2026 - 2027 EMC
Speech/Demonstration Topic

PROBLEM:

A customer contacted you to install a dedicated branch circuit for a Miller Thunderbolt 210 MV welder, with the option to add a ChargePoint Home Flex Level 2 240 Volt Plug-In EV Charger in the future. The welder's Maximum Effective Supply Current (I_1eff) is 22.5 amps, and its Rated Maximum Supply Current (I_1max) is 44.9 amps. The Maximum Load for the EV charger is 40 amps. The subpanel, circuit, and charger will be located within the same agricultural structure. The charger requires a NEMA 6-50R receptacle. Branch circuit conductors will run from the SEP to the NEMA plug. The conductors will be 6/2 NM-B, rated for 60°C (140°F). The outlet box will be installed to accommodate a noncombustible wall finish.

You will need to thoroughly explain the operating principles and installation of circuit conductors for the individual equipment branch circuit. Also, you should select the correct overcurrent protection and receptacle type in accordance with Articles 625 and 630 and Table 310.16 of the 2026 National Electrical Code.

The Speech Demo board will resemble an unfinished garage within an agricultural structure and will contain the service entrance panel, free of excessive dust and a corrosive atmosphere. All wiring materials, including the subpanel, NM-B conductor, and device box, will be installed in a mock stud wall. The components installed will be prepared for noncombustible metal wall covering. NM-B conductor will be prepared but not terminated in the subpanel and the device box.

MATERIALS LIST:

1 - 100 Amp Eaton Sub-Panel (with bonding strap removed)
1 - #6 THWN-2 Stranded Cu Grounding conductor. (Installed)
1 - 1 ¼" Conduit for Subpanel raceway
3 - 4 THWN-2 Cu Supply conductors installed in a 100-amp circuit breaker.
1 - 50 Amp Double-Pole GFI circuit breaker (Not Installed)
(BR 50 Amp 120-Volt/240-Volt 2-Pole GFCI Circuit Breaker Pigtail Neutral) (Not Installed)
1 – NEMA 6 -50R EV-rated receptacle (Not Installed)
1 – 4" x 2 1/8" Device Box (Installed in Demo Board)
1 – Square Device Cover Plate (Not Installed)
3 – 1 ½" x 3" 14 Gauge Nail Stop (Two Installed, One Not Installed)
2 – 1" Non-Metallic Clamp
6/2 NM-B Cable

REFERENCE:

2026 National Electrical Code
Agricultural Wiring Handbook – 18th Edition
Poster Size Schematic Drawing
ChargePoint Home Flex Installation Guide
Miller Thunderbolt 210 MV Manual

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