

PEARL Reconditioning Standards			
LOW VOLTAGE TRANSFORMERS DRY-TYPE (600V AC Max. Primary)	Revision		
	Standard	Number	Date
	1410	5	11-2008

The term "reconditioning" is defined as "the process of returning electrical equipment to safe and reliable operating condition based on the design of the original manufacturer at the time of manufacturing."

NOTE: This guideline does not pertain to control power or instrumentation transformers.

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 6: Transformer Insulation Resistance Test Value
- 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 (Megohmmeter) 1000 Vdc minimum

One of the following pieces of test equipment is required to perform the transformer ratio verification testing requirements of this reconditioning standard:

1. Turns-To-Turns Ratio Test Set
2. AC Voltage Supply and Voltmeter (+/- 0.5%)
3. Self-contained Transformer Test Set

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II RECONDITION EVALUATION

These steps are used to determine what will be required to recondition this product 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 the overall exterior for missing screws, bolts, nuts, fasteners, retainers and keepers.
- 1.1.4 Inspect for unused openings.
- 1.1.5 Inspect for improper covers.
- 1.1.6 Inspect for rust and corrosion.
- 1.1.7 Inspect for proper alignment of all panels.
- 1.1.8 Record results on an approved PEARL Evaluation Form.

1.2 Phase and Neutral Bus

- 1.2.1 Inspect for signs of corrosion.
- 1.2.2 Inspect for signs of overheating.
- 1.2.3 Inspect all connections for missing hardware.
- 1.2.4 Check for a continuous current-carrying path.
- 1.2.5 Record results on an approved PEARL Evaluation Form.

1.3 Grounding Bus

- 1.3.1 Inspect for signs of corrosion.
- 1.3.2 Inspect for signs of overheating.
- 1.3.3 Inspect ground for missing hardware.
- 1.3.4 Check for a continuous current-carrying path.
- 1.3.5 Record results on an approved PEARL Evaluation Form.

1.4 Bus Support

- 1.4.1 Inspect for signs of overheating.
- 1.4.2 Inspect for signs of deterioration.
- 1.4.3 Inspect for chips, cracks and broken insulators.
- 1.4.4 Record results on an approved PEARL Evaluation Form.

1.5 Tap Board

- 1.5.1 Inspect for signs of overheating.
- 1.5.2 Inspect for signs of deterioration.
- 1.5.3 Inspect for tracking and corona damage.
- 1.5.4 Inspect for signs of corrosion.
- 1.5.5 Inspect all connections for missing hardware.
- 1.5.6 Record results on an approved PEARL Evaluation Form.

1.6 Windings

- 1.6.1 Inspect for cracked insulation.
- 1.6.2 Inspect for signs of overheating.
- 1.6.3 Record results on an approved PEARL Evaluation Form.

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- 1.7 Core**
 - 1.7.1** Inspect for signs of corrosion.
 - 1.7.2** Inspect for signs of overheating.
 - 1.7.3** Record results on an approved PEARL Evaluation Form.

2 TESTING

2.1 Insulation Resistance

- 2.1.1** Connect all primary terminals together.
- 2.1.2** Connect all secondary terminals together.
- 2.1.3** Primary to secondary and ground test
 - 2.1.3.1** Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.3.2** Correct for temperature, if necessary (Table 11).
 - 2.1.3.3** Record results on an approved PEARL Evaluation Form.
- 2.1.4** Secondary to primary and ground test
 - 2.1.4.1** Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.4.2** Correct for temperature, if necessary (Table 11).
 - 2.1.4.3** Record results on an approved PEARL Evaluation Form.
- 2.1.5** Primary to secondary test
 - 2.1.5.1** Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.5.2** Correct for temperature, if necessary (Table 11).
 - 2.1.5.3** Record results on an approved PEARL Evaluation Form.
- 2.1.6** Compare test results to manufacturer's recommendations or Table 6 of Section 6000.

2.2 Transformer Turns Ratio Verification

- 2.2.1** Perform a 'turns ratio test' on each phase from primary to secondary on all taps.
- 2.2.2** Record results on appropriate PEARL Evaluation Form.
- 2.2.3** Compare test results to manufacturer's recommendations or industrial standards.

2.3 Core Ground

- 2.3.1** Perform a core ground test on each phase.
- 2.3.2** Record results on appropriate PEARL Evaluation Form.
- 2.3.3** Compare test results to manufacturer's recommendations or industrial standards.

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III RECONDITIONING PROCEDURES

The following procedures are in a recommended order and are required to recondition this product. PEARL recognizes that, based on actual product design and as found condition, some of these procedures may not be applicable. The testing requirement must be completed before the product can be labeled as a PEARL reconditioned product.

1 RECONDITIONING

1.1 Frame/Enclosure

- 1.1.1 Disassemble to clean.
- 1.1.2 Clean all parts of contamination and corrosion.
- 1.1.3 Prepare the frame/enclosure to paint, as necessary.
- 1.1.4 Paint frame/enclosure.

1.2 Coils and Insulators

- 1.2.1. Clean coils.
- 1.2.2. Clean insulators.

1.3 Missing or Defective Components, Parts and Hardware

- 1.3.1 Replace or repair any missing or defective components, parts and hardware found during the inspection phase of this standard.

1.4 Torque

- 1.4.1 Check all screw and bolt connections for the proper torque per manufacturer's recommendations or Table 1 of Section 6000.
- 1.4.2 Record results on an approved PEARL Reconditioning Test Form.

1.5 Final Assembly

- 1.5.1 Ensure that frame is plumb and square.
- 1.5.2 Cover any unused openings.
- 1.5.3 Ensure that the nameplate/label data is complete, correct and legible.

2 TESTING

2.1 Insulation Resistance

- 2.1.1 Connect all primary terminals together.
- 2.1.2 Connect all secondary terminals together.
- 2.1.3 Primary to secondary and ground test.
 - 2.1.3.1 Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.3.2 Correct for temperature, if necessary (Table 11).
 - 2.1.3.3 Record results on an approved PEARL Reconditioning Test Form.
- 2.1.4 Secondary to primary and ground test.
 - 2.1.4.1 Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.4.2 Correct for temperature, if necessary (Table 11).
 - 2.1.4.3 Record results on an approved PEARL Reconditioning Test Form.

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- 2.1.5** Primary to secondary test
 - 2.1.5.1** Perform an insulation resistance test at test voltage specified in Table 6 of Section 6000. The test duration shall be for 1 minute.
 - 2.1.5.2** Correct for temperature, if necessary (Table 11).
 - 2.1.5.3** Record results on an approved PEARL Reconditioning Test Form.

2.1.6 Compare test results to manufacturer's recommendations or Table 6 of Section 6000.

2.1.7 The test results must be within the guidelines recommended in order for the product to become a PEARL labeled product.

2.2 Transformer Turns Ratio Verification

2.2.1 Perform a 'turns ratio test' on each phase from primary to secondary on all taps.

2.2.2 Record results on appropriate PEARL Reconditioning Test Form.

2.2.3 Compare test results to manufacturer's recommendations or industrial standards.

2.2.4 The test results must be within the guidelines recommended in order for the product to become a PEARL labeled product.

2.3 Core Ground

2.3.1 Perform a core ground test on each phase.

2.3.2 Record results on appropriate PEARL Reconditioning Test Form.

2.3.3 Compare test results to manufacturer's recommendations or industrial standards.

2.3.4 The test results must be within the guidelines recommended in order for the product to become a PEARL labeled product.

2.3.5

IV PEARL CERTIFICATION

This product has now been reconditioned under the PEARL Reconditioning Standard. The blue PEARL Reconditioning Quality Seal may now be placed on the device.