This standard is designed to verify that a medium voltage electrically operated enclosed non-fusible vacuum disconnect switch is in a safe and reliable operating condition based upon the design of the original manufacturer at the time of manufacturing. PEARL testing does not verify the claims of the original equipment manufacturer as to the validity of its design criteria. In the event that the device is not in this condition then this standard cannot be used and the PEARL Reconditioning Standard needs to be followed.

PEARL does not warrant, guarantee or make any representation regarding the correctness of specifications, use for any particular purpose, quality or extent of testing, accuracy, or reliability as to any equipment, products or documentation referenced herein.

REFERENCES

The following references are use in this standard. Each of these references can be found in their respective listed locations.

Table References: Section 6000

Table 1: US Standard bus connection bolt torque values.
Table 2: Insulation resistance and test values for electrical apparatus.
Table 5: Overpotential Test Voltages for Non-Inductive Electrical Apparatus
Table 11: Insulation resistance and test temperature conversion to 20°C values.

I TEST EQUIPMENT

The following test equipment is required to perform the testing requirements of this reconditioning standard:

1. Insulation Resistance Test Set (Megohmeter) 2500 Vdc minimum
2. DC Overpotential Test Set (Hipot)

One of the following pieces of test equipment is required to perform the contact resistance testing requirements of this reconditioning standard:

1. Digital Low Resistance Ohmmeter (DLRO – 10 amp unit is sufficient.)
2. DC Current Source and a Millivoltmeter

One of the following pieces of test equipment may be required to perform the testing requirements of this reconditioning standard, depending on the accessories:

1. AC Voltage Supply
2. DC Voltage Supply
3. Millivoltmeter or a Multimeter

II EVALUATION

The following procedures shall be used to determine the condition of a medium voltage electrically operated enclosed non-fusible vacuum disconnect switch under this standard.

1 INSPECTION

1.1 Frame/Enclosure

1.1.1 Ensure that the nameplate data is legible.
1.1.2 Ensure that the third party listing service label is legible.
1.1.3 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.
1.1.4 Inspect for rust and corrosion.
1.1.5 Record results on an approved PEARL Evaluation Form.

1.2 Viewing Window

1.2.1 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.
1.2.2 Inspect viewing window glass for cracks and clarity.
1.2.3 Inspect viewing window glass weather stripping.
1.2.4 Record results on an approved PEARL Evaluation Form.

1.3 Insulators

1.3.1 Inspect for missing bolts or nuts.
1.3.2 Inspect for defects, cracks, or chips.
1.3.3 Inspect for signs of overheating or tracking.
1.3.4 Inspect for signs of deterioration or contamination.
1.3.5 Record results on an approved PEARL Evaluation Form.

1.4 Insulating Links/Push Rods

1.4.1 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.
1.4.2 Inspect for defects, cracks, or chips.
1.4.3 Inspect for signs of overheating or tracking.
1.4.4 Inspect for signs of deterioration or contamination.
1.4.5 Record results on an approved PEARL Evaluation Form.

1.5 Interlocks

1.5.1 Inspect for proper door interlock operation.
1.5.2 Inspect for proper Kirk lock assembly, if necessary.
1.5.3 Record results on an approved PEARL Evaluation Form.

1.6 Inter-phase Barriers

1.6.1 Inspect for dust, dirt and foreign materials.
1.6.2 Inspect for defects, cracks, or chips.
1.6.3 Inspect for signs of overheating or tracking.
1.6.4 Inspect for signs of deterioration or contamination.
1.6.5 Record results on an approved PEARL Evaluation Form.

1.7 Vacuum Bottle

1.7.1 Ensure that the nameplate data is legible.
1.7.2 Inspect for cracks and chips.
1.7.3 Check erosion gap on each phase if available.
1.7.4 Record results on an approved PEARL Evaluation Form.

1.8 Operating Mechanism

1.8.1 Inspect for signs of rust and corrosion.

1.8.2 Inspect for excessive and inappropriate lubrication.

1.8.3 Inspect closing spring.

1.8.4 Inspect opening spring.

1.8.5 Inspect operating chain or belt.

1.8.6 Inspect operation motor.

1.8.7 Inspect for missing screws, bolts, nuts, fasteners, retainers and keepers.

1.8.8 Manually operate disconnect switch a minimum of five (5) times while checking for proper operation of the quick-make and quick-break feature.

1.8.9 Electrically operate disconnect switch a minimum of five (5) times while checking for proper operation of the quick-make and quick-break feature.

1.8.10 Record results on an approved PEARL Evaluation Form.

1.9 Control Wiring

1.9.1 Inspect for overheating.

1.9.2 Inspect for damage and deteriorated insulation.

1.9.3 Check for loose and defective terminal connectors.

1.9.4 Record results on an approved PEARL Evaluation Form.

1.10 Limit Switches

1.10.1 Inspect all limit switches for proper operation.

1.10.2 Check all terminal connections.

1.10.3 Inspect for chips, cracks and defective limit switch cases.

1.10.4 Record results on an approved PEARL Evaluation Form.

1.11 Checks and Adjustments

1.11.1 Make all other checks per manufacturer's recommendations. In the absence of a manufacturer’s recommendations, any checks made will be based upon procedures that will ensure the original manufacturer’s design.

1.11.2 Record results on an approved PEARL Evaluation Form

2 TESTING

2.1 Insulation Resistance

2.1.1 *Consult manufacturer's instructions for any precautions before performing this test*.

2.1.2 Perform an insulation resistance test at test values specified in Table 2 of Section 6000 as follows:

2.1.2.1 Disconnect switch in the open position

2.1.2.1.1 Line to load

2.1.2.2 Disconnect switch in the closed position

2.1.2.2.1 Phase to phase

2.1.2.2.2 Phase to ground

2.1.3 Correct for temperature, if necessary (Table 11).

2.1.4 Record results on an approved PEARL Evaluation Form.

2.1.5 Compare test results to manufacturer's recommendations or Table 2 of Section 6000.

2.2 Contact Resistance

2.2.1 Perform a contact resistance, millivolt drop test or watt-loss test from line to load on each phase of a closed switch with the test points at the line and load lug landings.

2.2.2 Record results on an approved PEARL Evaluation Form.

2.2.3 Compare test results to manufacturer's recommendations.

2.2.4 A PEARL recognized method for evaluation of the current carrying path is comparing the test results of each pole. Results should be within 50% for any of the poles. Any other industrial standard used for evaluation of the current carrying path shall provide at least the same integrity as the PEARL recognized standard of comparing the test results of each pole and ensuring that they are within 50% of each other.

2.3 Overpotential Test

2.3.1 Perform an overpotential test at test voltage specified in Table 5 as follows:

2.3.1.1 Switch in the closed position

2.3.1.1.1 Phase to phase

2.3.1.1.2 Phase to ground

2.3.2 Record results on an approved PEARL Evaluation Form.

2.3.3 Compare results to manufacturer's guidelines or industrial standards.

2.4 Vacuum Bottle Integrity Test

2.4.1 *Consult manufacturer's instructions for any precautions concerning radiation warnings before performing this test*.

2.4.2 Perform a vacuum bottle integrity test on each phase using specific manufacturer's literature guidelines for test voltage and test sets.

2.4.3 Switch in the open position - Line to Load

2.4.4 Record results on an approved PEARL Evaluation Form.

2.4.5 Compare results to manufacturer's guidelines or company guidelines.

NOTE: If the original equipment manufacturer has designed the parts to be field installed, then the devices may be replaced as necessary. Otherwise, if changes are made to the accessories then the PEARL Reconditioning Standards need to be followed.

2.5 Checks and Adjustments

2.5.1 Make all checks and adjustments per manufacturer's recommendations. In the absence of a manufacturer's recommendations, any check or adjustment made will be based upon procedures that will ensure the original manufacturer's design.

2.5.2 All checks and adjustments must be within the guidelines recommended in order for the product to become a PEARL labeled product.

2.5.3 Record results on an approved PEARL Evaluation Form.

2.6 Torque

2.6.1 Check all screw and bolt connections for the proper torque per manufacturer's recommendations or Table 1 of Section 6000.

2.6.2 Record results on an approved PEARL Evaluation Form.

2.7 Final Operation

2.7.1 Ensure that all components, structures, devices and assemblies are complete and equipment is ready for service prior to beginning operations.

2.7.2 Operate the device a minimum of ten (10) times while checking for proper operation of the quick-make and quick-break feature.

2.7.3 All devices must operate properly in order for the product to become a PEARL labeled product.

2.7.4 Record results on appropriate PEARL Evaluation Form.

3 EVALUATION REVIEW

In order for the device to be eligible for the Inspect & Test Quality Seal, the device needs to have passed all of the preceding Inspection (1) and Testing (2) points. Any failures in the process will require that the device be "Reconditioned" at which time the PEARL Reconditioning Standard needs to be followed.

III PEARL CERTIFICATION

This product has now been inspected and tested and has passed all tests under the PEARL Inspect & Test Standard. The green PEARL Inspect & Test Quality Seal may now be placed on the device.