



ADVANCED ENERGY'S PROVEN EFFICIENCY VERIFICATION PROGRAM FOR MOTOR REPAIR FACILITIES

Congratulations on your decision to apply for Advanced Energy's Proven Efficiency Verification (PEV) program for motor repair facilities. This program provides verification that a given facility is capable of performing high-quality AC induction motor diagnosis and repair. The PEV program is recognized under our AE Certification Trademark, and all the rights to use of this trademark are granted for a one-year period. The mark can be used on motor nameplates that have been repaired to the PEV program specifications, on websites, on letterhead and in other marketing-related materials. Annual PEV program renewal is required to maintain the mark.

What will you receive with verification?

1. A listing in Advanced Energy's online directory of verified facilities that is available to industrial and commercial customers.
2. An AE Certified® certificate.
3. Pre- and post-repair test data from an independent laboratory suitable for copying and providing to your customers.
4. A kit that contains electronic files of the AE Certification Trademark and advertising flyers for your customers.
5. 100 press releases sent by Advanced Energy announcing your verification to a mailing list provided by you.
6. Access to an Advanced Energy representative for your customers to call for more information about your verification.

The PEV program has high standards, and your commitment will require time and effort; however, the returns on your investment will justify the endeavor. When you complete the program and present your AE Certified® credentials to your customers and prospects, you will be increasing your marketability and offering them reassurance that they have made a good decision by choosing your services.

Included in this packet are the instructions and checklists needed for your application and preparation for an on-site assessment. If you have any questions, please call Kitt Butler at (919) 857-9017. We recommend that you complete the forms in this packet and then make

copies to send to Advanced Energy, retaining the originals for your records.

Part B of this booklet contains an explanation of the rules and regulations that apply to the application, the on-site assessment, the motor tests and publication of your verification status.

INSTRUCTIONS AND FEE INFORMATION

1. Read all documents provided in this packet to understand the PEV program requirements.
2. Complete the forms by printing in black ink. Send a scanned copy of the forms to Advanced Energy and retain this booklet for your records.
3. Complete the general application checklist and have your authorized representative sign the agreement with the conditions for verification.
4. Send all applications and worksheets to:

**Advanced Energy
Proven Efficiency Verification
909 Capability Drive, Suite 2100
Raleigh, NC 27606**

FEES

On-Site Assessment	\$5,000.00
Pre- and Post-Repair Testing	\$5,000.00

Advanced Energy will invoice twice, once at the conclusion of the on-site audit and once after post-repair testing is complete and confirmed.

NOTE ON CHARGES NOT COVERED ABOVE: *Motor shipping charges are the responsibility of the customer. Customer must pay travel expenses for PEV auditor.*

GENERAL APPLICATION CHECKLIST

Name and address of **owner** of repair facility.

Owner's Name

Phone ()

Address

City, State, Zip

Legal name and full address of repair facility. This name and address will appear on the certificate of verification and in Advanced Energy directories. They will also be used for all correspondence with the facility.

Facility Name

Phone ()

Street Address

P.O. Box

City, State, Zip

Country

Authorized representative of the facility. The authorized representative is responsible for ensuring that the facility complies with the conditions and criteria for verification. This person's name will appear in Advanced Energy directories and on the AE Certified® certificate.

Name

Title

Email Address

Phone #/Fax #

As part of this application package, please provide the following:

- If available, a copy of your general AC motor repair specifications prior to the on-site assessment. This information will be kept confidential by Advanced Energy.
- A detailed organizational chart of the facility that shows the name and position of all key personnel. Include a listing of facility personnel involved in motor repair operations, their role in motor repair operations and their years of experience in motor repair.
- A description of the motor repair facility, including facility size and major equipment.
- Copies of all motor repair job record forms.
- Signed "Conditions for Verification" sheet (page 4).
- The completed "Instructions and Fee Information" sheet and your fee payment (page 2).
- A copy of this page.

Your application package is not complete without all of the above items.

CONDITIONS FOR VERIFICATION

To become verified and maintain verification, the facility agrees in writing to:

1. Be assessed and evaluated initially by allowing an auditor representing Advanced Energy to inspect the areas outlined in the "Audit Checklist Summary."
2. Participate in the testing portion of the verification process by providing test motors as outlined in Part B of this application.
3. Provide to Advanced Energy, within 30 days of receipt of the on-site assessment results, a description and schedule for actions to clear any discrepancies listed in the assessment report within 6 months.
4. Resolve all deficiencies according to the schedule outlined in step 3.
5. Have all deficiencies resolved and testing requirements completed within 12 months of the on-site assessment. If this time limit is not met, the process will be discontinued or restarted with a new audit (including the audit fee and expenses).
6. Report to Advanced Energy within 30 days of any major changes involving the location, ownership, management structure or authorized representative.
7. Return all rights to the use of the AE Certification Trademark, including certificates, should you a) be requested to do so by Advanced Energy; b) voluntarily terminate your verification status; or c) become unable to conform to any of the conditions related to the technical requirements.
8. Pay all required fees.
9. Cease promotion and advertising of the facility as being AE Certified® and desist in using any AE Certification Trademark in all forms if verification status is terminated for any reason, whether for failure to maintain verification or because of other reasons.
10. All PEV test motors will be labeled with a brass number tag. This tag should never be removed from the motor.
11. All efforts should be made to preserve the PEV test motors' original nameplates. If an original nameplate must be replaced, the new nameplate must contain ALL of the original nameplate information. The nameplate must remain permanently attached, data side up, to the test motor.

12. Loss of Advanced Energy brass number tag and/or original nameplate may result in the additional cost of a replacement motor and additional PEV testing.

13. Motors tested for PEV will be returned to the customer for storage. Prior to the next renewal date, Advanced Energy will contact the customer to arrange a schedule for shipping.

As the facility's authorized representative, I agree to the above conditions for verification. I attest that all statements made in this application are correct to the best of my knowledge and are made in good faith.

Authorized Representative

Date

AUDIT CHECKLIST SUMMARY

I. General

Repair specifications will be reviewed, including specifications and processes for periodic update and audit, to be sure specs are being followed. If a repair specification is not available for the initial audit, one must be provided by the first annual verification renewal.

Housekeeping

Quality assurance program

Reference documents on hand

II. Personnel

Staff

1. Review of staff job functions and qualifications
2. Review of practices when deviating from standard repair specs

Training

Review of in-house and out-of-house training programs

III. Equipment

Assessment of what equipment is owned and the condition of each.

Cut-off Saw
Burn Out Oven & Bake Out Oven
Water Mist flame suppression system
Alternative stripping method equipment
Coil removal equipment
Stator cleaning system
Balance Machine

Coil winding equipment

Coil winding machine

Varnish systems

VPI
Trickle method
Dip tank

Electrical metering

(All measuring instruments shall be calibrated at least annually.)

Power system panel meters
Core loss tester
Ohmmeter
AC or DC Hi-Pot tester
IR Tester (Meggar)
Surge comparison tester

Burn Out and Bake Out oven temperature sensor/control

Part temperature recording meter

Flame suppression temperature control (if independent of oven thermostat control)

Test Panel Power Supply Capacities

IV. Materials Used in Repairs

Insulation materials

Wire type

Varnishes. A review of varnishes will include a review of sample testing processes and varnish/resin types

Bearing Inventory (storage process and brands)

V. Motor Repair Procedures

Receiving - A review of job sheets and recording and tracking of jobs

Incoming tests

Disassembly and inspection

Rewind Process

1. Stator stripping
2. Stator cleaning
3. Coil prep
4. Coil insertion
5. Connections
6. Pre-dip tests
7. Dip and Bake
8. Post-dip tests

Mechanical Repairs

1. Shaft repair (including bearing fits)
2. End shield repair

Assembly

1. Bearing selection
2. Bearing installation
3. Rotor insertion

Final tests

1. No load run test
2. Vibration results
3. Records delivered to customer.

VI. The before/after motor repair test is the second phase of the program and will be conducted after successful completion of the audit.

Criteria for Qualified test results

- Any efficiency increase is acceptable.
- A maximum of 0.40-point drop in efficiency at either 50, 75 or 100% loads.
- A maximum of 1.0 cumulative drop in efficiency at 50, 75 and 100% load points.

Confidentiality

The information collected during this program will never be associated with the name of this facility except within Advanced Energy for the purposes of certification or recertification of the facility. However, the data may be used in an anonymous compilation study of motor repair practices.

PART B
EXPLANATION OF RULES AND CONDITIONS GOVERNING
PEV PROGRAM

A. General

B. Motor repair tests

Motor specs for repair tests

If a motor fails the PEV criteria at retest

C. Annual renewal

General information

Requested information list for Renewal Application Form

Failure of annual renewal

D. Re-audit

E. Use of AE Certification Trademark for marketing purposes

A. General

All requirements of "Conditions for Verification" must be met initially and maintained as described below and on page 4.

B. Motor repair tests

Motor specs for repair tests

1. Two motors must be tested, rewound and retested for initial verification.
2. The two motors must be of different hp ratings and within the range of 20 to 200 hp. The larger motor must be at least two times the hp rating of the smaller motor.
3. Motors to be tested must be designed for 60 Hz, 230, 460 volt 3-phase power.
4. Motor original winding must be concentric or lap.
5. Original motor manufacturer's winding spec for PEV test motors must be provided to Advanced Energy when motors are submitted for baseline testing.
6. Winding spec, as determined "at stripping" and "as installed," must be supplied when repaired motors are submitted for retest.
7. "As installed" winding spec may deviate from motor manufacturing's spec or from "as stripped" spec, but PEV applicant is responsible for any additional costs (such as for additional tests) that may result if the motor fails the retest.
8. New and rewound PEV motors must be run-in at no-load & rated voltage until the input watts have stabilized (not less than 4 hours) to provide bearing grease break-in before motors are delivered to Advanced Energy for testing.

If a motor fails the PEV criteria at retest

1. Advanced Energy will advise customer of the motor loss categories contributing to failure.
2. Advanced Energy will suggest action (not guaranteed) that may lead to passing a retest.
3. Advanced Energy will advise customer that it is their choice to take the suggestions or not, or to take any other action they choose before attempting a retest. All costs (shipping, testing, travel, etc.) are the customer's responsibility.

4. Advanced Energy will advise customer of the cost for each retest.
5. Any additional analysis or investigation requested by the customer (bearing grease inspection, for instance) will be done at Advanced Energy's standard billing rates.
6. A motor retest failure due to a procedural error during repair may result in a requirement for the customer to revise their repair procedure(s) to incorporate an Irreversible Corrective Action (ICA). If an ICA is required, the customer must provide Advanced Energy with documentation defining the effectiveness and implementation of the ICA.

C. Annual renewal

General information

1. One motor must be rewound and retested at Advanced Energy annually.
2. After the initial PEV retests, before motors leave Advanced Energy, the customer must identify one of the original test motors to use for the next annual renewal (else see below). (Advanced Energy must inflict winding damage to ensure that the motor will be rewound before it is returned for renewal retest.)
3. After each renewal retest, the customer must indicate if the test motor will be reused for the next annual renewal.
4. The customer must supply the "as stripped" and "as installed" winding design specs when submitting the motor for renewal testing.
5. The customer will submit a renewal application indicating significant changes in ownership, employees, facility or equipment (see below).
6. The customer must supply a copy of their repair spec as in use at the time of the renewal.
7. If a customer does not wish to use one of the initial PEV motors for the annual renewal (or cannot find the original motor at renewal time), a new motor that meets the original motor selection criteria must be supplied to Advanced Energy for baseline testing. That motor will then be rewound and returned to Advanced Energy for retesting. In this scenario, the renewal fee will be higher. Original manufacturing "as stripped" and "as installed" winding design specs must be provided for renewal (as for original PEV tests).

Requested information list for Renewal Application Form

- "As stripped" and "as installed" winding design specs (send with renewal test motor).
- A copy of repair spec in use at the time of the renewal.
- Owner's name(s).
- Facility physical address.
- Mailing address.
- Organizational chart.
- List of all employees involved in motor repair, with total years of experience in motor repair and total years with the company.
- Major motor repair equipment list.
- Record of motor repair employee training over the previous year.
- Record showing calibration due dates for all metering and measuring equipment.

Failure of annual renewal

Failure to pass annual renewal could result from:

- Retest failure that is not corrected.
- Refusal to provide requested information.
- Inability to provide a valid repair spec.
- Refusal to submit to a requested re-audit.

D. Re-audit

A facility re-audit must be completed at least every 5 years. A re-audit may also be required based on determinations made during annual renewal. The magnitude and cost of the re-audit will be on a case-by-case basis and depend on its cause.

A re-audit requirement MAY be triggered by one of the following:

- A change in ownership of the company.
- A change in management of the company.
- A change in management of the motor repair unit.
- A significant (>30%) turnover or loss in motor repair staff cumulative years of experience.
- Facility relocation.
- The loss of major motor repair equipment.
- A major change in repair procedures.

E. Use of AE Certification Trademark for marketing purposes

The AE Certification Trademark may be used only so long as PEV program requirements are maintained and the facility meets all standards for certification.

PEV is a certification. When promoting the facility as AE Certified®, the facility should always use that specific language. When referring to Advanced Energy, specify that Advanced Energy is a nonprofit, independent, non-government organization; it is permitted to say that Advanced Energy is a certification body. If mention is made of Advanced Energy's credentials, the NVLAP accreditation verbiage must be used exactly as printed in Advanced Energy literature (a NVLAP requirement).

The AE Certification Trademark may be used in marketing and advertising materials so long as no changes to design, fonts or colors are made. The AE Certification Trademark is always shown in solid black or orange (HEX# e67d3c) and green (HEX# 3b5b59).