



## Raceway, Box and Fittings Fill Requirements

**Program:** Electrician Technician

**Course:** EL130 Flexible Cables/Conduit Bending and Raceways

**Objectives:** Under the supervision of your instructor, you should be able to do the following:

After completing this lab, you will be able to:

- Properly select, install, and support pull and junction boxes and their associated fittings
- Describe the National Electrical Code® (NEC®) regulations governing pull and junction boxes.
- Size pull and junction boxes for various applications.

**Lab Equipment:**

- Project board (plywood sheet or equivalent)

**Required Tools:**

- 1 - Tape measure
- 1 - Hacksaw
- 1 - EMT reamer or lineman pliers
- 1 - Torpedo level
- 1 - Screwdriver set
- 1 - 2 pairs of slip-joint pliers (Channellock® or equivalent)
- 1 – Pair of work gloves

**Materials:**

- 20' - 1/2-inch EMT conduit
- 1 – 4S metal box, deep
- 1 – 4S metal box, shallow
- 4 – ½" one-hole EMT straps
- 4 - 1/2" EMT compression connectors
- 1 – ½" EMT Compression coupler

**Safety (PPE):**

- Safety glasses/goggles
- Hard Hat

**Resources:**

- National Electrical Code®



**Required Time:** 180 minutes

**Shop Maintenance:**

- All work will cease 20 minutes prior to the end of class.
- All work areas must be cleaned.
- Tools and equipment must be cleaned and returned to the designated areas (cage, tool room, cabinets etc.)
- Any broken or missing tools must be reported immediately.
- Tools and equipment are students' responsibility

**Procedures:**

This performance project requires the student to install a simple 1/2-inch EMT conduit run containing two metal surface-mounted boxes, and to determine the maximum number of 12 AWG conductors allowed in each box.

1. Select the correct device boxes as specified on the drawing (Figure 1).
2. Knock out the required knockout plugs on the boxes as determined by the drawing, then mount and install the device boxes on the board.
3. Measure, cut, ream, and bend the conduit according to the bends and dimensions shown on the drawing and the instructions listed in the trainee notes.
4. You may use only one coupling in your installation.
5. Make sure that you bend box offsets at each box entry.
6. Secure the conduit in place according to the requirements of NEC Section 358.30.
7. Refer to the tables in NEC Article 314 to determine the maximum number of 12 AWG THHN conductors permitted in each box.



8. Have your instructor check your work.

