

DC Motor Evaluation

As part of any modernization, the motors should be evaluated in accordance with the American National Standards Institute (A.N.S.I.) and Electrical Apparatus Service Association (E.A.S.A.) standards. These standards are outlined in “ANSI/EASA Standard AR100-2015”

“RECOMMENDED PRACTICE FOR THE REPAIR OF ROTATING ELECTRICAL APPARATUS”

The service company should be experienced with DC Elevator Gearless Traction Machines and the use of ANSI/EASA AR100-2015 guidelines to provide the following:

1. **Identification of the motor and control system**
 - a. Identify the motor (1.3), noting design perimeter limitations for applicability with new control systems
2. **Condition Assessment and Inspection:** An inspection of the machine should be performed (1.5.1), making note of:
 - a. Armature, Field Coil, Interpole, and Brake Coil insulation condition
 - b. Commutator condition and commutation
 - c. Brush and Brush Rigging condition
 - d. Bearing and lubrication condition
 - e. Brake Condition (Pad, Drum/Disk, Bushings and Pins, Linkage)
 - f. Fitment and Mechanical Integrity (Shaft, Laminations, Sheave)
 - g. Air gap
3. **Testing**
 - a. Low voltage electrical testing should be conducted prior to cleaning or repair to indicate suitability of continued operation and quickly locate areas where repair is necessary.
 - b. Low voltage insulation resistance should measure greater than 2 Megohms at 500Vac/dc. Insulation resistance (IR) tests should be performed with acceptable results before the High-potential tests (4.2).
 - c. High-potential tests should only be applied after a machine has been cleaned and dried and the insulation resistance (IR) tests are acceptable. Conduct insulation resistance test after high-potential test (4.3). Because of the stress placed on the insulation high-potential tests may not be advisable and repeated tests are not advised.
 - d. Brush Rigging insulation resistance test should be performed
 - e. Brake coil insulation resistance test and winding resistance test should be performed
 - f. Armature Winding Test (4.3.3). An Insulation resistance test should be performed. In addition one or more of the following tests should be performed
 - i. Growler
 - ii. Winding surge test
 - iii. Bar to Bar resistance test
 - g. Field Coils and Interpoles (4.3.4). An Insulation resistance test should be performed. In addition one or more of the following tests should be performed
 - i. Winding resistance
 - ii. Winding surge test
 - iii. AC voltage drop test
 - iv. Impedance test

4. **Cleaning** (1.5.2) All windings and parts should be cleaned with carbon dust, grit, grease, oil, and cleaning agent residue removed.
- NitroClean™**, or equivalent, of electrical components should be performed when not removed to service facility for repair
 - NitroClean™** and/or other acceptable methods of cleaning should be performed on equipment removed to a service facility

5. **Repair as necessary**

- Electrical repairs and rewinding. Components failing electrical tests as described in the above "Testing" should undergo further evaluation as outlined in "AR100 section 4" and repaired as necessary or rewound as per guidelines of "AR100 section 3" .Attention should be given to
 - Commutator machining, undercut and beveling
 - Brush holders and rigging insulation resistance, "quartering", seating and neutral
 - Electrical insulation tests should be repeated after repairs are made to verify insulation quality.
 - Mechanical repairs including shafts, bearings and seals, lubrication, laminated cores, balancing, and air gaps should be performed in accordance with AR100 section 2 and the O.E.M. specifications.
6. **Dynamic Testing** (4.6). Upon completion of modernization and prior to returning the elevator to service a System Dynamic Test should be conducted to ensure that the motor is operating within its optimal performance parameters as produced by drive, controller, and system loads
- Armature voltage and current readings should be measured under maximum load conditions
 - Field voltage and current should be measured at Standing, Forcing, and Full speed
 - Temperature of the Fields, Armature and Interpoles brake coil and bearings should be measured

NitroClean™ is a registered trademark of McIntosh Industries, Inc., Hillside N.J.

This document is prepared as a summary of ANSI/EASA AR100-2015 Recommended Practices for the Repair of Rotating Electrical Apparatus. An unabridged copy is available from:

McIntosh Industries, Inc.
Hillside, NJ
Technical support

E.A.S.A.
St. Louis, Mo

ANSI recognizes only one standard on a topic; therefore, ANSI/EASA AR100 is the American standard for repair of rotating electrical apparatus. The Recommended Practice is an important publication to distribute both internally and to customers.