Δ **362.56 Splices and Taps.** Splices and taps shall be made only in accordance with 300.15.

Δ **362.60 Grounding.** Where equipment grounding is required, a separate grounding conductor shall be installed in the raceway in compliance with Article 250, Part VI.

Exception No. 1: The equipment grounding conductor shall be permitted to be run separately from the raceway where used for grounding dc circuits as permitted in 250.134, Exception No. 2.

Exception No. 2: The equipment grounding conductor shall not be required where the grounded conductor is used as part of the effective ground-fault path as permitted in 250.142.

Part III. Construction Specifications

362.100 Construction. ENT shall be made of material that does not exceed the ignitibility, flammability, smoke generation, and toxicity characteristics of rigid (nonplasticized) polyvinyl chloride.

ENT, as a prewired manufactured assembly, shall be provided in continuous lengths capable of being shipped in a coil, reel, or carton without damage.

362.120 Marking. ENT shall be clearly and durably marked at least every 3 m (10 ft) as required in the first sentence of 110.21(A). The type of material shall also be included in the marking. Marking for limited smoke shall be permitted on the tubing that has limited smoke-producing characteristics.

The type, size, and quantity of conductors used in prewired manufactured assemblies shall be identified by means of a printed tag or label attached to each end of the manufactured assembly and either the carton, coil, or reel. The enclosed conductors shall be marked in accordance with 310.8.

ARTICLE

366 Auxiliary Gutters

Part I. General

366.1 Scope. This article covers the use, installation, and construction requirements of metal auxiliary gutters and nonmetallic auxiliary gutters and associated fittings.

An auxiliary gutter provides additional gutter space for wiring in various types of electrical enclosures and equipment. This additional gutter space may be necessary to provide sufficient room for the number of conductors in an enclosure or to provide adequate wiring bending/deflection space where conductors connect to a terminal. Although the construction of an auxiliary gutter is no different from that of a wireway, the field application of this equipment differentiates an auxiliary gutter from a wireway.

A wireway is a raceway in accordance with the definition of *raceway* in Article 100. Auxiliary gutters supplement enclosure wiring spaces and are not encompassed by the definition of raceway. Therefore, *NEC*® requirements that apply only to raceways do not apply to auxiliary gutters. An example of such a requirement is 230.7, which prohibits service conductors from being installed in a raceway with conductors that are not service conductors. This rule applies to wireways installed in accordance with Articles 376 and 378. However, an auxiliary gutter installed to supplement the wiring space of a service equipment enclosure is not a wireway; therefore, service conductors, feeder conductors, and branch-circuit conductors can occupy the same wiring space of an auxiliary gutter. Unlike wireways, which are covered in Articles 376 and 378, auxiliary gutters are permitted to contain bare and insulated copper and aluminum busbars. See 366.23(A) for the ampere rating of bare copper and aluminum busbars installed in auxiliary gutters.

366.6 Listing Requirements.

(A) Outdoors. Nonmetallic auxiliary gutters installed outdoors shall be listed for all of the following conditions:

(1) Exposure to sunlight
(2) Use in wet locations
(3) Maximum ambient temperature of the installation

(B) Indoors. Nonmetallic auxiliary gutters installed indoors shall be listed for the maximum ambient temperature of the installation.

The sections and associated fittings of auxiliary gutters are identical to those of wireways. They differ only in their intended use. If listed, they may be marked as "Wireway," "Auxiliary Gutter," or "Wireway or Auxiliary Gutter," depending on the intended application.

Part II. Installation

366.10 Uses Permitted.

(A) Sheet Metal Auxiliary Gutters.

(1) Indoor and Outdoor Use. Sheet metal auxiliary gutters shall be permitted for indoor and outdoor use.

(2) Wet Locations. Sheet metal auxiliary gutters installed in wet locations shall be suitable for such locations.

(B) Nonmetallic Auxiliary Gutters. Nonmetallic auxiliary gutters shall be listed for the maximum ambient temperature of the installation and marked for the installed conductor insulation temperature rating.

Informational Note: Extreme cold may cause nonmetallic auxiliary gutters to become brittle and therefore more susceptible to damage from physical contact.

(1) Outdoors. Nonmetallic auxiliary gutters shall be permitted to be installed outdoors where listed and marked as suitable for the purpose.

(2) Indoors. Nonmetallic auxiliary gutters shall be permitted to be installed indoors.

N **(C) Extended Distance of Auxiliary Gutters.** Auxiliary gutters shall be permitted to extend a distance not greater than 9 m (30 ft) beyond the equipment that it supplements.

Exception: Where used in accordance with 620.35 for elevators, an auxiliary gutter shall be permitted to extend a distance greater than 9 m (30 ft) beyond the equipment it supplements.

Δ **366.12 Uses Not Permitted.** Auxiliary gutters shall not be used to enclose switches, overcurrent devices, appliances, or other similar equipment.

366.20 Conductors Connected in Parallel. Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.10(G), the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

366.22 Number of Conductors.

No limit is placed on the size of conductors that can be installed in an auxiliary gutter. If the auxiliary gutter is being used to supplement the wiring "gutter" space of a panelboard cabinet, the wire-bending requirements of 312.6(A) and (B) apply total wiring space created by adding the width of the auxiliary gutter to the width of the wire-bending space of the panelboard cabinet. The dimensions of insulated conductors, found in Tables 5 and 5A of Chapter 9, can be used to calculate the size of auxiliary gutters.

(A) Sheet Metal Auxiliary Gutters. The sum of the cross-sectional areas of all contained conductors and cables at any cross section of a sheet metal auxiliary gutter shall not exceed 20 percent of the interior cross-sectional area of the sheet metal auxiliary gutter.

(B) Nonmetallic Auxiliary Gutters. The sum of cross-sectional areas of all contained conductors and cables at any cross section of the nonmetallic auxiliary gutter shall not exceed 20 percent of the interior cross-sectional area of the nonmetallic auxiliary gutter.

366.23 Ampacity of Conductors.

(A) Sheet Metal Auxiliary Gutters. The adjustment factors in 310.15(C)(1) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under 310.15(E), exceeds 30 at any cross section of the sheet metal auxiliary gutter. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors. The current carried continuously in bare copper bars in sheet metal auxiliary gutters shall not exceed 1.55 amperes/mm^2 (1000 amperes/in.^{2}) of cross section of the conductor. For aluminum bars, the current carried continuously shall not exceed 1.09 amperes/mm^2 (700 amperes/in.^{2}) of cross section of the conductor.

Where sheet metal auxiliary gutters contain 30 or fewer current-carrying conductors, the correction factors in 310.15(B)(2) do not apply. However, if more than 30 conductors are installed in the same cross-sectional area of a sheet metal auxiliary gutter, the ampacity adjustment factors of 310.15(C)(1) apply, and the number of current-carrying conductors is not limited up to the 20-percent fill.

(B) Nonmetallic Auxiliary Gutters. The adjustment factors specified in 310.15(C)(1) shall be applicable to the current-carrying conductors up to and including the 20 percent fill specified in 366.22(B).

The requirements for nonmetallic auxiliary gutters limit the cross-sectional area of all conductors to 20 percent. There is no 30-conductor allowance. The derating factors specified in 310.15(C)(1) must be applied as stated in 366.23(B).

366.30 Securing and Supporting.

(A) Sheet Metal Auxiliary Gutters. Sheet metal auxiliary gutters shall be supported and secured throughout their entire length at intervals not exceeding 1.5 m (5 ft).

(B) Nonmetallic Auxiliary Gutters. Nonmetallic auxiliary gutters shall be supported and secured at intervals not to exceed 900 mm (3 ft) and at each end or joint, unless listed for other support intervals. In no case shall the distance between supports exceed 3 m (10 ft).

366.44 Expansion Fittings. Expansion fittings shall be installed where expected length change, due to expansion and contraction due to temperature change, is more than 6 mm (0.25 in.).

See also

Table 352.44(A) for expansion characteristics of nonmetallic gutters similar to those of polyvinyl chloride (PVC) conduit

300.7(B) commentary for more on expansion requirements

366.56 Splices and Taps. Splices and taps shall comply with 366.56(A) through (D).

(A) Within Gutters. Splices or taps shall be permitted within gutters where they are accessible by means of removable covers or doors. The conductors, including splices and taps, shall not fill the gutter to more than 75 percent of its area.

(B) Bare Conductors. Taps from bare conductors shall leave the gutter opposite their terminal connections, and conductors shall not be brought in contact with uninsulated current-carrying parts of different voltages.

(C) Suitably Identified. All taps shall be suitably identified at the gutter as to the circuit or equipment that they supply.

(D) Overcurrent Protection. Tap connections from conductors in auxiliary gutters shall be provided with overcurrent protection as required in 240.21.

366.58 Insulated Conductors.

(A) Deflected Insulated Conductors. Where insulated conductors are deflected within an auxiliary gutter, either at the ends or where conduits, fittings, or other raceways or cables enter or leave the gutter, or where the direction of the gutter is deflected greater than 30 degrees, dimensions corresponding to one wire per terminal in Table 312.6(A) shall apply.

(B) Auxiliary Gutters Used as Pull Boxes. Where insulated conductors 4 AWG or larger are pulled through an auxiliary gutter, the distance between raceway and cable entries enclosing the same conductor shall not be less than that required in 314.28(A)(1) for straight pulls and 314.28(A)(2) for angle pulls.

366.60 Grounding. Metal auxiliary gutters shall be connected to an equipment grounding conductor(s), to an equipment bonding jumper, or to the grounded conductor where permitted or required by 250.92(B)(1) or 250.142.

Part III. Construction Specifications

366.100 Construction.

(A) Electrical and Mechanical Continuity. Gutters shall be constructed and installed so that adequate electrical and mechanical continuity of the complete system is secured.

(B) Substantial Construction. Gutters shall be of substantial construction and shall provide a complete enclosure for the contained conductors. All surfaces, both interior and exterior, shall be suitably protected from corrosion. Corner joints shall be made tight, and where the assembly is held together by rivets, bolts, or screws, such fasteners shall be spaced not more than 300 mm (12 in.) apart.

(C) Smooth Rounded Edges. Suitable bushings, shields, or fittings having smooth, rounded edges shall be provided where conductors pass between gutters, through partitions, around bends, between gutters and cabinets or junction boxes, and at other locations where necessary to prevent abrasion of the insulation of the conductors.

(D) Covers. Covers shall be securely fastened to the gutter.

(E) Clearance of Bare Live Parts. Bare conductors shall be securely and rigidly supported so that the minimum clearance between bare current-carrying metal parts of different voltages mounted on the same surface will not be less than 50 mm (2 in.), nor less than 25 mm (1 in.) for parts that are held free in the air. A clearance not less than 25 mm (1 in.) shall be secured between bare current-carrying metal parts and any metal surface. Adequate provisions shall be made for the expansion and contraction of busbars.

366.120 Marking.

(A) Outdoors. Nonmetallic auxiliary gutters installed outdoors shall have the following markings:

(1) Suitable for exposure to sunlight
(2) Suitable for use in wet locations
(3) Installed conductor insulation temperature rating

(B) Indoors. Nonmetallic auxiliary gutters installed indoors shall be marked with the installed conductor insulation temperature rating.

ARTICLE 368 Busways

Δ Part I. General

368.1 Scope. This article covers service-entrance, feeder, and branch-circuit busways and associated fittings.

Exhibit 368.1 illustrates a section of busway with a plug-in device covered by this article. Busway of this type typically is used as a feeder to supply other feeders or to supply branch circuits for utilization equipment. The plug-in devices provide the means to connect feeders and branch circuits to the busway and contain the overcurrent protection for the connected feeder or branch circuit.

In addition to the power distribution busway illustrated in Exhibit 368.1, there are four special application busway designs covered by UL 857, *Standard for Safety for Busways*:

1. Lighting busway, with a maximum current rating of 50 amperes, supplies and supports industrial and commercial luminaires.
2. Trolley busway allows continuous contact with a trolley through a slot in the enclosure and might be marked as "Lighting Busway" if intended for use with industrial and commercial luminaires.
3. Continuous plug-in busway allows for the insertion of plug-in devices at any point along its length. This busway, limited to a maximum current rating of 225 amperes, is intended for general use and is permitted to be installed within reach of persons.
4. Short-run busway is intended primarily to feed switchboards and is limited to a run of 30 feet horizontal or 10 feet vertical.

Part II. Installation

368.10 Uses Permitted. Busways shall be permitted to be installed where they are located in accordance with 368.10(A) through (C).

Informational Note: See 300.21 for information concerning the spread of fire or products of combustion.

Busways are commonly used as feeders. They either are installed horizontally or, where used for power distribution in high-rise