



**AN ADVANCED ENERGY
MOTOR RENEWAL PROGRAM**

Proven Efficiency

Verification Application
and Summary Checklist



ADVANCED ENERGY'S PROVEN EFFICIENCY VERIFICATION FOR MOTOR REPAIR FACILITIES

Congratulations on your decision to apply for Advanced Energy's Proven Efficiency Verification for motor repair facilities.

This program provides motor repair facilities and their customers with verification that the facility is capable of providing high quality AC induction motor diagnosis and repair. When you complete the program and present your PEV credentials to your customers and prospects, you will be able to offer them reassurance that they have made a good decision by choosing your services.

What will you receive with verification?

1. A listing in Advanced Energy's directory of verified facilities that is available to industrial and commercial customers on the Internet.
2. A Proven Efficiency Verification 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 PEV and AE logos; 100 advertising flyers for your customers
5. 100 press releases sent by Advanced Energy to a mailing list provided by you, announcing your verification.
6. Access to an Advanced Energy representative for your customers to call for more information about your verification.

The Proven Efficiency Verification standards are high standards. We make no apology for the precision with which we conduct our audit and testing. You should be aware that your commitment to the program in terms of time and effort will be required.

However, the returns on your investment justify the endeavor. The marketability of your company will increase dramatically when you have compelling evidence for your customers and prospects that you are their best choice for their repair business.

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 concerning this

information, please call Kitt Butler at 919/857-9000. We recommend that you complete the forms in this booklet, and then make copies to send to Advanced Energy, retaining the booklet intact 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 package in order to understand Proven Efficiency Verification requirements.
2. Complete the forms by printing in black ink. Send a photocopy 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. Make checks and purchase orders payable to **ADVANCED ENERGY**. Please print "Proven Efficiency" on your check or purchase order to ensure that payment will be credited to the proper account. To make payment by charge card, complete the MasterCard or Visa charge authorization below.
5. Send all applications and worksheets with payment to:

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

If you have any questions, please call Kitt Butler at Advanced Energy at 919/857-9000 or FAX 919/832-2696.

FEES *(subject to change)*

On-Site Assessment	\$5,000.00	\$
Pre- and Post-Repair Testing	\$4,500.00*	\$
TOTAL ENCLOSED		\$

** The fee for the Pre- and Post-Repair Testing is not required until the on-site assessment portion of the program has been successfully completed.*

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

Check Enclosed Visa MasterCard

AUTHORIZATION TO CHARGE MASTERCARD OR VISA

Account Number: _____ Expiration Date: _____

Vcode (3 digits on back of card): _____

Name of Cardholder: _____ Date: _____

Signature of Cardholder: _____

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, and will 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. The authorized representative will receive all Advanced Energy correspondence and will be contacted about on-site assessments.

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 held confidential at 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 the motor repair operation, and their number of years experience in motor repair.
- 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 the above items.

CONDITIONS FOR VERIFICATION

In order 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 that are outlined on 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. Providing 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, authorized representative; and
7. Return to Advanced Energy the Certificate of Verification for revision or other action 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 these conditions related to the technical requirements.
8. Pay all required fees.
9. If verification status is terminated for any reason, whether for failure of verification to be maintained or because of other reasons, to cease promotion and advertising of the facility as being PEV certified and to desist in using any PEV marketing materials.
10. 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 original nameplate must remain permanently attached, data side up, to the test motor.

12. Loss of AE brass number tag and/or original nameplate may result in the additional costs of a replacement motor and additional PEV testing.
13. Motors tested for PEV will be stored at Advanced Energy following the initial repair and after each renewal, until just prior to the next PEV renewal date. Prior to the next renewal date, AE will contact the PEV customer to arrange a schedule for shipping the test motor to the customer for rewinding.

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
Roasting oven
Water or steam flame suppression system
Alternative stripping method equipment
Coil removal equipment
Stator cleaning system

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

AC Hi-Pot

DC Hi-Pot

Megger

Surge comparison tester

Roasting oven temperature sensor/control

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

Test Panel Power Supply Capacities

IV. Materials used in repairs

Insulation materials

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

V. Motor Rewinding Procedures

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

Incoming tests

Disassembly and inspection

Repair

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
9. Shaft repair
10. End shield repair

Assembly

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

Final tests

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 this repair facility. However, the data may be used in an anonymous compilation study of motor repair practices.

PART B
EXPLANATION OF RULES AND CONDITIONS GOVERNING
PROVEN EFFICIENCY VERIFICATION

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

Failure of annual renewal

D. Re-audit

E. Use of PEV accreditation for marketing purposes

A. General

All requirements of "Conditions for Verification" must be met initially and maintained as described below and on page 4/9.

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 from 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, or 575 volt 3-phase power.
4. One motor original winding must be concentric. One motor original winding must be lap.
5. Original motor manufacturer's winding spec for PEV test motors must be provided to AE 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 mfg.'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 24 hours), to provide bearing grease break-in before motors are delivered to AE for testing.

If a motor fails the PEV criteria at retest

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

5. Any additional analysis or investigation requested by the customer (bearing grease inspection for instance) will be done at our 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 AE 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 AE, 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 spec 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 can't find the original motor at renewal time), a new motor that meets the original motor selection criteria, must be supplied to AE for baseline testing, then be rewound and returned to AE for retesting. In this scenario the renewal fee will be higher. Original mfg. winding spec, "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 spec (send with renewal test motor).
- A copy of repair spec in use at the time of the renewal.
- Owners 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 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 the 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 facility 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, dependent on the cause for the re-audit.

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 PEV accreditation for marketing purposes

The Advanced Energy logo and the Proven Efficiency seal may be used only so long as PEV accreditation is maintained and the facility meets all standards for accreditation.

Proven Efficiency Verification is not a certification, it is an accreditation. When promoting the facility as PEV accredited, 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 an accrediting body. If mention is made of Advanced Energy credentials, it is necessary that the NVLAP accreditation verbiage be used exactly as printed in Advanced Energy literature (a NVLAP requirement) and that UL acceptance verbiage be used exactly as printed in Advanced Energy literature (a UL requirement).

The Advanced Energy logo and the Proven Efficiency seal may be used in marketing and advertising materials, so long as no changes to design, fonts or colors are made. The Advanced Energy logo is always shown in PMS colors red (Pantone® 193) and black. The PEV seal is always shown in PMS colors red (Pantone® 1945) and/or black.