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Installation Guidelines for Expansion and Expansion/ Deflection Fittings



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FOREWORD

These guidelines were prepared by a joint sections committee of the Conduit Fittings (5FB), Steel Conduit and Electrical Metallic Tubing (5RN), and Polymer Raceway Products (5TC) sections of the National Electrical Manufacturers Association. At the time of approval, these sections consisted of the following members.

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AFC Cable Systems, a part of Atkore International—www.afcweb.com—New Bedford, MA
Appleton Group—www.egseg.com—Rosemont, IL
Arlington Industries, Inc.—www.aifittings.com—Scranton, PA
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Steel Conduit and Electrical Metallic Tubing Section:

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INTRODUCTION

All materials expand and contract with changes in temperature. The amount of expansion and contraction varies depending on the temperature, type, and composition of raceway material. Expansion fittings are used to compensate for changes in length (the expansion and contraction—a linear movement) in electrical raceways, thus preventing harmful stresses in the raceway system and to supporting structures.

Raceways subjected to structural movement experience shear and lateral forces. Expansion/deflection fittings are used to compensate for these forces, thus safely permitting three-dimensional (linear, angular, and parallel) movement of the raceway.

Without the use of expansion or expansion/deflection fittings, the forces and length change can cause

- raceway bowing,
- distorted electrical boxes and enclosures,
- broken couplings or fittings,
- separation of raceways,
- structural damage,
- damage to cables and conductors, and
- interruption of electrical continuity in the system.

The most common error is not using enough expansion or expansion/deflection fittings. It is much more difficult and costly to insert an expansion or expansion/deflection fitting once wiring has been installed and put in service.

These guidelines are intended as an informational document. It is recommended that users of this document contact the manufacturer for additional information and specifications on product use and limits.

Section 1 General

1.1 Scope

These guidelines provide information on the proper application and installation of all expansion and expansion/deflection fittings intended for use in hazardous and non-hazardous locations in accordance with the *National Electrical Code*® (NEC); the *Canadian Electrical Code*® (CE Code), Part I; the International Building Code; and the National Building Code of Canada. These guidelines cover expansion and expansion/deflection fittings for nonflexible metallic and nonmetallic conduit and tubing, including the following:

- Electrical metallic tubing: type EMT
- Intermediate metal conduit: type IMC
- Reinforced thermosetting resin conduit: type RTRC
- Rigid metal conduit: type RMC
- Rigid polyvinyl chloride conduit: type PVC

1.2 Nomenclature and definitions

angular deflection: the degree that a straight run of raceway bends from its center line under a load

barrel: a static component of an expansion fitting or expansion/deflection fitting that houses the piston

coefficient of thermal expansion: the amount a raceway material expands or contracts per unit length with one degree change in temperature

contraction: reduction in raceway length

deflection: the displacement of a raceway under load

deflection fitting: a raceway accessory that compensates for the offset or angular deflection of a raceway system

delta temperature (delta T): the difference between the recorded maximum ambient temperature and minimum ambient temperature

engagement line: see **mid-point ring**

expansion: increase in raceway length

expansion/deflection fitting: a raceway accessory that compensates for the linear expansion, linear contraction, and the offset or angular deflection of a raceway system

expansion fitting: a raceway accessory that compensates for the linear expansion or contraction of a raceway system

expansion joint: see **structural joint**

mid-point ring: a marking on an expansion fitting piston indicating the middle of the piston

movement joint: see **structural joint**

muzzle: see **barrel**

offset: intentional or unintentional linear misalignment of a raceway system