



PROCESS
INDUSTRY
PRACTICES

July 2021

Electrical

**PIP ELTFT02
Induction Motor
Electrical Maintenance**

Currently in preview, click buy full version

PURPOSE AND USE OF PROCESS INDUSTRY PRACTICES

In an effort to minimize the cost of process industry facilities, this Practice has been prepared from the technical requirements in the existing standards of major industrial users, contractors, or standards organizations. By harmonizing these technical requirements into a single set of Practices, administrative, application, and engineering costs to both the purchaser and the manufacturer should be reduced. While this Practice is expected to incorporate the majority of requirements of most users, individual applications may involve requirements that will be appended to and take precedence over this Practice. Determination concerning fitness for purpose and particular matters or application of the Practice to a particular project or engineering situations should not be made solely on information contained in these materials. The use of trade names from time to time should not be viewed as an expression of preference but rather recognized as normal usage in the trade. Other brands having the same specifications are equally correct and may be substituted for those named. All Practices or guidelines are intended to be consistent with applicable laws and regulations including OSHA requirements. To the extent these Practices or guidelines should conflict with OSHA or other applicable laws or regulations, such laws or regulations must be followed. Consult an appropriate professional before applying or acting on any material contained in or suggested by the Practice.

This Practice is subject to revision at any time.

© Process Industry Practices (PIP), Construction Industry Institute, The University of Texas at Austin, 3925 West Braker Lane (R4500), Austin, Texas 78759. PIP Member Companies and Subscribers may copy this Practice for their internal use. Changes or modifications of any kind are not permitted within any PIP Practice without the express written authorization of PIP. Authorized Users may attach addenda or overlays to clearly indicate modifications or exceptions to specific sections of PIP Practices. Authorized Users may provide their clients, suppliers and contractors with copies of the Practice solely for Authorized Users' purposes. These purposes include but are not limited to the procurement process (e.g., as attachments to requests for quotation/purchase orders or requests for proposals/contracts) and preparation and issue of design engineering deliverables for use on a specific project by Authorized User's client. PIP's copyright notices must be clearly indicated and unequivocally incorporated in documents where an Authorized User desires to provide any third party with copies of the Practice.

PUBLISHING HISTORY

July 2021 *Issued*

Not printed with State funds



PIP ELTFT02 Induction Motor Electrical Maintenance

Table of Contents

- 1. Scope2**
- 2. References2**
 - 2.1 Industry Codes and Standards2
 - 2.2 Other References2
- 3. Definitions3**
- 4. General3**
 - 4.1 Maintenance Types3
 - 4.2 Maintenance Interval3
 - 4.3 Documentation5
- 5. Electrical Maintenance5**
 - 5.1 Safety5
 - 5.2 Electrical Assessment5
 - 5.3 Power Quality Assessments7
 - 5.4 Static Assessments12
 - 5.5 Rotor Assessments24
 - 5.6 Connection Assessments29
 - 5.7 Miscellaneous Assessments32

Data Forms

- ELTFT02-T1 – Inspection and Testing form for Induction Motor Power Quality Assessment
- ELTFT02-T2 – Inspection and Testing form for Induction Motor Insulation Resistance Assessment

- ELTFT02-T2T – Inspection and Testing form for Induction Motor Insulation Resistance Trending
- ELTFT02-T3 – Inspection and Testing form for Induction Motor Step Voltage Assessment
- ELTFT02-T4 – Inspection and Testing form for Induction Motor Resistance and Inductance Assessment
- ELTFT02-T5 – Inspection and Testing form for Induction Motor Capacitance Assessment
- ELTFT02-T6 – Inspection and Testing form for Induction Motor Rotor Assessment Calculations
- ELTFT02-T7 – Inspection and Testing form for Induction Motor Connection Assessment
- ELTFT02-T8 – Inspection and Testing form for Induction Motor Visual & Mechanical Assessment
- ELTFT02-T9 – Inspection and Testing form for Induction Motor Surge Protection System Assessment
- ELTFT02-T10 – Inspection and Testing form for Induction Motor RTD Assessment
- ELTFT02-T11 – Inspection and Testing form for Induction Motor Space Heater Assessment

1. Scope

This Practice covers minimum requirements for the maintenance of induction motors. The aspects of electrical maintenance are described.

While many of the maintenance aspects covered in this Practice can be applied to synchronous and DC motor maintenance, synchronous and DC motor maintenance is not part of this Practice.

2. References

Applicable parts of the following industry codes and standards and other references shall be considered an integral part of this Practice. The edition in effect on the date of contract award shall be used, except as otherwise noted. Short titles are used herein where appropriate.

2.1 Industry Codes and Standards

- Institute of Electrical and Electronic Engineers (IEEE)
 - IEEE 43 - *Recommended Practice for Testing Insulation Resistance of Rotating Machinery*
 - IEEE 519 - *Recommended Practice and Requirements for Harmonic Control in Electric Power Systems*
 - IEEE 1434 - *IEEE Guide for the Measurement of Partial Discharge in AC Electric Machinery*
- InterNational Electrical Testing Association (NETA)
 - MTS - *Standard for Maintenance Testing Specifications for Electrical Power Equipment and Systems*
- National Fire Protection Association (NFPA)
 - NFPA 70 - *National Electrical Code*
 - NFPA 70B - *Recommended Practice for Electrical Equipment Maintenance*
 - NFPA 70E - *Standard for Electrical Safety in the Workplace*

2.2 Other References

- [1] *A Field's Time, The Complete Guide To Electrical Insulation Testing* – Megger, 2017
- [2] *Applying Temperature Standards to IR Inspections of Electrical Systems* – Paul Greiner, Maintenance Technology October 1993
- [3] *MCEmax Data Interpretation* – PdMA Corporation, April 2003
- [4] *PD Seminar: Failure Mechanisms, PD Theory, PD Detection, PD Interpretation* – Iris Power Engineering, October 2000
- [5] *User's Manual Digital Winding Tester D12R, D6R 3R* – Baker Instrument Company, February 2010
- [6] *Testing Theories and Recommendations* – Baker Instrument Company
- [7] *The New Weibull Handbook* – Dr. Robert B. Abernethy, Fourth Edition 2002
- [8] *The Use of a DLRO (Digital Low Resistance Ohmmeter) versus a DMM (Digital Multi-Meter)* – Megger Application Note