



Submittal Review Response

Project Name: **Hilo WWTP Rehabilitation and Replacement Project Phase 1**
Submittal No.: **16130-004.0**
Date: **9/22/2025**

Client: County of Hawai'i Carollo Project No.: 203975
Contractor: Nan, Inc.
Submittal Name: Conduits Galvanized Rigid Steel
Reviewed By: Francisco Martinez

SUBMITTAL REVIEW

Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.

Approved	<input type="checkbox"/> No Exceptions
	<input type="checkbox"/> Make Corrections Noted - See Comments
	<input type="checkbox"/> Make Corrections Noted - Confirm
Not Approved	<input checked="" type="checkbox"/> Correct and Resubmit
	<input type="checkbox"/> Rejected - See Remarks
Receipt Acknowledged	<input type="checkbox"/> Filed for Record
	<input type="checkbox"/> With Comments - Resubmit

Review Comments:

1. Confirm that the submitted GRC conduits have NPT standard conduit threads with a 3/4-inch taper per foot as required per specification section 16130 - 2.03.A.1.
2. Explosion proof flexible conduit is called out in the GRS product data but EFLX does not seem to be included in the submittal. Provide clarification if EFLX conduit is to be included in the submittal or if EFLX will be provided in a separate submittal.
3. Submittal seems to be missing conduit bodies. Submit conduit bodies as required per specification section 16130 - 2.03.F.1.
4. Confirm that the submitted insulated grounding bushings have a positive metallic end stop as required per specification section 16130 - 2.04.C.a.
5. All extraneous information should be neatly crossed out as required per specification section 01330 - 1.07.B.
6. Pipe straps should be submitted under a separate cover for hangers and supports.

High Priority

CONTRACTOR SUBMITTAL TRANSMITTAL FORM REV. A

Owner: County of Hawaii
Contractor: Nan, Inc.
Project Name: Hilo WWTP Phase 1
Submittal Title:
TO:
From: Nan Inc.

Project No.: WW-4705R
Submittal Number:
For Information Only

Specification No. and Subject of Submittal / Equipment Supplier	
Spec:	Paragraph:
Authored By:	Date Submitted:

Submittal Certification		
Check Either (A) or (B):		
<input type="checkbox"/> (A)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with <u>no exceptions</u> .	
<input type="checkbox"/> (B)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings <u>except</u> for the deviations listed.	
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.		
General Contractor's Reviewer's Signature: <u>M. H.</u>		
Printed Name and Title: In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
Firm:	Signature:	Date Returned:

PM/CM Office Use	
Date Received GC to PM/CM:	
Date Received PM/CM to Reviewer:	
Date Received Reviewer to PM/CM:	
Date Sent PM/CM to GC:	

Nan, Inc

PROJECT: HILO WWTP REHABILITATION
AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY
THIS CONTRACTOR. IT IS CERTIFIED
CORRECT, COMPLETE, AND IN
COMPLIANCE WITH CONTRACT
DRAWINGS AND SPECIFICATIONS. ALL
AFFECTED CONTRACTORS AND
SUPPLIERS ARE AWARE OF, AND WILL
INTEGRATE THIS SUBMITTAL (UPON
APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED _____
SPECIFICATION SECTION # _____
SPECIFICATION _____
PARAGRAPH _____
DRAWING _____
SUBCONTRACTOR _____
SUPPLIER _____
MANUFACTURER _____

CERTIFIED BY CQCM or Designee : M. H.

Submittal

SUB Reference No : MECI-SUB-0003

Status: OUTSTANDING

For Action: Darrin Lee, MECI
David Wieseler, MECI

Project: HILO WWTP REHABILITATION AND REPLACEMENT PROJECT

Subject: 16130 - CONDUITS - GALVANIZED RIGID STEEL

Submittal on galvanized rigid steel conduit, joint compounds, conduit seals, and conduit accessories.

Submitted For: Approval

Specification 16130 - CONDUITS

Reference :

Paragraph No.: 16130 - 1.04.B

Description : Submittal on galvanized rigid steel conduit, joint compounds, conduit seals, and conduit accessories.

Discipline: ELEC

Area: 00

Attachments: HWWTP -16130 - CONDUITS - GALVANIZED RIGID STEEL.pdf

SUB by: Hannah Anderson, MECI On: 08 September 2025

Created By: Hannah Anderson, MECI On: 08 September 2025, 02:00:21 PM -10:00

Last Edited By: Hannah Anderson, MECI On: 08 September 2025, 02:00:21 PM -10:00

01 - QC/Project Engineer Review

Approved without comment.

QC/Project Engineer Review by: David Wieseler, MECI On: 08 September 2025

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02 - Project Manager Review

Project Manager Review by: On:

Created By: On: ,

Last Edited By: On: ,

03 - Response

Response by:

On:

Created By:

On: ,

Last Edited By:

On: ,

04 - Project Manager/Engineer Closeout

Project Manager/Engineer

On:

Closeout by:

On: ,

Created By:

On: ,

Last Edited By:



MASS ELECTRIC CONSTRUCTION COMPANY PRODUCT DATA SUBMITTAL

REVISION	DATE	PREPARED BY	APPROVED BY
0	09/08/2025	Hannah Anderson	David Wieseler

HILO WASTEWATER TREATMENT PLANT REHABILITATION AND REPLACEMENT PROJECT



SPECIFICATION - 16130 GALVANIZED RIGID STEEL CONDUIT

DOCUMENT REVISION LOG

Revision Number	Revision Date	Description	Approvals		
			PE INITIAL		PM INITIAL
0	09/08/2025	Issued for Review	DCW	09/08/2025	

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SECTION 16130

CONDUITS

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes:
 - 1. Metallic conduits.
 - 2. Nonmetallic conduits.
 - 3. Conduit bodies.
 - 4. Conduit fittings and accessories.
 - 5. Conduit installation.

1.02 REFERENCES

- A. Abbreviations:
 - 1. GRC: Galvanized rigid steel conduit.
 - 2. PCS: Polyvinyl chloride (PVC) coated rigid steel conduit.
 - 3. PVC: Polyvinyl chloride rigid nonmetallic conduit.
 - 4. SLT: Sealtight-liquidtight flexible conduit.
 - 5. EFLX: Explosion proof flexible conduit.
 - 6. NPT: National pipe thread.
- B. Definitions:
 - 1. Conduit bodies: A separate portion of a conduit system that provides access through a removable cover to the interior of the system at a junction of 2 or more conduit sections. Includes, but not limited to, Shapes C, E, LB, T, X, etc.
 - 2. Conduit fitting: An accessory that primarily serves a mechanical purpose. Includes, but not limited to, bushings, locknuts, hubs, couplings, reducers, etc.
- C. Standards:
 - 1. American National Standards Institute (ANSI):
 - a. C80.1 - Electrical Rigid Steel Conduit.
 - 2. National Electrical Code (NEC).
 - 3. National Electrical Manufacturer's Association (NEMA):
 - a. RN-1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Steel Conduit.
 - b. TC7 - Smooth-Wall Coilable Electrical Polyethylene Conduit.
 - 4. Underwriters Laboratories (UL), Inc.:
 - a. 651B - Standard for Continuous Length HDPE Conduit.
 - b. 1203 -Standard for Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations.

1.03 DELEGATED DESIGN

- A. As specified in Sections 01357 - Delegated Design Procedures and 16070 - Hangers and Supports.

1.04 SUBMITTALS

- A. Furnish submittals as specified in Section 01330 - Submittal Procedures.
- B. Product data:
 - 1. Furnish complete manufacturer's catalog sheets for every type and size of conduit, fitting, conduit body, and accessories to be used on the Project.
 - 2. Furnish complete manufacturer's recommended special tools to be used for installation if required.
 - 3. Certified test results for PVC-coated metallic conduit showing the adhesive bond is stronger than the tensile strength of the PVC.
- C. Shop drawings:
 - 1. Furnish conduit routing plans for conduits before the installation of any conduit. Conduit routing submittals are to be stamped and sealed by a registered Professional Engineer. Include the following details.
 - a. Intended routing of each conduit.
 - b. Conduit size.
 - c. Conduit material.
 - d. Number and type of conductors.
 - e. Supporting methods.
 - 2. Provide a fully developed contractor conduit schedule that includes tags for all conduits and shows all wires from each source to destination.
 - a. Number conduits in accordance with the Contract Documents.
 - 3. Provide ampacity and conduit sizing calculations when combining wires within common conduits beyond or differently than what is already shown as combined in the conduit schedule. Include de-rating factors used when combining current-carrying conductors within each conduit. Match the conduit tags in the detailed contractor drawings and conduit schedule.
 - a. Reference General Notes on drawing 00-E-01-002 for constraints when combining wires within common conduits.
- D. Delegated design submittals:
 - 1. As specified in Section 16070 - Hangers and Supports.
- E. Certifications:
 - 1. Furnish PVC-coated conduit manufacturer's valid, unexpired certification for each installer.
- F. Record Documents:
 - 1. Incorporate all changes in conduit routing on electrical plan drawings.
 - 2. Dimension underground and concealed conduits from building lines.
 - 3. Furnish hard copy drawings.
- G. Installation drawings: Installation drawings, including individual conduit numbers, routing, sizes, cable sizes, and circuit numbers for each conduit.

1.05 QUALITY ASSURANCE

- A. All conduits, conduit bodies, and fittings shall be UL listed and labeled.

- B. Every installer of PVC-coated metallic conduit shall be certified by the manufacturer for installation of the conduit, and be able to present a valid, unexpired installer certification card prior to installation beginning.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not expose non-metallic conduit to direct sunlight.
- B. Do not store conduit in direct contact with the ground.

1.07 PROJECT OR SITE CONDITIONS

- A. As specified in Section 01850 - Design Criteria.

1.08 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Before performing any trenching locate existing underground utilities:
 - a. As specified in Section 02280 – Subsurface Utility Engineering.
 - b. Review of existing civil record drawings for recorded underground utilities.
 - 1) Determine underground utility horizontal and vertical location by at least 1 of the following methods:
 - a) Soft excavation.
 - b) Local utility location service, CALL BEFORE YOU DIG or equal.

1.09 WARRANTY

- A. As specified in Section 01783 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide conduits, conduit bodies, fittings, junction boxes, and all necessary components, whether or not indicated on the Drawings, as required, to install a complete electrical raceway system.
- B. Provide location and protection of existing underground utilities, underground conduit trenching, conduit and backfill necessary for the complete installation of underground conduits.

2.02 MANUFACTURERS

- A. **Galvanized rigid steel conduit:**
 - 1. One of the following or equal:
 - a. Allied Tube and Conduit.
 - b. Western Tube and Conduit.
 - c. Wheatland Tube Co.

- B. PVC-coated rigid steel conduit:
 - 1. One of the following or equal:
 - a. Allied.
 - b. Calbond.
 - c. NEC, Inc. BlackGuard.
 - d. Ocal, Inc.
 - e. Robroy Ind.
- C. Sealtight-liquidtight flexible conduit:
 - 1. One of the following or equal:
 - a. Southwire.
 - b. AFC Cable Systems.
 - c. Electri-Flex Co.
 - d. Anaconda.
- D. Explosion proof flexible conduit:
 - 1. One of the following or equal:
 - a. Appleton.
 - b. Crouse-Hinds.
 - c. Hubbell Killark.
- E. Rigid nonmetallic PVC conduit:
 - 1. One of the following or equal:
 - a. Carlon.
 - b. Cantex.
 - c. Triangle Conduit and Cable.
- F. Conduit bodies:
 - 1. One of the following or equal:
 - a. Crouse-Hinds.
 - b. Appleton.
 - c. O-Z/Gedney.
 - d. Ocal, Inc.
 - e. Robroy Ind.
 - f. Calbond.
 - g. Carlon.
- G. Joint compound:
 - 1. The following or equal:
 - a. Thomas & Betts.
- H. Galvanized rigid steel conduit expansion fittings:
 - 1. One of the following or equal:
 - a. Crouse-Hinds.
 - b. Appleton.
 - c. O-Z/Gedney.
- I. PVC-coated rigid steel conduit expansion fittings:
 - 1. One of the following or equal:
 - a. Ocal, Inc.

- b. Robroy Ind.
 - c. NEC, Inc. BlackGuard.
- J. Conduit sleeve:
1. One of the following or equal:
 - a. Crouse-Hinds.
 - b. Appleton.
 - c. O-Z/Gedney.
- K. **Conduit seals:**
1. One of the following or equal:
 - a. **Appleton.**
 - b. Crouse-Hinds.
 - c. O-Z/Gedney.
- L. Conduit through wall and floor seals:
1. The following or equal:
 - a. O-Z/Gedney:
 - 1) Type "WSK."
 - 2) Type "CSM."

2.03 COMPONENTS

- A. GRC:
 - 1. All threads: NPT standard conduit threads with a 3/4-inch taper per foot:
 - a. Running conduit threads are not acceptable.
 - 2. Hot-dip galvanized inside and out:
 - a. Ensures complete coverage and heats the zinc and steel to a temperature that ensures the zinc alloys with the steel over the entire surface.
 - b. Electro-galvanizing is not acceptable.
 - 3. Manufactured in accordance with:
 - a. UL-6.
 - b. ANSI C80.1.
- B. PCS:
 1. The steel conduit, before PVC coating, shall be new, unused, hot-dip galvanized material, conforming to the requirements for Type GRC.
 2. Coated conduit NEMA Standard RN-1:
 - a. The galvanized coating may not be disturbed or reduced in thickness during the cleaning and preparatory process.
 3. Factory-bonded PVC jacket:
 - a. The exterior galvanized surfaces shall be coated with primer before PVC coating to ensure a bond between the zinc substrate and the PVC coating.
 - b. Nominal thickness of the exterior PVC coating shall be 0.040 inch except where part configuration or application of the piece dictates otherwise.
 - c. PVC coating on conduits and associated fittings shall have no sags, blisters, lumps, or other surface defects and shall be free of holes and holidays.

- d. The PVC adhesive bond on conduits and fittings shall be greater than the tensile strength of the PVC plastic coating:
 - 1) Confirm bond with certified test results.
- 4. A urethane coating shall be uniformly and consistently applied to the interior of all conduits and fittings:
 - a. Nominal thickness of 0.002 inch.
 - b. Conduits having areas with thin or no coating are not acceptable.
 - c. All threads shall be coated with urethane.
- 5. The PVC exterior and urethane interior coatings applied to the conduits shall afford sufficient flexibility to permit field bending without cracking or flaking at temperature above 30 degrees Fahrenheit (-1 degree Celsius).
- 6. PCS conduit bodies and fittings:
 - a. Malleable iron.
 - b. The conduit body, before PVC coating, shall be new, unused material and shall conform to appropriate UL standards.
 - c. The PVC coating on the outside of conduit bodies shall be 0.040-inch thick and have a series of ribs to protect the coating from tool damage during installation.
 - d. 0.002-inch interior urethane coating.
 - e. Utilize the PVC coating as an integral part of the gasket design.
 - f. Stainless steel cover screw heads shall be encapsulated with plastic to ensure corrosion protection.
 - g. A PVC sleeve extending 1 conduit diameter or 2 inches, whichever is less, shall be formed at each female conduit opening.
 - 1) The inside diameter of the sleeve shall be the same as the outside diameter of the conduit to be used.
 - 2) The sleeve shall provide a vapor- and moisture resistant seal at every connection.
 - 3) Fittings shall be Form 8 and supplied with plastic encapsulated stainless steel cover screws. Fittings shall be UL Type 4X. Fittings shall be from the same manufacturer as the conduit in order to maintain system continuity and warranty.

C. SLT:

- 1. Temperature rated for use in the ambient temperature at the installed location but not less than the following:
 - a. General purpose:
 - 1) Temperature range: -20 degrees Celsius to +80 degrees Celsius.
 - b. Oil-resistant:
 - 1) Temperature range: -20 degrees Celsius to +60 degrees Celsius.
- 2. Sunlight-resistant, weatherproof, and watertight.
- 3. Manufactured from single strip steel, hot-dip galvanized on all 4 sides before conduit fabrication.
- 4. Strip steel spiral wound resulting in an interior that is smooth and clean for easy wire pulling.
- 5. Overall PVC jacket.
- 6. With integral copper ground wire, built in the core, in conduit trade sizes 1/2 inch through 1-1/4 inch.

- D. EFLX:
 - 1. Suitable for the hazardous Class and Group where installed:
 - a. As specified in Section 16050 - Common Work Results for Electrical.
 - 2. Metallic braid shall provide continuous electrical path.
 - 3. Stainless steel construction.
 - 4. Provide fittings and unions as required for the installation.

- E. PVC:
 - 1. Extruded from virgin PVC compound:
 - a. Schedule 40 unless otherwise specified.
 - b. Schedule 80 extra-heavy wall where specified.
 - 2. Rated for 90 degrees Celsius conductors or cable.
 - 3. Rated for use in direct sunlight.

- F. Conduit bodies:
 - ✓ 1. Material consistent with conduit type:
 - ✓ a. Malleable iron bodies and covers when used with Type GRC.
 - ✓ b. PVC-coated malleable iron bodies and covers when used with Type PCS.
 - 2. Conduit bodies to conform to Form 8, Mark 9, or Mogul design:
 - a. Mogul design conforming to NEC requirements for bending space for large conductors for conduit trade sizes of 1 inch and larger with conductors #4 AWG and larger, or where required for wire-bending space.
 - 3. Gasketed covers attached to bodies with stainless steel screws secured to threaded holes in conduit body.

2.04 ACCESSORIES

- ✓ A. Connectors and fittings:
 - 1. Manufactured with compatible materials to the corresponding conduit.

- ✓ B. Insulated throat metallic bushings:
 - ✓ 1. Construction:
 - ✓ a. Malleable iron or zinc-plated steel when used with steel conduit.
 - ✓ b. Positive metallic conduit end stop.
 - ✓ c. Integrally molded non-combustible phenolic-insulated surfaces rated at 150 degrees Celsius.
 - ✓ d. Use fully insulated bushings on nonmetallic conduit system made of high-impact 150 degrees Celsius rated non-combustible thermosetting phenolic.

- ✓ C. Insulated grounding bushings:
 - ✓ 1. Construction:
 - ✓ a. Malleable iron or steel, zinc-plated, with a positive metallic end stop.
 - ✓ b. Integrally molded non-combustible phenolic-insulated surfaces rated at 150 degrees Celsius.
 - ✓ c. Tin-plated copper grounding saddle for use with copper or aluminum conductors.

- D. Electrical unions (Erickson Couplings):
 - 1. Construction:
 - a. Malleable iron for use with steel conduit.

- b. PVC-coated malleable iron for use with PCS conduit.
 - c. Concrete tight, 3-piece construction.
 - d. Rated for Class I Division 1 Group D in hazardous areas.
- E. SLT fittings:
- 1. Construction:
 - a. Malleable iron.
 - b. Furnished with locknut and sealing ring.
 - c. Liquidtight, raintight, oiltight.
 - d. Insulated throat.
 - e. Furnish as straight, 45-degree elbows, and 90-degree elbows.
 - f. Designed to prevent sleeving:
 - 1) Verify complete bonding of the raceway jacket to the plastic gasket seal.
 - g. Equipped with grounding device to provide ground continuity irrespective of raceway core construction. Grounding device, if inserted into raceway and directly in contact with conductors, shall have rolled-over edges for sizes under 5 inches.
 - h. Where terminated into a threadless opening using a threaded hub fitting, a suitable moisture-resistant/oil-resistant synthetic rubber gasket shall be provided between the outside of the box or enclosure and the fitting shoulder. Gasket shall be adequately protected by and permanently bonded to a metallic retainer.
 - 2. Corrosion-resistant and outdoor SLT fittings:
 - a. Construction:
 - 1) PVC-coated liquidtight fittings with a bonded 0.040-inch-thick PVC coating on the metal connector to form a seal around the SLT conduit.
 - 2) Insulated throat and an integral sealing ring.
- F. Hubs for threaded attachment of steel conduit to sheet metal enclosures:
- 1. Construction:
 - a. Insulated throat.
 - b. PVC-coated when used in corrosive areas.
 - c. Bonding locknut.
 - d. Recessed neoprene o-ring to ensure watertight and dusttight connector.
 - e. 1/2-inch through 1-1/4-inch steel zinc electroplated.
 - f. 1-1/2-inch through 6-inch malleable iron zinc plated.
 - 2. Usage:
 - a. All conduits in damp, wet, outdoor, and corrosive areas shall use threaded hubs for connections to sheet metal enclosures.
- G. Sealing fittings:
- 1. Construction:
 - a. 40-percent wire fill capacity.
 - b. PVC-coated when used in corrosive areas.
 - c. PVC Coated Hazardous (Classified) Location fittings must be UL 1203 listed after the coating is applied and have a red metal tag attached to the fitting to signify compliance.
 - d. Malleable ductile iron with steel conduit.
 - e. Aluminum with aluminum conduit.

- f. Type EYDX where drains are required.
 - g. Type EYSX where drains are not required.
 - h. UL 1203 listed for use in Class I, Division 1, Groups A, B, C, D; Class I, Division 2, Groups A, B, C, D; and Class II, Divisions 1 and 2, Groups E, F, and G.
2. Sealing compound:
- a. Fiber filler and cement as recommended by the sealing fitting manufacturer.
 - b. Approved for the conditions and use.
 - 1) Not affected by surrounding atmosphere or liquids.
 - c. Melting point shall be 200 degrees Fahrenheit minimum.
- H. Expansion/deflection couplings:
1. Use to compensate for movement in any directions between 2 conduit ends where they connect.
 2. Shall allow movement of 3/4 inch from the normal in all directions.
 3. Shall allow angular movement for a deflection of 30 degrees from normal in any direction.
 4. Constructed to maintain electrical continuity of the conduit system.
 5. Materials:
 - a. End couplings: Bronze or galvanized ductile iron.
 - a. Sleeve: Neoprene.
 - b. Bands: Stainless steel.
 - c. Bonding jumper: Tinned copper braid.
- I. Expansion couplings:
1. Shall allow for expansion and contraction of conduit:
 - a. Permitting 8-inch movement, 4 inches in either direction.
 2. Constructed to maintain electrical continuity of the conduit system.
 3. Materials:
 - a. Head: Malleable or ductile iron.
 - b. Sleeve: Steel.
 - c. Insulating bushing: Phenolic.
 - d. Finish: Hot-dip galvanized.
 - e. PVC-coated steel when used with Type PCS.
- J. Conduit markers:
1. As specified in Section 16075 - Identification for Electrical Systems.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Before installing any conduit or locating any device box:
1. Examine the complete set of Drawings and Specifications, and all applicable shop drawings.
- B. Verify all dimensions and space requirements and make any minor adjustments to the conduit system as required to avoid conflicts with the building structure, other equipment, or the work of other trades.

3.02 INSTALLATION

A. General:

- a. The electrical drawings are diagrammatic in nature. Conduit routing is indicated on the drawings using both "homeruns" and schematic representation.
 - 1) Install conduit homeruns as indicated on the Drawings and as specified.
 - 2) Install conduit runs with schematic representation indicated on the Drawings and as specified.
 - 3) Modify conduit runs to suit field conditions, as accepted by the Engineer:
 - a) Make changes in conduit locations that are consistent with the design intent but are dimensionally different, or routing to bypass obstructions.
 - b) Make changes in conduit routing due to the relocation of equipment.
 - c) Install conduits and equipment in such a manner as to avoid obstructions and to preserve headroom and keep openings and passageways clear.
 - 4) Where the Drawings do not indicate the exact mounting and/or supporting method to be used, use materials and methods similar to the mounting details indicated on the Drawings.
 - 5) The electrical drawings do not indicate all required junction boxes and pull boxes:
 - a) Provide junction boxes and pull boxes to facilitate wire pulling as required:
 - (1) To meet cable manufacturer's pulling tension requirements.
 - (2) To limit total conduit bends between pull locations.
 - b) Install junction boxes and pull boxes at locations acceptable to the Engineer.
 - b. The Contractor is responsible for any deviations in general location, conduit size, routing, or changes to the conduit schedule without the express written approval or direction by the Engineer:
 - 1) The Engineer is the sole source in determining whether the change is constituted as a deviation:
 - a) Perform any changes resulting in additional conduits, or extra work from such deviations.
 - b) Incorporate any deviations on the Record Documents.
 - 2) Owner reserves the right to deduct the amount of applicable reimbursement, equivalent to the cost of the engineering effort required to show those unauthorized changes on As-Built Drawings.
2. Use only tools recommended by the conduit manufacturer for assembling the conduit system.
3. Provide adequate clearances from high-temperature surfaces for all conduit runs. Provide minimum clearances as follows:
 - a. Clearance of 6 inches from surfaces 113 degrees Fahrenheit to 149 degrees Fahrenheit.
 - b. Clearance of 12 inches from surfaces greater than 149 degrees Fahrenheit.

- c. Keep conduits at least 6 inches from the coverings on hot water and steam pipes, 18 inches from the coverings on flues and breechings, and 12 inches from fuel lines and gas lines.
 - d. Where it is necessary to route conduits close to high-temperature surfaces, provide a high-reflectance thermal barrier between the conduit and the surface.
4. Support conduit runs on water-bearing walls a minimum of 7/8-inch away from wall on an accepted preformed channel:
- a. Do not run conduits within water-bearing walls unless otherwise indicated on the Drawings.
5. Do not install 1-inch or larger conduits in or through structural members unless approved by the Engineer.
6. Run conduits exposed to view parallel with or at right angles to structural members, walls, or lines of the building:
- a. Install straight and true conduit runs with uniform and symmetrical elbows, offsets, and bends.
 - b. Make changes in direction with long radius bends or with conduit bodies.
7. Install conduits with total conduit bends between pull locations less than or equal to 270 degrees.
8. Route all exposed conduits to preserve headroom, access space and workspace, and to prevent tripping hazards and clearance problems:
- a. Install conduit runs so that runs do not interfere with proper and safe operation of equipment and do not block or interfere with ingress or egress, including equipment-removal hatches.
 - b. Route conduits to avoid drains or other gravity lines. Where conflicts occur, relocate the conduit as required.
9. Conduits may be run in concrete members or slabs with permission of the Engineer or as indicated on the Drawings:
- a. Refer to the typical details for conduit spacing and size requirements.
10. When installing conduits through existing slabs or walls, make provisions for locating any possible conflicting items where the conduit is to penetrate. Use tone signal or X-ray methods to make certain that no penetrations will be made into the existing conduits, piping, cables, post-tensioning cables, etc.
11. Plug conduits brought into pull boxes, manholes, handholes, and other openings until used to prevent entrance of moisture.
12. Install conduits through wall and floor seals where indicated on the Drawings.
13. For existing and new 2-inch and larger conduit runs, snake conduits with a conduit cleaner equipped with a cylindrical mandrel of a diameter not less than 85 percent of nominal diameter of the conduit:
- a. Remove and replace conduits through which mandrel will not pass.
14. Provide all sleeves and openings required for the passage of electrical raceways or cables even when these openings or sleeves are not specifically indicated on the Drawings.
15. Install complete conduit systems before conductors are installed.
16. Provide metallic conduits terminating in transformer, switchgear, motor control center, or other equipment conduit windows with grounding bushings and ground with a minimum No. 6 AWG ground wire.
17. Underground conduits:
- a. Install underground conduits, including conduit runs below slabs-on-grade in concrete-reinforced duct bank construction:
 - 1) As specified in Section 16133 - Duct Banks.

- b. Make underground conduit size transitions at handholes and manholes.
 - c. Install spare conduits in underground duct banks towards top center of runs to allow for ease of installation of future cables as conduits enter underground manholes and handholes.
 - d. Seal around conduit penetrations of below grade walls with a mechanical seal.
 - 18. Underground conduit trenching:
 - a. Perform trenching as specified in Section 02318 - Trenching.
 - b. Trench must be uniformly graded with the bottom, rock free and covered with select material.
 - c. Damage occurring to existing ducts, conduits, cables, and other utilities during underground conduit installation shall be remediated to the satisfaction of the Owner.
 - d. Whenever possible, use the walls of the trench as forms for concrete encasement:
 - 1) Forms are required where the soil is not self-supporting.
- B. Equipment grounding conductors:
- 1. Provide a separate, green insulated, grounding conductor in each raceway independent of raceway material:
 - a. Multi-conductor power and control cables shall include an integral green insulated grounding conductor.
 - b. Provide a separate grounding conductor in each individual raceway for parallel feeders.
 - 2. Conductors shall be the same type and insulation as the circuit conductors:
 - a. Use 600-volt insulation for the equipment grounding conductors for medium voltage systems.
 - 3. Minimum size in accordance with the NEC.
- C. Lighting and receptacle conduits:
- 1. Provide conduit runs for lighting and receptacle circuits, whether or not indicated on the Drawings:
 - 2. Install conduits in accordance with the requirements of this Section unless otherwise indicated.
 - 3. Minimum conduit size:
 - a. 3/4-inch for exposed conduits.
 - b. 1-inch for underground or in-slab conduits.
 - 4. Provide conduit materials for the installed location as specified in Section 16050 - Common Work Results for Electrical.
- D. Hazardous areas:
- 1. As specified in Section 16050 - Common Work Results for Electrical for hazardous areas and specific Class and Division.
- E. Conduit usage:
- 1. Exposed conduits:
 - a. Rigid conduit:
 - 1) Install the rigid conduit type for each location as specified in Section 16050 - Common Work Results for Electrical and 16052 – Hazardous Classified Area Construction.
 - 2) Minimum size: 3/4-inch.

- b. Flexible conduit:
 - 1) Use flexible conduit for final connections between rigid conduit and motors, vibrating equipment, instruments, control equipment, or where required for equipment servicing:
 - a) Use Type SLT with rigid metallic conduit.
 - b) Use Type NFC with PVC conduit.
 - c) Use Type EFLX in Class I Division 1 locations.
 - 2) Minimum size: 3/4-inch:
 - a) 1/2 when required for connection to instruments.
 - 3) Maximum length:
 - a) Fixed equipment:

Conduit Trade Size	Flexible Conduit Length (inch)
3/4	18
1	18
1-1/4	18
1-1/2	18
2	36
2-1/2	36
3	36
3-1/2	38
4	40

- b) Removable instruments or hinged equipment:
 - (1) As required to allow complete removal or full movement without disconnecting or stressing the conduit.
- 2. Concrete-encased and embedded conduits:
 - a. Straight runs and bends less than 45 degrees:
 - 1) Type PVC Schedule 40.
 - b. Bends with total deflection greater than 45 degrees:
 - 1) PCS.
 - c. Entering and exiting duct bank, underground or embedded conduit runs a minimum 12 inches above and below grade, finished floor, or entering equipment:
 - 1) PCS.
 - d. Minimum size:
 - 1) 2-inch in duct banks.
 - 2) 1-inch for in-slab conduits.
 - 3) Provide conduit fittings to enlarge the conduit from the exposed size in the conduit schedule as required.
- 3. Direct-buried and sand-bedded duct bank conduits:
 - a. Type PCS.
 - b. Minimum size: 1-inch.
- 4. Below-slab conduits:
 - a. Type PCS.

- b. Minimum size: 1-inch.
 - 5. Concrete capped, pea gravel-bedded duct bank conduits:
 - a. Type PVC40.
 - b. Minimum size: 1-inch.
 - 6. PVC-coated rigid metallic conduit:
 - a. Use specifically manufactured or machined threading dies to manufacturer's specifications to accommodate the PVC jacket.
 - b. Repair damage to PVC coatings with manufacturer supplied touchup compound or PVC Coating Repair Kit for PVC Coated Raceway Systems.
 - 7. GRC:
 - a. Conduit shall be cut square and reamed before threading.
- F. Conduit joints and bends:
1. General:
 - a. Where conduit is underground, under slabs on grade, exposed to the weather, or in NEMA Type 4 or NEMA Type 4X locations, make joints liquidtight.
 - b. Keep bends and offsets in conduit runs to an absolute minimum.
 - c. All bends shall be symmetrical.
 - d. The following conduit systems shall use large-radius sweep elbows:
 - 1) Underground conduits.
 - 2) Conduits containing fiber optic cables.
 - e. Provide large-radius factory-made bends for 1-1/4-inch trade size or larger.
 - f. Make field bends with a radius of not less than the requirements found in the NEC:
 - 1) The minimum bending radius of the cable must be less than the radius of the conduit bend.
 - 2) Make all field bends with power bending equipment or manual benders specifically intended for the purpose:
 - a) Make bends so that the conduit is not damaged and the internal diameter is not effectively reduced.
 - b) For the serving utilities, make bends to meet their requirements.
 - g. Replace all deformed, flattened, or kinked conduit.
 2. Threaded conduit:
 - a. Cut threads on rigid metallic conduit with a standard conduit-cutting die that provides a 3/4-inch per foot taper and to a length such that all bare metal exposed by the threading operation is completely covered by the couplings or fittings used. In addition, cut the lengths of the thread such that all joints become secure and wrench-tight just preceding the point where the conduit ends would butt together in couplings or where conduit ends would butt into the ends or shoulders of other fittings.
 - b. Thoroughly ream conduit after threads have been cut to remove burrs.
 - c. Use bushings or conduit fittings at conduit terminations.
 - d. On exposed conduits, repair scratches and other defects with galvanizing repair stick, Enterprise Galvanizing "Galvabar™," or CRC "Zinc It."
 - e. Coat conduit threads with an approved electrically conductive sealant and corrosion inhibitor that is not harmful to the conductor insulation:
 - 1) Apply to the male threads and tighten joints securely.
 - 2) Clean excess sealant from exposed threads after assembly.
 - f. Securely tighten all threaded connections.

- g. Any exposed threaded surfaces must be cleaned and coated with a galvanizing solution so that all exposed surfaces have a galvanized protective coating.
- 3. PVC:
 - a. Use approved solvent-weld cement specifically manufactured for the purpose. Spray-type cement is not allowed.
 - b. Apply heat for bends so that conduit does not distort or discolor. Use a spring mandrel as required to ensure full inside diameter at all bends:
 - 1) Utilize a heater specifically for PVC conduit as recommended by the conduit manufacturer.

G. Conduit sealing and drainage:

- 1. Conduit drainage and sealing other than required for hazardous and classified areas:
 - a. Provide sealing and drainage in vertical drops of long (in excess of 20 feet), exterior, above-grade conduit runs at the points at which the conduit enters buildings, switchgear, control panels, lighting panelboards, and other similar enclosures.
 - b. Provide seal fittings with drains in vertical drops directly above grade for exterior and above-grade conduit runs that are extended below grade.
 - c. Provide conduit seals with drains in areas of high humidity and rapidly changing temperatures:
 - 1) Where portions of an interior raceway pass through walls, ceilings, or floors that separate adjacent areas having widely different temperatures.
 - d. Provide conduit seals similar to O-Z/Gedney (Type CSM) on all conduits between corrosive and non-corrosive areas.
 - e. Seal one end only of all underground conduits at highest point with O-Z/Gedney sealing (non-hazardous) filling, or equal.
- 2. Install seals with drains at any location along conduit runs where moisture may condense or accumulate. This requirement includes, but is not limited to, the following locations: control panels, junction boxes, pullboxes, or low points of the conduit.

H. Hangers and supports:

- 1. General:
 - a. Provide appropriate hangers, supports, fasteners, and seismic restraints to suit applications:
 - 1) As specified in Section 16070 - Hangers and Supports.
 - 2) Provide support materials consistent with the type of conduit being installed as specified in Section 16050 - Common Work Results for Electrical.
 - b. Support conduit at the intervals required by the NEC.
 - c. Perforated strap and plumbers' tape are not acceptable for conduit supports.
- 2. Finished areas:
 - a. Above suspended ceilings:
 - 1) Support conduit on or from the structure. Do not support conduit from hanging wires or suspended ceiling grid.

- b. Concealed conduit on wood:
 - 1) Use 2-hole galvanized steel straps screwed or nailed to the wood or hammer-driven stamped galvanized-type supports having serrated or sawtooth edges on the driven portion and designed specifically for the size and type of conduit being supported. Drive these latter supports so that the conduit is tightly and rigidly supported. Replace any dented or damaged conduit.
 - c. In steel-stud construction:
 - 1) Tie conduit at maximum 4-foot intervals with No. 16 gauge double-annealed galvanized wire or conduit clips so that conduit cannot move from vibration or other causes.
 - 3. Conduit on concrete or masonry:
 - a. Use 1-hole malleable iron straps with metallic or plastic expansion anchors and screws or support from preset inserts.
 - b. Use preset inserts in concrete when possible.
 - c. Use pipe spacers (clamp backs) in wet locations.
 - 4. Conduit on metal decking:
 - a. Use 1-hole malleable iron straps with 1-inch-long cadmium-plated Type A panhead sheet-metal screws. Fully or partially hammer-driven screws are not acceptable.
 - 5. Suspended conduit:
 - a. Use malleable-iron factory-made split-hinged pipe rings with threaded suspension rods sized for the weight to be carried (minimum 3/8-inch diameter), Kindorf, or equal.
 - b. For grouped conduits, construct racks with threaded rods and tiered angle iron or preformed channel cross members. Clamp each conduit individually to a cross member. Where rods are more than 2-feet long, provide rigid sway bracing.
 - 6. Supports at structural steel members:
 - a. Use beam clamps.
 - b. Drilling or welding may be used only as specified or with approval of the Engineer.
 - 7. PVC-coated rigid metal systems:
 - a. Provide right-angle beam clamps and "U" bolts specially formed and sized to snugly fit the outside diameter of the coated conduit. Provide "U" bolts with PVC-encapsulated nuts that cover the exposed portions of the threads.
 - b. Securely fasten exposed conduits with Type 316 stainless steel clamps or straps.
- I. Expansion or expansion/deflection fittings:
- 1. General:
 - a. Align expansion coupling with the conduit run to prevent binding.
 - b. Follow manufacturer's instructions to set the piston opening.
 - c. Install expansion fittings across concrete expansion joints and at other locations where necessary to compensate for thermal or mechanical expansion and contraction.
 - d. Furnish fittings of the same material as the conduit system.

2. For metallic conduit, provide expansion or expansion/deflection couplings, as appropriate, where:
 - a. Install expansion fittings a minimum of every 200 feet in straight conduit runs.
- J. Empty conduits:
 1. Provide a pull tape in each empty conduit more than 10 feet in length.
 2. Seal ends of all conduits with approved, manufactured conduit seals, caps, or plugs immediately after installation:
 - a. Keep ends sealed until immediately before pulling conductors.
- K. Miscellaneous:
 1. Seal roof penetrations for raceways and other items that penetrate the roof in accordance with roofing manufacturer's instructions and as indicated on the Drawings.
 2. Provide electrical unions at all points of union between ends of rigid conduit systems that cannot otherwise be coupled:
 - a. Running threads and threadless couplings are not allowed.
 3. Replace any conduits installed that the Engineer determines do not meet the requirements of this Specification.
 4. Provide conduit housekeeping curb around all embedded or below-grade conduits exiting or entering the slab, per the Typical Details.

3.03 COMMISSIONING

- A. As specified in Section 01756 - Commissioning.

END OF SECTION

1.0 GALVANIZED RIGID STEEL CONDUIT

**SPECIFICATION – 16130-2.02.A
GALVANIZED RIGID STEEL CONDUIT**



**mass.
electric
construction
company**



REPUBLIC CONDUIT

Spec Submittal Sheet

Galvite® Electrical Rigid Metal Conduit-Steel (Galvite® ERMC-S, GRC, or RIG)

Designed to offer superior protection, strength, safety and ductility for your most demanding wiring jobs, Nucor Tubular Products – Republic Conduit, Inc. (NTP-RC)'s hot-dip galvanizing process ensures Galvite will last longer, provide thorough protection for your entire electrical raceway system, and deliver greater value for your installation dollar.

All Galvite RIG is made from steel which is melted and rolled in the United States.

Specifications

Architects and engineers desiring to specify Galvite ERMC-S from NTP-RC should include the following description:

2.03.A.2

Electrical conductors shall be enclosed in Galvite ERMC-S in accordance with the National Electrical Code (NEC). Rigid steel conduit shall be mild steel, manufactured, Hot-Dip Galvanized and produced to the following specifications:

2.03.A.3.a

- UL Standard for Electrical Rigid Metal Conduit – Steel, UL 6, File # E104582
- National Electrical Code, Article 344
- ANSI/NEMA Standard for Electrical Rigid Steel Conduit C80.1

2.03.A.3.b

GRC (Electrical Rigid Metal Conduit-Steel)													
Trade Size Designator		Outside Diameter (OD)		Nominal Inside Diamter (ID)		Feet/Bundle	Bundles/Lift	Standard Lift				Length without Coupling	Cap Color
US	Metric	IN	mm	IN	mm			Feet	m	Lbs	kg		
1/2"	16	0.840	21.34	0.622	15.80	100	25	2,500	762.5	2,050	931.3	9' 11 1/4"	BLACK
3/4"	21	1.050	26.67	0.824	20.93	50	40	2,000	610.0	2,180	990.4	9' 11 1/4"	RED
1"	27	1.315	33.4	1.049	26.64	50	25	1,250	381.3	2,013	914.5	9' 11"	BLUE
1 1/4"	35	1.660	42.16	1.380	35.05			900	274.5	1,962	891.3	9' 11"	RED
1 1/2"	41	1.900	48.26	1.610	40.89			800	244.0	2,104	955.9	9' 11"	BLACK
2"	53	2.375	60.33	2.067	52.50			600	183.0	2,100	954.0	9' 11"	BLUE
2 1/2"	63	2.875	73.03	2.469	62.71			370	112.9	2,068	939.5	9' 10 1/2"	BLACK
3"	78	3.500	88.90	3.068	77.93			300	91.5	2,181	990.8	9' 10 1/2"	BLUE
3 1/2"	91	4.000	101.6	3.548	90.12			250	76.3	2,200	999.5	9' 10 1/4"	BLACK
4"	103	4.500	114.3	4.026	102.26			200	61.0	2,060	935.9	9' 10 1/4"	BLUE
5"	129	5.563	141.3	5.047	128.19			150	45.8	2,100	954.0	9' 10"	BLUE
6"	155	6.625	168.28	6.065	154.05			100	30.5	1,840	835.9	9' 10"	BLUE

Outside Diameter Tolerances

	in	mm
For trade size through 2"	±0.015	±0.38
For trade size 2 1/2" through 4"	±0.025	±0.64
For trade size 5" through 6"	±1%	

- The values in feet / pound units are standard. The metric equivalents may be approximate. Conduit is always identified by its English or Metric Trade Size Designator.
- All dimensions and weights shown above are nominal.
- All sizes furnished in nominal 10' lengths when supplied with coupling.
- Applicable length tolerance = ±1/4" (±6.35mm) without a coupling.
- NTP-RC's Galvite® ERMC-S is provided with a color coded thread protector on one end and a coupling on the other.



Galvanized Rigid Conduit (GRC)

Features & Specifications

Full Electrical System Protection

Calconduit GRC conduit is manufactured from mild steel and is highly resistant to damage from impact yet ductile to facilitate bending.

Color-coded end cap thread protectors keep the threads clean and sharp, and also provide instant trade size recognition. Even sizes are color-coded blue, and $\frac{1}{2}$ " sizes are black, and $\frac{1}{4}$ " sizes are red.

2.03.A.2

Coatings

Conduit: Hot-dip galvanized inside and out providing galvanic corrosion protection. In addition, top coated with a compatible organic layer to protect against white rust. The inside surface is evenly coated for wire-pulling ease, even through multiple 90° bends.

Coupling: Electro-galvanized inside and out to provide galvanic corrosion protection

EMI Shielding

Calconduit GRC Conduit is effective in reducing the effects of electromagnetic field levels for encased power distribution circuits, shielding computers and other sensitive electronic equipment from the effects of electromagnetic interference.

Codes & Standards Compliance

Calconduit GRC Conduit is precision manufactured for dependable, long-lasting value and ultimate protection for electrical conductors. Covered by Article 344 of the National Electrical Code® (NEC®), GRC conduit is highly resistant to damage from impact. GRC conduit is recognized as an equipment grounding conductor in Section 250.118 of the NEC®. GRC is listed to **UL Safety Standards 6** 2.03.A.3.a

GRC is manufactured to **ANSI C80.1**, which has been adopted as Federal Specifications in lieu of WW-C-581. Installation of Rigid Metal Conduit shall be in accordance with the National Electrical Code® (NEC®) and UL General Information card #DYIX. Master bundles conform to NEMA standard RN 2.

2.03.A.3.b

Galvanized Rigid Conduit (GRC) Weights and Dimensions

Listed to Safety Standard UL 6

Manufactured in accordance with ANSI C80.1



Specification Data

To specify GRC Conduit, include the following: GRC Conduit shall be hot-dip galvanized and manufactured by Calconduit. Threads shall be hot galvanized after cutting. GRC conduit shall be Listed to Safety Standard UL 6 by a nationally recognized testing laboratory with follow-up service. It shall be manufactured in accordance with ANSI C80.1

GRC conduit shall be listed to UL 6 and manufactured in accordance with ANSI C80.1.

Note: Federal Specification WW-C-581, Class 1, Type A has been superseded by UL Standard 6, which has been adopted by the Federal Government.

Trade Size in	Metric Designator	Average Outside Diameter ¹		Nominal Wall Thickness ²		Approximate Weight Per 100ft (30.5m)		Master Bundle Quantity*	
		in	mm	in	mm	lb	kg	ft	m
$\frac{1}{2}$	16	0.840	21.34	0.104	2.64	82	37.2	2500	762.5
$\frac{3}{4}$	21	1.050	26.67	0.107	2.72	109	49.4	2000	610.0
$1\frac{1}{2}$	27	1.315	33.40	0.126	3.20	161	73.0	1250	381.3
$1\frac{1}{4}$	35	1.660	42.16	0.133	3.38	218	98.9	900	274.5
$1\frac{1}{2}$	41	1.900	48.26	0.138	3.51	263	119.3	800	244.0
$2\frac{1}{2}$	53	2.375	60.33	0.146	3.71	350	158.8	600	183.0
$2\frac{1}{2}$	63	2.875	73.03	0.193	4.90	559	253.6	370	112.9
$3\frac{1}{2}$	78	3.500	88.90	0.205	5.21	727	329.8	300	91.5
$3\frac{1}{2}$	91	4.000	101.60	0.215	5.46	880	399.2	250	76.3
4	103	4.500	114.30	0.225	5.72	1030	467.2	200	61.0
5	129	5.563	141.30	0.245	6.22	1400	634.5	150	45.8
6	155	6.625	168.28	0.266	6.76	1840	833.9	100	30.5

¹Tolerances: Trade Size 1/2" to 11/2": ±0.015" (0.38mm); Trade Size 2"-6": ±1% Length equals 10 (ft) (3.05m) with a tolerance of +/- .25 (in) (6.35mm)

² For information only. Not a requirement of the UL standard.

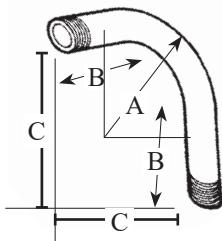
* NEMA RN 2 Standar

RIGID ELBOWS

90° - GALVANIZED STEEL



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FEATURES

- Low conductivity, high corrosion resistance
- Smooth defect free interior and exterior

APPLICATIONS

- For a secure connection to Rigid conduit; bend enables directional changes in conduit

STANDARD MATERIAL

- Galvanized steel

STANDARD FINISH

- Hot dip galvanized

2.03.A.2

CERTIFICATIONS

- cULus Listed

- Fed. Spec: WW-C-563

- 1/2"-4" meet UL 6 and ANSI C80.1

2.03.A.3

PART #	SIZE	INNER QTY.	MASTER QTY.	WEIGHT/CASE (LBS.)	(A) MIN. UL RADIUS	(B) STRAIGHT LEG EACH END	(C) OFFSET
61	1/2"	---	50	40	4"	2.875"	6.343"
62	3/4"	---	50	54	4.50"	2.875"	6.781"
63	1"	---	20	40	5.75"	3"	8.901"
64	1-1/4"	---	20	60	7.25"	3.25"	10.25"
65	1-1/2"	---	10	42	8.25"	3.625"	11.937"
66	2"	---	10	68	9.50"	4.1875"	14.031"
67	2-1/2"	1	50	650	10.50"	5.25"	16"
68	3"	1	35	630	13"	5.8125"	18.947"
69	3-1/2"	1	35	910	15"	6.75"	22.218"
70	4"	1	25	825	16"	6.9375"	23.437"
70A	5"	1	30	1350	24"	11.125"	36.156"
70B	6"	1	24	1152	30"	12.4375"	41.46"

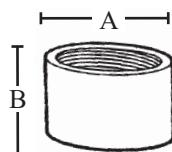
ELBOWS, COUPLINGS AND NIPPLES

RIGID COUPLINGS

TUBULAR THREADED TYPE - STEEL



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PART #	SIZE	THREADS PER INCH	MASTER QTY.	WEIGHT/CASE (LBS.)	A	B
51	1/2"	14	150	20	1.63"	1.563"
52	3/4"	14	50	9	1.64"	1.625"
53	1"	11-1/2	30	10	1.97"	2"
54	1-1/4"	11-1/2	25	10	2.03"	2.063"
55	1-1/2"	11-1/2	25	14	2.06"	2.063"
56	2"	11-1/2	20	15	2.13"	2.125"
57	2-1/2"	8	12	22	2.19"	3.125"
58	3"	8	8	18	3.31"	3.25"
59	3-1/2"	8	4	14	3.41"	3.375"
60	4"	8	4	12	3.52"	3.50"
60A	5"	8	2	11	3.95"	3.75"
60B	6"	8	3	12	4.25"	4"

FEATURES

- NPSM thread type

APPLICATIONS

- Indoor or outdoor use
- Use to join and ensure proper alignment of threaded Rigid or IMC conduit

STANDARD MATERIAL

- Steel

STANDARD FINISH

- Zinc plated

CERTIFICATIONS

- UL Standard: UL 6A 2.03.A.3
- Fed. Spec: WW-C-563
- NEMA: ANSI C80.1-2015 2.03.A.3

316 STAINLESS STEEL



RC-50SS



LISTED

PART #	MATERIAL	RIGID SIZE	MASTER QTY.
RC-50SS	316 STAINLESS STEEL	1/2"	100
RC-75SS	316 STAINLESS STEEL	3/4"	100
RC-100SS	316 STAINLESS STEEL	1"	50
RC-125SS	316 STAINLESS STEEL	1-1/4"	50
RC-150SS	316 STAINLESS STEEL	1-1/2"	25
RC-200SS	316 STAINLESS STEEL	2"	25
RC-250SS	316 STAINLESS STEEL	2-1/2"	10
RC-300SS	316 STAINLESS STEEL	3"	1
RC-350SS	316 STAINLESS STEEL	3-1/2"	1
RC-400SS	316 STAINLESS STEEL	4"	1

FEATURES

- NPSM thread type

APPLICATIONS

- Joins 2 pieces of threaded Rigid/IMC conduit.

STANDARD MATERIAL

- 316 Stainless Steel

CERTIFICATIONS

- UL listed

2.0 JOINT COMPOUNDS

SPECIFICATION – 16130-2.02.G GALVANIZED RIGID STEEL CONDUIT



**mass.
electric
construction
company**

KOPR-SHIELD® joint compound

Protects, lubricates and enhances the conductivity of all electrical connections



Product features

- Meets NEC requirements for protection against corrosion: "Where corrosion protection is necessary and the conduit is threaded in the field, all threads shall be coated with an approved electrically conductive, corrosion-resistant compound."
- Extremely adhesive compound flows smoothly into uneven contours and voids, ensuring easy application and complete, positive protection and lubrication
- Won't settle out, thin, thicken, harden or dry out under the most severe environmental conditions
- Excellent temperature characteristics – can be brushed on at -50° F to 250° F (-45° C to 121° C) and remains intact for short periods even at 1,800° F (982° C)
- Helps ensure low resistance and seals out air and moisture
- Unique, homogenized blend of pure, polished colloidal copper, rust and corrosion inhibitors

NEC and National Electrical Code are registered trademarks of the National Fire Protection Association, Inc.

KOPR-SHIELD® joint compound



Product code	Container	Size
201-31879	Brush cap can	1½ oz. (0.04 liter)
201-31879-1	Brush cap can	4 oz. (0.12 liter)
CP8-TB	Brush cap can	8 oz. (0.24 liter)
CP16	Brush cap can	1 pint (0.47 liter)
CP128	Can	1 gallon (3.79 liter)

Note: Not recommended for food or beverage processing applications.

3.0 CONDUIT SEALS

**SPECIFICATION – 16130-2.02.K
GALVANIZED RIGID STEEL CONDUIT**



**mass.
electric
construction
company**

Unions, Sealing Fittings, Flexible Couplings, Elbows, Drain/Breather, Close-Up Plugs: Explosionproof

UNILETS® for Use with Threaded Metal Conduit

Features: All Fittings

- Explosionproof, dust-ignitionproof.
- Smooth, rounded integral bushing in each hub protects conductor insulation.
- Accurately tapped, tapered threads for tight, rigid joints and ground continuity.

Features: Non-Expansion Unions

- Concentric ring interlocked design of 1/2", 3/4" and 1" sizes makes possible smaller diameter, allowing use in tighter spaces. 1-1/4" and larger UNY sizes have removable male nipple.

- Choice of malleable iron or aluminum.

Features: Expansion Unions

- One-piece design eliminates need for disassembly during installation.
- Telescoping cylinder within cylinder design permits expansion or contraction.
- Standard or long types available.
- Small external diameters—excellent in restricted areas in wiring of pumps, motors, and other equipment.
- Internal phosphor bronze "bonding jumper" ring assures positive ground between telescoping cylinders.

Features: Sealing Fittings

- Raintight construction.
- Removable nipple in male sealing fitting may be used interchangeably in top or bottom hub.
- EYS—for sealing vertical conduit. Large opening for damming and filling.
- Expanded Fill EYSEF/EYDEF—allow up to 40% conduit fill in compliance with the National Electrical Code.
- EYSF/EYSM—for sealing vertical conduit. Large opening for damming and filling.

- ESUF/ESUM for sealing vertical or horizontal conduit. Pouring spout rotates 90° Removable cover provides full access for damming 2-1/2" thru 4" sizes have threaded cover openings for damming.

- EYF/EYM—close radius type for sealing vertical or horizontal conduit runs.
- EYDM Drain Sealing Fittings—close radius type for sealing vertical conduit runs. Access cover has drain valve for automatic draining of water accumulation above the seal.

- Kwiko® A sealing cement is a specially formulated water soluble powder. Mixed to the proper proportions, it is poured in sealing fittings and hardens to contain

and restrict the passage of gases and explosions in classified areas.

- Fiber Filler-makes dams around and between all conductors to prevent sealing compound from leaking while being poured in its liquid state.

Features: Sealing Hubs

- UL Listed for use in hazardous locations when Kwiko® A Sealing Compound or Crouse-Hinds Chico® A Sealing Compound are used to make the seal.

Features: Flexible Couplings

- Heavy duty design resists mechanical abuse. Watertight.
- Electrical conductivity equal to rigid conduit on a similar length basis—no bonding jumper required.
- Interior insulating liner protects conductors from abrasion under vibrating conditions.
- EXGJH—both end fittings are female, each furnished with a removable male nipple.
- EXLK—female end fitting with union at one end and a female end fitting with a removable male nipple at the other end.

Standard Materials

- UNY and UNF (Non-Expansion) Unions, 1/2" thru 1": steel or aluminum. 1-1/4" thru 6": malleable iron or aluminum.
- UNY and UNF Expansion Unions: steel.
- UNL Unions: malleable iron and steel.
- EYSF/EYSM, EYF/EYM and EYDM Seals: malleable iron or Almag 35 aluminum.
- EYS, EYSEF/EYDEF, and ESUF/ESUM: malleable iron.
- EYD and EYS Seals: Grayloy®-iron.
- EXGJH and EXLK Couplings, 1/2" thru 2": outer bronze braid, inner brass core with insulating liner; 2-1/2" thru 4": outer stainless steel braid, inner stainless steel core with insulating liner. End Fittings: 1/2" thru 2"—brass; 2-1/2" thru 4"—stainless steel.
- PLG Close-Up Plugs: malleable iron, steel, or aluminum.
- BR Reducers: malleable iron or aluminum.
- EL and UNA Elbows: malleable or cast iron.
- ECDB Combination Drain/Breather: stainless steel.

Standard Finishes

- Unions—UNY,UNF and UNL (Non-Expansion) and UNY and UNF (Expansion)

of malleable iron have triplecoat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat, of steel have zinc electroplate, of aluminum 1/2" thru 2" have natural finish and 2-1/2" thru 4" have epoxy powder coat.

- Sealing Fittings—EYSF/EYSM, ESUF/ESUM, EYF/EYM, EYDM and EYD/EYS of malleable iron and Grayloy®-iron have triple-coat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat, of Almag 35 aluminum have epoxy powder coat.

- Sealing Hubs—ES of malleable iron have a triple-coat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat.

● Flexible Couplings—EXGJH and EXLK 2.03.F.1.a natural finish.

- Close-up Plugs—PLG of malleable iron have a triple-coat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat; steel have zinc electroplate; aluminum have natural finish.

- Bell Reducers—BR of malleable iron have a triple-coat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat; aluminum have natural finish.

- Elbows—EL are malleable iron and have zinc electroplate; UNA are malleable iron and have a triple-coat—(1) zinc electroplate, (2) dichromate, and (3) epoxy powder coat.

- Combination Drain/Breathers—ECDB are passivated stainless steel and have a natural finish.

Options

- For ES Sealing Hubs, add suffix BLSG for sealing gaskets and locknuts (provide a water and oil-tight connection).

Compliances

- UL Standard 886
- Appleton malleable iron products conform to ASTM A47-77, Grade 32510. which has the following properties: tensile strength, 50,000 psi; yield, 32,000 psi; and elongation, 10%.
- Appleton aluminum products are produced from a high strength copper-free (4/10 or 1% max.) alloy.

- Class I, Div. 1 & 2 and Class II, Div. 1 & 2, if installed as follows: Unions, Elbows, Plugs, Flex. Couplings—NEC 501-4 (a)(b); Seals—NEC 501-5 (a)(b)(c)(d)(e) and NEC 502-5; Drains—NEC 501-5(f).

2.03.D.1



Class I, Div. 1 and 2
Groups A+, B, C, D
Class II, Div. 1 and 2
Groups E, F, G
Class III

EYS Grayloy™ -Iron Sealing Fittings: Explosionproof, Dust-Ignitionproof, Raintight UNILETS® for use with Threaded Metal Conduit

	Size (Inches)	Turning Radius† Inches (cm)	Kwiko® A Cement Req'd Ozs. (Grams)	Catalog Number Grayloy™-Iron*
EYS Vertical and Horizontal Conduit Seals (25% fill)** for Close Turning Radius				
Female				
Female	1/2	1.16 (2.9)	1 (28)	EYS-11±
	3/4	1.25 (3.2)	2 (57)	EYS-21±
	1	1.38 (3.5)	4 (113)	EYS-31±
	1-1/4	1.75 (4.4)	9	EYS-4
	1-1/2	2.06 (5.2)	12 (340)	EYS-5
	2	2.31 (5.9)	21 (595)	EYS-6
	2-1/2	2.69 (6.8)	37 (1,049)	EYS-7
	3	3.13 (7.9)	61 (1,729)	EYS-8
	3-1/2	3.44 (8.7)	80 (2,268)	EYS-9
	4	3.69 (9.4)	112 (3,175)	EYS-10
	5	4.69 (11.9)	198 (5,613)	EYS-012
	6	5.38 (13.7)	230 (9,667)	EYS-014
Male				
Male	1/2	1.16 (2.9)	1 (28)	EYS-116±
	3/4	1.25 (3.2)	2 (57)	EYS-216±
	1	1.38 (3.5)	4 (113)	EYS-316±
	1-1/4	1.75 (4.4)	9	EYS-46
	1-1/2	2.06 (5.2)	12 (340)	EYS-56
	2	2.31 (5.9)	21 (595)	EYS-66
	2-1/2	2.69 (6.8)	37 (1,049)	EYS-76
	3	3.13 (7.9)	61 (1,729)	EYS-86
	3-1/2	3.44 (8.7)	80 (2,268)	EYS-96
	4	3.69 (9.4)	112 (3,175)	EYS-106
	5	4.69 (11.9)	198 (5,613)	EYS-0126
	6	5.38 (13.7)	230 (9,667)	EYS-0146
Female/Male EYS				
EYS Grayloy™ -Iron Vertical Sealing Fittings (25% fill)**				
Female				
Female	1/2	1.63 (4.14)	1 (28.4)	EYS-1±
	3/4	1.91 (4.85)	2 (56.8)	EYS-2±
	1	2.38 (6.05)	3 (85.1)	EYS-3±
Male/Female (Removable Male Nipple)				
Male	1/2	1.63 (4.14)	1 (28.4)	EYS-16±
	3/4	1.91 (4.85)	2 (56.8)	EYS-26±
	1	2.38 (6.05)	3 (85.1)	EYS-36±

* Shaded area indicates items which are U.L. Listed for Class I, Groups A,B,C, and D; Class II, Groups E,F and G; and Class III.

† U.L. Listed for use with Appleton "Kwiko® A" and Crouse-Hinds "Chico® A" cement.

† Turning radius with cover or plug removed.

** Per Nec 501(c)(6), seals in Class I, Division 1 and 2 must be limited to conductor fill of 25% of cross sectional area of a rigid metal conduit of the same trade size unless approved for higher percentage fill. See 40% fill seals on page I-9.

ELBY Series:
 Class I, Div. 1 and 2
 Groups B♦, C, D
 Class II, Div. 1 and 2
 Groups E, F, G
 Class III

ELBD Series:
 Class I, Div. 1 and 2
 Group D
 Class II, Div. 1 and 2
 Groups E, F, G
 Class III

ELBY and ELBD 90° Pulling Elbows: Explosionproof, Dust-Ignitionproof

UNILETS® for use with Threaded Metal Conduit.

Type and Size (Inches)	Catalog Number
	Malleable Iron
	Aluminum



ELBY Capped Elbow

1/2
 3/4
 1
 1-1/4

ELBY-50
ELBY-75
ELBY-100
ELBY-125

ELBY-50-A
ELBY-75-A
ELBY-100-A
ELBY-125-A



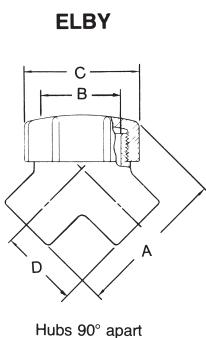
ELBD Pulling Elbow

1/2
 3/4
 1
 1-1/4
 1-1/2
 2
 2-1/2
 3
 3-1/2
 4

Patented Roller Feature—
Listings in Bold Type

ELBD-50
ELBD-75
ELBD-100
ELBD-125
ELBD-150
ELBD-200

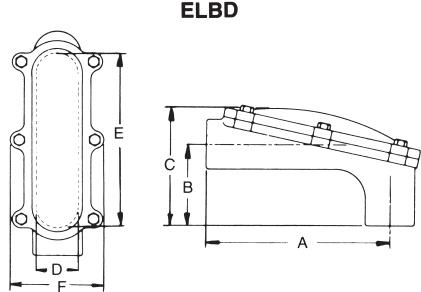
ELBD-50-A
ELBD-75-A
ELBD-100-A
ELBD-125-A
ELBD-150-A
ELBD-200-A
ELBD-250-A
ELBD-300-A
ELBD-350-A
ELBD-400-A



ELBY

ELBY Series
Dimensions in Inches

Hub Size (Inches)	A	B	C	D	A	B	C	D	E	F
1/2	2.75	1.44	2.06	1.44	5.06	2.63	4.50	1.06	4.69	2.69
3/4	2.88	1.44	2.06	1.44	5.06	2.63	4.50	1.06	4.69	2.69
1	3.19	1.88	2.56	1.75	7.88	3.44	5.00	1.75	7.50	3.94
1-1/4	4.00	2.31	3.13	2.13	7.88	3.44	5.00	1.75	7.50	3.94
1-1/2					10.63	4.81	6.75	2.56	10.69	4.94
2					10.63	4.81	6.75	2.56	10.69	4.94
2-1/2					14.69	6.63	9.25	3.75	13.81	6.69
3					14.69	6.63	9.25	3.75	13.81	6.69
3-1/2					28.25	7.50	12.75	4.63	27.56	7.38
4					28.25	7.50	12.75	4.63	27.56	7.38



ELBD

ELBD Series
Dimensions in Inches

	Dimensions in Centimeters	Dimensions in Centimeters
1/2	7.0	3.7
3/4	7.3	3.7
1	8.1	4.8
1-1/4	10.2	5.9
1-1/2		
2		
2-1/2		
3		
3-1/2		
4		

For cubic inches information, see page J-19

♦Shaded area indicates items suitable for Class I, Group B, in addition to Class I, Groups C, D; Class II, Groups E, F, G; and Class III.

Class I, Div. 1 and 2
Groups A△, B◆, C, D
Class II, Div. 1 and 2
Groups E, F, G
Class III

PLG Close-Up Plugs and BR Reducers:

Explosionproof, Dust-Ignitionproof

UNILETS® for Use with Threaded Metal Conduit.

Size (Inches) NPT Threads	Catalog Number		
	Steel (1/2" to 1") and Malleable (1-1/4" to 6")		
	Aluminum (1/2" to 4")		
PLG - Close-Up Plugs			
Recessed Head			
1/2	PLG-50R△		
3/4	PLG-75R△		
1	PLG-100R△		
1-1/4	PLG-125◆		
1-1/2	PLG-150◆		
2	PLG-200◆		
2-1/2	PLG-250◆		
3	PLG-300◆		
4	PLG-400◆		
Square Head	PLG-50A△ PLG-75A△ PLG-100A△ PLG-125A◆ PLG-150A◆ PLG-200A◆ PLG-250A◆ PLG-300A◆ PLG-400A◆		
1/2	PLG-50S△		
3/4	PLG-75S△		
1	PLG-100S△		
1-1/4	PLG-125S◆		
1-1/2	PLG-150S◆		
2	PLG-200S◆		
2-1/2	PLG-250S◆		
3	PLG-300S◆		
3-1/2	PLG-350S◆		
4	PLG-400S◆		
Bar Head (Cast Iron)	PLG-50B		
5			
6	PLG-600B		
BR - Threaded Bell Reducing Couplings			
Large Hub Size (Inches)	Small Hub Size (Inches)	Catalog Number	
		Malleable Aluminum	
3/4	1/2	BR75-50△	BR75-50A△
1	1/2	BR100-50△	BR100-50A△
1	3/4	BR100-75△	BR100-75A△
1	1	BR125-100◆	BR125-100A
1-1/4	3/4	BR125-75◆	BR125-75A
1-1/2	1	BR150-100◆	BR150-100A
1-1/2	3/4	BR150-75◆	BR150-75A
1-1/2	1-1/4	BR150-125◆	BR150-125A
2	3/4	BR200-75◆	BR200-75A
2	1	BR200-100◆	BR200-100A
2	1-1/4	BR200-125◆	BR200-125A
2	1-1/2	BR200-150◆	BR200-150A
2-1/2	1-1/2	BR250-150◆	BR250-150A
3	2	BR300-200◆	BR300-200A
3-1/2	2-1/2	BR350-250◆	BR350-250A
4	3	BR400-300◆	BR400-300A
5	4	BR500-400◆	BR500-400A

△ Indicates items in the shaded area which are UL Listed for Class I, Groups A,B,C and D; Class II, Groups E,F and G; and Class III.

◆ Indicates items in the shaded area which are UL Listed for Class I, Groups B,C and D; Class II, Groups E,F and G; and Class III.

Class I, Div. 1 and 2
 Groups A,B♦,C,D
 Class II, Div. 1 and 2
 Groups E,F,G
 Class III

**Sealing Fittings: EYS and ESU;
 Explosionproof, Dust-Ignitionproof, Raintight
 UNILETS® for use with Threaded Metal Conduit**

	Size (Inches)	Turning Inches	Radius† (cm)	Kwiko® A Cement Req'd Ozs. (Grams)	Catalog Number	Almag 35* Aluminum
EYS Vertical Conduit Seals (25% fill)‡						
	Female					
1/2"	1.81	(4.5)	2	(56.7)	EYSF-50♦	EYSF-50AL
3/4	2.25	(5.7)	3	(85.1)	EYSF-75♦	EYSF-75AL
1	2.38	(6.0)	5	(141.7)	EYSF-100♦	EYSF-100AL
1-1/4	2.94	(7.5)	11	(311.8)	EYSF-125	
1-1/2	3.50	(8.9)	19	(538.6)	EYSF-150	
2	4.13	(10.5)	31	(878.8)	EYSF-200	
2-1/2	4.75	(12.1)	46	(1304.1)	EYSF-250	
3	5.63	(14.3)	82	(2324.7)	EYSF-300	
4	6.50	(16.5)	92	(2608.2)	EYSF-400	
Male/Female (Removable Male Nipple)						
1/2"	1.81	(4.5)	2	(56.7)	EYSM-50♦	EYSM-50AL
3/4	2.25	(5.7)	3	(85.1)	EYSM-75♦	EYSM-75AL
1	2.38	(6.0)	5	(141.7)	EYSM-100♦	EYSM-100AL
ESU Vertical and Horizontal Conduit Seals (25% fill)‡						
	Female					
1/2"	1.25	(3.2)	4	(113.4)	ESUF-50	
3/4	1.25	(3.2)	4	(113.4)	ESUF-75	
1	1.38	(3.5)	5	(141.7)	ESUF-100	
Male/Female (Removable Male Nipple)						
1/2"	1.25	(3.2)	4	(113.4)	ESUM-50	
3/4	1.25	(3.2)	4	(113.4)	ESUM-75	
1	1.38	(3.5)	5	(141.7)	ESUM-100	
1/2"—1"						

‡ Per Nec 501-5(c)(6) seals in Class I, Division 1 and 2 must be limited to conductor fill of 25% of cross sectional area of a rigid metal conduit of the same trade size unless approved for higher percentage fill. See 40% fill seals on page I-9.

♦ Indicated items in the shaded area which are suitable for Class I, Groups A,B,C and D; Class II, Groups E,F,G; and Class III.

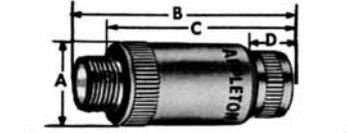
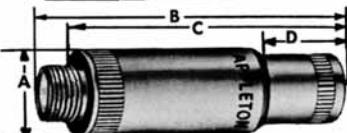
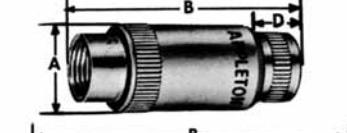
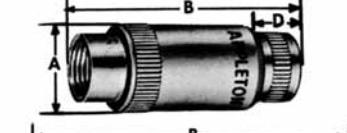
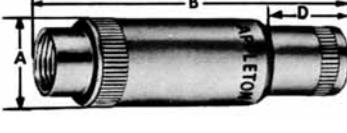
* U.L. Listed for use with Appleton "Kwiko® A" and Crouse-Hinds "Chico® A" cement.

† Turning radius with cover or plug removed.

Class I, Div. 1 and 2
Groups C,D
Class II, Div. 1 and 2
Groups E,F,G
Class III

Expansion Unions: UNY and UNF; Explosionproof, Dust-Ignitionproof

UNILETS® for Use with Threaded Metal Conduit

Size (Inches)	Catalog Number Steel
	UNY Male Unions— Standard For connecting conduit to enclosure 1/2 3/4 1 
	UNY50 UNY75 UNY100
	UNYL Male Unions— Long For connecting conduit to enclosure 1/2 3/4 1
	UNYL50 UNYL75 UNYL100
	UNF Female Unions— Standard For connecting conduit to conduit 1/2 3/4 1
	UNF50 UNF75 UNF100
	UNFL Female Unions— Long For connecting conduit to conduit 1/2 3/4 1
	UNFL50 UNFL75 UNFL100

Dimensions in Inches

Catalog Number	Size (Inches)	A	B (Overall Length at Max. Expansion)	C	D (Maximum Expansion)
UNY50	1/2	1.19	2.88	2.31	.50
UNY75	3/4	1.44	3.06	2.44	.53
UNY100	1	1.75	3.38	2.69	.66
UNYL50	1/2	1.19	3.88	3.31	1.00
UNYL75	3/4	1.44	4.06	3.44	1.09
UNYL100	1	1.75	4.69	4.00	1.34
UNF50	1/2	1.19	2.94		.50
UNF75	3/4	1.44	3.06		.53
UNF100	1	1.75	3.38		.66
UNFL50	1/2	1.19	3.94		1.00
UNFL75	3/4	1.44	4.13		1.09
UNFL100	1	1.75	4.75		1.34

Dimensions in Millimeters

UNY50	1/2	30.2	73.0	58.7	12.7
UNY75	3/4	36.5	77.8	61.9	13.5
UNY100	1	44.5	85.7	68.3	16.7
UNYL50	1/2	30.2	98.4	84.1	25.4
UNYL75	3/4	36.5	103.2	87.3	27.8
UNYL100	1	44.5	119.1	101.6	34.1
UNF50	1/2	30.2	74.6		12.7
UNF75	3/4	36.5	77.8		13.5
UNF100	1	44.5	85.7		16.7
UNFL50	1/2	30.2	100.0		25.4
UNFL75	3/4	36.5	104.8		27.8
UNFL100	1	44.5	120.7		34.1

4.0 CONDUIT ACCESSORIES

SPECIFICATION – 16130-2.04 GALVANIZED RIGID STEEL CONDUIT



**mass.
electric
construction
company**

Pipe Straps, Conduit Clamps and Hangers

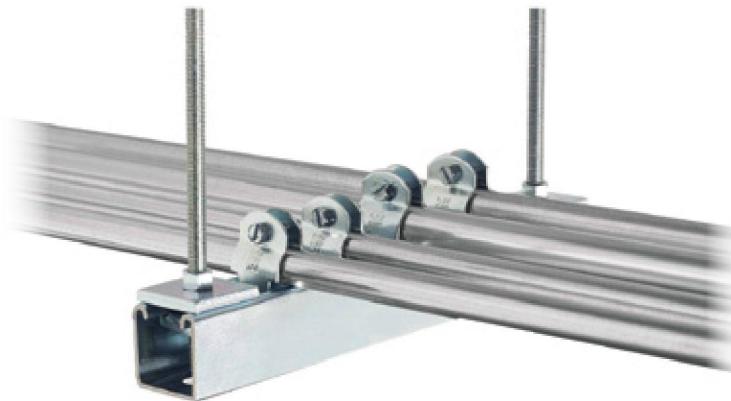
Pre-assembled for easy handling and sorting.

Superstrut® Pipe Straps

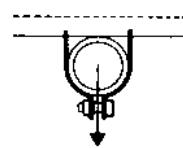
Superstrut® Pipe Straps are designed to be twist inserted anywhere along the slot side of the channel. Pipes can be placed as closely as pipe couplings permit.

Some unique features of the straps include:

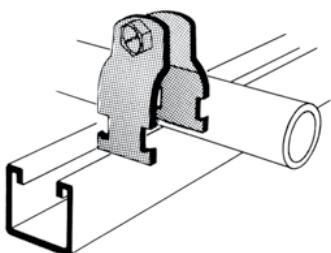
- Bolt head is combination slot and hex head for flexibility of attachment
- Square nut is captivated on the shoulder for easy one-handed tightening
- Straps are interchangeable with 1½" strut for broader application
- Straps are shipped assembled so counting and sorting are easier
- Pipe or conduit sizes are shown on the strap for easy identification
- All Superstrut® Straps are preassembled for easy handling and sorting



Design Loads



700 — Superstrut® Straps for EMT



CAT. NO.	EMT SIZE (IN.)	O.D. SIZE (IN.)	STEEL STRAP THICKNESS	DESIGN LOAD (LBS.)	STD. CTN.
700 3/8-STR	3/8	.577	14 ga.	750	100
700-1/2-STR	1/2	.706	14 ga.	750	100
700-3/4-STR	3/4	.922	14 ga.	750	100
700-1-STR	1	1.163	14 ga.	750	100
700-1-1/4-STR	1 1/4	1.510	14 ga.	750	50
700-1-1/2-STR	1 1/2	1.740	12 ga.	800	50
700-2-STR	2	2.197	12 ga.	800	50

Standard Finish – GoldGalv®

701 — Superstrut® Straps for O.D. Tubing

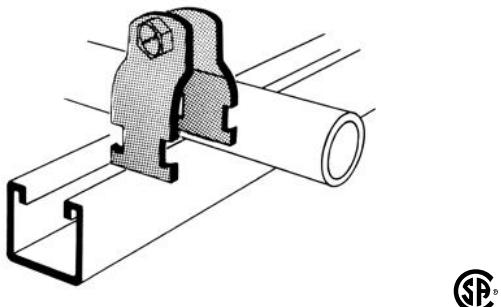


CAT. NO.	TUBING O.D. (IN.)	STEEL STRAP THICKNESS	DESIGN LOAD (LBS.)	STD. CTN.
701-1/4	1/4	14 ga.	750	100
701-3/8	3/8	14 ga.	750	100
701-1/2-STR	1/2	14 ga.	750	100
701-5/8	5/8	14 ga.	750	100
701-3/4	3/4	14 ga.	750	100
701-7/8	7/8	14 ga.	750	100
701-1-STR	1	14 ga.	750	50
701-1-1/8	1 1/8	14 ga.	1,000	100
701-1-1/4	1 1/4	14 ga.	1,000	25
701-1-3/8	1 3/8	14 ga.	1,000	100
701-1-1/2	1 1/2	14 ga.	1,000	25
701-1-5/8	1 5/8	14 ga.	1,000	100
701-1-3/4	1 3/4	12 ga.	1,000	25
701-1-7/8	1 7/8	12 ga.	1,000	50
701-2	2	12 ga.	1,000	50
701-2-1/8	2 1/8	12 ga.	1,300	50
701-2-1/4	2 1/4	12 ga.	1,300	25
701-2-3/8	2 3/8	12 ga.	1,300	25
701-2-1/2	2 1/2	12 ga.	1,300	25
701-2-5/8	2 5/8	12 ga.	1,300	50

(continued on following page)

Pipe Straps, Conduit Clamps and Hangers

701 — Superstrut® Straps for O.D. Tubing (continued)



CAT. NO.	TUBING O.D. (IN.)	STEEL STRAP THICKNESS	DESIGN LOAD (LBS.)	STD. CTN.
701-2-3/4	2 1/4	12 ga.	1,300	25
701-2-7/8	2 1/8	12 ga.	1,300	25
701-3	3	12 ga.	1,300	25
701-3-1/8	3 1/8	12 ga.	1,300	25
701-3-1/4	3 1/4	12 ga.	1,300	25
701-3-3/8	3 3/8	12 ga.	1,300	25
701-3-1/2	3 1/2	12 ga.	1,300	25
701-3-5/8	3 5/8	11 ga.	1,650	25
701-3-3/4	3 3/4	11 ga.	1,650	25
701-3-7/8	3 7/8	11 ga.	1,650	25
701-4	4	11 ga.	1,650	25
701-4-1/8	4 1/8	11 ga.	1,650	25
701-4-1/4	4 1/4	11 ga.	1,650	25
701-4-3/8	4 3/8	11 ga.	1,650	25
701-4-1/2	4 1/2	11 ga.	1,650	10
701-4-5/8	4 5/8	11 ga.	1,650	10
701-4-3/4	4 3/4	11 ga.	1,650	10
701-4-7/8	4 7/8	11 ga.	1,650	10
701-5	5	11 ga.	1,650	25
701-5-1/8	5 1/8	11 ga.	1,650	10
701-5-1/4	5 1/4	11 ga.	1,650	10
701-5-3/8	5 3/8	11 ga.	1,650	10
701-5-1/2	5 1/2	11 ga.	1,650	10
701-5-5/8	5 5/8	10 ga.	1,650	10
701-5-3/4	5 3/4	10 ga.	1,650	10
701-5-7/8	5 7/8	10 ga.	1,650	10
701-6	6	10 ga.	1,650	10
701-6-1/8	6 1/8	10 ga.	1,650	10
701-6-1/4	6 1/4	10 ga.	1,650	10
701-6-3/8	6 3/8	10 ga.	1,650	10
701-6-1/2	6 1/2	10 ga.	1,650	10
701-6-5/8	6 5/8	10 ga.	1,650	10
701-6-3/4	6 3/4	10 ga.	1,650	10
701-6-7/8	6 7/8	10 ga.	1,650	10
701-8	8	10 ga.	1,650	10

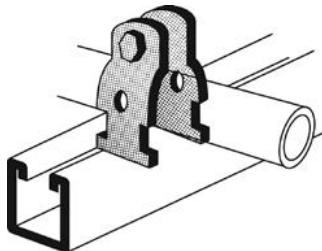
702 — Superstrut® Straps for Rigid Conduit, IMC and Pipe

- For Rigid or IMC Conduit, Pipe and Electric Metal Tubing (EMT)

CAT. NO.	RIGID CONDUIT OR PIPE SIZE (IN.)	O.D. SIZE (IN.)	STEEL STRAP THICKNESS	DESIGN LOAD (LBS.)	STD. CTN.
702-3/8	3/8	.675	14 ga.	750	100
702-1/2	1/2	.840	14 ga.	750	100
702-3/4	3/4	1.050	14 ga.	750	100
702-1	1	1.315	14 ga.	750	100
702-1-1/4	1 1/4	1.660	14 ga.	800	50
702-1-1/2	1 1/2	1.900	12 ga.	800	50
702-2-STR	2	2.375	12 ga.	800	50
702-2-1/2	2 1/2	2.875	12 ga.	1,000	50
702-3	3	3.500	12 ga.	1,650	50
702-3-1/2	3 1/2	4.000	11 ga.	1,650	25
702-4	4	4.500	11 ga.	1,650	25
702-4-1/2	4 1/2	5.000	11 ga.	1,650	25
702-5	5	5.563	11 ga.	1,650	25
702-6	6	6.625	11 ga.	1,650	10
702-8	8	8.625	11 ga.	1,650	10
702-10	10	10.750	10 ga.	1,650	25
702-12	12	12.750	10 ga.	1,650	25

Standard Finish — GoldGalv® brand. For Electro-Galvanized (Silver), add EG suffix.

703 — Universal Clamp



CAT. NO.	PIPE O.D. (IN.)	STEEL STRAP THICKNESS	DESIGN LOAD (LBS.)	STD. CTN.
703-1/2	.706-.840	16 ga.	400	100
703-3/4	.932-1.050	14 ga.	550	100
703-1	1.163-1.315	14 ga.	550	100
703-1-1/4	1.508-1.660	14 ga.	800	50
703-1-1/2	1.738-1.900	14 ga.	800	50
703-2	2.195-2.375	14 ga.	800	50

Standard Finish — GoldGalv®

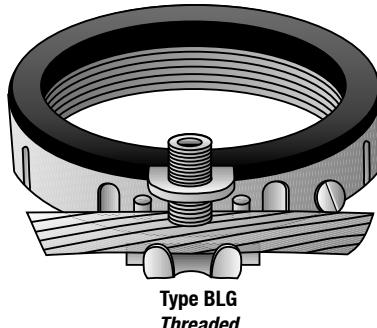
Types BLG and HBLG Specification Grade Insulated Grounding Bushings

For Threaded Rigid Conduit and IMC.

NEC/CEC:
Listed for Ordinary Locations

Applications

- To provide a compact means of grounding conduit through an Insulated Bushing.
- To protect insulated conductors from abrasion during pulling and mechanical vibration.
- To provide voltage gradient between line conductors and ground at point of electrical and mechanical stress on conductor insulation.



Features

- Tin plated copper saddle for use with copper or aluminum conductors from #8 to 4/0. 2.04.C.1.c
- Copper conductor only for #14-4 lug and 250-500 lug.
- Allows easy insertion of grounding conductor for thru or end connection.
- Low grounding connector profile.
- Spring action design maintains positive firm contact on grounding conductor.
- Set screw provides fixed alignment and positive ground continuity.
- Phenolic insulation, with 150 °C U.L. rating, molded on over metallic conduit stop will not shatter or shrink at sub-zero temperatures. 2.04.C.1.b
- Lugs not sold separately.

Standard Materials

Type BLG:

- 1/2" and 3/4" - Steel
- 1" to 6" - Malleable iron

Type HBLG:

- 1/2" and 3/4" - Steel
- 1" to 6" - Malleable iron

2.04.C.1.a

2.04.C.1.b

Standard Finishes

Type BLG:

- 1/2" and 3/4", 1" to 6" - Zinc plated with stainless steel screws

Type HBLG:

- 1/2" and 3/4", 1" to 6" - Mechanical/Hot dip galvanized with stainless steel screws

Options

- Type BLG grounding bushings are also available for use on threaded conduit in Malleable Iron/Hot Dip Mechanically Galvanized - Specify Type HBLG. Contact your local representative for pricing and availability.

NEC/CEC Certifications and Compliances

- UL Standard: ANSI/UL 514B, 467, 468
- UL Listed: E-24264
- CSA Standard: C22.2 No. 41
- CSA Certified: 015978
- NEMA: FB-1

Types BLG and HBLG Specification Grade Insulated Grounding Bushings

For Threaded Rigid Conduit and IMC.

NEC/CEC:
Listed for Ordinary Locations

Trade Size (Inches)	Grounding Wire Size ①		Dimensions in Millimeters (Inches)			Catalog Number	
	Min.	Max.	Max. Dia. without lug	Max. Ht.	Turning Radius with lug	Zinc Plated	Mechanically or Hot-Dip Galvanized
1/2	14	4	28.70 (1.13)	12.70 (0.50)	28.70 (1.13)	BLG-0504	HBLG-0504
1/2	8	2/0	28.70 (1.13)	12.70 (0.50)	38.10 (1.50)	BLG-0522	HBLG-0522
3/4	14	4	35.05 (1.38)	16.00 (0.63)	31.75 (1.25)	BLG-0704	HBLG-0704
3/4	8	2/0	35.05 (1.38)	16.00 (0.63)	38.10 (1.50)	BLG-0722	HBLG-0722
1	14	4	41.40 (1.63)	19.05 (0.75)	35.05 (1.38)	BLG-1104	HBLG-1104
1	8	2/0	41.40 (1.63)	19.05 (0.75)	41.40 (1.63)	BLG-1122	HBLG-1122
1-1/4	14	4	50.80 (2.00)	19.05 (0.75)	38.10 (1.50)	BLG-1204	HBLG-1204
1-1/4	8	2/0	50.80 (2.00)	19.05 (0.75)	44.45 (1.75)	BLG-1222	HBLG-1222
1-1/2	14	4	57.15 (2.25)	19.05 (0.75)	41.40 (1.63)	BLG-1504	HBLG-1504
1-1/2	8	2/0	57.15 (2.25)	19.05 (0.75)	47.75 (1.88)	BLG-1522	HBLG-1522
2	14	4	69.85 (2.75)	22.35 (0.88)	50.80 (2.00)	BLG-2004	HBLG-2004
2	8	2/0	69.85 (2.75)	22.35 (0.88)	57.15 (2.25)	BLG-2022	HBLG-2022
2-1/2	14	4	82.55 (3.25)	25.40 (1.00)	54.10 (2.13)	BLG-2604	HBLG-2604
2-1/2	8	2/0	82.55 (3.25)	25.40 (1.00)	63.50 (2.50)	BLG-2622	HBLG-2622
2-1/2	6	4/0	82.55 (3.25)	25.40 (1.00)	69.85 (2.75)	BLG-2624	HBLG-2624
2-1/2	250	500	82.55 (3.25)	25.40 (1.00)	87.38 (3.44)	BLG-2650	HBLG-2650
3	14	4	101.60 (4.00)	25.40 (1.00)	63.50 (2.50)	BLG-3104	HBLG-3104
3	8	2/0	101.60 (4.00)	25.40 (1.00)	69.85 (2.75)	BLG-3122	HBLG-3122
3	6	4/0	101.60 (4.00)	25.40 (1.00)	79.50 (3.13)	BLG-3124	HBLG-3124
3	250	500	101.60 (4.00)	25.40 (1.00)	95.25 (3.75)	BLG-3150	HBLG-3150
3-1/2	14	4	114.30 (4.50)	25.40 (1.00)	69.85 (2.75)	BLG-3604	HBLG-3604
3-1/2	8	2/0	114.30 (4.50)	25.40 (1.00)	76.20 (3.00)	BLG-3622	HBLG-3622
3-1/2	6	4/0	114.30 (4.50)	25.40 (1.00)	85.85 (3.38)	BLG-3624	HBLG-3624
3-1/2	250	500	114.30 (4.50)	25.40 (1.00)	101.60 (4.00)	BLG-3650	HBLG-3650
4	14	4	127.00 (5.00)	28.70 (1.13)	76.20 (3.00)	BLG-4104	HBLG-4104
4	8	2/0	127.00 (5.00)	28.70 (1.13)	92.20 (3.63)	BLG-4122	HBLG-4122
4	6	4/0	127.00 (5.00)	28.70 (1.13)	92.20 (3.63)	BLG-4124	HBLG-4124
4	250	500	127.00 (5.00)	28.70 (1.13)	107.95 (4.25)	BLG-4150	HBLG-4150
5	14	4	158.75 (6.25)	31.75 (1.25)	95.25 (3.75)	BLG-5104	HBLG-5104
5	8	2/0	158.75 (6.25)	31.75 (1.25)	101.60 (4.00)	BLG-5122	HBLG-5122
5	6	4/0	158.75 (6.25)	31.75 (1.25)	107.95 (4.25)	BLG-5124	HBLG-5124
5	250	500	158.75 (6.25)	31.75 (1.25)	127.00 (5.00)	BLG-5150	HBLG-5150
6	14	4	187.45 (7.38)	35.05 (1.38)	107.95 (4.25)	BLG-6104	HBLG-6104
6	8	2/0	187.45 (7.38)	35.05 (1.38)	114.30 (4.50)	BLG-6122	HBLG-6122
6	6	4/0	187.45 (7.38)	35.05 (1.38)	123.95 (4.88)	BLG-6124	HBLG-6124
6	250	500	187.45 (7.38)	35.05 (1.38)	138.18 (5.44)	BLG-6150	HBLG-6150

① Solid or stranded for No. 4 awg or smaller; stranded for No. 2 or larger. Copper conductor only for #14-4 lug and 250-500 lug.

Specification Grade Insulated Bushings

For Rigid Metal Conduit, IMC & EMT

Types B, HB, AB, RB, SB, SBT

Use:

To protect insulated conductors from abrasion during pulling and from mechanical vibration.

To provide voltage gradient between live conductors and ground at point of electrical and mechanical stress on conductor insulation.

2.04.B.1

Features:

- Molded-on high impact phenolic thermosetting insulation
- UL insulation temperature rating 150°C
- Positive metallic conduit stop

Material/Finish:

For Threaded Rigid and IMC

Type B: $\frac{1}{2}$ " & $\frac{3}{4}$ " - Steel, Zinc Plated
1" to 6" - Malleable Iron, Zinc Plated

Type HB: $\frac{1}{2}$ " & $\frac{3}{4}$ " - Steel, Mechanical/Hot Dip Galvanized
1" to 6" - Malleable Iron, Mechanical/Hot Dip Galvanized

Type AB: Aluminum Bushing

Type RB: Bronze, for highly corrosive atmospheres

For Threadless Rigid and IMC

Type SB: $\frac{1}{2}$ " & $\frac{3}{4}$ " - Steel, Zinc Plated with Stainless Steel screws
1" to 6" - Malleable Iron/Zinc Plated with Stainless Steel screws

For EMT

Type SBT: $\frac{1}{2}$ " & $\frac{3}{4}$ " - Steel, Zinc Plated with Stainless Steel screws

1" to 6" - Malleable Iron/Zinc Plated with Stainless Steel screws

Options:

Type B insulated bushings are also available for threadless rigid and IMC in the following materials:

Type HSB: Malleable Iron or Steel Mechanical/Hot Dip Galvanized

Type ASB: Aluminum

Type RSB: Bronze

Third Party Certification:

 UL Listed: E-11853

 CSA Certified: 011584

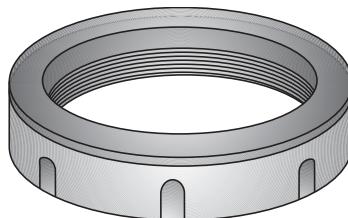
Applicable Third Party Standards:

UL Standard: 514B

CSA Standard: C22.2 No. 18

Fed. Spec: W-F-408E

NEMA: FB-1



Type B
Threaded

Type SB
Threadless

Trade Size (inches)	Threaded for Rigid Conduit & IMC Catalog Numbers				Malleable Iron or Steel/ Zinc Plated	EMT Catalog Numbers
	Malleable Iron or Steel/ Zinc Plated	Hot-Dip Mechanical Galvanized	Copper Free Aluminum	Bronze		
$\frac{1}{2}$	B-50	HB-50	AB-50	RB-50	SB-50	SBT-50
$\frac{3}{4}$	B-75	HB-75	AB-75	RB-75	SB-75	SBT-75
1	B-100	HB-100	AB-100	RB-100	SB-100	SBT-100
$1\frac{1}{4}$	B-125	HB-125	AB-125	RB-125	SB-125	SBT-125
$1\frac{1}{2}$	B-150	HB-150	AB-150	RB-150	SB-150	SBT-150
2	B-200	HB-200	AB-200	RB-200	SB-200	SBT-200
$2\frac{1}{2}$	B-250	HB-250	AB-250	RB-250	SB-250	SBT-250
3	B-300	HB-300	AB-300	RB-300	SB-300	SBT-300
$3\frac{1}{2}$	B-350	HB-350	AB-350	RB-350B	SB-350	SB-350
4	B-400	HB-400	AB-400	RB-400	SB-400	SB-400
5	B-500	HB-500	AB-500	RB-500	SB-500	
6	B-600	HB-600	AB-600	RB-600	SB-600	

Note:

1 A Mechanically Galvanized finish provides a plating thickness equivalent to Hot-Dip process, meeting ASTM A-153 performance criteria.

Unlike the Hot-Dip process, mechanical galvanizing provides plating on all machined and/or threaded surfaces.

2 Caps to prevent entry of foreign matter into conduit prior to pulling cables are available. See Type PPC on page DB1.

Dimensions in Inches		
	Max. Dia.	Overall Height
$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{2}$
$\frac{3}{4}$	$1\frac{3}{8}$	$\frac{5}{8}$
1	$1\frac{1}{8}$	$\frac{3}{4}$
$1\frac{1}{4}$	2	$\frac{3}{4}$
$1\frac{1}{2}$	$2\frac{1}{4}$	$\frac{3}{4}$
2	$2\frac{3}{4}$	$\frac{7}{8}$
$2\frac{1}{2}$	$3\frac{1}{4}$	1
3	4	1
$3\frac{1}{2}$	$4\frac{1}{2}$	1
4	5	$1\frac{1}{8}$
5	$6\frac{1}{4}$	$1\frac{1}{4}$
6	$7\frac{1}{8}$	$1\frac{1}{8}$

Suggested Specification:

O-Z/Gedney Type B insulated bushings of malleable iron or steel, with conduit end stop and integrally molded noncombustible phenolic insulated surfaces rated 150°C shall be used on the ends of all raceways containing No. 4 or larger conductors.