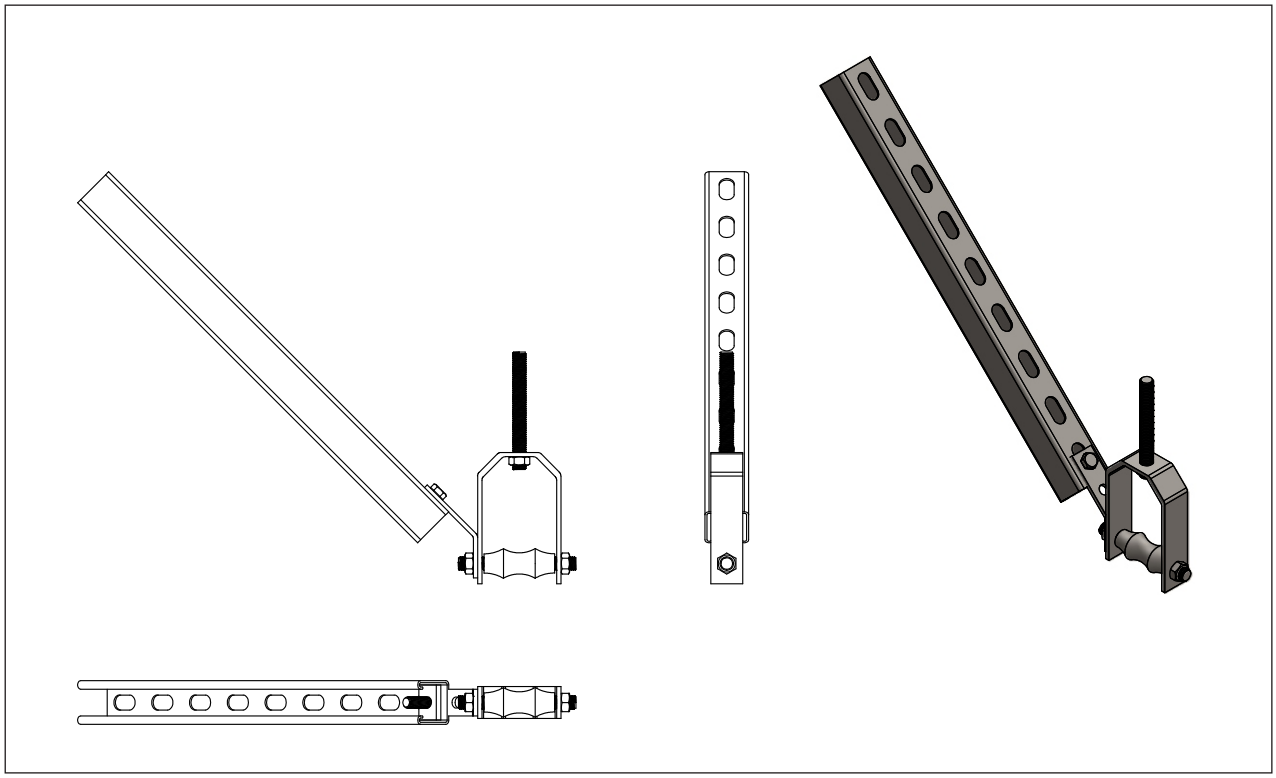
For a single pipe hanger, the longitudinal & transverse channel brace is attached to both side of the pipe

There are two different methods of attaching the channel brace to a clevis hanger. One is to attached the braces to the drop rod. The other alternative shown at the top of the page is to attached a channel brace to both side of clevis hanger.

The transverse brace is attached to one side of the hanger. The specific connection depends upon the type of pipe hanger used.

The longitudinal brace is attached to the top of the hanger. The simplest method is using flat fitting and a pipe clamp.

Seismic Assembly For Roller



APPLICATION:

Bracing systems are designed & constructed to resist virtually all code specified seismic forces in the event of an earthquake, there fore keeping non-building structural components operational and intact.

Actual application may very are not limited to support methods shown. However, any changes to the support methods, hardware & designs depicted in these guideline should only be made in accordance with standard engineering practices

Adjustable Roller Hanger is recommended for suspended pipes in applications where horizontal movement, due to expansion and contraction, will occur and vertical adjustment is necessary.

MATERIAL:

Mild Steel, Carbon Steel. Also other materials can be provided on request

FINISH AVAILABLE:

Electro-Galvanized, Hot Dip Galvanized.

NOTE:

For a single pipe hanger, the longitudinal & transverse channel brace is attached to both side of the pipe

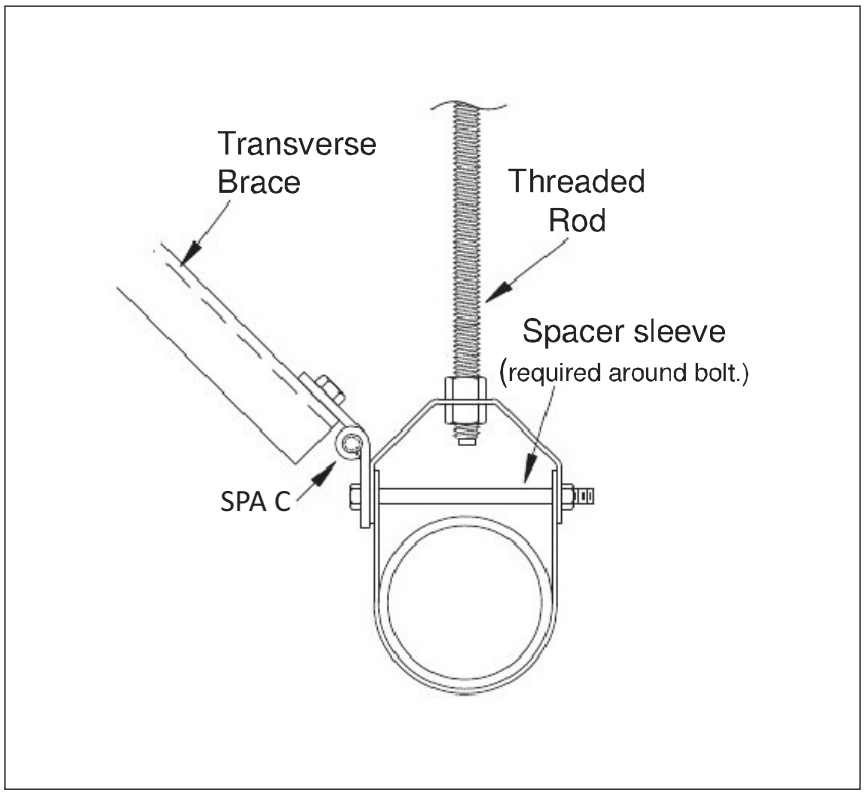
There are two different methods of attaching the channel brace to a Adjustable Roller Hanger. One is to attached the braces to the drop rod. The other alternative shown at the top of the page is to attached a channel brace to both side of Adjustable Roller Hanger.

The transverse brace is attached to one side of the hanger. The specific connection depends upon the type of pipe hanger used.

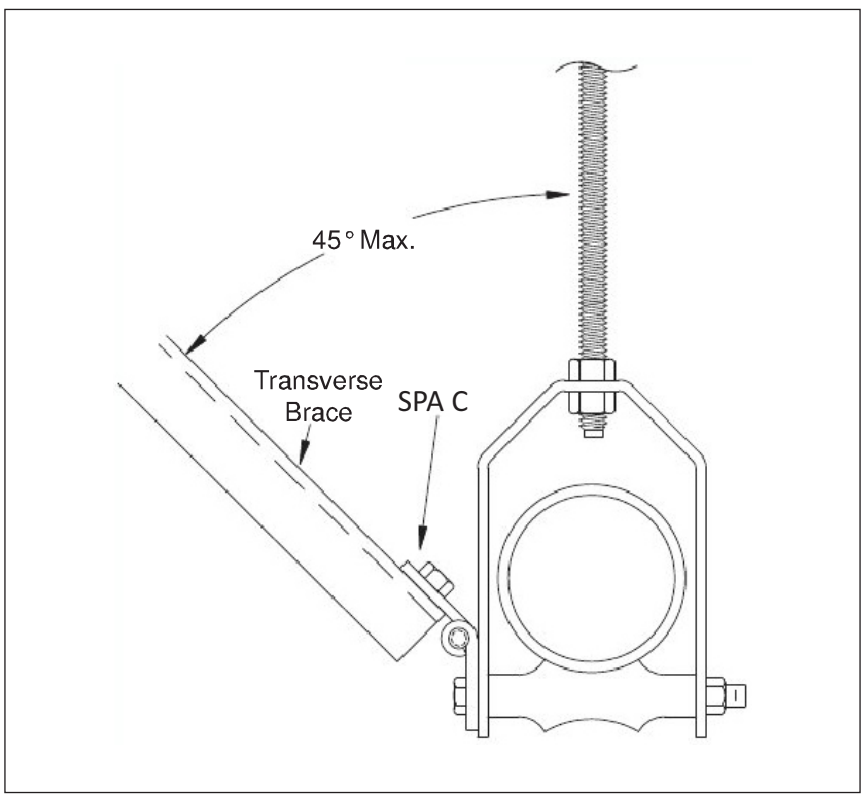
The longitudinal brace is attached to the top of the hanger. The simplest method is using flat fitting and a pipe clamp.

Channel Bracing - Single Pipe, Transverse Brace

The Transverse brace is attached to one side of the hanger.
The specific connection depends upon the type of pipe hanger used.



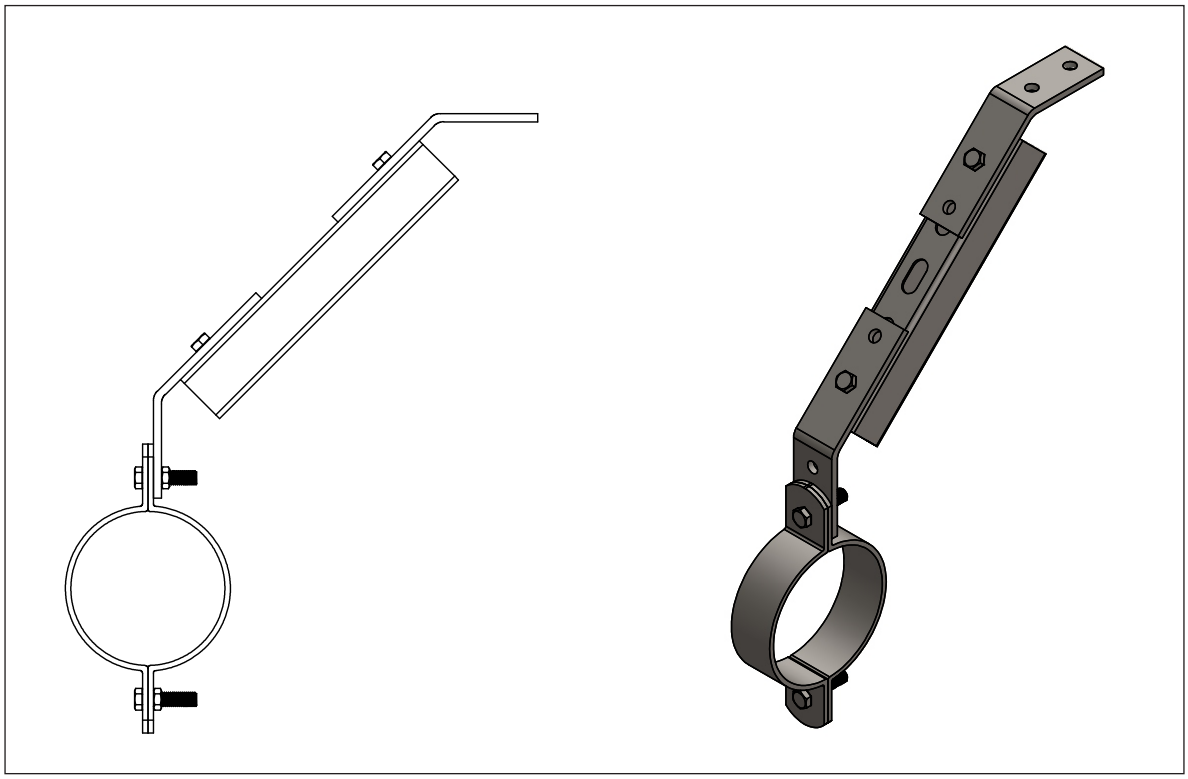
Transverse Brace



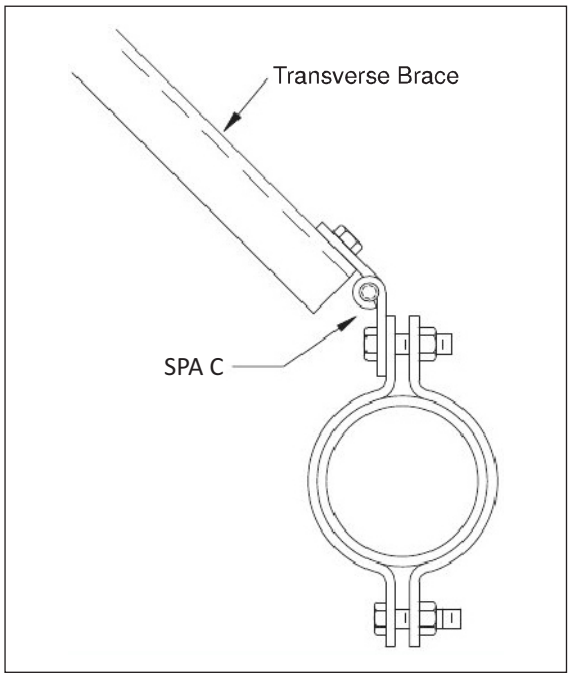
Transverse Brace

Channel Bracing - Single Pipe, Transverse Brace

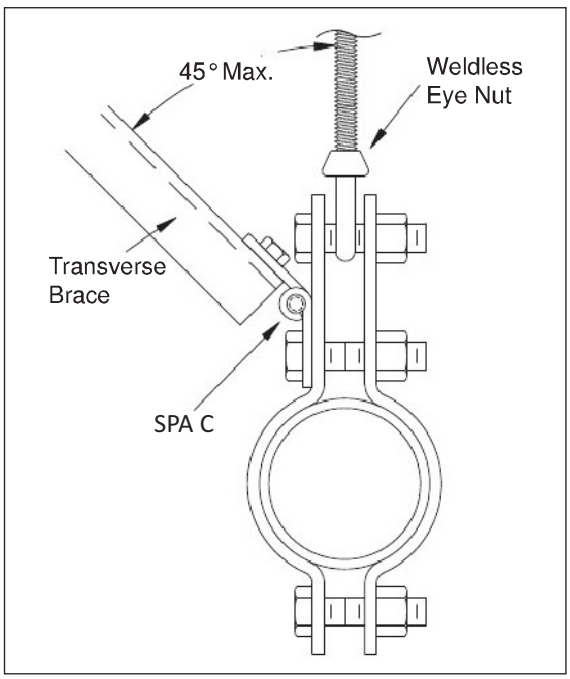
The Transverse brace is attached to one side of the clamp.
The specific connection depends upon the type of pipe clamp used.



Seismic Assembly For Two Bolt Clamp



Transverse Brace

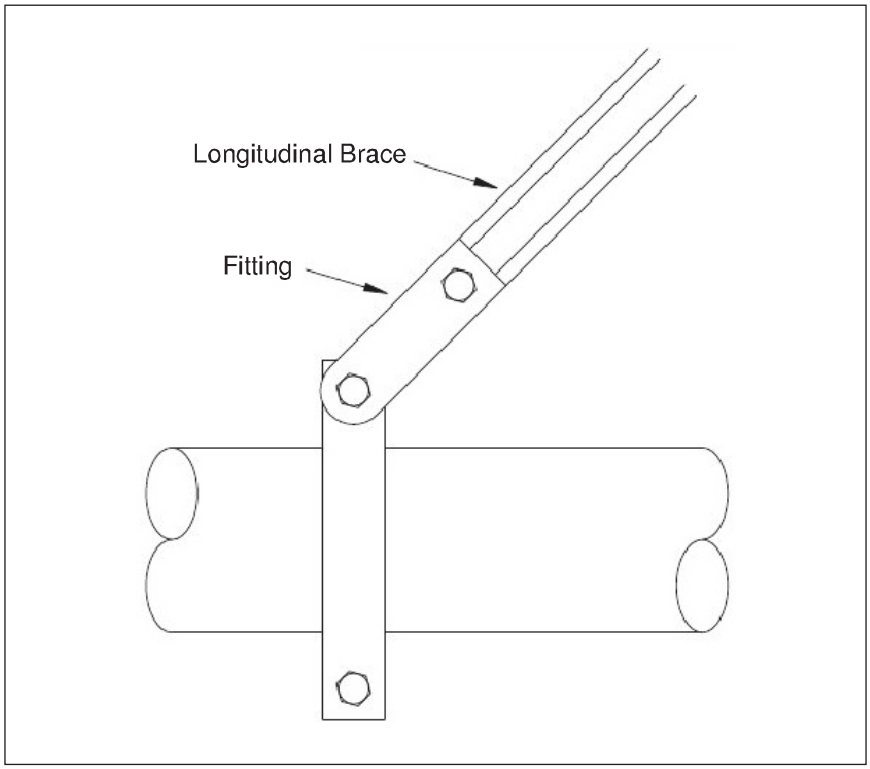


Transverse Brace

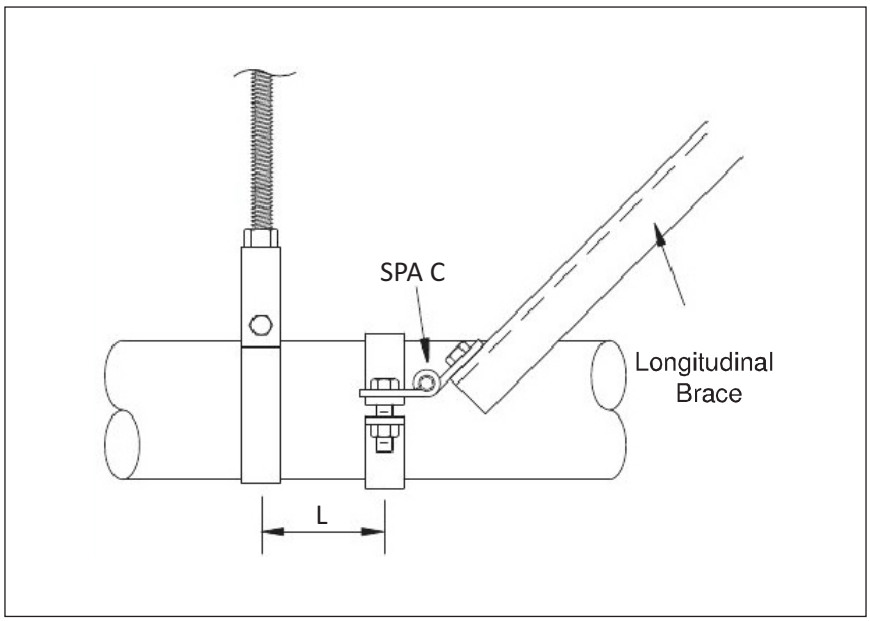
Channel Bracing - Single Pipe, Longitudinal Brace

Unlike the trapeze, only one longitudinal brace is attached to the pipe hanger. The simplest method is using a flat fitting and a pipe clamp as shown on the left.

An alternative is to connect a hinge to the pipe clamp as shown below. This method allows some adjustment in the connection of the longitudinal brace to the anchor above.

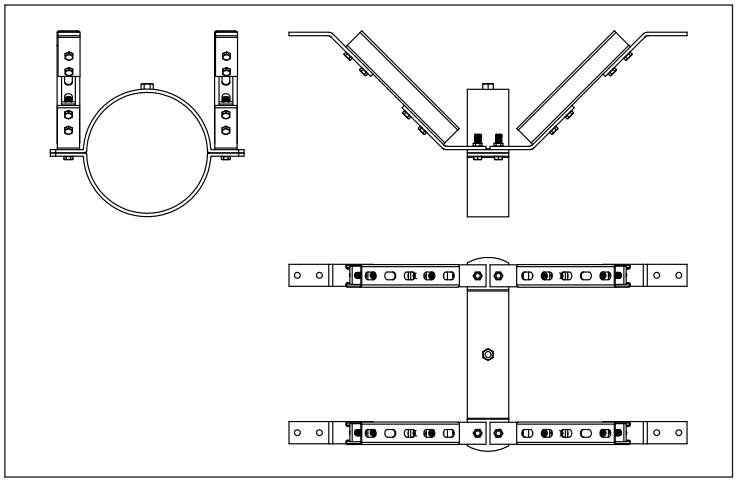


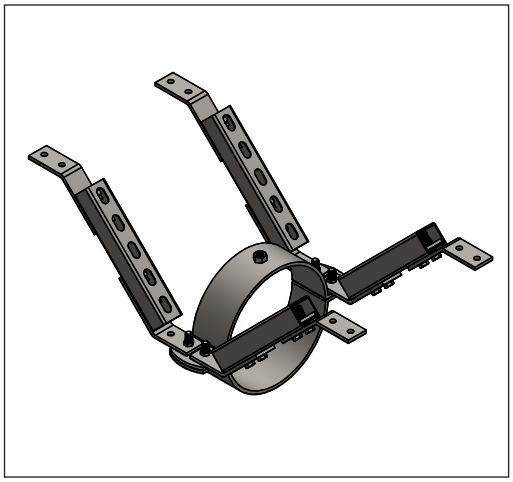
Transverse Brace



Longitudinal Brace

Four Point Bracing For Heavy Pipe Section





APPLICATION:

HEAVY DUTY PIPE HANGER is recommended for non-insulated stationary heavy pipe lines in either a horizontal or vertical position. It can be used for supporting pipes along with roof as well as along wall. it is Used where loads to be carried are larger in magnitude.

CONSTRUCTION:

HEAVY DUTY PIPE HANGER consists of piece of mild steel shaped to wrap around the pipe. Quick – Locking permits simple and fast installation. Large opening angles for easy insertion of the pipes. Clamping range without gaps. Reduces noise upto 18 dB.

MATERIAL:

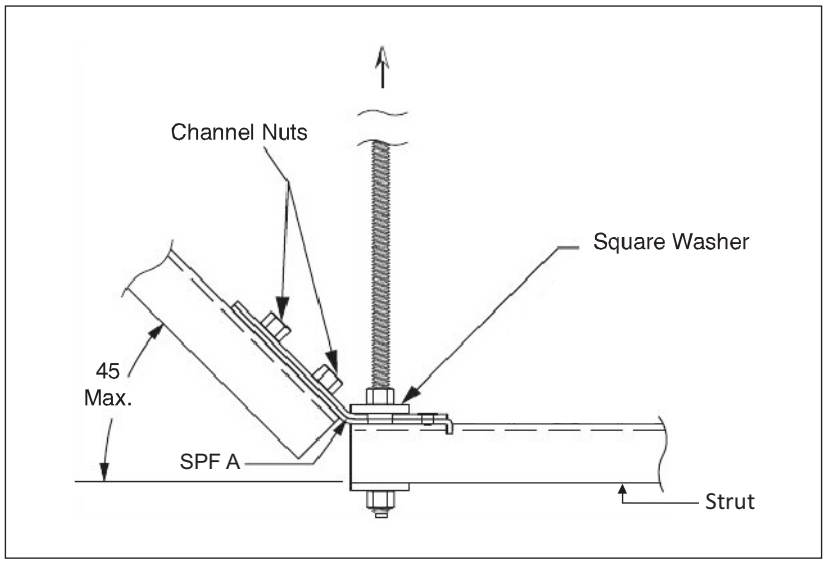
Mild Steel. Also other materials can be provided on request

FINISH AVAILABLE:

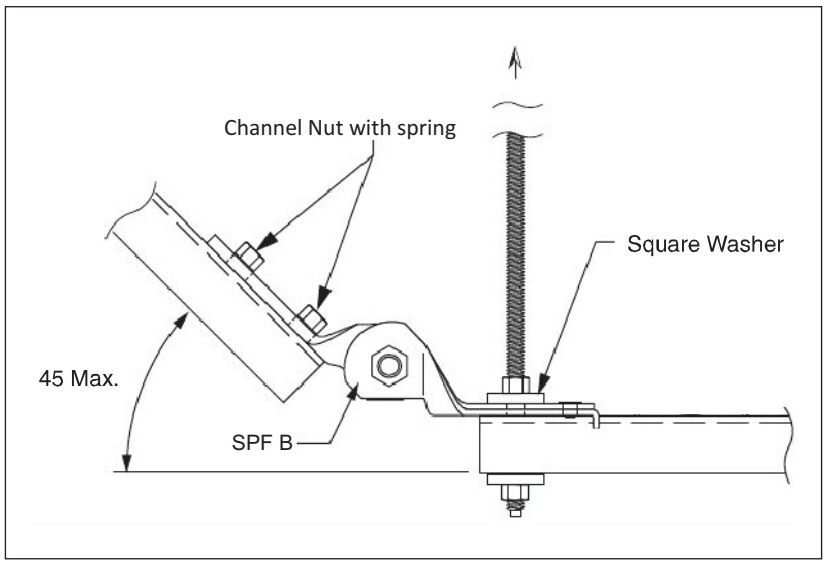
Electro-Galvanized, Hot Dip Galvanized, Plain .

Channel Bracing - Single Channel, Transverse Brace

The Transverse channel brace is typically attached to just one side of the trapeze, The specific connection depends upon the type of pipe hanger used.



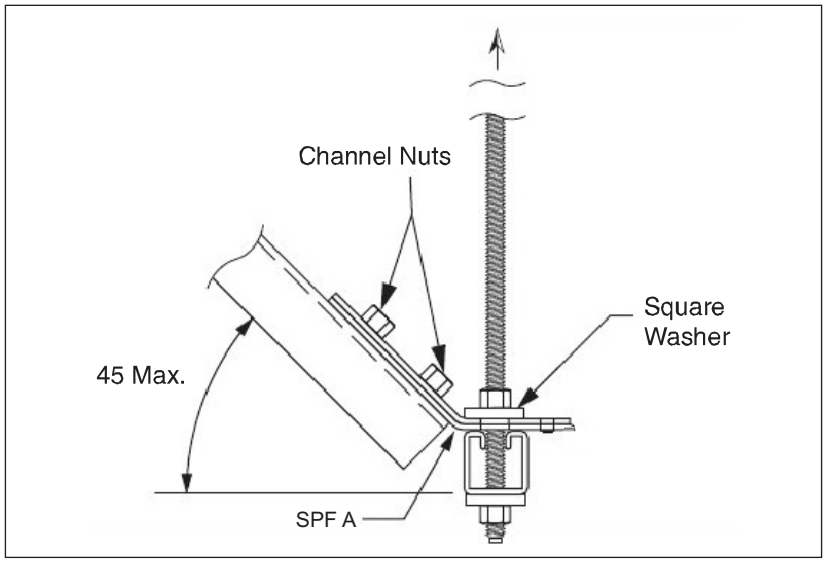
Transverse Brace with Seismic Pivot Fitting



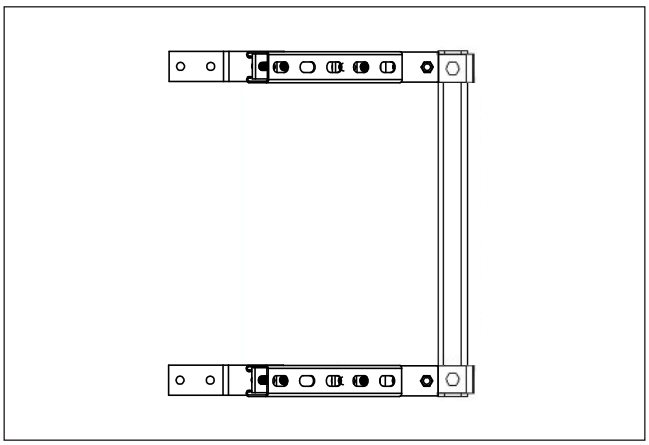
Transverse Brace with Seismic Pivot Fitting

Channel Bracing - Single Channel, Longitudinal Brace

The longitudinal channel brace is must be attached to both side of the trapeze.



Longitudinal Brace with Seismic Pivot Fitting

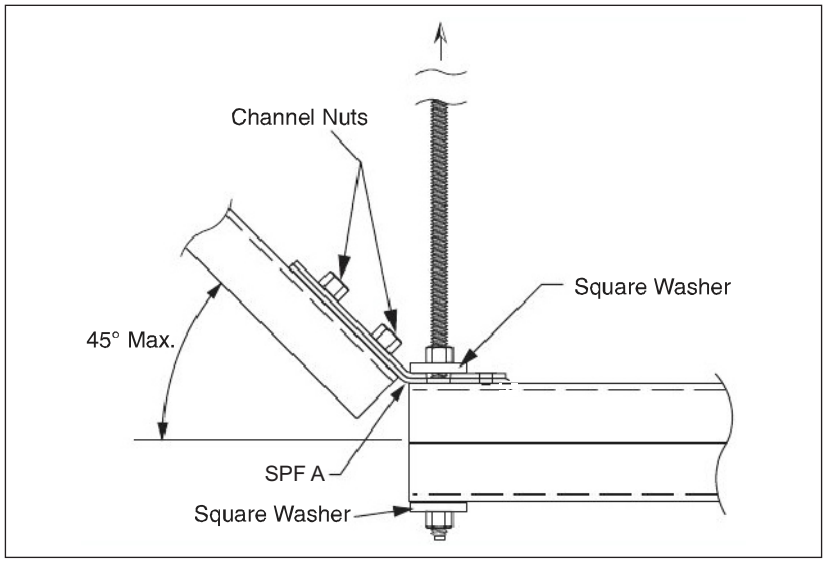


Longitudinal Brace

Channel Bracing - Double Channel, Transverse Brace

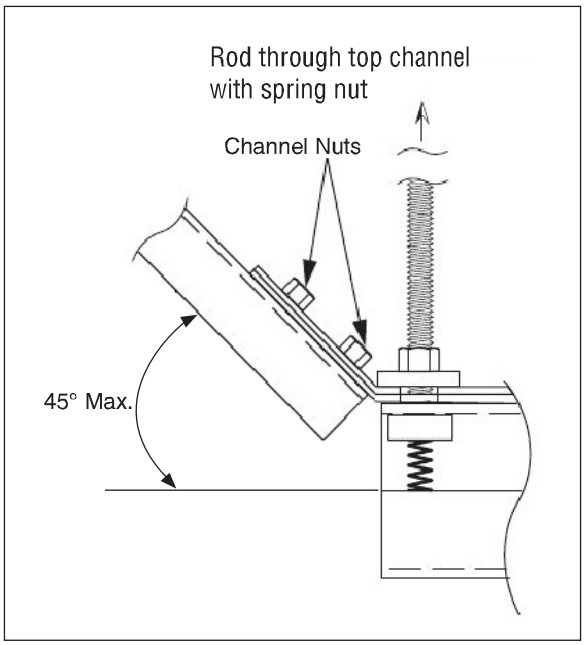
The Transverse channel brace is typically attached to just one side of the trapeze.

There are two different methods of attaching the hanger rod to the trapeze. One is to allow the rod to go through the channel and add a square washer on the bottom side as shown in the examples.



Transverse Brace

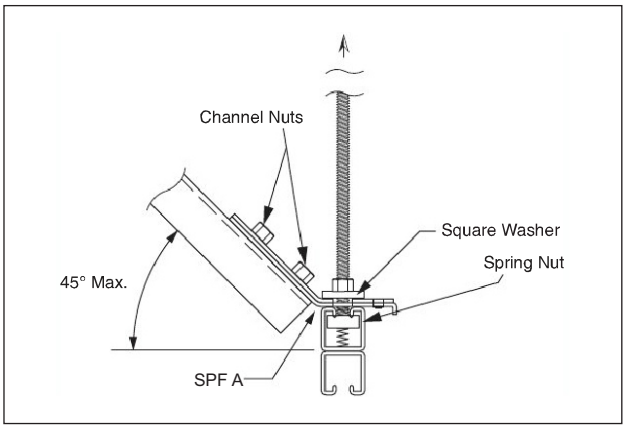
Another method, shown below, is to use a channel nut in the top half of the back-to-back channel.



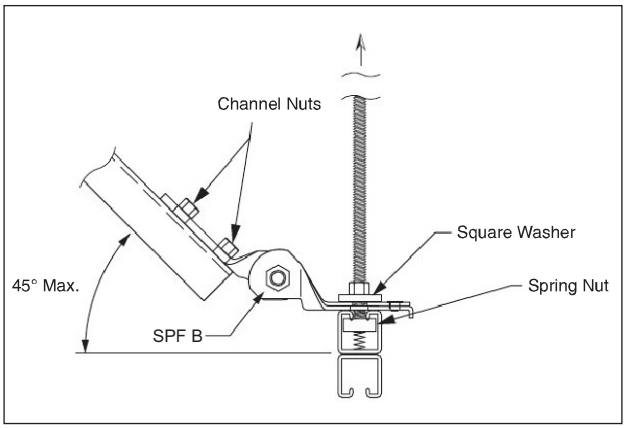
Channel Bracing - Double Channel, Longitudinal Brace

The longitudinal channel brace is must be attached to both side of the trapeze.

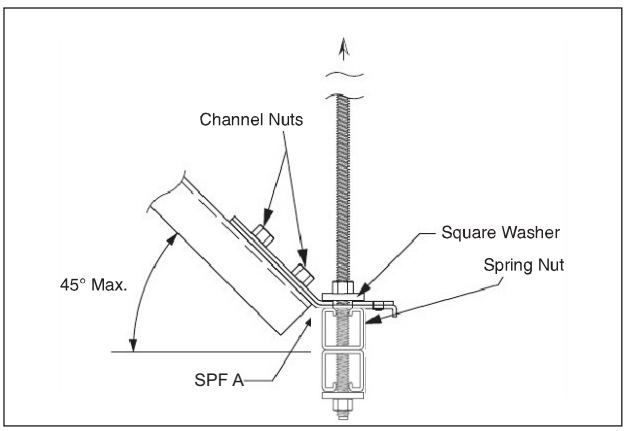
There method of attaching the hanging rod to the trapeze. One is using the channel nut as shown in the examples. The other is to extend the rod through the channel and use a square washer and nut to hold it as shown below.



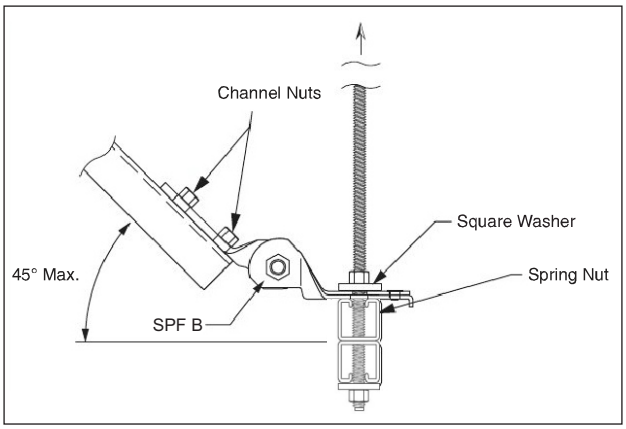
Longitudinal Brace (Install in Pairs)



Longitudinal Brace



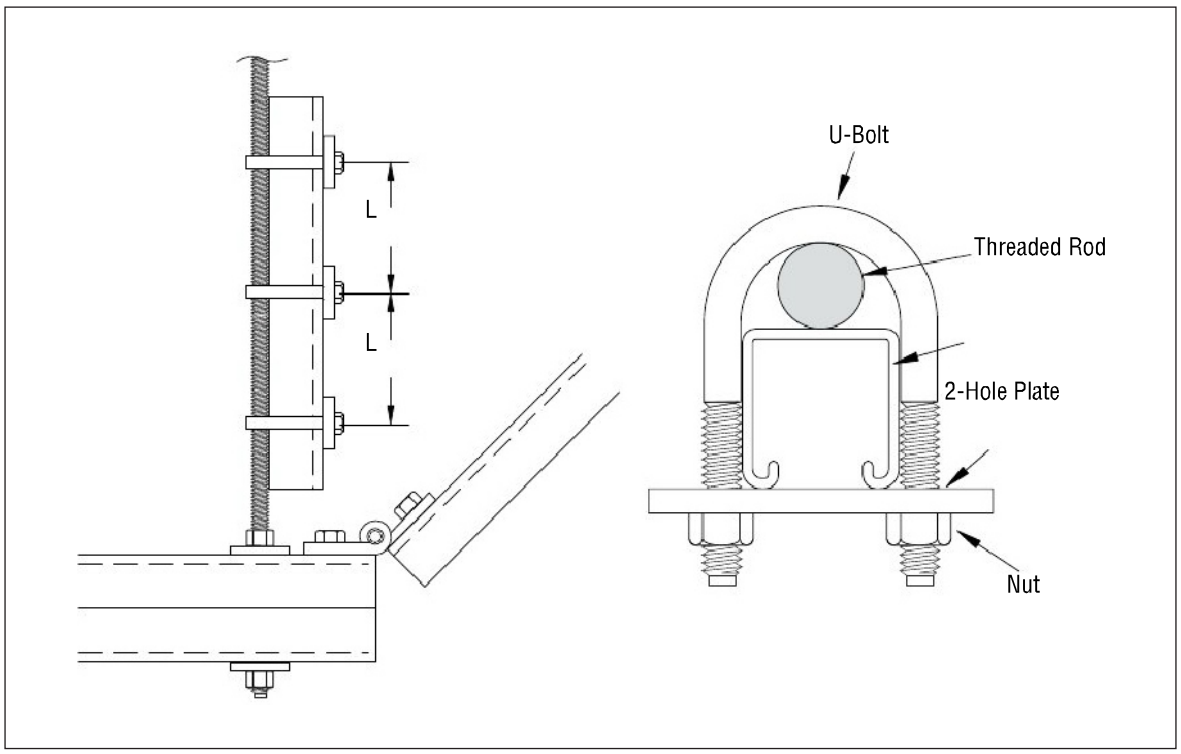
Optional Attachment



Optional Attachment

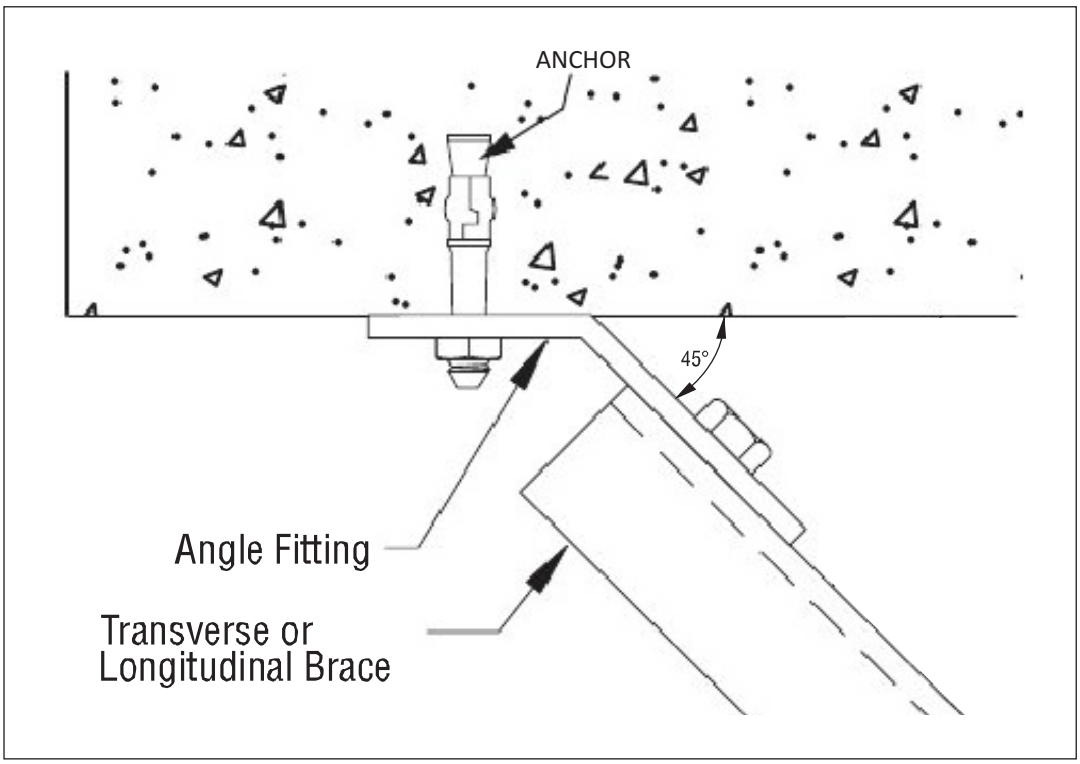
Bracing Stiffener - Primary Trapeze Support

Another technique to secure the channel to the drop rod and provide vertical stiffening is to utilize standard U bolts and a 2-hole plate as shown below...



Bracing - Structural Anchor [Concrete]

This section of the document describes how to attach a brace to an overhead anchor. The main criteria for selecting the top anchor scheme is the type of construction for the building.

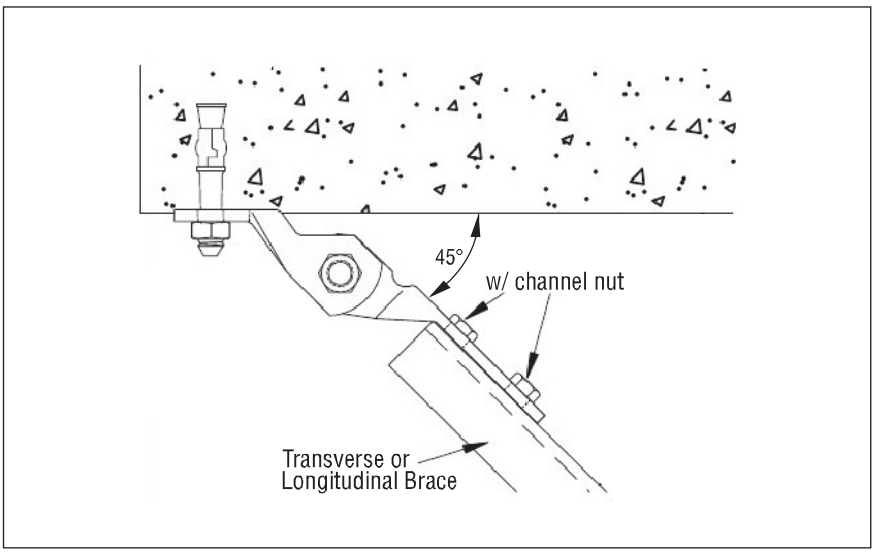


In both of the cases shown on the left, metal framing channel is anchored to the concrete structure and then the cable brace is anchored to the channel.

This technique provides for greater load capacity and some adjustment in the connection.

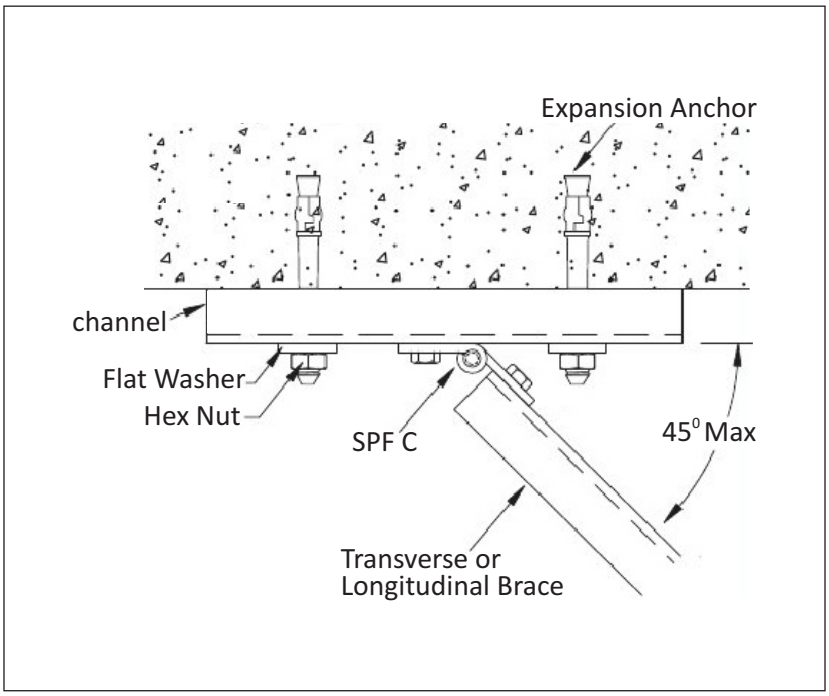
In the first example, standard channel is used and a square washer and bolt anchor the channel to the structure.

In the bottom example, the channel is used. This elminates the need for the bolt to go all the way through the channel since the channel is enlarged at the point of anchor so that a socket will fit on the bolt head.

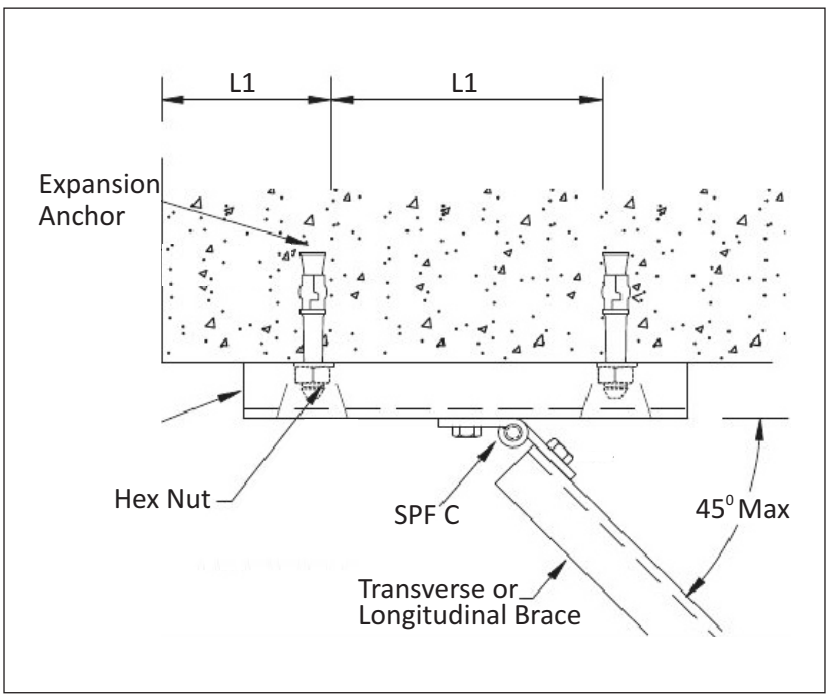


Attachment to - Concrete Structures

A connection similar to the ones using an embedded concrete insert can be created by attaching a piece of channel to the concrete using anchors. Than, appropriate fittings can be used to anchor the brace.



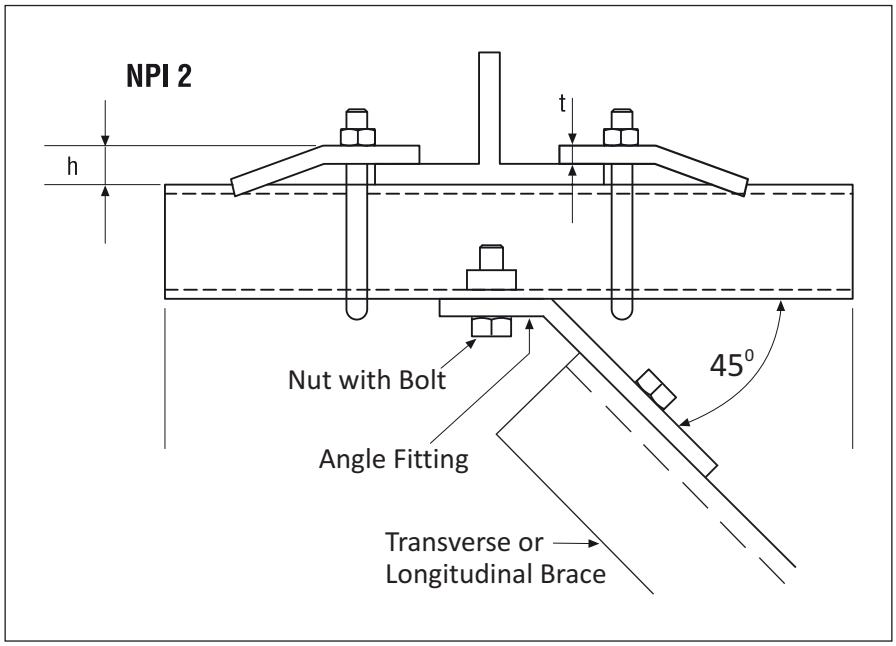
Attachment to Concrete



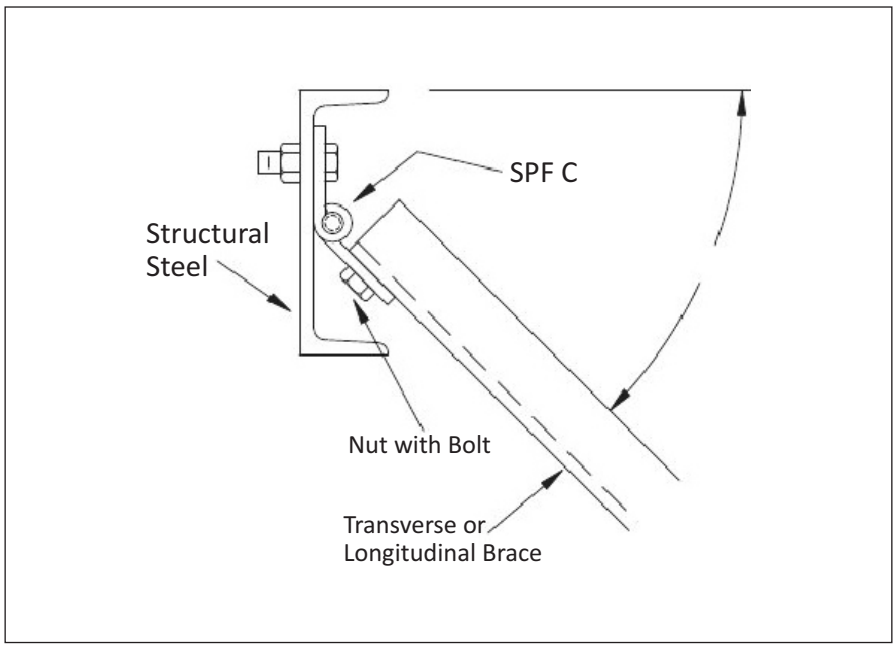
Attachment to Concrete

Bracing - Structural Anchor [Structural Steel]

The options for attaching the brace to a structural steel anchor are nearly limitless. One concept is to attach a piece of channel to the beam using appropriate beam clamps. Refer to the Unistrut General Engineering Catalog for other beam clamping options.

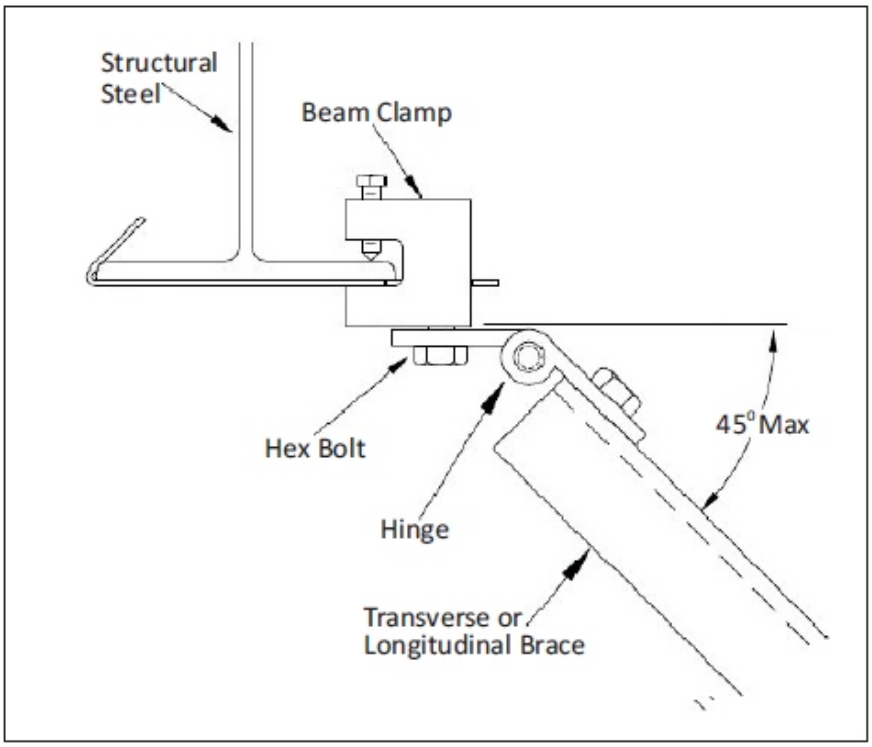


Attachment to Structural Steel

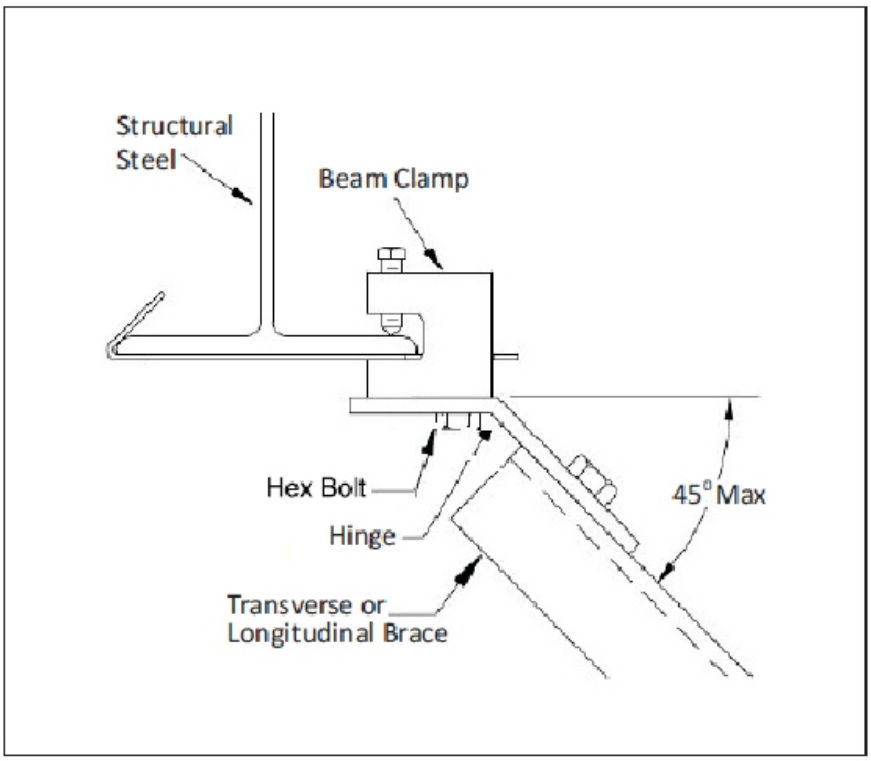


Attachment to Structural Steel

Bracing - Structural Anchor [Structural Steel]



Attachment to Structural Steel



Attachment to Structural Steel

Note : Load testing for this case not yet complete.

Bracing - Structural Anchor [Structural Steel]



Slotted Channel



Slotted Channel (Double)



Unslotted Channel



Unslotted Channel (Double)

Channel Nuts and Hardware



SPRING NUT



RAIL NUT



THREADED ROD



COUPLING NUT



HEX BOLT



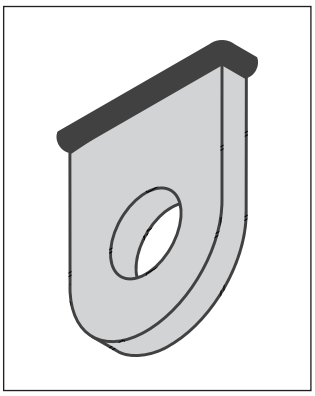
HEX NUT



SPRING WASHER



WASHER



SINGLE LUG PLATE



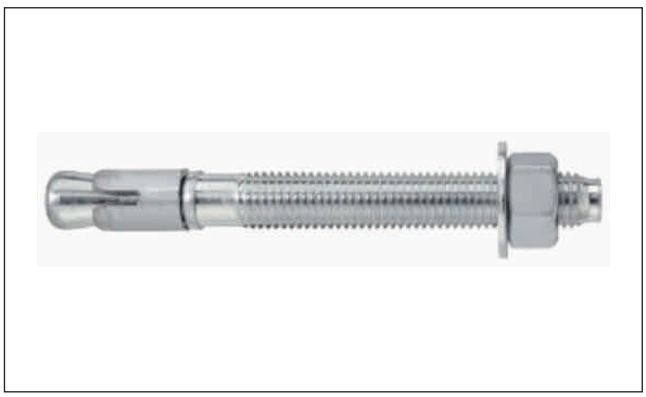
J BOLT



L TYPE BOLT



DROP IN ANCHOR



WEDGE ANCHOR

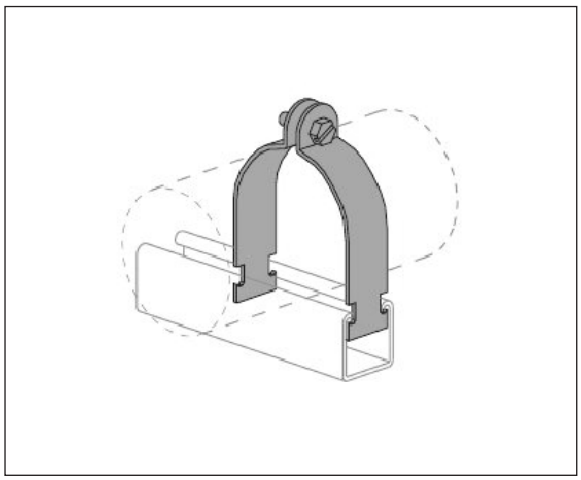


DRAW IN ANCHOR

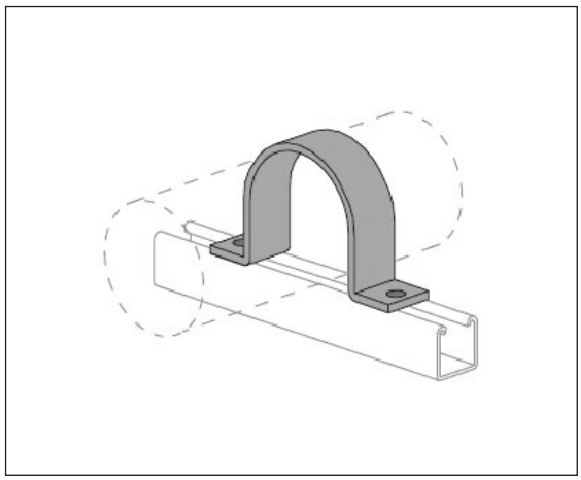


BEAM CLAMP

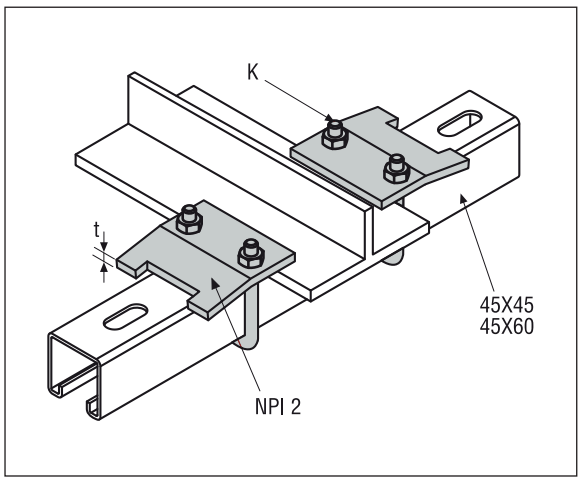
Misc. Fittings



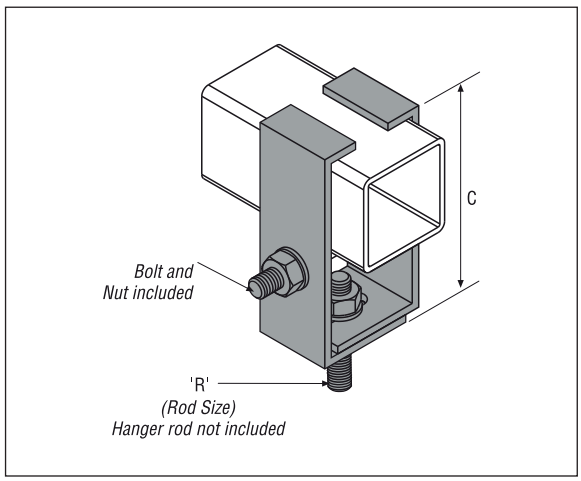
Strut Clamp



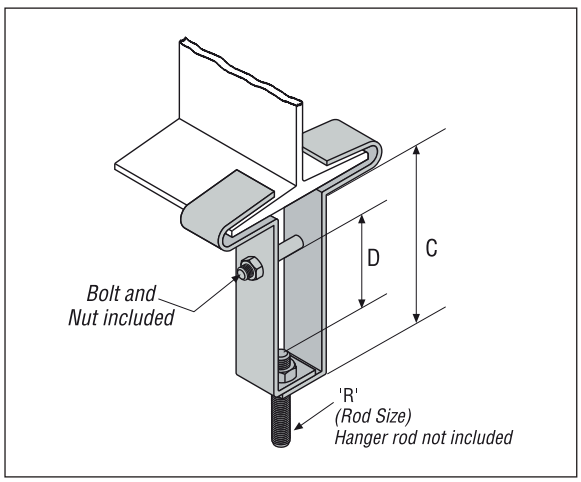
U Strap



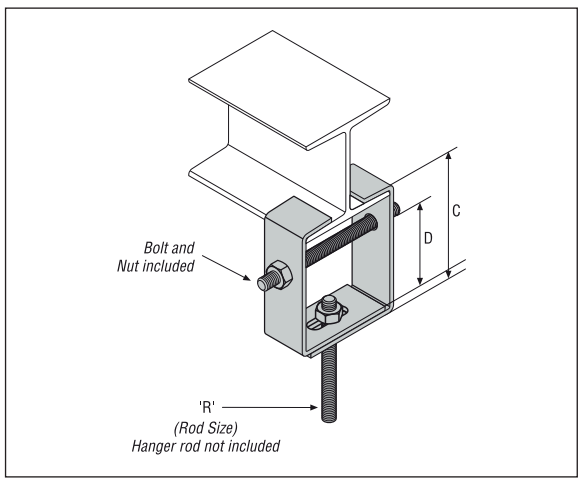
Square Bolt Beam Clamp



Box Beam Clamp

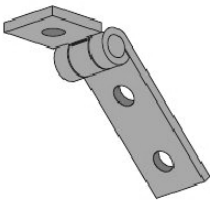


Standard Steel Beam Clamp

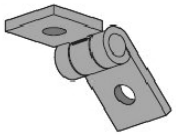


Box Steel Beam Clamp

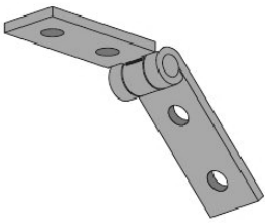
Seismic Brace/Anchor Fittings



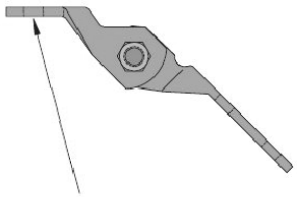
All hole sizes : 13 MM



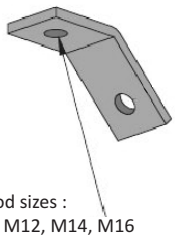
All hole sizes : 13 MM



All hole sizes : 13 MM



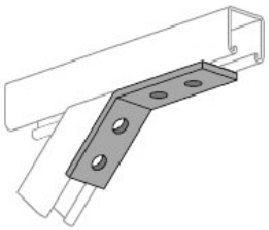
For rod sizes :
M10, M12, M14, M16



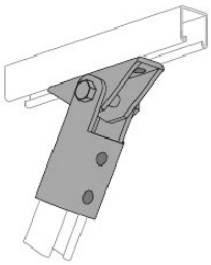
For rod sizes :
M10, M12, M14, M16



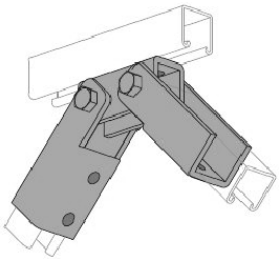
All hole sizes : 13 MM



All hole sizes : 13 MM



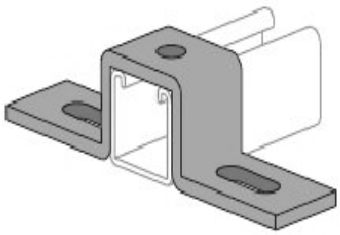
All hole sizes : 13 MM



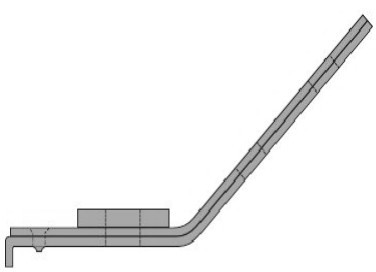
All hole sizes : 13 MM

Channel Nuts and Hardware

Misc. Fittings (cont.)

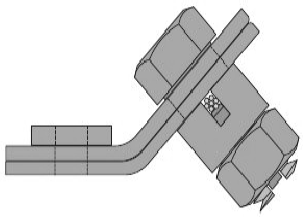


Seismic Pivot Fittings



For rod sizes : M10, M12, M14, M16

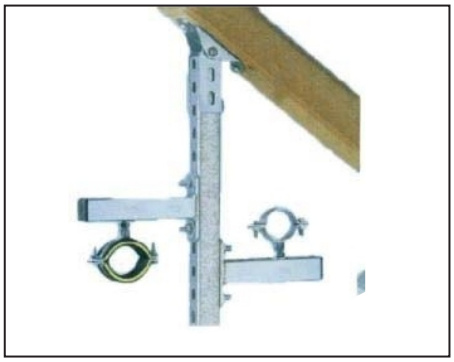
All SPF Fittings come with the proper rod size square washer.

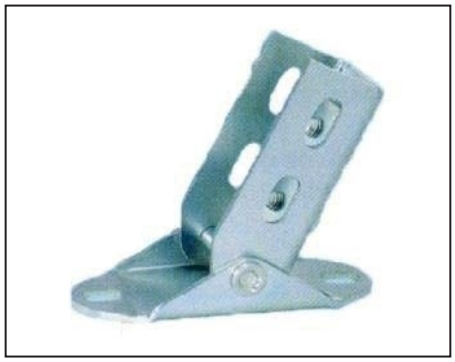


For rod sizes : M10, M12, M14, M16

Hinge Connector

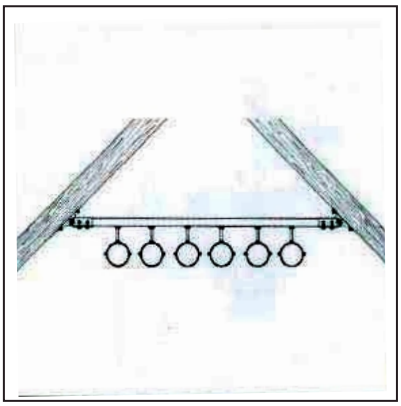
A number of different fittings can be used to connect the brace to an embedded concrete insert. The final choice depends on the load capacity required and the flexibility offered by each fitting.



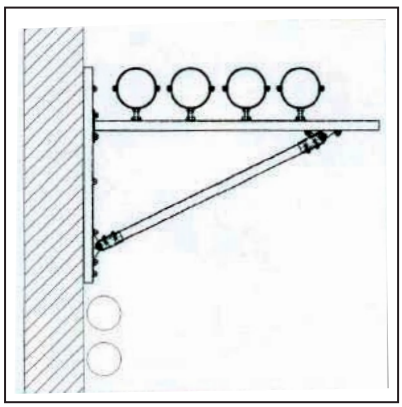


ADVANTAGES:

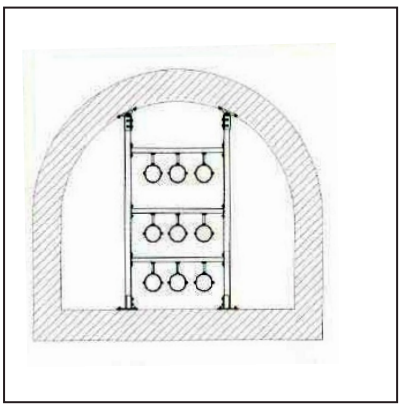
- The specialist product in solving problems when connecting Support Channels to inclined surfaces
- Flexible angle adjustment during installation possible
- Easy and quick fastening owing to pre-mounted Double Rail Nut
- Fixing to the Support Channel in any direction possible when using profile 38/40
- Ideal for installation at slope main truss, vaults and semicircular cable shafts



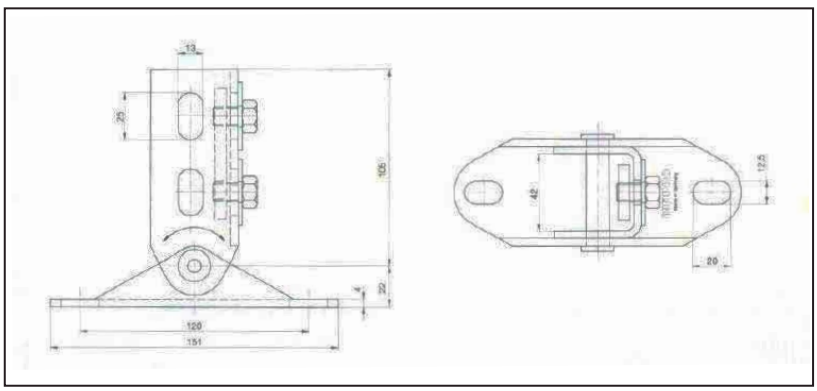
Installation of a pipe bracket at slope main truss



Pipe installation to Wall Bracket with diagonal strut



Installation of a support frame in vaults or semicircular shafts



DATA :

Pre-mounted consists of:

-1 Saddle Support

-1 Double Rail Nut

-2 Hexagon Head bolts M10

-2 Washers

Adjustable Brace Fitting

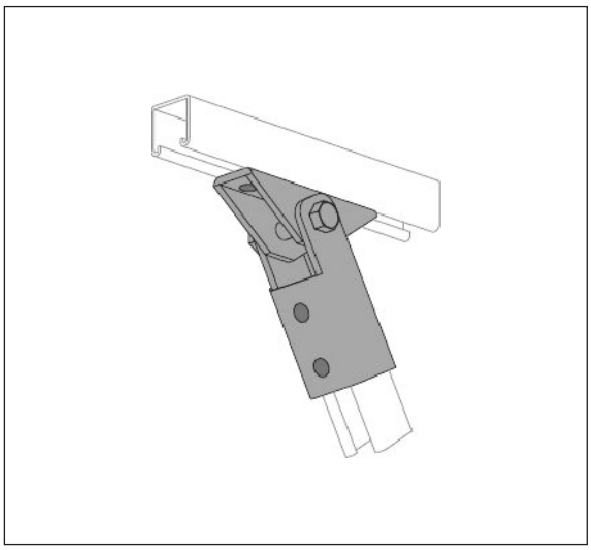
MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

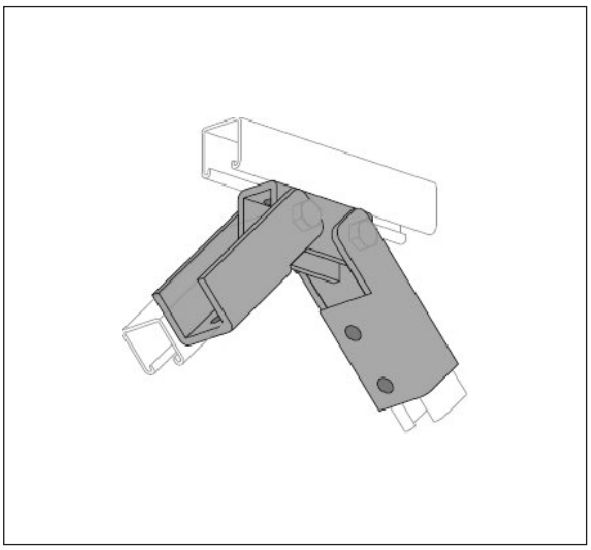
FINISH

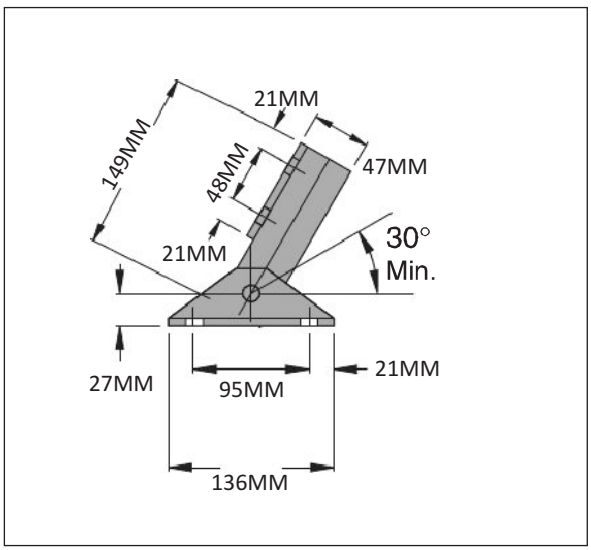
Electro-galvanized (EG), conforming to ASTM B633 Type III SC1.

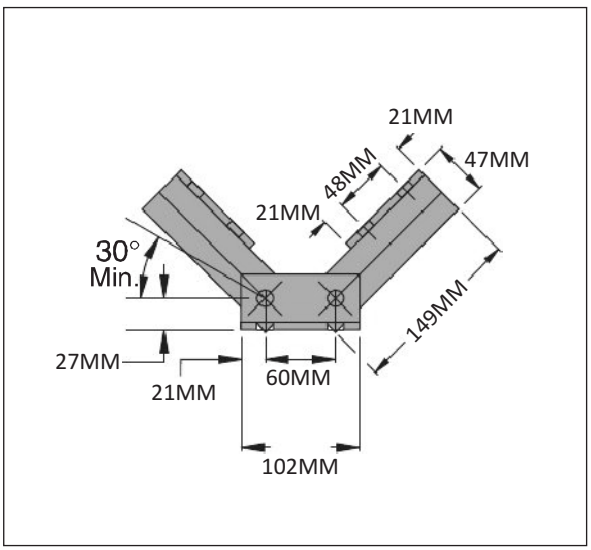
Wt/100 pcs: 307 Lbs (139.3 kg)



Wt/100 pcs: 497 Lbs (225.4 kg)







Standard Dimensions for 1⅝" (41 mm) width series channel fittings *(Unless Otherwise Shown on Drawing)*

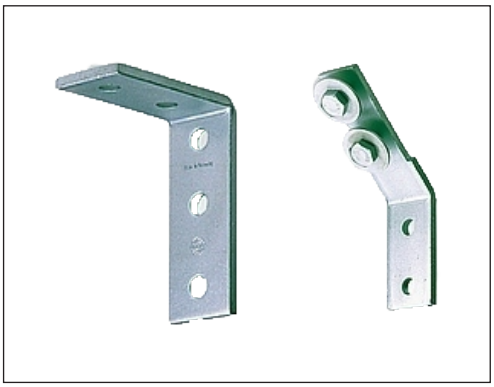
Hole Diameter: 9⁄16" (14.3mm); **Hole Spacing - From End:** 13⁄16" (20.6 mm)

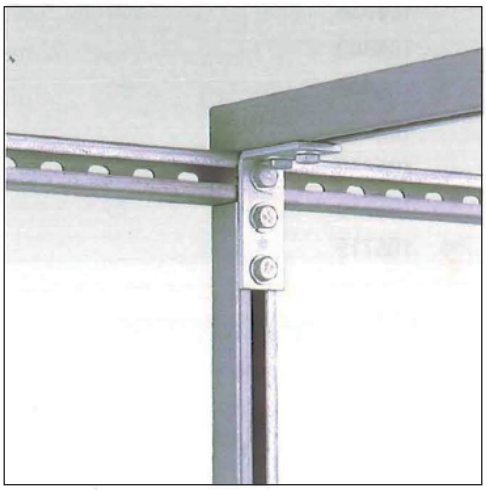
Hole Spacing - On Center: 1⅞" (47.6 mm); **Width:** 1⅝"(41mm); **Thickness:** ¼" (6.4mm)

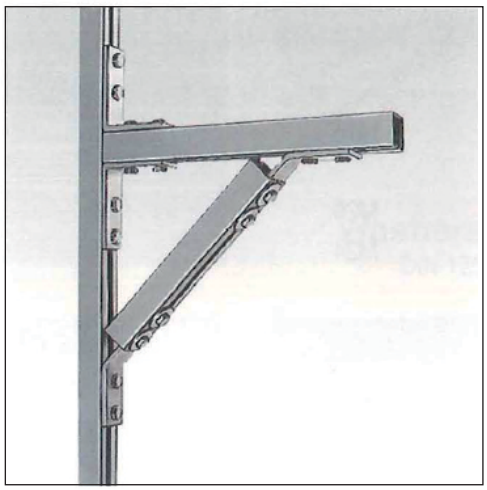
Pivot Fittings

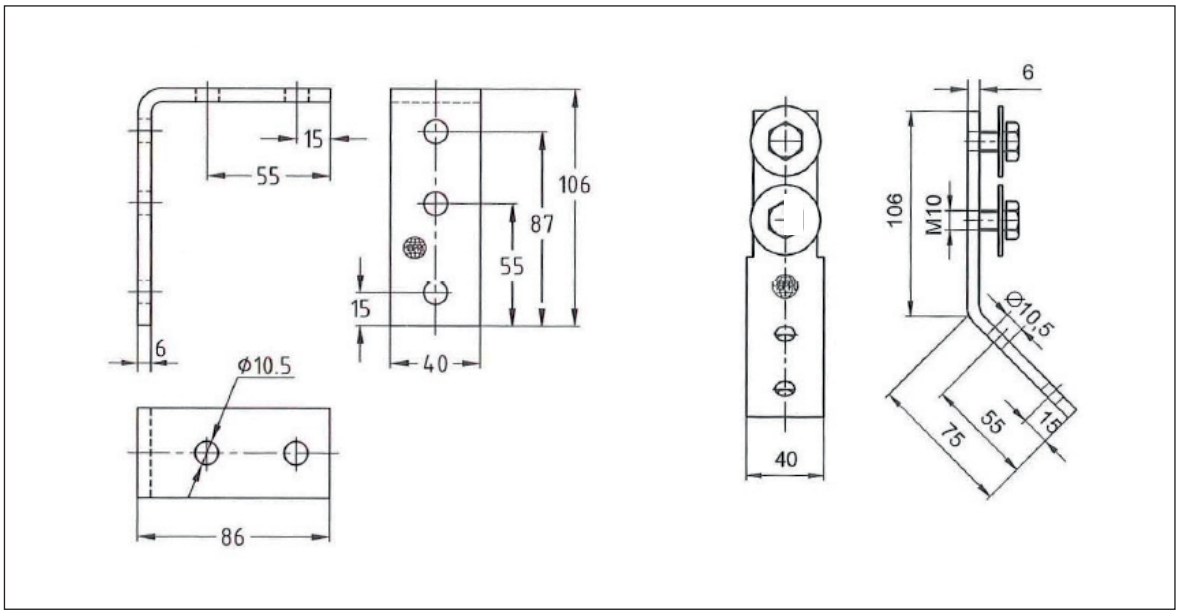
APPLICATION:

- Solid fixing element for construction of pre-wall installations and shelves as well as for channel constructions for attachments of pipelines and air ducts without welding
- Also applicable for direct mounting on walls, ceilings or floors
- Suitable for outdoor use









ADVANTAGES:

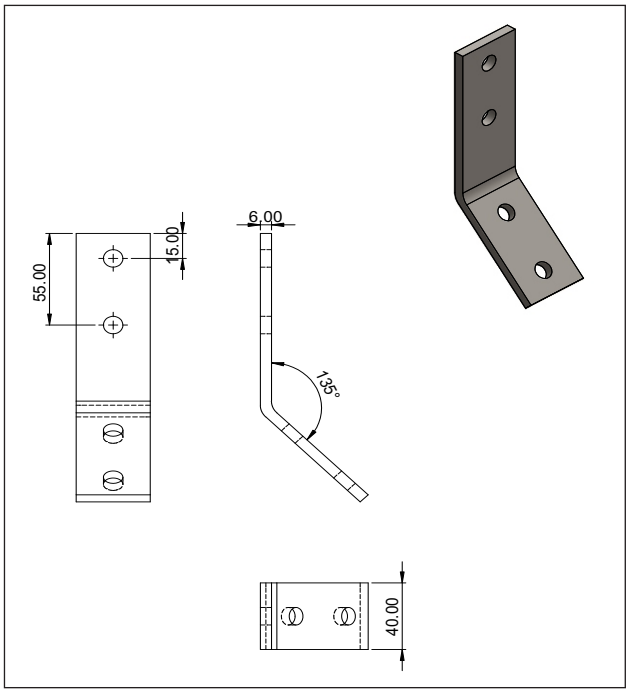
- Versatile in use due to oblong holes

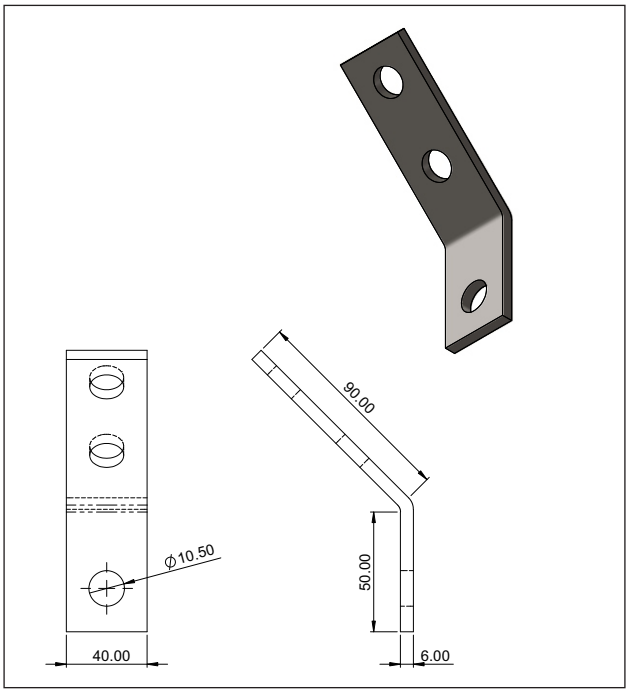
  e.g. as:

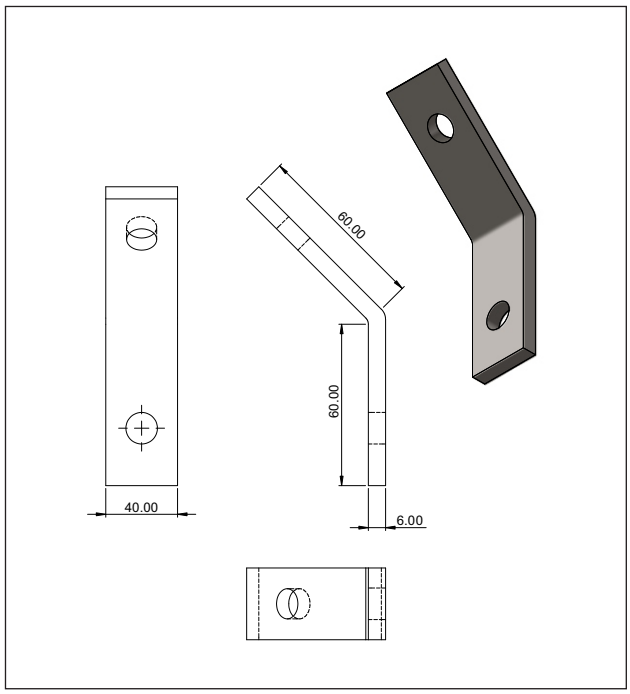
- Angular support bracket

  Angular load-bearing bracket

- Connection element
- Angular bracket
- Multi-purpose component for professional, practical installation solutions

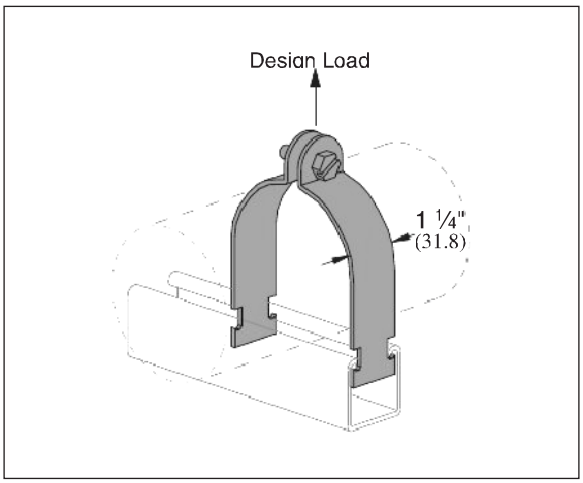






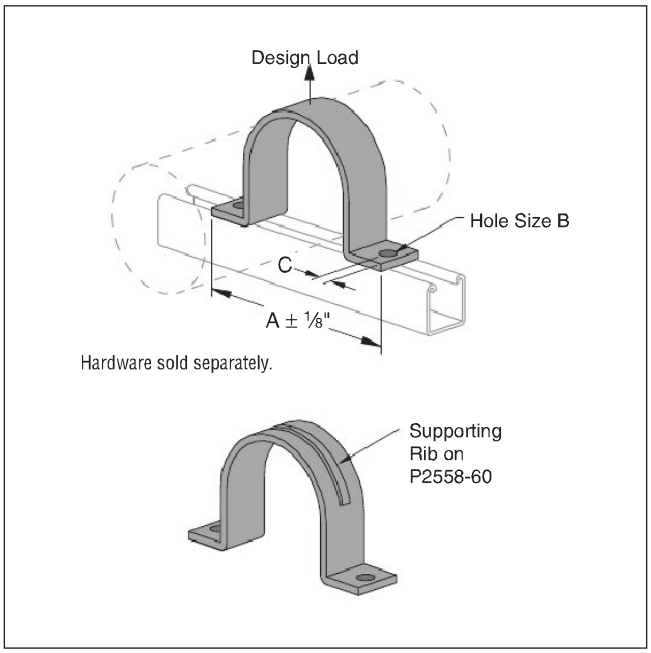
Pipe Clamps for Rigid Steel Conduit

Slotted hex head screw and nut included.
Finish: Electro-galvanized.



PRODUCT CODE	NOMINAL PIPE SIZE		O.D. OF PIPE 'D'	A	B	C	FASTENER SIZE
	INCH	MM	MM				
SE-TPCC 22	1/2"	15	22	50.5	14.2	25.00	M 6 x 25
SE-TPCC 27	3/4"	20	27	57.1	17.5	30.00	M 6 x 25
SE-TPCC 34	1"	25	34	63.8	20.6	38.00	M 6 x 25
SE-TPCC 42	1 1/4"	32	42	76.2	25.4	46.00	M 6 x 25
SE-TPCC 48	1 1/2"	40	48	81.5	28.4	52.00	M 6 x 25
SE-TPCC 60	2"	50	60	95.8	34.8	65.00	M 8 x 40
SE-TPCC 73	2 1/2"	65	73	108.7	41.1	78.00	M 8 x 40
SE-TPCC 89	3"	80	89	128.3	50.8	94.00	M 8 x 40
SE-TPCC 114	4"	100	114	153.7	63.5	120.00	M 8 x 40

Single Piece Pipe Strap



Product Code	Nominal Pipe Size		Pipe OD (mm)	Hanger Dimension (mm)		Bolt Size (mm)	MAX LOAD (KG)
	In.	mm		Overall dimension A	Distance Between two bolt B		
SE-US 22	½”	DN15	21.3	76	51	M8	500
SE-US 27	¾”	DN20	26.7	82	57	M8	500
SE-US 34	1”	DN25	33.4	89	64	M8	500
SE-US 42	1 ¼”	DN32	42.1	96	71	M8	500
SE-US 48	1 ½”	DN40	48.2	102	77	M8	500
SE-US 54	-		54	108	83	M8	500
SE-US 60	2”	DN50	60.3	114	89	M8	500
SE-US 67	-		67	121	96	M8	500
SE-US 73	2 ½”	DN65	73.0	145	113	M8	600
SE-US 82	-		82	152	120	M8	600
SE-US 89	3”	DN80	88.9	160	128	M8	600
SE-US 102	3 ½”	DN90	101.6	170	138	M8	600
SE-US 108	-		108	178	146	M8	600
SE-US 114	4”	DN100	114.3	185	153	M8	600
SE-US 126	-		126	196	164	M8	600
SE-US 141	5"	DN125	141.3	210	178	M10	600
SE-US 148	-		148	218	186	M10	600
SE-US 155	-		155	225	193	M10	600
SE-US 168	6”	DN150	168.3	237	205	M10	600
SE-US 179	-		179	249	217	M10	600
SE-US 190	-		190	260	228	M10	800
SE-US 205	-		205	275	243	M10	800
SE-US 219	8”	DN200	219.1	289	257	M10	800
SE-US 230	-		230	300	268	M10	800
SE-US 241	-		241	332	291	M12	1250
SE-US 263	-		263	354	313	M12	1250
SE-US 273	10’’	DN250	273.0	364	323	M18	1250
SE-US 295	-		295	386	345	M18	1250
SE-US 323	12”	DN300	323.8	417	376	M18	1250
SE-US 356	14”	DN350	355.6	447	409	M18	1800

Threaded Rods

Full Threaded Bars

Standards:-

- ASTM/ASME/BS/DIN/BS EN ISO /JIS

Material:-

- Mild Steel, Carbon Steel, Alloy Steel & Stainless Steel.

Size Range:-

- M6 to M100 in metric series
- ¼” to 4” in imperial

Threads:-

- UNC, 8UN, UNF, Metric Coarse and Metric Fine

Typical Grades & Standards:-

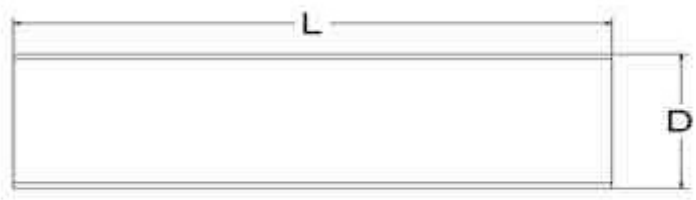
- ASTM A193 Grade B7, B7M, B8, B8M & B16
- ASTM A320 Grade L7 & L7M
- Stainless Steel 304, 304L, 316, 316L, A2-70/80, A4-70/80
- BS 3692 / BS 4190 grade 4.6, 4.8, 5.6, 5.8, 8.8

Any other specific grade can be manufactured upon request with short lead times.

Ordering Information:-

- Dimensions - Dia and Length.
- Standard and Grade
- Finish (Black, GI, Yellow, HDG, Cadmium, Nickel, PTFE etc)





Steel ThreadedRod
ANSI B.1.1/BS4882
Material To ASMT
A193-B7/B7M/B16/B8 & B8M

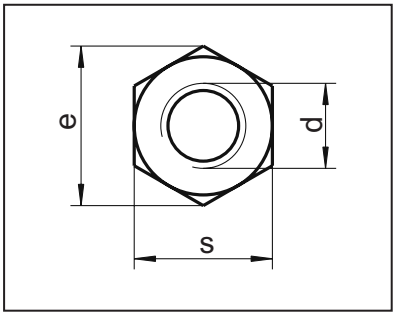
PRODUCT COAD	DIA(D)	THREAD PER INCH
SE-TR 1/4	1/4"UNC	20
SE-TR 5/16	5/16"UNC	18
SE-TR 3/8	3/8"UNC	16
SE-TR 7/16	7/16"UNC	14
SE-TR 1/2	1/2"UNC	13
SE-TR 9/16	9/16"UNC	12
SE-TR 5/8	5/8"UNC	11
SE-TR 3/4	3/4"UNC	10
SE-TR 7/8	7/8"UNC	9
SE-TR 1	1"UNC	8
SE-TR 1.1/8	1.1/8"UNC	7
SE-TR 1.1/8	1.1/8"UNC	8
SE-TR 1.1/4	1.1/4"UNC	7
SE-TR 1.1/4	1.1/4"UNC	8
SE-TR 1.3/8	1.3/8"UNC	6
SE-TR 1.3/8	1.3/8"UNC	8
SE-TR 1.2/2	1.2/2"UNC	6
SE-TR 1.2/2	1.2/2"UNC	8
SE-TR 1.5/8	1.5/8"UNC	8
SE-TR 1.3/4	1.3/4"UNC	8
SE-TR 1.7/8	1.7/8"UNC	8
SE-TR 2	2"UNC	8
SE-TR 2.1/4	2.1/4"UNC	8
SE-TR 2.1/2	2.1/2"UNC	8
SE-TR 2.3/4	2.3/4"UNC	8
SE-TR 3	3"UNC	8
SE-TR 3.1/4	3.1/4"UNC	8
SE-TR 3.1/2"	3.1/2"UNC	8

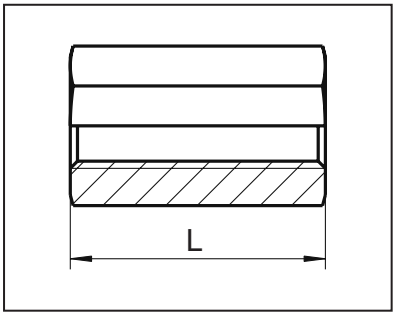
Steel Threaded
Rod to DIN 975
Material To ASMT
A193M-B7/B7M/B16/B8 & B8M

PRODUCT COAD	DIA(D)	THREAD PITCH (mm)
SE-TR 6	M6	1
SE-TR 8	M8	1.25
SE-TR 10	M10	1.5
SE-TR 12	M12	1.75
SE-TR 14	M14	2
SE-TR 16	M16	2
SE-TR 18	M18	2.5
SE-TR 20	M20	2.5
SE-TR 22	M22	2.5
SE-TR 24	M24	3
SE-TR 27	M27	3
SE-TR 30	M30	3.5
SE-TR 33	M33	3.5
SE-TR 36	M36	4
SE-TR 39	M39	4
SE-TR 42	M42	4.5
SE-TR 45	M45	4.5
SE-TR 48	M48	5
SE-TR 52	M52	5
SE-TR 56	M56	5.5
SE-TR 64	M64	6
SE-TR 72	M72	6
SE-TR 76	M76	6

Coupling Nut







MATERIAL:

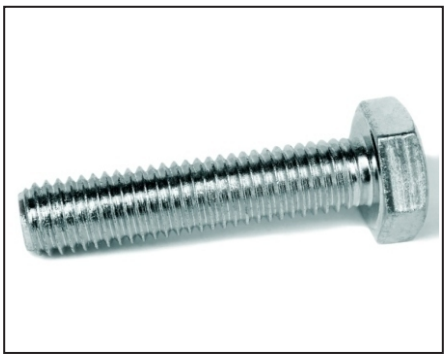
Mild Steel. Also other materials can be provided on request

FINISH AVAILABLE:

Electro-Galvanized, Hot Dip Galvanized.

Item	Length L (mm)	Thread D	S	e
SE-CPN M6	18	M6	10	11.1
SE-CPN M8	24	M8	13	15.0
SE-CPN M10	30	M10	17	19.6
SE-CPN M12	36	M12	19	21.9
SE-CPN M16	48	M16	24	27.7

Hex Bolts



Hex Head and Heavy Hex Head in Full and Partial Threading

STANDARDS:-

- ASTM/ASME/BS/DIN/BS EN ISO /JIS

MATERIAL:-

- Mild Steel, Carbon Steel, Alloy Steel & Stainless Steel.

SIZE RANGE:-

- M6 to M64 in metric series
- ¼" to 2½" in imperial
- Bigger sizes can be manufactured as per order.

THREADS:-

- UNC, 8UN, UNF, Metric Coarse and Metric Fine

TYPICAL GRADES & STANDARDS:-

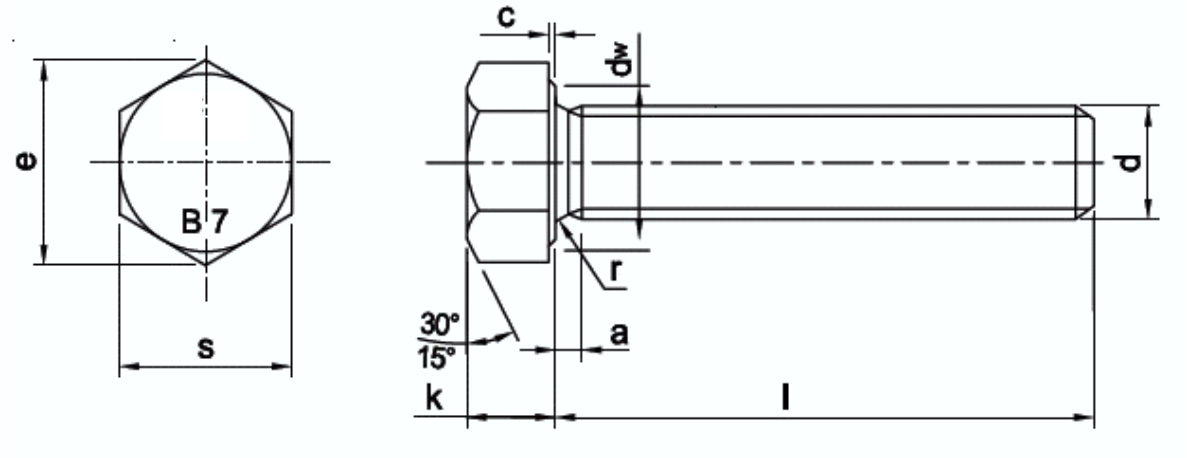
- BS3692 / BS4190 grade 4.6, 4.8, 5.6, 5.8, 8.8, 10.9 and 12.9
- ASTM A307 Grade A and B
- ASTM A325
- ASTM A193 Grade B7, B7M, B8, B8M & B16
- ASTM A320 Grade L7 & L7M
- Stainless Steel 304, 304L, 316, 316L, A2-70/80, A4-70/80

Any other specific grade can be manufactured upon request with short lead times.

ORDERING INFORMATION:-

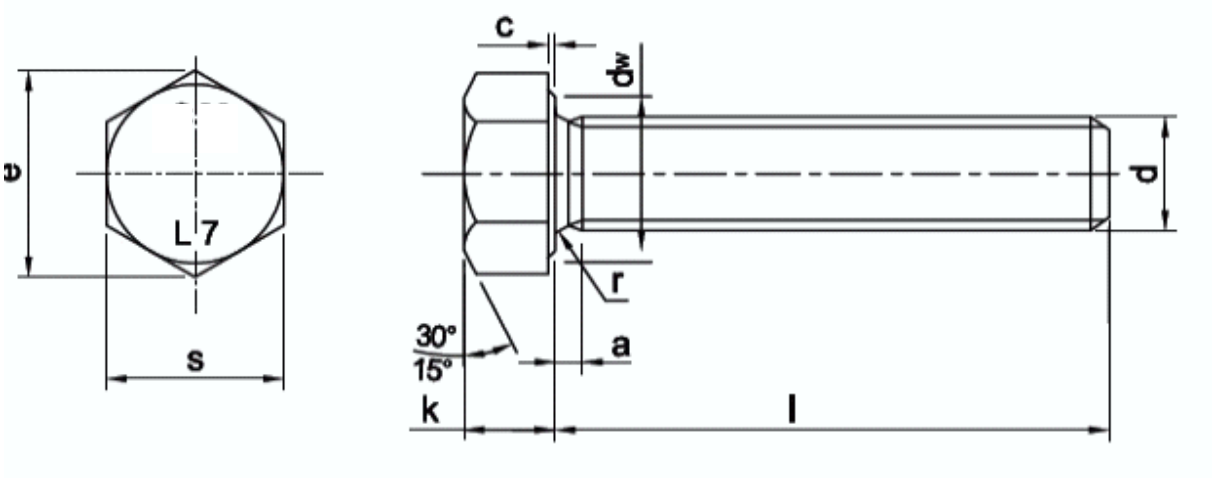
- Dimensions – Size Dia and Length.
- Standards and Grade
- Finish (Black, GI, Yellow, HDG, Cadmium, Nickel, PTFE etc)
- Nut and washer quantity

DIN 93 HEXAGON HEAD BOLT
Material ASTM A193 Grade B7



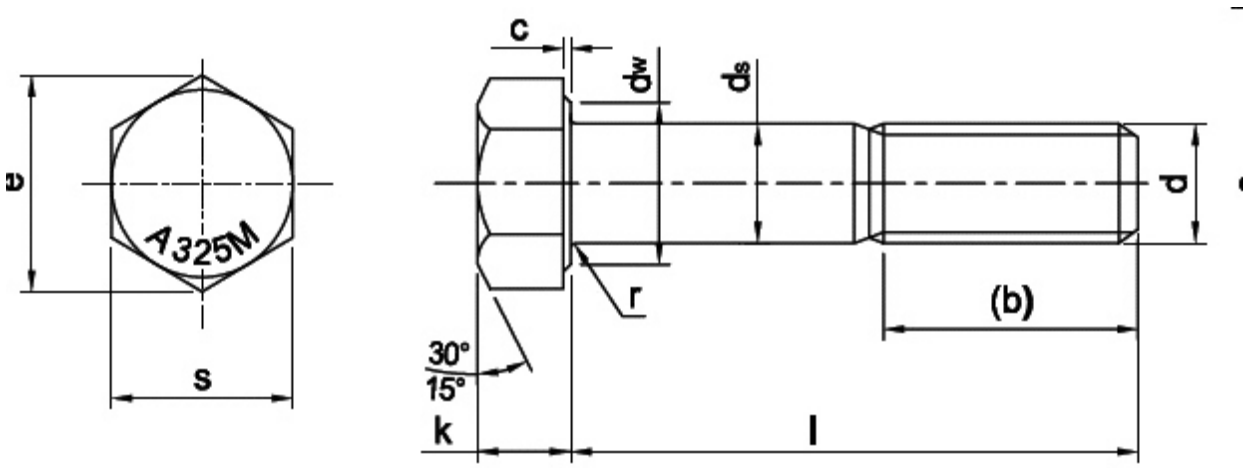
Threads (d)		M6	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M42	M45	M52
Across flat (s)	Min	9.78	12.73	16.73	18.67	23.67	29.67	35.38	40.00	45.00	49.00	53.80	58.80	63.10	68.10	78.10
	Max	10.00	13.00	17.00	19.00	24.00	30.00	36.00	41.00	46.00	50.00	55.00	60.00	65.00	70.00	80.00
Across corner(e)	Min	11.05	14.38	18.90	21.10	26.75	33.53	39.98	45.20	50.85	55.37	60.79	66.44	71.30	76.95	88.25
Head Thickness(k)	Min	3.85	5.15	6.22	7.32	9.82	12.28	14.78	16.65	18.28	20.58	22.08	24.58	25.58	27.58	32.50
	Max	4.15	5.45	6.58	7.68	10.18	12.72	15.22	17.35	19.12	21.42	22.92	25.42	26.42	28.42	33.50
Unthreaded Length (a)	Min	1.00	1.25	1.5	1.75	2.00	2.50	3.00	3.00	3.50	3.50	4.00	4.00	4.50	4.50	5.00
	Max	3.00	4.00	4.50	5.30	6.00	7.50	9.00	9.00	10.50	10.50	12.00	12.00	13.50	13.50	5.00
Washer face Depth (c)	Min	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
	Max	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00
Washer face Dia (dw)	Min	8.88	11.63	15.60	17.40	22.49	28.19	33.61	38.00	42.70	46.50	51.10	55.90	55.90	64.70	74.20
Head junction Radius(r)	Min	0.25	0.40	0.40	0.60	0.60	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.20	1.20	1.60

DIN 933 HEXAGON HEAD BOLT
Material ASTM A320 Grade L7



A320 L7 HEX BOLTS																
Threads (d)		M6	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M42	M45	M52
Across flat (s)	Min	9.78	12.73	16.73	18.7	23.67	29.67	35.38	40.00	45.00	49.00	53.80	58.80	63.10	68.10	78.10
	Max	10.00	13.00	17.00	19.00	24.00	30.00	36.00	41.00	46.00	50.00	55.00	60.00	65.00	70.00	80.00
Across corner(e)	Min	11.05	14.38	18.90	21.10	26.75	33.53	39.98	45.20	50.85	55.37	60.79	66.44	71.30	76.95	88.25
Head Thickness(k)	Min	3.85	5.15	6.22	7.32	9.82	12.28	14.78	16.65	18.28	20.58	22.08	24.58	25.58	27.58	32.50
	Max	4.15	5.45	6.58	7.68	10.18	12.72	15.22	17.35	19.12	21.42	22.92	25.42	26.42	28.42	33.50
Unthreaded Length (a)	Min	1.00	1.25	1.5	1.75	2.00	2.50	3.00	3.00	3.50	3.50	4.00	4.00	4.50	4.50	5.00
	Max	3.00	4.00	4.50	5.30	6.00	7.50	9.00	9.00	10.50	10.50	12.00	12.00	13.50	13.50	5.00
Washer face Depth (c)	Min	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
	Max	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00
Washer face Dia (dw)	Min	8.88	11.63	15.60	17.40	22.49	28.19	33.61	38.00	42.70	46.50	51.10	55.90	55.90	64.70	74.20
Head junction Radius(r)	Min	0.25	0.40	0.40	0.60	0.60	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.20	1.20	1.60

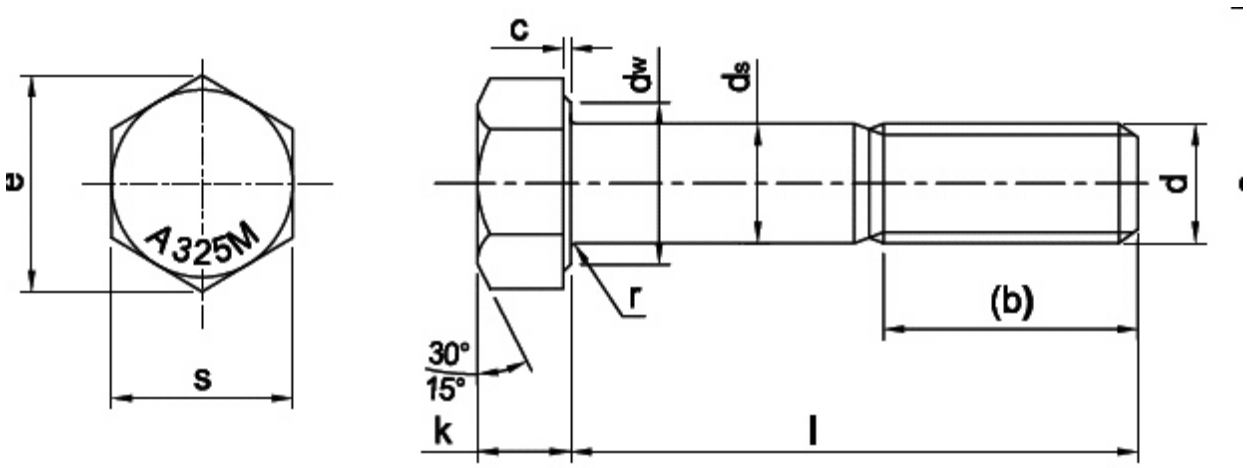
ASTM A325M HEX BOLTS



A325M HEX BOLTS								
Threads (d)		M16	M20	M24	M27	M30	M33	M36
Across flat (s)	Min	26.16	33.00	35.00	40.00	45.00	49.00	58.80
	Max	27.00	34.00	36.00	41.00	46.00	50.00	60.00
Across corner(e)	Min	29.56	37.29	39.55	45.20	50.85	55.37	66.44
	Max	31.18	39.26	41.57	47.34	53.12	57.74	69.28
Head Thickness(k)	Min	9.25	11.60	13.10	14.10	16.10	17.65	21.45
	Max	10.75	13.40	14.90	15.90	17.90	19.75	23.55
Washer face Depth (c)	Min	0.40	0.40	0.40	0.40	0.40	0.40	0.40
	Max	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Washer face Dia (dw)	Min	24.90	31.40	33.30	38.00	42.80	46.50	55.90
Shank Diameter (d s)	Min	15.30	19.16	21.16	23.16	26.16	29.16	35.00
	Max	16.70	20.84	22.84	24.84	27.84	30.84	37.00
Head junction Radius(r)	Min	0.60	0.80	0.80	1.00	1.20	1.20	1.50
Thread Length (b)	1<100	31	36	38	41	44	49	56
	1>100	38	43	45	48	51	56	63

l = Overall length of the Bolt

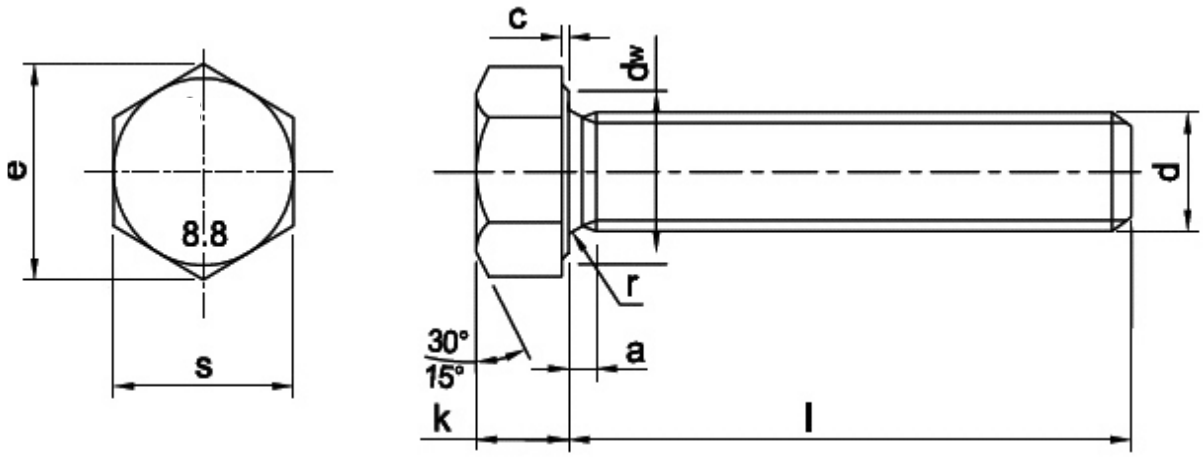
ASTM A325M HEX BOLTS



A325M HEX BOLTS								
Threads (d)		M16	M20	M24	M27	M30	M33	M36
Across flat (s)	Min	26.16	33.00	35.00	40.00	45.00	49.00	58.80
	Max	27.00	34.00	36.00	41.00	46.00	50.00	60.00
Across corner(e)	Min	29.56	37.29	39.55	45.20	50.85	55.37	66.44
	Max	31.18	39.26	41.57	47.34	53.12	57.74	69.28
Head Thickness(k)	Min	9.25	11.60	13.10	14.10	16.10	17.65	21.45
	Max	10.75	13.40	14.90	15.90	17.90	19.75	23.55
Washer face Depth (c)	Min	0.40	0.40	0.40	0.40	0.40	0.40	0.40
	Max	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Washer face Dia (dw)	Min	24.90	31.40	33.30	38.00	42.80	46.50	55.90
Shank Diameter (d s)	Min	15.30	19.16	21.16	23.16	26.16	29.16	35.00
	Max	16.70	20.84	22.84	24.84	27.84	30.84	37.00
Head junction Radius(r)	Min	0.60	0.80	0.80	1.00	1.20	1.20	1.50
Thread Length (b)	1<100	31	36	38	41	44	49	56
	1>100	38	43	45	48	51	56	63

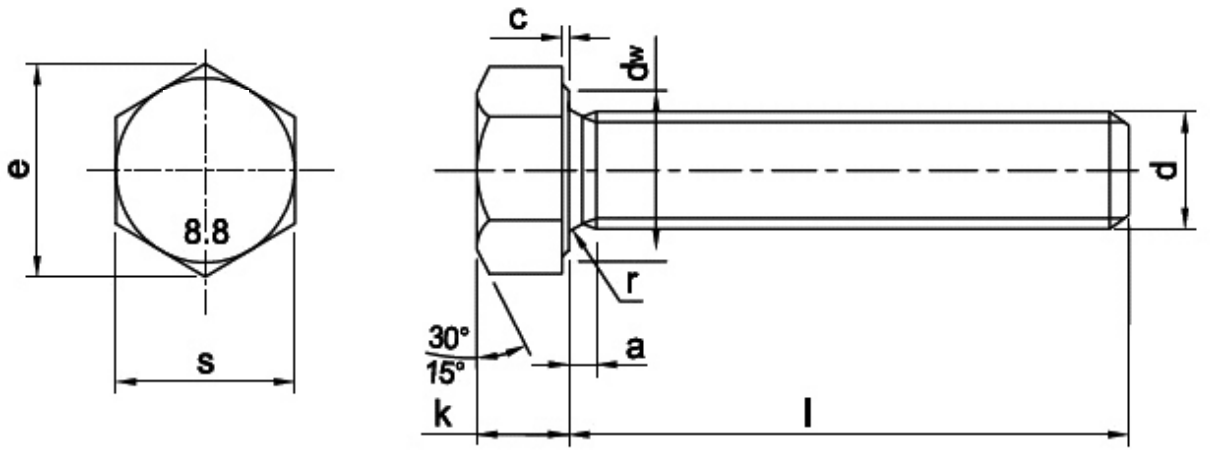
l = Overall length of the Bolt

DIN 933 HEX SCREWS (FULL THREAD)
Grades 4.6, 8.8, 10.9, 12.9, A2 70, A2 80, A4 70 and A4 80



Threads (d)		M6	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M42	M45	M52
Across flat (s)	Min	9.78	12.73	16.73	18.7	23.67	29.67	35.38	40.00	45.00	49.00	53.80	58.80	63.10	68.10	78.10
	Max	10.00	13.00	17.00	19.00	24.00	30.00	36.00	41.00	46.00	50.00	55.00	60.00	65.00	70.00	80.00
Across corner(e)	Min	11.05	14.38	18.90	21.10	26.75	33.53	39.98	45.20	50.85	55.37	60.79	66.44	71.30	76.95	88.25
Head Thickness(k)	Min	3.85	5.15	6.22	7.32	9.82	12.28	14.78	16.65	18.28	20.58	22.08	24.58	25.58	27.58	32.50
	Max	4.15	5.45	6.58	7.68	10.18	12.72	15.22	17.35	19.12	21.42	22.92	25.42	26.42	28.42	33.50
Unthreaded Length (a)	Min	1.00	1.25	1.5	1.75	2.00	2.50	3.00	3.00	3.50	3.50	4.00	4.00	4.50	4.50	5.00
	Max	3.00	4.00	4.50	5.30	6.00	7.50	9.00	9.00	10.50	10.50	12.00	12.00	13.50	13.50	5.00
Washer face Depth (c)	Min	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
	Max	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00
Washer face Dia (dw)	Min	8.88	11.63	15.60	17.40	22.49	28.19	33.61	38.00	42.70	46.50	51.10	55.90	55.90	64.70	74.20
Head junction Radius(r)	Min	0.25	0.40	0.40	0.60	0.60	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.20	1.20	1.60

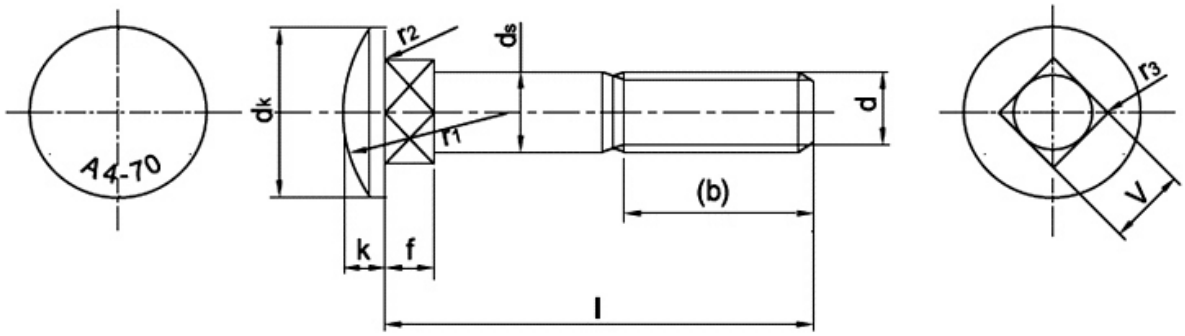
DIN 931 HEX BOLTS (HALF THREAD)
Grades - 4.6, 8.8, A2 70, A2 80, A4 70 and A4 80



A320 L7 HEX BOLTS																
Threads (d)		M6	M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39	M42	M45	M52
Across flat (s)	Min	9.78	12.73	16.73	18.7	23.67	29.67	35.38	40.00	45.00	49.00	53.80	58.80	63.10	68.10	78.10
	Max	10.00	13.00	17.00	19.00	24.00	30.00	36.00	41.00	46.00	50.00	55.00	60.00	65.00	70.00	80.00
Across corner(e)	Min	11.05	14.38	18.90	21.10	26.75	33.53	39.98	45.20	50.85	55.37	60.79	66.44	71.30	76.95	88.25
Head Thickness(k)	Min	3.85	5.15	6.22	7.32	9.82	12.28	14.78	16.65	18.28	20.58	22.08	24.58	25.58	27.58	32.50
	Max	4.15	5.45	6.58	7.68	10.18	12.72	15.22	17.35	19.12	21.42	22.92	25.42	26.42	28.42	33.50
Washer face Depth (c)	Min	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
	Max	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00
Washer face Dia (dw)	Min	0.15	0.15	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	0.30
	Max	0.50	0.60	0.60	0.60	0.80	0.80	0.80	0.80	0.80	0.80	0.80	1.00	1.00	1.00	1.00
Shank Diameter (ds)	Min	5.82	7.78	9.78	11.73	15.73	19.67	23.67	27.00	30.00	33.00	36.00	39.00	42.00	45.00	52.00
	Max	6.00	8.00	10.00	12.00	16.00	20.00	24.00	26.48	29.48	32.38	35.38	38.38	41.38	44.38	51.26
Head junction Radius(r)	Min	0.25	0.40	0.40	0.60	0.60	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.20	1.20	1.60
Thread Length (b)	1<125*	18	22	26	30	38	46	54	60	66						
	125<200	24	28	32	36	44	52	60	66	72	78	84	90	96	102	116
	1>200*	37	41	45	49	57	65	73	79	85	91	97	103	109	115	129

l = Overall length of the Bolt

DIN 603 STAINLESS STEEL CARRIAGE BOLT/MUSHROOM BOLT



Threads (d)		M6	M8	M10	M12
dk	Min	15.45	19.35	23.35	29.35
	Max	16.55	20.65	24.65	30.65
ds	Min	5.52	7.42	9.42	11.30
	Max	6.00	8.00	10.00	12.00
f	Min	3.40	4.40	5.40	7.25
	Max	4.60	5.60	6.60	8.75
k	Min	3.12	4.12	4.62	6.05
	Max	3.88	4.88	5.38	6.95
r1	Approx	12.60	16.00	19.20	24.10
r2	Max	0.50	0.50	0.50	1.00
r3	Max	0.90	1.20	1.50	1.80
v	Min	5.52	7.42	9.42	11.30
	Max	6.48	8.58	10.58	12.70
(b)	1<125*	18	22	26	30
	125<200	24	28	32	36
	1>200*	37	41	45	49

l = Overall length of the Bolt

Nuts

Standard Hex Nut, Heavy Hex Nut, Hex Coupling Nut,
Nylon Lock Nut, Spring Nut, Dome Nut and Wing Nut

Standards:-

- ASTM/ASME/BS/DIN/BS EN ISO /JIS

Material:-

- Mild Steel, Carbon Steel, Alloy Steel & Stainless Steel.

Size Range:-

- M6 to M64 in metric series
- ¼" to 2-½" in imperial
- Bigger sizes can be manufactured as per order.

Threads:-

- UNC, 8UN, UNF, Metric Coarse and Metric Fine

Typical Grades & Standards:-

- Grade 4.6, 4.8, 5.6, 5.8, 8.8, 10.9 and 12.9
- DIN 934 Class 4, 8, 10, 12, A270, A280, A470 and A480
- ASTM A194/A194M Grades 2H, 2HM, 4L, 7L and 7LM
- ASTM A563/563M Grades 8, 10S, A, B, C, D, DH, DH3

Ordering Information:-

- Dimensions - Size.
- Standard and Grade
- Finish (Black, GI, Yellow, HDG, Cadmium, Nickel, PTFE etc)





DIN 934 HEX NUTS

DIN 934 HEX NUTS			
Threads (d)	Across flat (s)	Across corner (e)	Nut thickness (m)
M6	10.00	11.05	6.00
M8	13.00	14.38	6.50
M10	17.00	18.90	8.00
M12	19.00	21.10	10.00
M16	24.00	26.75	13.00
M20	30.00	32.95	16.00
M24	36.00	39.55	19.00
M27	41.00	45.20	22.00
M30	46.00	50.85	24.00
M33	50.00	55.37	26.00
M36	55.00	60.79	29.00
M39	60.00	66.44	31.00
M42	65.00	71.30	34.00
M45	70.00	76.95	36.00
M48	75.00	82.60	38.00
M52	80.00	88.25	42.00
M56	85.00	93.56	45.00
M64	95.00	104.86	51.00
M72	105.00	116.16	58.00

Washers

Plain Washers, Spring Lock Washers and Hardened Steel Washers

Standards:-

- ASTM/ASME/BS/DIN/BS EN ISO /JIS

Material:-

- Mild Steel, Carbon Steel, Alloy Steel & Stainless Steel.

Size Range:-

- M6 to M64 in metric series
- ¼" to 2-½" in imperial
- Bigger sizes can be manufactured as per order.

Typical Grades & Standards:-

- DIN 125/A
- DIN 127/B
- DIN 9021
- ASTM F436 and F436M

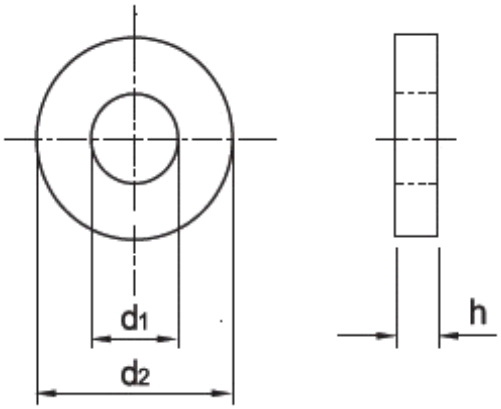
Any other specific grade can be manufactured upon request with short lead times

Ordering information:-

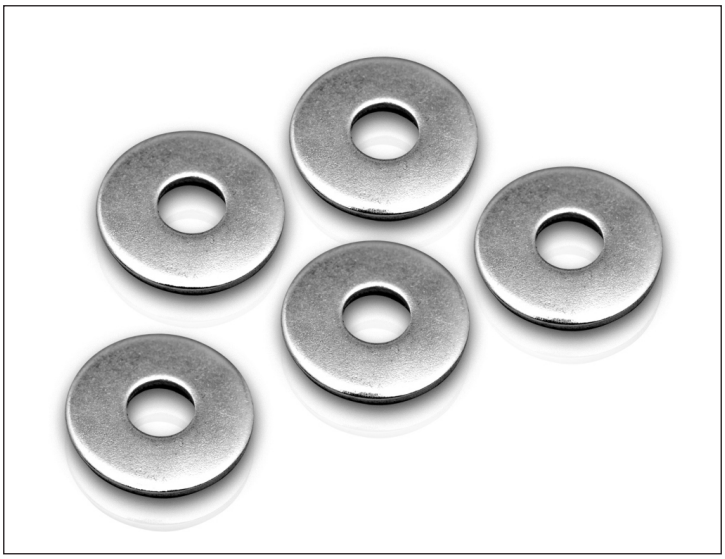
- Dimensions – Size.
- Standard and Grade
- Finish (Black, GI, Yellow, HDG, Cadmium, Nickel, PTFE etc.)



DIN 125 FLAT WASHER



washer size	Inner Diameter (d1)	Outer Diameter (d2)	Thickness (h)
M6	6.40	12.00	1.60
M8	8.40	16.00	1.60
M10	10.50	20.00	2.00
M12	13.00	24.00	2.50
M16	17.00	30.00	3.00
M20	21.00	37.00	3.00
M24	25.00	44.00	4.00
M27	28.00	50.00	4.00
M30	31.00	56.00	4.00
M33	34.00	60.00	5.00
M36	37.00	66.00	5.00
M39	40.00	72.00	6.00
M42	43.00	78.00	7.00
M45	46.00	85.00	7.00
M48	50.00	92.00	8.00
M52	54.00	98.00	8.00
M56	58.00	105.00	9.00
M64	66.00	115.00	9.00
M72	74.00	125.00	10.00



F436M WASHER

washer size	Inner Diameter (d1)		Outer Diameter (d2)		Thickness(h)	
	Max.	Min.	Max.	Min.	Max.	Min.
12	14.40	14.00	27.00	25.70	4.60	3.10
14	16.40	16.00	30.00	28.70	4.60	3.10
16	18.40	18.00	34.00	32.40	4.60	3.10
20	22.50	22.00	42.00	40.40	4.60	3.10
22	24.50	24.00	44.00	42.40	4.60	3.40
24	26.50	26.00	50.00	48.40	4.60	3.40
27	30.50	30.00	56.00	54.10	4.60	3.40
30	33.60	33.00	60.00	58.10	4.60	3.40
36	39.60	39.00	72.00	70.10	4.60	3.40
42	45.60	45.00	84.00	81.10	7.20	4.60
48	52.70	52.00	95.00	92.80	7.20	4.60
56	62.70	62.00	101.00	104.50	8.70	6.10
64	70.70	70.00	187.00	115.80	8.70	6.10
72	78.70	76.00	130.00	127.50	8.70	6.10

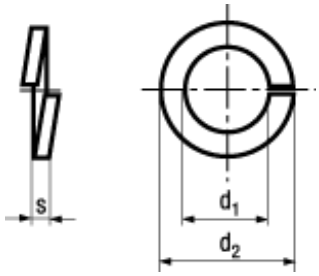
Spring Lock Washer



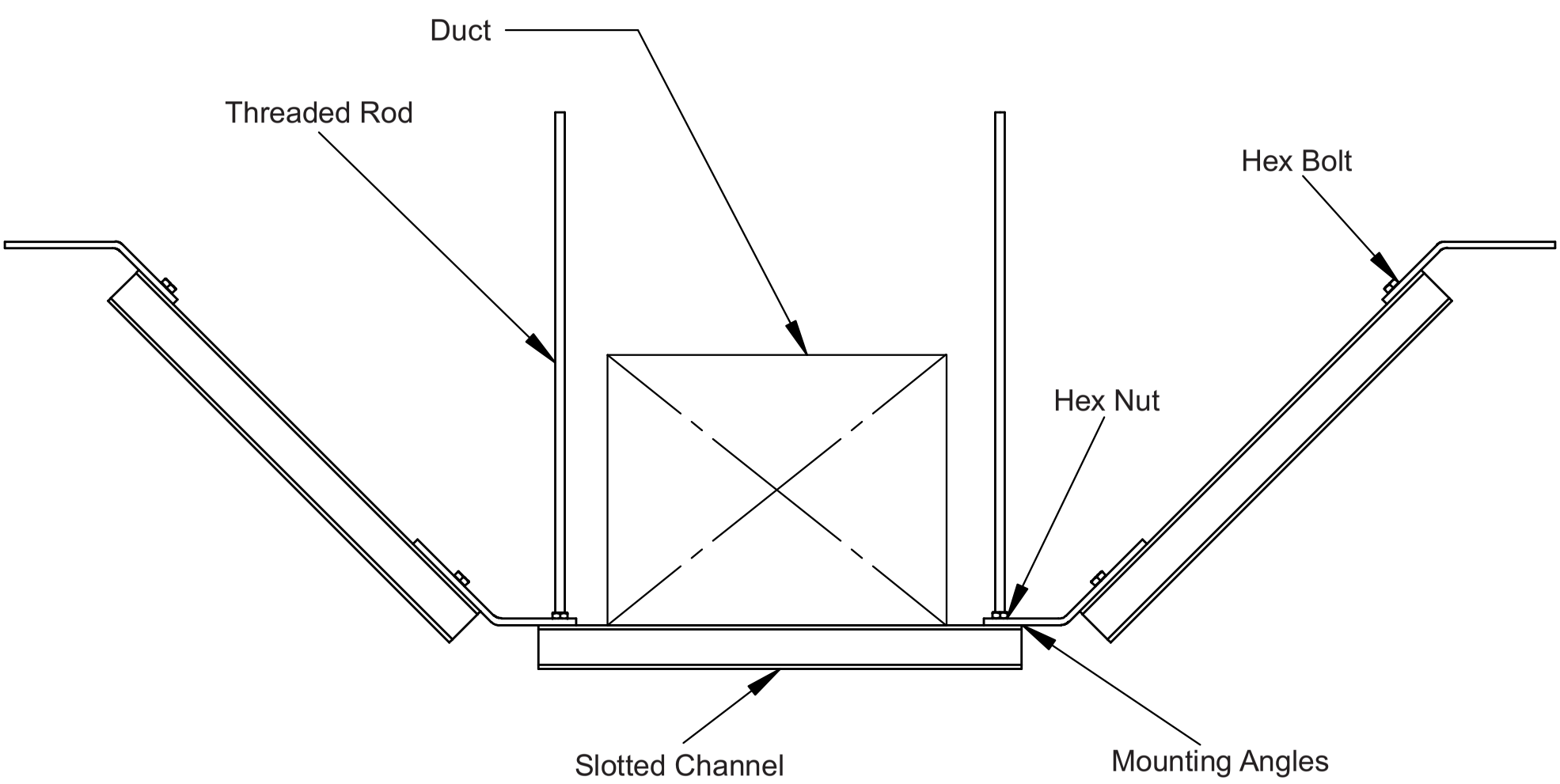
APPLICATIONS :
Resists loosening caused by vibration and corrosion.
Is preferred lockwashers for use with bearing surfaces.
Provide a hardened bearing surface.creating more uniform torque control
Provides more uniform load distribution.

MATERIALS :
Mild Steel.

FINISH AVAILABLE :
Electro-Galvanized / Hot dip Galvanized.



Nominal Washer Size	d1 min.	d1 max.	d2 max.	s
M2,5	2,6	2,9	5,1	0,6
M3	3,1	3,4	6,2	0,8
M3,5	3,6	3,9	6,7	0,8
M4	4,1	4,4	7,6	0,9
M5	5,1	5,4	9,2	1,2
M6	6,1	6,5	11,8	1,6
M7	7,1	7,5	12,8	1,6
M8	8,1	8,5	14,8	2
M10	10,2	10,7	18,1	2,2
M12	12,2	12,7	21,1	2,5
M14	14,2	14,7	24,1	3
M16	16,2	17	27,4	3,5
M18	18,2	19	29,4	3,5
M20	20,2	21,2	33,6	4
M22	22,5	23,5	35,9	4
M24	24,5	25,5	40	5
M27	27,5	28,5	43	5
M30	30,5	31,7	48,2	6
M33	33,5	34,7	55,2	6
M36	36,5	37,7	58,2	6
M39	39,5	40,7	61,2	6
M42	42,5	43,7	68,2	7
M45	45,5	46,7	71,2	7
M48	49	50,5	75	7


Duct
Threaded Rod
Hex Bolt
Hex Nut
Slotted Channel
Mounting Angles

PROJECT DETAILS











TEMBO GLOBAL INDUSTRIES LTD

Plot No. - D 146/ 147,M.I.D.C
T.T.C Turbhe - Industrial Area,
Opp. -Balmer Lawrie Van Leer,
Navi Mumbai - 400 705,
Maharashtra - INDIA.
Tel. : +91 22 2762 0641/42/43
Web : www.sakethexim.com
Email : info@sakethexim.com
sales@sakethexim.com