***Ewing-Foley, Inc. Continuing Education Training***

**Electrical Continuing Education, NEC Article 430**

**4-Hour Power point slide presentation**

 **Instructor Ralph Bliquez**

APPLICATION FOR A 4-HOUR CODE CHANGE CLASS ON MOTORS

 2023 NEC, ARTICLE 430

The scope of Article 430 is extensive with the most pages of any article in the Code. The variety of motor types and applications are confusing at best and the number of exceptions for seemingly every requirement are bewildering. This class will present the first five parts of the article with a focus on conductor ampacity, overload protection and short circuit/ground fault protection for motor branch circuits and feeders.

The class will begin with a short history of motor development. There will be several quizzes to clarify how calculations must be made to account for the variety of motors, ampacity exceptions, variety of protection methods, and multiple motor and other load requirements.

There are not many changes in Article 430 between the 2020 and 2023 NEC. What changes there are will be in red.

Class Outline with Approximate Time Requirements:

A Short History of Motor Development (10 Minutes)

Part I: General

430.1 Scope (10 Minutes)

430.2 Reconditioned Motors NEW (10 Minutes)

430.4 Part-Winding Motors (20 Minutes)

 The need for part-winding motors will be the first opportunity to address the current inrush for “locked rotor” and the consequences of this current inrush for overload and overcurrent protection.

430.6 (A) (1) & (2) Table Values/Nameplate Values (20 Minutes)

The difference between Full Load Current and Full Load Amperage: (Reference to 430.247-250 for current values affecting conductor ampacity and short- circuit or ground fault protection & Nameplate amperage values for Overloads)

430.6 (B), (C) & (D) Why Nameplate Values (5 Minutes)

430.7 Marking on Motors & Multimotor Equipment (30 Minutes)

430.9-16 Terminals, Space and Housing Requirements, Location Issues (10 Minutes)

430.17 Highest and Smallest Rated Motor Full Load Current (10 Minutes)

Part II: Motor Circuit Conductors

430.21 & 22: Continuous and Duty-Cycle Service (10 Minutes)

430.23-27: Wound Rotor Secondary, Multimotor & Combination Loads, Feeder Demand Factor and Capacitor Reference: (10 Minutes)

430.28: Feeder Taps: (15 Minutes)

Part III: Motor and Branch-Circuit Overload Protection

430.31: (A) & (B) Where Hazards Exist NEW (5 Minutes)

430.32: Overloads for Continuous Duty (10 Minutes)

430.33-44: Overload Controls: Fuses, Other Devices, # of Conductors opened, and Orderly Shutdown Conditions (10 Minutes)

Part IV: Motor Branch-circuit Short-Circuit and Ground Fault Protection

430.51: General Protection of Motors -- Not over 1000 Volts

430.52: (A) & (B) General Protection (5 Minutes)

430.52: (C) (1) (a) & (b) Heavily Revised NEW (10 Minutes)

The table in 430.52 (C)(1) lists the Maximum Rating or Setting of the 4 Motor Branch-Circuit Short-Circuit and Ground-Fault Protection Devices which vary exponentially but, in all cases, exceed the requirements in Article 240. These maximum ratings and settings are compromises that are necessary to start the motor. Each OCPD reacts differently.

 (C) (2) Manufacturer’s Requirements not to be exceeded

 (C) (3) Revisions of Instantaneous NEW Circuit Breakers

430.53: Several Motor Loads on One Branch Circuit (A) & (B) (10 Minutes)

 (C) (1) – (5) Other Group Installations NEW

 (D) (1) & (2) Single Motor Taps NEW

Part V: Motor Feeder Short-Circuit and Ground-Fault Protection

430.61 General (5 Minutes)

430.62 Rating or Setting of Motor Load (10 Minutes)

 Reference back to 430.24 for Motor Loads and Other Loads

430.63 Rating or Setting of Motor Load and Other Loads (5 Minutes)

There will be a 10 Minute Break at approximately 2 hours.

COURSE OBJECTIVES

The objectives of the class for Article 430 are to inform electricians of the complexity of motor requirements and the need to consult manufacturers’ instructions based on the types of motors and their uses.

LEARNING OUTCOME

Electricians will understand the importance of the motor characteristics, motor application, and manufacturer’s requirements that affect the conductor size, overload and overcurrent protection.

INSTRUCTOR

The instructor is Ralph Bliquez who is currently approved in Oregon, Washington, Idaho, California, Utah, Montana, and North Dakota.