Conduit Tubing

Electrical Metallic Tubing (EMT)
Intermediate Metal Conduit (IMC)
Hot-Dip Galvanized Steel Rigid Metal Conduit (RMC)

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Wheatland Tube

Includes 2011 National Electrical Code Reference
From Start To Finish, You Get 100% Wheatland Quality

Wheatland controls the manufacture of its hot-dip galvanized steel Rigid Metal Conduit (RMC), Electrical Metallic Tubing (EMT) and Intermediate Metal Conduit (IMC) every step of the way. We fabricate our own tubing from flat steel coils, weld it and do our own galvanizing. Then to be sure you get the same quality throughout the raceway system, we make our own nipples, elbows, and couplings to match. In fact, we’re the only conduit manufacturer who does.

It’s not surprising that Wheatland, of all conduit suppliers, has the expertise and resources to do the complete job. For Wheatland, as a major manufacturer of steel pipe, has developed the processes and techniques necessary to the production of quality tubular products.

Wheatland steel Rigid Metal Conduit, EMT and IMC meet all applicable provisions of the Underwriters Laboratories, the National Electrical Code, and the American National Standards Institute and Federal Specifications. This conformance to specifications is covered in detail on pages 3 to 12 and may be used as reference in submitting bids.

Specialists In Steel Pipe

Wheatland Tube Company and affiliated companies manufacture steel tubular goods exclusively. Wheatland steel Rigid Metal Conduit, Electrical Metallic Tubing and Intermediate Metal Conduit are produced on the most modern equipment in the world. The smallest detail is given careful attention to assure you the highest standards of product quality.

Wheatland steel Rigid Metal Conduit is widely known for the finest hot-dip galvanizing and hot-zinc-coated threads in the industry. A specially formulated coating inhibits oxidation. The galvanized coating is uniform and flake-proof. The conduit cuts, threads, and bends easily because of Wheatland’s controlled processing.

Wheatland Electrical Metallic Tubing and Intermediate Metal Conduit are manufactured on modern electric resistance weld mills, galvanized in line, and sprayed with special coatings for ease of pulling wires and to inhibit white rust and storage stain.

General Information

Authority Having Jurisdiction (AHJ)
All jurisdictions responsible for electrical installations neither automatically adopt the current edition of the National Electrical Code® nor do they implement it uniformly. Therefore, it is good practice to check with the authority having jurisdiction for local interpretations of the rules and approval of equipment and materials before beginning installation.

Other Articles and Sections of the National Electrical Code
The three NEC® 2011 Articles contained in this brochure specifically address the installation of electrical steel raceways produced by Wheatland. They represent only a small segment of the code which may be amended by other Articles or Sections, depending on the installation. The safe installations of these raceways require that all applicable Articles and Sections of the code be observed.

The National Electrical Code® is published every three years. The next edition is due in 2014.

Federal Specifications
The Federal government, in an effort to reduce costs, has undertaken a process of identifying non-government and industry-wide practices that have been accepted previously by the Department of Defense under the Single Process Initiative (SPI) for use in lieu of a specific military or Federal Specification or standard. This process reduces the burden of the government to produce and maintain a separate standard.

Federal agencies accept UL 6 where applicable to steel Rigid Metal Conduit and UL1242 where applicable to Intermediate Metal Conduit in lieu of WW-C-581.

Federal agencies accept American National Standards Institute ANSI C80.3 and UL 797 where applicable to Electrical Metallic Tubing in lieu of WW-C-563.
Use of Wheatland Electrical Metallic Tubing in Conformance to the 2011 National Electrical Code®

Article 358
Electrical Metallic Tubing: Type EMT

I. General

358.1 Scope. This article covers the use, installation, and construction specifications for electrical metallic tubing (EMT) and associated fittings.

358.2 Definition.

Electrical Metallic Tubing (EMT). An unthreaded thinline raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed utilizing appropriate fittings. EMT is generally made of steel (ferrous) with protective coatings or aluminum (nonferrous).

358.6 Listing Requirements. EMT, factory elbows, and associated fittings shall be listed.
II. Installation

358.10 Uses Permitted.

(A) Exposed and Concealed. The use of EMT shall be permitted for both exposed and concealed work.

(B) Corrosion Protection. Ferrous or nonferrous EMT, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and approved as suitable for the condition.

(C) Wet Locations. All supports, bolts, straps, screws, and so forth shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials. FPN: See 300.6 for protection against corrosion.

FPN: See 300.6 for protection against corrosion.

358.12 Uses Not Permitted. EMT shall not be used under the following conditions:

(1) Where, during installation or afterward, it will be subject to severe physical damage

(2) Where protected from corrosion solely by enamel

(3) In cinder concrete or cinder fill where subject to permanent moisture unless protected on all sides by a layer of noncinder concrete at least 50 mm (2 in.) thick or unless the tubing is at least 450 mm (18 in.) under the fill

(4) In any hazardous (classified) location except as permitted by other articles in this Code

(5) For the support of luminaries or other equipment except conduit bodies no larger than the largest trade size of the tubing

(6) Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action

Exception: Aluminum fittings and enclosures shall be permitted to be used with steel EMT where not subject to severe corrosive influences.

358.20 Size.

(A) Minimum. EMT smaller than metric designator 16 (trade size ½) shall not be used.

Exception: For enclosing the leads of motors as permitted in 430.245 (B).

(B) Maximum. The maximum size of EMT shall be metric designator 103 (trade size 4).

358.22 Number of Conductors. The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9. (See page 7)

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9. (See page 7)

358.24 Bends - How Made. Bends shall be made so that the tubing is not damaged and the internal diameter of the tubing is not effectively reduced. The radius of the curve of any field bend to the centerline of the tubing shall not be less than shown in Table 2, Chapter 9 for oneshot and full shoe benders. (See page 10)

358.26 Bends - Number in One Run. There shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points, for example, conduit bodies and boxes.

358.28 Reaming and Threading.

(A) Reaming. All cut ends of EMT shall be reamed or otherwise finished to remove rough edges.

(B) Threading. EMT shall not be threaded.

Exception: EMT with factory threaded integral couplings complying with 358.100.

358.30 Securing and Supporting. EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30 (A) and (B).

(A) Securely Fastened. EMT shall be securely fastened in place at least every 3 m (10 ft). In addition, each EMT run between termination points shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other tubing terminations.

Exception No. 1: Fastening of unbroken lengths shall be permitted to be increased to a distance of 1.5 m (5 ft) where structural members do not readily permit fastening within 900 mm (3 ft).

Exception No. 2: For concealed work in finished buildings or prefinished wall panels where such securing is impracticable, unbroken lengths (without coupling) of EMT shall be permitted to be fished.

(B) Supports. Horizontal runs of EMT supported by openings through framing members at intervals not
greater than 3 m (10 ft) and securely fastened within 900 mm (3 ft) of termination points shall be permitted.

358.42 Couplings and Connectors. Couplings and connectors used with EMT shall be made up tight. Where buried in masonry or concrete, they shall be concretetight type. Where installed in wet locations, they shall comply with 314.15.

358.56 Splices and Taps. Splices and taps shall be made in accordance with 300.15.

358.60 Grounding. EMT shall be permitted as equipment grounding conductor.

III. Construction Specifications

358.100 Construction. Factory-threaded integral couplings shall be permitted. Where EMT with a threaded integral coupling is used, threads for both the tubing and coupling shall be factory-made. The coupling and EMT threads shall be designed so as to prevent bending of the tubing at any part of the thread.

358.120 Marking. EMT shall be clearly and durably marked at least every 3 m (10 ft) as required in the first sentence of 110.21.

Intermediate Metal Conduit - Steel (IMC)

Weights and Dimensions

<table>
<thead>
<tr>
<th>Trade Size</th>
<th>Metric Designator</th>
<th>Threads Per Inch</th>
<th>Acceptable Length of Finished Conduit without Coupling (ft/100)</th>
<th>Weight 10 Unit Lengths with Couplings (lb/kg)</th>
<th>Nominal Outside Diameter (in/mm)</th>
<th>Nominal Inside Diameter (in/mm)</th>
<th>Nominal Wall Thickness (in/mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½</td>
<td>16</td>
<td>14</td>
<td>9 (-1/4 in., +6 mm)</td>
<td>62 (28.12)</td>
<td>0.815 (20.70)</td>
<td>0.660 (16.76)</td>
<td>0.078 (1.97)</td>
</tr>
<tr>
<td>¾</td>
<td>21</td>
<td>14</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>84 (38.10)</td>
<td>1.029 (26.14)</td>
<td>0.869 (22.07)</td>
<td>0.083 (2.10)</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>11½</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>119 (53.98)</td>
<td>1.290 (32.77)</td>
<td>1.105 (28.07)</td>
<td>0.093 (2.35)</td>
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<td>1¼</td>
<td>35</td>
<td>11½</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>158 (71.67)</td>
<td>1.638 (41.59)</td>
<td>1.448 (36.77)</td>
<td>0.095 (2.41)</td>
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<td>1½</td>
<td>41</td>
<td>11½</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>194 (88.00)</td>
<td>1.883 (47.82)</td>
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<td>0.100 (2.54)</td>
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<tr>
<td>2</td>
<td>53</td>
<td>11½</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>256 (116.12)</td>
<td>2.360 (59.93)</td>
<td>2.150 (54.60)</td>
<td>0.105 (2.67)</td>
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<tr>
<td>2½</td>
<td>63</td>
<td>8</td>
<td>11 (-1/4 in., +6 mm)</td>
<td>411 (200.04)</td>
<td>2.857 (72.57)</td>
<td>2.557 (64.95)</td>
<td>0.150 (3.81)</td>
</tr>
<tr>
<td>3</td>
<td>78</td>
<td>8</td>
<td>10½ (-1/4 in., +6 mm)</td>
<td>543 (246.30)</td>
<td>3.476 (88.29)</td>
<td>3.176 (80.67)</td>
<td>0.150 (3.81)</td>
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<tr>
<td>3½</td>
<td>91</td>
<td>8</td>
<td>10½ (-1/4 in., +6 mm)</td>
<td>629 (285.31)</td>
<td>3.971 (100.86)</td>
<td>3.671 (93.24)</td>
<td>0.150 (3.81)</td>
</tr>
<tr>
<td>4</td>
<td>103</td>
<td>8</td>
<td>10½ (-1/4 in., +6 mm)</td>
<td>700 (317.52)</td>
<td>4.466 (113.44)</td>
<td>4.166 (105.82)</td>
<td>0.150 (3.81)</td>
</tr>
</tbody>
</table>

NOTES: (1) Figures are the average of the maximum and minimum dimensions as given in UL 1242.
(2) Calculated from nominal outside diameter and nominal wall thickness.

Steel Intermediate Metal Conduit is manufactured to the lengths shown above, so when the coupling is attached a 10 foot (3.05m) length is produced.

Packaging

<table>
<thead>
<tr>
<th>Trade Size</th>
<th>Metric Designator</th>
<th>Threads Per Inch</th>
<th>Quantity Per Bundle</th>
<th>Quantity Per Lift</th>
<th>Weight Per Lift</th>
<th>Volume Per Lift</th>
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<td>¾</td>
<td>21</td>
<td>14</td>
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<td>--- 50</td>
<td>2500 762</td>
<td>2100 962.5</td>
</tr>
<tr>
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<td>27</td>
<td>11½</td>
<td>50 15.2</td>
<td>--- 34</td>
<td>1700 518</td>
<td>2023 917.6</td>
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<td>35</td>
<td>11½</td>
<td>35 15.2</td>
<td>--- 35</td>
<td>1350 411</td>
<td>2133 967.5</td>
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<tr>
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<td>41</td>
<td>11½</td>
<td>110 30.5</td>
<td>--- 110</td>
<td>1100 335</td>
<td>2134 968.0</td>
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<td>53</td>
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<td>--- 80</td>
<td>800 244</td>
<td>2048 929.0</td>
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<td>63</td>
<td>8</td>
<td>37 15.2</td>
<td>--- 37</td>
<td>370 113</td>
<td>1632 740.3</td>
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<tr>
<td>3</td>
<td>78</td>
<td>8</td>
<td>30 15.2</td>
<td>--- 30</td>
<td>300 91</td>
<td>1629 738.9</td>
</tr>
<tr>
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<td>91</td>
<td>8</td>
<td>24 15.2</td>
<td>--- 24</td>
<td>240 73</td>
<td>1510 684.8</td>
</tr>
<tr>
<td>4</td>
<td>103</td>
<td>8</td>
<td>24 15.2</td>
<td>--- 24</td>
<td>240 73</td>
<td>1680 762.0</td>
</tr>
</tbody>
</table>

The quantity per Lift conforms to the National Electrical Manufacturers Association Standards Publication RN-2 Packaging of Master Bundles for Steel Rigid Conduit, Intermediate Metal Conduit (IMC), and Electrical Metallic Tubing.
Use of Intermediate Metal Conduit In Conformance To The 2011 National Electrical Code®

Article 342
Intermediate Metal Conduit: Type IMC

I. General

342.1 Scope. This article covers the use, installation, and construction specifications for intermediate metal conduit (IMC) and associated fittings.

342.2 Definition.

Intermediate Metal Conduit (IMC). A steel threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated couplings and appropriate fittings.

342.6 Listing Requirements. IMC, factory elbows and couplings, and associated fittings shall be listed.

II. Installation

342.10 Used Permitted.

(A) All Atmospheric Conditions and Occupancies. Use of IMC shall be permitted under all atmospheric conditions and occupancies.

(B) Corrosion Environments. IMC, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and judged suitable for the condition.

(C) Cinder Fill. IMC shall be permitted to be installed in or under cinder fill where subject to permanent moisture where protected on all sides by a layer of noncinder concrete not less than 50 mm (2 in.) thick; where the conduit is not less than 450 mm (18 in.) under the fill; or where protected by corrosion protection and judged suitable for the condition.

(D) Wet Locations. All supports, bolts, straps, screws, and so forth, shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials.

FPN: See 300.6 for protection against corrosion.

342.14 Dissimilar Metals. Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action.

Aluminum fittings and enclosures shall be permitted to be used with IMC.

342.20 Size.

(A) Minimum. IMC smaller than metric designator 16 (trade size ½) shall not be used.

(B) Maximum. IMC larger than metric designator 103 (trade size 4) shall not be used.

FPN: See 300.1(C) for the metric designator and trade sizes. These are for identification purposes only and do not relate to actual dimensions. (See page 7)

342.22 Number of Conductors. The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9. (See page 7)

Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed the allowable percentage fill specified in Table 1, Chapter 9. (See page 7)

342.24 Bends - How Made. Bends of IMC shall be so made that the conduit will not be damaged and the internal diameter of the conduit will not be effectively reduced. The radius of the curve of any field bend to the centerline of the conduit shall not be less than indicated in Table 2, Chapter 9. (See page 10)

342.26 Bends - Number in One Run. There shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points, for example, conduit bodies and boxes.

342.28 Reaming and Threading. All cut ends shall be reamed or otherwise finished to remove rough edges. Where conduit is threaded in the field, a standard cutting die with a 1 in 16 (¾ in. taper per foot) shall be used.


342.30 Securing and Supporting. IMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 342.30(A) and (B).

(A) Securely Fastened. IMC shall be secured in accordance with one of the following:
(1) IMC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination.
(2) Where structural members do not readily permit
fastening within 900 mm (3 ft) fasting shall be permitted to be increased to a distance of 1.5 m (5 ft).
(3) Where approved, conduit shall not be required to be securely fastened within 900 mm (3 ft) of the service head for above-the-roof termination of a mast.

(B) Supports. IMC shall be supported in accordance with one of the following:
(1) Conduit shall be supported at intervals not exceeding 3 m (10 ft).
(2) The distance between supports for straight runs of conduit shall be permitted in accordance with Table 344.30(B)(2), provided the conduit is made up with threaded couplings and such supports prevent transmission of stresses to termination where conduit is deflected between supports.
(3) Exposed vertical risers from industrial machinery or fixed equipment shall be permitted to be supported at intervals not exceeding 6 m (20 ft) if the conduit is made up with threaded couplings, the conduit is supported and securely fastened at the top and bottom of the riser, and no other means of intermediate support is readily available.
(4) Horizontal runs of IMC supported by openings through framing members at intervals not exceeding 3 m (10 ft) and securely fastened within 900 mm (3 ft) of termination points shall be permitted.

342.42 Couplings and Connectors.

(A) Threadless. Threadless couplings and connectors used with conduit shall be made tight. Where buried in masonry or concrete, they shall be the concretetight type. Where installed in wet locations, they shall comply with 314.15. Threadless couplings and connectors shall not be used on threaded conduit ends unless listed for the purpose.

(B) Running Threads. Running threads shall not be used on conduit for connection at couplings.

342.46 Bushings. Where a conduit enters a box, fitting, or other enclosure, a bushing shall be provided to protect the wires from abrasion unless the box, fitting, or enclosure is designed to protect such protection.

FPN: See 300.4(G) for the protection of conductors 4 AWG and larger at bushings.

342.56 Splices and Taps. Splices and taps shall be made in accordance with 300.15.

342.60 Grounding. IMC shall be permitted as an equipment grounding conductor.

III. Construction Specifications

342.120 Marking. Each length shall be clearly and durably marked at least every 1.5 m (5 ft) with the letters IMC. Each length shall be marked as required in 110.21.

342.130 Standard Lengths. The standard length of IMC shall be 3.05 m (10 ft), including an attached coupling, and each end shall be threaded. Longer or shorter lengths with or without coupling and threaded or unthreaded shall be permitted.

Chapter 9 Tables

Table 1 Percent of Cross Section of Conduit and Tubing for Conductors

<table>
<thead>
<tr>
<th>Number of Conductors</th>
<th>All Conductor Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53</td>
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<tr>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>Over 2</td>
<td>40</td>
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</table>

From Article 300 Wiring Methods

Table 300.1(C) Metric Designator and Trade Sizes

<table>
<thead>
<tr>
<th>Metric Designator</th>
<th>Trade Size</th>
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</thead>
<tbody>
<tr>
<td>12</td>
<td>3/8</td>
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<tr>
<td>16</td>
<td>1/2</td>
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<tr>
<td>21</td>
<td>3/4</td>
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<tr>
<td>27</td>
<td>1</td>
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<tr>
<td>35</td>
<td>1 1/4</td>
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<tr>
<td>41</td>
<td>1 1/2</td>
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<tr>
<td>63</td>
<td>2 1/2</td>
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<tr>
<td>78</td>
<td>3</td>
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<tr>
<td>91</td>
<td>3 1/2</td>
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<td>103</td>
<td>4</td>
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<tr>
<td>129</td>
<td>5</td>
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<tr>
<td>155</td>
<td>6</td>
</tr>
</tbody>
</table>

Note: The metric designators and trade sizes are for identification purposes only and are not actual dimensions.

Need 20 Foot Lengths of Rigid or EMT? Contact Wheatland Electrical sales department E-mail: info@wheatland.com, Phone: 800-257-8182, or Fax: 724-346-7052

Grounding Study on Steel EMT, IMC, and Rigid Conduit

After Article 250 was revised in the 1990 NEC®, the steel conduit producers initiated a program to evaluate the performance of steel EMT, IMC, and Rigid Metal Conduit during faults in secondary distribution systems.
Georgia Institute of Technology, Atlanta, GA undertook the research and in 1994 published their findings in a report that updated the grounding data developed by Eustace Soares, some 40 years earlier, and answered the questions of compliance with NEC® Article 250.

- Part II, Contains Appendices of Test Results.

You can download or view the study at, www.steelconduit.org

### Hot-Dip Galvanized

#### Rigid Metal Conduit - Steel (RMC)

**Weights and Dimensions**

<table>
<thead>
<tr>
<th>Trade Size</th>
<th>Metric Designator</th>
<th>Threads Per Inch</th>
<th>Acceptable Length of Finished Conduit without Coupling (± 1/4 in.)</th>
<th>Weight 10 Unit Lengths with Couplings</th>
<th>Nominal Outside Diameter*</th>
<th>Nominal Inside Diameter*</th>
<th>Nominal Wall Thickness*</th>
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</thead>
<tbody>
<tr>
<td>½</td>
<td>16</td>
<td>14</td>
<td>9 11½ 3030</td>
<td>82 37.20 21.34 0.632 16.05 .104 2.64</td>
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<td></td>
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</tr>
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*For information only, not a UL 6 requirement.
Rigid Steel Conduit is manufactured to the lengths shown above, so when a straight-tapped coupling Wheatland trade sizes 3 through 6 are UL Listed for use with directional boring equipment.

#### Packaging

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<th>Trade Size</th>
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<th>Threads Protector Color</th>
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The quantity per Lift conforms to the National Electrical Manufacturers Association Standards Publication RN-2 Packaging of Master Bundles for Steel Rigid Conduit, Intermediate Metal Conduit (IMC), and Electrical Metallic Tubing.
Use of Wheatland Rigid Metal Conduit - Steel in Conformance to the 2011 National Electrical Code®

Article 344 Rigid Metal Conduit: Type RMC

I. General

344.1 Scope. This article covers the use, installation, and construction specifications for rigid metal conduit (RMC) and associated fittings.

344.2 Definition.

Rigid Metal Conduit (RMC). A threadable raceway of circular cross section designed for the physical protection and routing of conductors and cables and for use as an equipment grounding conductor when installed with its integral or associated coupling and associated fittings. RMC is generally made of steel (ferrous) with protective coatings or aluminum (nonferrous). Special use types are red brass and stainless steel.

344.6 Listing Requirements. RMC, factory elbows and couplings, and associated fittings shall be listed.

II. Installation

344.10 Uses Permitted.

(A) All Atmospheric Conditions and Occupancies.

(1) Galvanized steel and Stainless Steel RMC. Galvanized steel and stainless steel RMC shall be permitted under all atmospheric conditions and occupancies.

(2) Red Brass RMC. Red brass RMC shall be permitted to be installed for direct burial and swimming pool applications.

(3) Aluminum RMC. Aluminum RMC shall be permitted to be installed where judged suitable for the environment. Rigid aluminum conduit encased in concrete or in direct contact with the earth shall be provided with approved supplementary corrosion protection.

(4) Ferrous Raceways and Fittings. Ferrous raceways and fittings protected from corrosion solely by enamel shall be permitted only indoors and in occupancies not subject to severe corrosive influences.

(B) Corrosive Environments.

(1) Galvanized Steel, Stainless Steel, and Red Brass RMC, Elbows, Couplings, and Fittings. RMC, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and judged suitable for the condition.

(2) Supplementary Protection of Aluminum RMC. Aluminum RMC shall be provided with approved supplementary corrosion protection where encased in concrete or in direct contact with the earth.

(C) Cinder Fill. Galvanized steel, stainless steel, and red brass RMC shall be permitted to be installed in or under cinder fill where subject to permanent moisture where protected on all sides by a layer of noncinder concrete not less than 50 mm (2 in.) thick; where the conduit is not less than 450 mm (18 in.) under the fill; or where protected by corrosion protection and judged suitable for the condition.

(D) Wet Locations. All supports, bolts, straps, screws, and so forth, shall be of corrosion-resistant materials or protected against corrosion by corrosion-resistant materials.

FPN: See 300.6 for protection against corrosion.

344.14 Dissimilar Metals. Where practicable, dissimilar metals in contact anywhere in the system shall be avoided to eliminate the possibility of galvanic action. Aluminum fittings and enclosures shall be permitted to be used with steel RMC, and steel fittings and enclosures shall be permitted to be used with aluminum RMC where not subject to severe corrosive influences.

344.20 Size.

(A) Minimum. RMC smaller than metric designator 16 (trade size ½) shall not be used.

Exception: For enclosing the leads of motors as permitted in Section 430.245 (B).

(B) Maximum. RMC larger than metric designator 155 (trade size 6 ) shall not be used.

FPN: See 300.1(C) for the metric designators and trade sizes. These are for identification purposes only and do not relate to actual dimensions. (See page 7)

344.22 Number of Conductors. The number of conductors shall not exceed that permitted by the percentage fill specified in Table 1, Chapter 9. (See page 7)
Cables shall be permitted to be installed where such use is not prohibited by the respective cable articles. The number of cables shall not exceed that allowable percentage fill specified in Table 1, Chapter 9. (See page 7)

344.24 Bends - How Made. Bends of RMC shall be so made that the conduit will not be damaged and so that the internal diameter of the conduit will not be effectively reduced. The radius of the curve of any field bend to the centerline of the conduit shall not be less than indicated in Table 2, Chapter 9. (See page 10)

344.26 Bends - Number in One Run. There shall not be more than the equivalent of four quarter bends (360 degrees total) between pull points, for example, conduit bodies and boxes.

344.28 Reaming and Threading. All cut ends shall be reamed or otherwise finished to remove rough edges. Where conduit is threaded in the field, a standard cutting die with a 1 in 16 taper (¾-in. taper per foot) shall be used.


344.30 Securing and Supporting. RMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 344.30(A) and (B).

(A) Securely Fastened. RMC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination. Fastening shall be permitted to be increased to a distance of 1.5 m (5 ft) where structural members do not readily permit fastening within 900 mm (3 ft). Where approved, conduit shall not be required to be securely fastened within 900 mm (3 ft) of the service head for above-the-roof termination of a mast.

(B) Supports. RMC shall be supported in accordance with one of the following:
(1) Conduit shall be supported at intervals not exceeding 3 m (10 ft)
(2) The distance between supports for straight runs of conduit shall be permitted in accordance with Table 344.30(B)(2), provided the conduit is made up with threaded couplings and such supports prevent transmission of stresses to termination where conduit is deflected between supports.
(3) Exposed vertical risers from industrial machinery or fixed equipment shall be permitted to be supported at intervals not exceeding 6 m (20 ft) if the conduit is made up with threaded couplings, the conduit is supported and securely fastened at the top and bottom of the riser, and no other means of intermediate support is readily available.

344.42 Couplings and Connectors.

(A) Threadless. Threadless couplings and connectors used with conduit shall be made tight. Where buried in masonry or concrete, they shall be the concrete-tight type. Where installed in wet locations, they shall comply with 314.15(A). Threadless couplings and connectors shall not be used on threaded conduit ends unless listed for the purpose.

(B) Running Threads. Running threads shall not be used on conduit for connection at couplings.

344.46 Bushings. Where a conduit enters a box, fitting, or other enclosure, a bushing shall be provided to protect the wires from abrasion unless the box, fitting, or enclosure is designed to provide such protection.

FPN: See 300.4(F) for the protection of conductors sizes 4 AWG and larger at bushings.

344.56 Splices and Taps. Splices and taps shall be made in accordance with 300.15.

344.60 Grounding. RMC shall be permitted as an equipment grounding conductor.

III. Construction Specifications

344.120 Marking. Each length shall be clearly and durably identified in every 3 m (10 ft) as required in the first sentence of 110.21. Nonferrous conduit of corrosion resistant material shall have suitable markings.

344.130 Standard Lengths. The standard length of RMC shall be 3.05 m (10 ft), including an attached coupling, and each end shall be threaded. Longer or shorter lengths with or without coupling and threaded or unthreaded shall be permitted.
Steel Conduit For EMI Solutions

Steel conduit will provide many benefits in your electrical distribution system. Steel conduit can dramatically reduce electromagnetic fields, thus reducing electromagnetic interference created by typical power frequency electrical wiring. Steel conduit systems can be designed for the best grounding. And steel conduit provides the well-known benefits of physical protection for conductors and fire safety.

All New Grounding and ElectroMagnetic Interference (GEMI) Analysis Software

Developed specifically to assist architects, electrical engineers, electrical contractors, building and facility operation professionals with issues involving:
- Electromagnetic interference in electrical distribution systems
- Most effective conduit for electromagnetic field reduction
- Harmonics in electrical systems
- Design of distribution feeder and branch circuits for safety and economics
- Equipment grounding
- Easy and accurate calculation of conduit runs for effective grounding path
- Analysis of existing circuits

GEMI was researched, designed and written at the School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA.

The GEMI software program, which can be used to address the effects of EMI on commonly used electronic equipment, has been validated with actual measurements of EMF and the most exhaustive studies of impedance and permeability of steel conduit in 40 years.

GEMI permits flexibility in the design of a new system, comparison with other type systems designed to the equipment grounding requirements of the NEC, and analysis of existing systems to determine any upgrading necessary for safe ground fault interruption or reduced electromagnetic fields.

To obtain a copy of the GEMI software contact Wheatland’s Marketing Department at info@wheatland.com. The software is free to qualified users.

Wheatland Nipples, Elbows, and Couplings

Wheatland has a complete line of nipples, elbows, and couplings for Rigid steel and aluminum conduit, and elbows for steel IMC and EMT.

Nipple, Elbow and Coupling Standards

The material standards that cover Wheatland’s standard length conduit and tubing cover our tubular fittings as well. As a convenience to our customers Wheatland inventories aluminum tubular fittings to ship with our steel fittings. Aluminum nipples, elbows and couplings conform to UL 6A, Federal Specification WW-C-540, and American National Standards Institute C80.5.

For complete information on weights, dimensions, and packaging ask for our product bulletins. Hot-dip Galvanized Rigid Conduit nipples, elbows and couplings are covered in one publication and Aluminum and IMC products in another.
**Electrical Metallic Tubing**

*For Use Over 600 Volts*

Underwriters Laboratories report *UL Report on Electrical Metallic Tubing For Use Over 600 Volts*, January 19, 1996 “identified Electrical Metallic Tubing (EMT) as suitable for use where the voltage between circuit conductors or between conductors and ground is over 600 volts.” For a copy of the UL report contact Wheatland’s Marketing Department at info@wheatland.com.

**Applicable EMT Material Standards**

Though the National Electrical Code® deals primarily with proper field application, it presumes that the tubing meets the standards necessary to perform properly under approved conditions. Wheatland Electrical Metallic Tubing is made to provide all the qualities required for proper installation as specified in the NEC®.

Wheatland Electrical Metallic Tubing is manufactured in conformance to standards established by the American National Standards Institute, the Underwriters Laboratories and the Federal Specification. In preparing bids, it may be stated that Wheatland EMT Conforms to:
- Underwriters Laboratories Standard UL 797
- Federal Specification WW-C-563
- American National Standard Institute C80.3
- NEC® 2011 Section 250.118(4) recognizes EMT as an equipment grounding conductor.

**Applicable IMC Material Standards**

Though the National Electrical Code® deals primarily with proper field application, it presumes that the conduit meets the standards necessary to perform properly under approved conditions. Wheatland Intermediate Metal Conduit is made to provide all the qualities required for proper installation as specified in the NEC®.

Wheatland Intermediate Metal Conduit is manufactured in conformance to standards established by the American National Standards Institute, the Underwriters Laboratories and the Federal Specification. In preparing bids, it may be stated that Wheatland Intermediate Metal Conduit Conforms to:
- Underwriters Laboratories Standard UL 1242
- Federal Specification WW-C-581
- American National Standard Institute C80.6
- NEC® 2011 Section 250.118(3) recognizes IMC as an equipment grounding conductor.

**Applicable Rigid Metal Conduit - Steel Material Standards**

Though the National Electrical Code® deals primarily with proper field application, it presumes that the conduit meets the standards necessary to perform properly under approved conditions. Wheatland galvanized steel Rigid Metal Conduit is made to provide all the qualities required for proper installation as specified in the NEC®.

Wheatland Galvanized steel Rigid Metal Conduit is manufactured in conformance to standards established by the American National Standards Institute, the Underwriters Laboratories and the Federal Specification. In preparing bids, it may be stated that Wheatland Galvanized steel Rigid Metal Conduit Conforms to:
- Underwriters Laboratories Standard UL 6
- Federal Specification WW-C-581
- American National Standard Institute C80.1
- NEC® 2011 Section 250.118(2) recognizes RMC as an equipment grounding conductor.
Wheatland produces a full line of listed electrical conduit, EMT and tubular fittings. We supply Steel and Aluminum Rigid Metal Conduit (RMC), Steel Intermediate Metal Conduit (IMC) and Steel Electrical Metallic Tubing (EMT). We also manufacture a full line of complementary tubular fittings made from the same materials as our raceways — nipples, elbows, couplings and running thread. (See Wheatland’s individual product literature for specific product details.)

All Wheatland manufacturing locations’ quality management systems are certified to the ISO 9001:2008 requirements.

For more information contact Wheatland’s Electrical Sales Department at 800-257-8182, email: info@wheatland.com or visit our website at www.wheatland.com.