

NEMA FB 2.40-2019

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# Standard for Installation Guidelines for Expansion and Expansion/Deflection Fittings



**NEMA FB 2.40-2019**

*Installation Guidelines for Expansion and Expansion/Deflection Fittings*

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## Foreword

This Standards publication provides recommended installation practices for all expansion and expansion/deflection fittings used in electrical raceways.

User needs have been considered throughout the development of this publication. Proposed or recommended revisions should be submitted to:

Megan Hayes  
Technical Director, Operations  
National Electrical Manufacturers Association  
1300 N. 17<sup>th</sup> Street, Suite 900  
Rosslyn, VA 22209

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This Standards publication was developed 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. Section approval of the Standard does not necessarily imply that all section Members voted for its approval or participated in its development. At the time it was approved, these sections were composed of the following Members.

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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 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

- a. raceway bowing,
- b. distorted electrical boxes and enclosures,
- c. broken couplings or fittings,
- d. separation of raceways,
- e. structural damage,
- f. damage to cables and conductors, and
- g. interruption of electrical continuity in the system.

The most common error is not using enough expansion or expansion/deflection fittings. Inserting an expansion or expansion/deflection fitting after the conductors have been installed and put into service is much more difficult and costly than when the conduit system is first installed.

This guideline is 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.

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## Section 1 General

### 1.1 Scope

This guideline provides information on the proper application and installation of 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. This guideline covers expansion and expansion/deflection fittings for nonflexible metallic and nonmetallic conduit and tubing, including the following:

- a. Electrical metallic tubing: type EMT
- b. Intermediate metal conduit: type IMC
- c. Reinforced thermosetting resin conduit: type RTRC
- d. Rigid metal conduit: type RMC
- e. Rigid polyvinyl chloride conduit: type PVC

### 1.2 Nomenclature and Definitions

**angular deflection:** the degree that a straight run of raceway bends from its centerline 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:** an 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