AC-DC MOTOR REPAIR STANDARDS PLUS TWO-POLE MOTOR REPAIR SOLUTIONS

3 DAY HANDS-ON WORKSHOP

COURSE OUTLINE

NOTE: This three-day workshop includes classroom instruction and hands-on/lab training; where the hands-on/lab training gives students the opportunity to participate in motor repair standards testing and measurement demonstrations.

I. AC SQUIRREL-CAGE INDUCTION MOTORS
1. Electric Motor Theory
2. Introduction to Alternating Current Motors
3. Understanding Motor Nameplates
4. Motor Construction & Operation
5. Alternating Current Motor Repair Standards Tests & Measurements

II. DC MOTORS
1. Introduction to Direct Current Motors
2. Understanding DC Motor Nameplates
3. Motor Construction & Operation
4. Direct Current Motor Repair Standards Tests & Measurements

III. TWO-POLE INDUCTION MOTOR REPAIR SOLUTIONS
1. Motor Frame & Housing Measurements/Certification
2. Motor Stator & Laminated Core Measurements/Certification
3. Motor Rotor & Laminated Core Measurements/Certification
4. Air Gap Measurements/Certification
5. Dynamic Rotor Balancing Standards
6. Balancing Machine Certification
7. Journal Bearing Assemblies
8. Performance Testing & Measurements

IV. MOTOR REPAIR STANDARDS TESTING & MEASUREMENTS
1. Motor Repair Testing & Measurements Documentation
2. Insulation Resistance Testing (IEEE 43)
3. High-Potential Testing (NEMA MG1)
4. Surge Comparison Testing (IEEE 522)
5. Laminated Core Testing (IEEE 432)
6. Rotor Bar Testing (IEEE 112)
7. Air Gap Certification (API 541)
8. Impedance Testing (Voltage Drop)
9. Phase Resistance & Inductance Testing (IEEE 1415)
10. Dynamic Rotor Balancing (ISO 1940/1)
11. Balancing Machine Certification (ISO 2953)
12. Equipment & Tooling Calibration (ISO Certification)

AC-DC MOTOR REPAIR STANDARDS PLUS TWO-POLE MOTOR REPAIR SOLUTIONS
3 DAY HANDS-ON WORKSHOP

COURSE OUTLINE AND SYLLABUS

NOTE: This three-day workshop includes sixteen (16) hours of classroom instruction and three (3) hours of hands-on/lab training; where the hands-on/lab training gives students the opportunity to participate in motor repair standards testing and measurement demonstrations.

I. AC SQUIRREL-CAGE INDUCTION MOTORS _____ 4.0 Hours
1. Electric Motor Theory ..... 1.0 Hours
2. Introduction to Alternating Current Motors ..... 1.0 Hours
3. Understanding Motor Nameplates ..... 0.5 Hours
4. Motor Construction & Operation ..... 1.0 Hours
5. Alternating Current Motor Repair Standards Tests & Measurements ..... 0.5 Hours

NOTE: This four-hour session includes five (5) learning modules. Module 1 covers basic electricity and electric motor theory including Ohm's law, voltage, current, resistance, inductance, reactance, impedance, as well as series and parallel circuits. Module 2 covers an introduction to alternating current motors including squirrel-cage induction, wound rotor, and synchronous motors. Module 3 covers alternating current motor nameplate nomenclature; emphasizing important nameplate items to concentrate on when installing, replacing, repairing and testing ac motors. Module 4 covers alternating current motor construction and operation including the stator's rotating magnetic field, rotor winding construction and operation, counter-electromotive force, self-inductance, synchronous speed, slip speed, and rotor frequency. Module 5 covers alternating current motor repair standards testing & measurements.

II. DC MOTORS _____ 3.0 Hours
1. Introduction to Direct Current Motors ..... 1.0 Hours
2. Understanding DC Motor Nameplates ..... 0.5 Hours
3. Motor Construction & Operation ..... 1.0 Hours
4. Direct Current Motor Repair Standards Tests & Measurements ..... 0.5 Hours

NOTE: This three-hour session includes four (4) learning modules. Module 1 covers an introduction to direct current motors including shunt, series and compound connected motors. Module 2 covers direct current motor nameplate nomenclature; emphasizing important nameplate items to concentrate on when installing, replacing, repairing and testing dc motors. Module 3 covers direct current motor construction and operation including dc motor field circuits, armature windings, commutators, brushes and brushholders. Module 4 covers direct current motor repair standards testing and measurements.

COURSE OUTLINE AND SYLLABUS (CONT'D)

III. TWO-POLE INDUCTION MOTOR REPAIR SOLUTIONS _____ 5.0 Hours

1. Motor Frame & Housing Measurements/Certification ..... 1.0 Hours
2. Motor Stator & Laminated Core Measurements/Certification ..... 0.5 Hours
3. Motor Rotor & Laminated Core Measurements/Certification ..... 0.5 Hours
4. Air Gap Measurements/Certification ..... 0.5 Hours
5. Dynamic Rotor Balancing Standards ..... 0.5 Hours
6. Balancing Machine Certification ..... 0.5 Hours
7. Journal Bearing Assemblies ..... 1.0 Hours
8. Performance Testing & Measurements ..... 0.5 Hours

NOTE: This five-hour session includes eight (8) learning modules. Module 1 covers two-pole motor frames and housings including measurement and certification procedures. Module 2 covers two-pole stators and laminated cores including testing, measurements and certification. Module 3 covers two-pole rotors and laminated cores including testing, measurements and certification. Module 4 covers air gap measurements and certification in accordance with the API 541 Standard. Module 5 covers dynamic rotor balancing in accordance with the ISO 1940/1 Standard. Module 6 covers balance machine certification in accordance with the ISO 2953 Standard. Module 7 covers important motor repair and considerations for two-pole motors equipped with journal bearings. Module 8 covers two-pole motor performance testing including acceptance and certification documentation.

IV. MOTOR REPAIR STANDARDS TESTING & MEASUREMENTS _____ 7.0 Hours

1. Motor Repair Testing & Measurements Documentation ..... 1.0 Hours
2. Insulation Resistance Testing (IEEE 43) ..... 1.0 Hours
3. High-Potential Testing (NEMA MG1) ..... 0.5 Hours
4. Surge Comparison Testing (IEEE 522) ..... 0.5 Hours
5. Laminated Core Testing (IEEE 432) ..... 0.5 Hours
6. Rotor Bar Testing (IEEE 112) ..... 0.5 Hours
7. Air Gap Certification (API 541) ..... 0.5 Hours
8. Impedance Testing (Voltage Drop) ..... 0.5 Hours
9. Phase Resistance & Inductance Testing (IEEE 1415) ..... 0.5 Hours
10. Dynamic Rotor Balancing (ISO 1940/1) ..... 0.5 Hours
11. Balancing Machine Certification (ISO 2953) ..... 0.5 Hours
12. Equipment & Tooling Calibration ..... 0.5 Hours

NOTE: This seven-hour session includes twelve (12) learning modules. Module 1 covers motor repair testing and measurements documentation emphasizing accuracy and consistency when recording motor repair test and measurement data. Modules 2 through 10 cover motor repair testing and measurement procedures in accordance with applicable industrial Standards. Module 11 covers the importance of certifying balancing machines in accordance with the ISO 2953 Standard. Module 12 covers equipment and tooling calibration procedures.