

Secretary of State  
Certificate and Order for Filing  
**PERMANENT ADMINISTRATIVE RULES**

I certify that the attached copies\* are true, full and correct copies of the PERMANENT Rule(s) adopted on [December 29, 2006] by the

Oregon Department of Energy  
Agency and Division

Date prior to or same as filing date  
OAR 330-070-0010 to 330-070-0097  
Administrative Rules Chapter Number

**William P. Nesmith**  
**Rules Coordinator**

625 Marion St. NE Salem, OR 97301-3737

503 378-4040  
Telephone

to become effective [ January 1, 2007 ]. Rulemaking Notice was published in the [ November 2006 ] Oregon Bulletin.\*\*

Date upon filing or later Month and Year

**RULE CAPTION**

### **Rule changes to update standards for several alternative energy devices and technician certification.**

Not more than 15 words that reasonably identifies the subject matter of the agency's intended action. DEC 29 2006

## RULEMAKING ACTION

List each rule number separately (000-000-0000)

Secure approval of new rule numbers (Adopted or Renumbered rules) with the Administrative Rules Unit prior to filing.

**ADOPT:**

~~AMEND: GAR 330-070-0010 through 330-070-0097~~

**REPEAL:**

RENUMBER:

**AMEND & RENUMBER:**

Stat. Auth.: ORS 469.160 through ORS 469.180; ORS 316.116

Other Auth.:

Stats. Implemented: ORS 469.185; 315.354; 315.356

**FILED**  
DEC 29 2006  
ARCHIVES DIVISION  
SECRETARY OF STATE

## RULE SUMMARY

The Oregon Department of Energy is proposing amendments to its rules governing Residential Energy Tax Credit (RETC) program to:

- Clarify the requirement that tax-credit certified technicians be employed by a company with a Construction Contractors Board license.
- Clarify the requirement for minimum installations for tax-credit certified technicians to state the installations have to be made in the previous calendar year.
- Clarify the requirements for tax-credit certified geothermal technicians.
- Clarify that homeowner-installed systems will be verified by ODOE on a case-by-case basis.
- Delete the requirement that solar pool and spa alternative energy devices (“AEDs”) be verified by a tax-credit certified solar technician.
- Increase the co-efficient of performance (COP) standard for ground water heat pump system and ground loop AEDs to at least 3.3 for closed loop systems and 3.5 for direct expansion systems.
- Add a requirement that when multiple ground water heat pump system and ground loop AEDs systems are installed, the pipes for each system must have their own trench or well.
- Increase the minimum Modified Energy Factor (MEF) for qualifying clothes washers to a minimum of 2.0 and a maximum Water Factor of 6.5 gal/cubic foot/cycle.
- Clarify the requirement concerning very high efficiency warm air furnaces to state that they must use ducted outside air for combustion.
- Increase the minimum Modified Energy Factor (MEF) for qualifying dishwashers.
- Clarify the water heater standards.
- Consider housekeeping changes.

Authorized Signer

Printed name

Date \_\_\_\_\_

\*With this original, file one photocopy of certificate, one paper copy of rules listed in Rulemaking Actions, and electronic copy of rules. \*\*The Oregon Bulletin is published the 1st of each month and updates rules found in the OAR Compilation. For publication in Bulletin, rule and notice filings must be submitted by 5:00 pm on the 15th day of the preceding month unless this deadline falls on a weekend or legal holiday, when filings are accepted until 5:00 pm on the preceding workday. ARC 930-2005

ARC 930-2005

**DIVISION 70**  
**TAX CREDIT ELIGIBILITY CRITERIA**  
**FOR RESIDENTIAL ALTERNATIVE**  
**ENERGY DEVICES**

**330-070-0010**

**Purpose**

- (1) ORS 469.160 through 469.180 offer tax credits for Alternate Energy Devices (AEDs).
- (2) These rules are OAR 330-070-0010 through 330-070-0097. They govern the way tax credits for AEDs will be granted or denied. None of these rules replace any building code requirements.
- (3) Effective Date: January 1, 2007. All decisions made by the Oregon Department of Energy (ODOE) regarding AED eligibility, issuance of tax-credit technician certification, complaints regarding performance of tax-credit certified technician, revocation of technician tax-credit certification and other matters relating to the administration of this program after the effective date of these rules will be made consistent with the criteria and standards contained in these rules.
- (4) These rules apply to tax years beginning on or after January 1, 2007. For all prior tax years, the law and rules applicable to those years remain in full force.
- (5) ODOE grants or denies AED tax credits. By granting a tax credit, neither ODOE nor the state implies that the AED will save more money than it will cost. Meeting standards in these rules does not assure that an AED is safe or reliable.

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 12(Temp), f. & ef. 10-14-77; DOE 3-1978, f. & ef. 3-7-78; DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-1990; DOE 1-1995, f. & cert. ef. 1-17-95; DOE 1-1996, f. & cert. ef. 4-1-96

**330-070-0013**

**Definitions**

As used in OAR 330-070-0010 through 330-070-0097:

- (1) **"AED"** – Alternative Energy Device.
- (2) **Active Solar Heating** – A solar system that uses air or water that is moved by pumps or fans to collect, store and distribute the sun's energy to a dwelling or part of a dwelling.
- (3) **"AFUE"** (Annual Fuel Utilization Efficiency) – The efficiency rating for furnaces and boilers expressed as the ratio of the energy output to the energy (fuel) input, including part load and cycling effects, but not including fan or pump electrical energy use.
- (4) **"Alternative Energy Device"** ("AED") - A device or system that reduces the amount of conventional energy used by a dwelling. AEDs include, but are not limited to, systems that collect and use solar energy; ground source heat pump systems; energy efficient appliances, energy efficient heating, ventilating and air conditioning systems; fuel cell systems; alternative fuel vehicles and related alternative fuel devices or wind devices that supply, offset or supplement electricity used for a dwelling or that supply electricity to a utility.
- (5) **"Alternative Fuel"** – Electricity, natural gas, ethanol, methanol, propane, and any other fuel approved by the Director of ODOE.
- (6) **"Alternative Fuel Device"** -- An alternative fuel vehicle, equipment necessary to convert a vehicle to use an alternative fuel, or a fueling system necessary to operate an alternative fuel vehicle.

(7) **“Applicant”** – A person who applies for a residential alternative energy device tax credit under this section.

(a) A person who files an Oregon tax return and applies for a residential alternative energy device tax credit under this section, or

(b) An Oregon Investor Owned Utility (IOU) as defined in ORS 757.005 or its subsidiaries and affiliated interests as defined in ORS 757.015 that is designated by an applicant under OAR 330-070-0013 (7)(a) to receive the residential tax credit certificate for a qualifying alternative fuel device on behalf of the designated applicant.

(c) Any other entity qualified to receive the residential tax credit certificate for a qualifying alternative fuel device on behalf of the designated applicant, as determined by ODOE.

(d) An individual or business that provides the tax credit pass-through amount to the eligible AED owner, and is assigned the tax credit by the AED owner.

(8) **“ARI”** – Air Conditioning and Refrigeration Institute.

(9) **“ASHRAE”** – American Society of Heating, Refrigerating and Air Conditioning Engineers.

(10) **“AWEA”** – American Wind Energy Association.

(11) **“Btu”** – British Thermal Unit.

(12) **“C<sub>EF</sub>”** – Energy Factor for Combined Systems. A non-dimensional descriptor of efficiency for combined space and water heating systems during operation in the water-heating mode only. This part of the three-part rating (space heating efficiency and combined efficiency being the other two) takes into account the standby losses from the storage tank, if any. A higher energy factor denotes better efficiency. Testing is accomplished using the ANSI/ASHRAE 124 test method.

(13) **“C<sub>AFUE</sub>”** – Annual Fuel Utilization Efficiency for Combined Systems. A descriptor of efficiency for combined space and water heating systems during operation in the space heating mode only. This part of the three-part rating (water heating efficiency and combined efficiency being the other two) does not count any standby losses from the storage tank, if any. A higher AFUE denotes better efficiency. Testing is accomplished using the ANSI/ASHRAE 124 test method.

(14) **“Consumer Disclosure”** – A form approved and provided by ODOE describing some AEDs. The technician fills this form out and gives it to the buyer of an AED. It shows estimated energy savings of the AED, required conservation items, required maintenance, freeze protection information and other data required by ODOE. Exclusions: energy efficient appliances and alternative fuel devices.

(15) **“COP”** – Coefficient of Performance. The ratio calculated by dividing the usable output energy by the electrical input energy. Both energy values must be expressed in equivalent units.

(16) **“Department”, “Energy Office”, or “Office”** – The Oregon Department of Energy.

(17) **“Director”** – Director of ODOE or the Director’s representative.

(18) **“Domestic Water Heating”** – The heating of water used in a dwelling for bathing, clothes washing, dishwashing and other related functions.

(19) **“Dwelling”** – means real or personal property inhabited as a principal or secondary residence and located within this state. “Dwelling” includes, but is not limited to, an individual unit within multiple unit residential housing.

(a) Principal residence – The dwelling owned by the applicant who on the date of the application has legal title to a dwelling, including the mortgagor under a duly recorded mortgage of real property, the trust or under a duly recorded deed of trust or a purchaser under a duly recorded contract for the purchase of real property, and who inhabits the dwelling for no fewer than 14 days in the calendar year for which the credit is claimed;

(b) Secondary residence – Vacation property owned by the applicant; and

(c) Not qualifying – Primary or secondary residences do not include motor homes or recreational vehicles as defined in ORS 446.003.

(20) **“EER” (Energy Efficiency Ratio)** – A measure of a cooling system’s instantaneous efficiency (cooling capacity divided by the power consumption), at DOE “A” test conditions, expressed in Btu/hr per watt.

(21) **“Electric Load”** – Appliance and lighting exclusive of any water or space heating use.

(22) **“Energy Efficient Appliance”** – A clothes washer, clothes dryer, water heater, refrigerator, freezer, dishwasher, space conditioning system, solar electric alternating current (AC) module, or any other major household appliance that has been certified by ODOE to have premium energy efficiency characteristics. Lists of certified energy efficient appliances are available from ODOE.

(23) **“Energy Factor”(EF)** – The non-dimensional efficiency rating for water heaters. It can be loosely translated as a percentage (e.g. EF 0.93 = 93 percent). A higher energy factor denotes better efficiency.

(24) **“Energy Yield Chart”** – Chart developed by ODOE showing first year energy yield of an AED.

(25) **“Energy Recovery Ventilator” (ERV)** – A device or system designed and installed to provide balanced fresh air ventilation for homes with the ability to transfer energy from the outgoing air stream to the incoming air stream that is also capable of at least 30 percent Latent

Recovery/Moisture Transfer (LRMT) at 32 degrees F when operating at the lowest fan speed.

(26) **“EUI<sub>(FURNACE)</sub>”** – The Energy Use Index for a furnace, used to determine its electric efficiency, and calculated by the following formula, with inputs derived from the appropriate values in the Gas Appliance Manufacturers Association (GAMA) Directory of Certified Efficiency Ratings for Heating and Water Heating Equipment:  $3.412 \times E_{AE} / (3.412 \times E_{AE} + 1,000 \times E_F) = 2.0$  percent.

(27) **“EUI<sub>(HERV)</sub>”** – The Energy Use Index for an HRV or ERV, used to determine its electric efficiency, and calculated by dividing a model’s power consumption, in watts, by the net supply air delivered, in cubic feet per minute (cfm), while the unit is operating in the lowest speed for which performance data is provided in the Home Ventilating Institute (HVI) Directory.

(28) **“FERC”** – Federal Energy Regulatory Commission.

(29) **“First Year Energy Yield”** – Usable energy produced under average conditions by an AED in one year. Expressed in kWh, usable energy is the gross energy contribution minus any parasitic energy used to operate the system.

(30) **“Fuel Cell Stack”** – The portion of a fuel cell system where the electrochemical reactions take place, generally consisting of an anode, an electrolyte, and a cathode and supporting systems bringing fuel to the stack and carrying away the electricity, electrochemical products and thermal energy generated.

(31) **“Fuel Cell System”** – A system for producing electricity electrochemically and non-reversibly, using a hydrogen rich fuel and oxygen, and producing an electric current, water, and thermal energy. Systems using reformed fossil fuels will also produce carbon dioxide.

(32) **“Ground Source Heat Pump”** – A heating, ventilating and air-conditioning system, also known as a ground water heat pump, earth-coupled heat pump, geothermal heat pump or ground loop AED, that utilizes a subsurface closed loop heat exchanger to extract or reject heat to the earth.

(33) **“Heating Season”** – September 1 through March 31.

(34) **“Heat Recovery Ventilator” (HRV)** – A device or system designed and installed to provide balanced fresh air ventilation for homes with the ability to transfer energy from the outgoing air stream to the incoming air stream.

(35) **“HSPF” (Heating Season Performance Factor)** - A measure of the heating efficiency of a heat pump system over the entire heating season (heating accomplished divided by power used), expressed as a ratio of Btu per watt-hour.

(36) **“HUD”** – U.S. Department of Housing and Urban Development.

- (37) **“Hybrid Vehicle”** – An alternative fuel vehicle which draws propulsion energy from on-board sources of stored energy which include both an internal combustion or heat engine and a rechargeable energy storage system.
- (38) **“Hydronic Space Heating System”** – A system that uses hot or warm water to deliver heat from a boiler or water heater to the living spaces in a home.
- (39) **“IREC”** – Interstate Renewable Energy Council.
- (40) **“kWh”** – kilowatt-hour; 1 kWh = 3413 BTUs for purposes of ODOE calculations.
- (41) **“Latent Recovery Moisture Transfer” (LRMT)** – In an HRV or ERV, moisture recovered to the ventilation supply air stream divided by moisture being exhausted, corrected for cross leakage, if any. LRMT = 0 would indicate that no exhausting moisture is recovered for the incoming supply air stream. LRMT = 1 would indicate that all exhausting moisture is transferred.
- (42) **“MCFC”** – Molten carbonate fuel cell.
- (43) **“Modified Energy Factor” (MEF)** – The non-dimensional efficiency rating for clothes washers. This measure, unlike the EF, takes into account the moisture removed from the wash load in the spin cycle, thereby changing energy use in the drying cycle. A higher MEF denotes a more efficient clothes washer.
- (44) **“MM”** – Million.
- (45) **“Net Cost”** – What the applicant paid to design, acquire, build and install the AED. Net cost includes permit and inspection fees. Net cost may include the value of federal tax credits or utility incentives. Net cost does not include service contracts, rebates, discounts or refunds.
- (46) **“Net Generation”** – The gross kWh produced minus internal losses and parasitic loads. The net generation is the amount available to serve dwelling loads, to provide to the utility, or both.
- (47) **“OG”** – Operating guidelines developed by the Solar Rating and Certification Corporation (SRCC) including system performance or component characteristics defined by SRCC in its directory. Operating guidelines shall be from the directory in effect at the date the rules are adopted.
- (48) **“ODOE”** – Oregon Department of Energy.
- (49) **“Owner-Built”** – An AED that is assembled and installed on an owner’s personal property and with an owner’s labor only.
- (50) **“Parasitic Power”** – The electrical energy the system uses to operate.
- (51) **“Passive”** – A solar AED that relies on heated liquid or air rising to collect, store and move heat without mechanical devices.
- (52) **“Passive Solar Space Heating”** - This refers to a system or building design that collects and stores solar energy received directly through south facing windows. The system/design is without powered moving parts and includes provisions to collect, store and distribute the sun’s energy using only convection, radiation and conduction of energy. See section 330-070-0062 for details.
- (53) **“Pass-Through Amount”**--The minimum amount required to be passed through to an eligible AED owner in exchange for the right to claim the tax credit. The pass-through amount shall be determined on an annual basis by the Director.
- (54) **“Pass-Through Provider”**--An individual or business that pays the pass-through amount to an eligible system owner and applies for the tax credit in place of the system owner.
- (55) **“Pass-Through Verification”** – Information collected by ODOE verifying that the approved pass-through amount has been provided, that the AED owner has relinquished his or her claim to a tax credit and has assigned the credit to the pass-through provider.
- (56) **“Peak Power Ratio”** – In the case of a hybrid vehicle, the maximum power available from the electric motor providing propulsion energy when powered by the rechargeable energy storage system, divided by the total of such maximum power and the SAE net power of the internal combustion or heat engine.
- (57) **“Performance Checked Duct System”**—A forced air duct system whose premium efficiency characteristics are that it has been tested for duct leakage by a tax credit certified technician using

ODOE-approved testing procedures, and that it has been repaired or constructed using ODOE-approved materials to reduce duct air leakage. For purposes of the tax credit, performance checked ducts are considered energy efficient appliances.

**(58) "Performance Checked Heat Pumps and Air Conditioners"**—A heat pump or air conditioner whose premium efficiency characteristics are that it has been tested using approved procedures and repaired or serviced as needed by a tax-credit certified technician to assure that refrigerant charge and system air flow are within ranges recommended by the equipment manufacturer. For purposes of the tax credit, performance tested heat pumps and air conditioners are considered energy efficient appliances.

**(59) "Placed in Service"** – The date when an AED is ready and available to produce usable energy.

**(60) "PV System"** – A complete solar electric power system capable of delivering power to either the main or sub-panel in a residence. Necessary components include: solar electric modules, inverter, mounting system, and disconnection equipment.

**(61) "SEER" (Seasonal Energy Efficiency Ratio)** – a measure of the efficiency of a cooling system over the entire cooling season (cooling accomplished divided by power used), expressed in Btu/kWh.

**(62) "Solar Attic Fan"**--A device that uses photovoltaics to power a fan that pulls hot air out of an attic or roof space. Such a device may either be a complete, all-in-one unit or be comprised of a small photovoltaic panel and a DC powered attic fan designed to be run by photovoltaic panel.

**(63) "Solar Domestic Water Heating System"** – A configuration of solar collectors, pump, heat exchanger and storage tank designed to heat water. System types include forced circulation, integral collector storage, thermosyphon, and self-pumping. For the purpose of determining system yields, a configuration of components is considered a new system if changes occur in any of the following: type or size of collectors, heat exchanger type or effectiveness, size of storage tank, or system type.

**(64) "Solar Electric AC Module"** – A solar photovoltaic module coupled with a utility interactive inverter. The combined system must be Underwriters Laboratory (UL) listed and meet all current Institute of Electronic and Electrical Engineers (IEEE) 929 requirements.

**(65) "SRCC"** – Solar Rating and Certification Corporation.

**(66) "Sensible Recovery Efficiency" (SRE)** – In an HRV or ERV, the sensible (measurable) energy recovered to the ventilation supply air stream minus supply fan and preheat coil energy use divided by the total sensible energy being exhausted plus exhaust fan energy. This measure of efficiency accounts for the effects of cross leakage between air streams, purchased energy for fan controls, and defrost system energy use.

**(67) "STC"** – Standard Test Conditions, which are 25 degrees Celsius cell temperature and 1000 watts per square meter.

**(68) "Sunchart"** – A chart or form issued or approved by ODOE showing the plotted path of the sun and any objects which block the sun from the AED. This shall include plant life and structures. The viewpoint shall be from the center of the lower edge of the collector. It shall show whether the plant life is made up of evergreen or leafy trees. If there is no shading on the AED, technicians shall indicate this in writing on the chart and shall include their signature and the date of the analysis.

**(69) "System Certification"** – Certification that an AED as described in the application meets criteria for the tax credit.

**(70) "System Owner"**--A person who owns the AED.

**(71) "Tax-Credit Certified Technician"**- A technician who has been approved by ODOE as sufficiently knowledgeable about the tax credit program. A tax-credit certified technician is responsible for assuring that the system installed is according to ODOE rules and verifying system installation quality and performance. A tax-credit certified technician must ensure that the applicant or system owner is knowledgeable about ODOE's AED rules.

(72) **"Tax-Credit Listed Company"**-- A company that employs at least one tax-credit certified technician.

(73) **"Total Solar Resource Fraction"** – the fraction of usable solar energy that is received by the solar panel/collector throughout the year. This accounts for impacts due to external shading, collector tilt and collector orientation.

(74) **"Unheated Spaces"** – Attics, garages, and any space with an average ambient temperature of 50 degrees Fahrenheit or below during the heating season.

(75) **"Used Equipment"** – Any solar tank or collector which previously has been installed or any piece of equipment not under current manufacturers' warranty.

(76) **"Wastewater Heat Recovery Device"** – A device designed to recover thermal energy from household wastewater streams for the purpose of returning a portion of this energy to the dwelling's hot water supply system.

(77) **"Water Factor" (WF)** – The measure of water efficiency in clothes washers. Measured in gallons per cubic foot of tub capacity, per cycle (gal/ft<sup>3</sup>/cycle).

(78) **"Wind AED"** – A wind alternative energy device. A qualifying wind energy conversion system that uses wind to produce mechanical or electrical power or energy. This includes turbines, towers and their associated components needed to form a complete system.

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

**Hist.: DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; Renumbered from 330-70-023; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1995, f. & cert. ef. 1-17-95; DOE 1-1996, f. & cert. ef. 4-1-96**

### **330-070-0020**

#### **Who is Eligible**

(1) To qualify for a credit, a person must:

(a) Have an income tax liability in Oregon; and

(b) Purchase, construct, install and certify an AED in accordance with these rules (OAR 330-070-0010 to 330-070-0097); and

(c) Be the owner or contract buyer of an Oregon dwelling served by the AED, or be a tenant of the dwelling owner; and

(A) Use the dwelling as a primary or secondary residence; or

(B) Rent or lease the dwelling to a tenant who uses the dwelling or dwellings as a principal or secondary residence.

(2) If the basis for the credit is the installation of an energy efficient appliance, the credit shall be allowed only to the taxpayer who actually occupies the dwelling as a principal or secondary residence.

(3) If the basis for the credit is a fueling station necessary to operate an alternative fuel vehicle, unless the certificate is transferred, the company that constructs the dwelling that incorporates the fueling station or who installs the fueling station in the dwelling may claim the credit. If the alternative energy device is an alternative fuel vehicle or related equipment, the credit must be claimed by the owner.

(4) A tax credit may be transferred. Any person that pays the present value of the tax credit for a qualified alternative energy device to the person who originally purchases the device shall be entitled to claim the credit in place of the original credit owner.

(5) For a qualified vehicle owned by lessor during period of first new use, the lessor may pass-through the right to claim the credit to the lessee exercising the first new use.

Stat. Auth.: ORS Ch. 469

Stats. Implemented: ORS 469.160

Hist.: DOE 12(Temp), f. & ef. 10-14-77; DOE 3-1978, f. & ef. 3-7-78; DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 7-1984, f. & ef. 12-19-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88

### **330-070-0026**

#### **Technician Tax Credit Certification**

- (1) Technicians may on a voluntary basis apply for ODOE tax-credit certification for a particular technology on an annual basis. Certification is intended to assist consumers with the state tax credit program, ensure that the systems are installed according to ODOE rules, and verify system installation quality and performance.
- (2) A tax-credit certified technician applies only to the following products:
  - (a) Solar water heating systems;
  - (b) Ground source heat pumps (geothermal);
  - (c) Photovoltaic systems;
  - (d) Performance-tested ducts; and
  - (e) Air source heat pumps/air conditioning systems.
- (3) The tax-credit certified technician's status is based on the following:
  - (a) Knowledge and understanding of the tax credit program requirements and expectations;
  - (b) Ability to provide systems that are designed and installed with a focus on performance and longevity;
  - (c) Ability to deal with both ODOE and consumers in a professional manner; and
  - (d) Employment by a company with a Construction Contractors Board (CCB) license.Failure to meet any of these criteria are grounds for removal from being certified. (See Section 330-070-0045 (2)).
- (4) Tax-credit certified technician status entitles a technician to:
  - (a) Inform the owner that he or she has attended an ODOE-required training class and is familiar with the rules and requirements of the Residential Energy Tax Credit Program.
  - (b) Verify that installation of tax-credit qualified equipment and systems meet ODOE standards for performance and longevity.
- (5) Tax-credit certified technician status requires that the technicians must follow ODOE requirements including:
  - (a) Duct and air-source heat pump/air conditioning technicians must acquire training required by the Director for providing the services necessary for that technology and pass a competency test with a score of 70 percent or above.
  - (b) Solar technicians must show licensure (North American Board of Certified Energy Practitioners-NABCEP or Limited Renewable Energy Technician- LRT for solar electric and Solar Thermal License (STL) for solar thermal) or pass a competency testing with a score of 70 or above for the technology.
  - (c) First-time geothermal technician applicants must show proof of successful completion within the previous 5 years of International Ground Source Heat Pump Association training (IGSHPA) or IGSHPA certified manufacturer's installer training program or other training approved by the ODOE Director. If IGSHPA or other certification is more than 5 years old, applicant must also complete two-hour relevant installer training, community college HVAC course, or other training approved by the Director within the previous year.
  - (d) Participate in ODOE tax-credit training and annual ODOE update telephone conference calls.
  - (e) Assure owner has user manual for equipment/system.



(f) Provide the customer with a completed application and a copy of the final itemized dated invoice for the system that is marked "inspected and paid for." Assure owner has a written full warranty for the system that lasts no less than 12 months after the system is installed.

(g) Maintain tax-credit certification status by completing the following technology-specific requirements during the previous calendar year:

(1) For solar technology – Complete at least two (2) hours of Oregon Solar Energy Industries Association (OSEIA)-approved solar-related training and either have submitted and approved two (2) tax credit applications for systems in technology in which technician is certified or score 70 percent or above on an ODOE competency test for appropriate solar technology.

(2) For air source heat pumps/air conditioning – Maintain current requisite technical certification and licensing; complete and either have submitted and approved four (4) tax credit applications or score 70 percent or above on competency test.

(3) For performance tested duct systems – Have submitted and approved a minimum of four (4) tax credit applications or score 70 percent or above on competency test.

(4) For ground-source heat pumps – Have submitted and approved a minimum of one (1) tax credit application or proof of having completed at least two hours of relevant installer training, community college HVAC course, or other training approved by the Director.

(6) Tax credits for installation of air source heat pumps/air conditioning systems, performance-tested ducts, geothermal systems, solar electric and solar thermal systems must be verified by an ODOE tax-credit certified technician. Homeowner-installed systems will be verified by ODOE on a case-by-case basis.

(7) A tax-credit certified technician must notify ODOE within 30 days if changes are made in any of the information in the certification application.

(8) ODOE may reject any application if the AED does not comply with ORS 469.160 through 469.180 and OAR 330-070-0010 through 330-070-0097. ODOE will explain all rejected applications in writing. Approved requests for lesser cost than claimed by the applicant will also include written reasons.

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 7-1984, f. & ef. 12-19-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1995, f. & cert. ef. 1-17-95; DOE 1-1996, f. & cert. ef. 4-1-96

### **330-070-0045**

#### **Enforcement**

(1) Applicant's actions that are cause for revocation of a residential alternate energy tax credit

(a) A system certification may be revoked pursuant to ORS 469.180 if the Director finds that:

(A) The applicant obtained the system certification by fraud or misrepresentation;

(B) The AED has not been installed or operated in substantial compliance with the plans, specifications or procedures specified in the application or certificate, such as:

(i) Failure to follow applicable standards;

(ii) Failure to comply with required codes or obtain required permits or inspections;

(iii) Return of the AED to the seller or installer for a refund;

(iv) Sale or removal of the device so that it no longer operates on the property of the applicant; or

- (C) The applicant refuses to allow ODOE to inspect the AED after a reasonable written request by the Department. A reasonable request must allow applicant to choose a day within three weeks of the request from the Department.
- (b) Following revocation, the applicant must forfeit the tax credit, and the Department of Revenue must proceed to collect any taxes not paid by the taxpayer because of this credit.
- (2) Technician's actions that are cause for revocation of technician's tax credit certification:
- (a) A technician tax-credit certification may be revoked pursuant to ORS 469.180 if the Director finds that the system or technician tax-credit certification was obtained by fraud or misrepresentation by the technician. The Director may find that fraud or misrepresentation occurred if:
- (A) False statements were made regarding the technician's licenses held, products or warranties carried by the tax-credit certified technician's employing company, the company's range of product cost, personnel employed in the business, or any other item in the application for technician tax-credit certification as defined in OAR 330-070-0026.
- (b) A technician tax-credit certification may be revoked pursuant to ORS 469.180 if the Director finds that the technician's performance regarding sales or installation of the alternative energy device for which the technician is issued a tax credit certificate under ORS 469.170 does not meet industry standards. The Director may find that the technician's performance does not meet industry standards under the following conditions:
- (A) The technician's employing company is not registered with the Construction Contractors Board or does not carry the required level of insurance, licensure or bonding; or
- (B) The technician and/or employing company fails to obtain the required state, federal or local permits required to install the AED as defined in OAR 330-070-0040; or
- (C) The technician fails to install the AED system in compliance with standards adopted under OAR 330-070-0060 through 330-070-0097; or
- (D) The technician fails to install the AED system in a professional manner; or
- (E) The technician fails to install the AED system to comply with manufacturers' published specifications; or
- (F) The technician and employing company fail to honor contract provisions when there is no legitimate excuse for nonperformance of the obligation; or
- (G) The technician and employing company fail to honor a warranty which they are contractually obligated to perform; and
- (H) The technician and/or employing company fail to make corrections to remedy failure to comply with paragraphs (A) through (G) of this subsection requested by ODOE within 30 days of written notification from ODOE of the problem, unless a time extension is granted by ODOE.
- (I) A tax credit for an AED sold or installed under the technician tax-credit certification is ordered revoked under subsection (2)(a) of this rule; or
- (J) New information indicates that the AEDs installed under the technician tax-credit certification and his or her employing company do not meet eligibility requirements.
- (c) A technician's tax-credit certification may be revoked pursuant to ORS 469.180 if the Director finds that the technician or employing company has misrepresented to the customer either the tax credit program or the nature or quality of the alternative energy device. The Director may find that the technician or employing company has misrepresented the tax credit program or the AED under the following conditions:
- (A) The technician or employing company has provided false or misleading information to the customer regarding the availability of the tax credit, amount and nature of the tax credit, procedures for tax credit application, eligibility standards for credit, or any other misleading information about the program implemented under ORS 469.160 through 469.180; or

(B) The technician or employing company has misrepresented the nature of the performance of the AED or claimed savings in excess of those on a yield chart without providing accurate calculations to the customer and to ODOE to substantiate the yield. For geothermal heat pumps, the technician or employing company has claimed savings higher than other units of similar efficiency; or

(C) The technician or employing company has misrepresented the cost of a system. For example, the technician or employing company omits costs in the contract for features necessary for basic installation and/or operation of the system and/or costs to comply with the AED eligibility under ORS 469.160 through 469.180; or

(D) The technician or employing company has misrepresented a competitor's product or service; and

(E) The technician or employing company fails to make corrections requested in writing by ODOE to remedy violations of (A) - (D) of this subsection within 30 days, unless more time is allowed by ODOE; or

(F) The technician or employing company fails to remedy the construction and/or warranty claim as directed by order of the Construction Contractors Board.

Stat. Auth.: ORS Ch. 469

Stats. Implemented: ORS 469.180

Hist.: DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1995, f. & cert. ef. 1-17-95

### **330-070-0059**

#### **Guidelines for Solar Pool and Spa AEDs**

(1) Installations must be of professional quality, be installed according to manufacturer's instructions; comply with all applicable state, county, or local codes and regulations.

(2) Consumers who purchase a solar water heating system must receive written operating and maintenance instructions. These instructions must at a minimum include:

(a) Clear instructions on how to monitor the system performance;

(b) Description and recommended frequency of homeowner maintenance;

(c) Diagram of the system noting location of valves and monitoring devices; and

(d) What to do and who to call in an emergency and when the system needs professional maintenance and repairs;

(3) Pool heating system designs and installations must comply with the following additional requirements:

(a) Collectors and piping must be securely mounted to withstand local wind loads;

(b) Piping and pump sizing must consider collector area, total flow rates, pressure drop across collectors, length of run from collectors to pump, and maximum allowable pressure drop for the system;

(c) Any building insulation disturbed due to the system installation must be restored to previous condition;

(d) Pool collector materials must come with a minimum 10-year full warranty (to ensure that equipment designed for temporary installation is not used).

(e) System must have a method to show that it is operating correctly. This equipment must be a permanent part of the system, not require any special tools, and be in an easily accessible location.

(f) Collector risers must follow the slope of the surface they are mounted on to ensure drainage for proper freeze protection.

- (g) Pool collectors must be equal to not less than 40 percent of the pool surface area if equipped with swimming pool blanket or not less than 60 percent if no pool blanket is present.
- (4) Spa heating system designs and installations must comply with the following additional requirements:
- (a) System design must be approved by the Oregon Department of Energy. Approval is based on complete system design documentation and calculation of annual energy savings.
  - (b) Controls must be capable of maintaining safe spa temperatures.
  - (c) Spa or hot tub must be insulated with not less than R-15 perimeter and bottom insulation and have a cover rated to not less than R-5.
- (5) ODOE will provide technicians with a simple means of estimating annual energy savings for a pool heating system. Spa heating system performance will be determined on a case-by-case basis. For the purposes of determining the tax credit, the annual energy savings will be reduced by 25 percent if the total solar resource fraction for the site is less than 75 percent, and by 100 percent if the total solar resource fraction for the site is less than 50 percent.
- (6) The costs listed in subsection (8)(a) through (h) of this rule are guidelines. They do not include all eligible costs. Other costs will qualify if justified to ODOE's satisfaction as part of a solar water heating AED. Only total systems will qualify for the tax credit. All systems must comply with OAR 330-070-0010 through 330-070-0097.
- (7) Eligible costs include:
- (a) The cost of solar collectors;
  - (b) The cost of thermal storage devices;
  - (c) The cost of monitors, meters and controls;
  - (d) The cost of photovoltaic devices used to supply electricity to parts of the system;
  - (e) Installation charges;
  - (f) Fees paid for design or building;
  - (g) The cost of swimming pool blankets, if they are installed with a solar pool heating system; and
  - (h) Up to \$200 of the cost of solar access easements. A certified copy of the recorded easement and proof of the cost must be submitted with an application.
- (8) The addition of more energy producing capacity to an existing solar pool heating system may be eligible for an AED tax credit if:
- (a) The system addition increases first year energy yield; and
  - (b) The system addition is built, installed and operated in accord with OAR 330-070-0010 through OAR 330-070-0097.
- (9) ODOE will calculate first year energy yield of a system addition by subtracting the estimated savings of the original AED from the increased first year energy yield with the addition.
- (a) ODOE will not recalculate the original AED's estimated energy savings, even if the AED produces less than estimated.
  - (b) Any AED which received an AED tax credit in a prior year shall be assumed to remain in place, for purposes of calculating a tax credit for a system addition.
- (10) A tax credit for a system addition must count as a tax credit for the tax year in which the addition is placed in service. The total tax credit of current and previous year credits shall not exceed \$1,500 per year.

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the Department of Energy.]

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 12(Temp), f. & ef. 10-14-77; DOE 3-1978, f. & ef. 3-7-78; DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 7-1984, f. & ef. 12-19-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87,

ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1995, f. & cert. ef. 1-17-95; DOE 1-1996, f. & cert. ef. 4-1-96

### **330-070-0060**

#### **Guidelines for Solar Domestic Water Heating AEDs**

- (1) Installations must be of professional quality, comply with all applicable state, county, or local codes and regulations and be verified by an ODOE tax-credit certified solar technician.
- (2) Consumers who purchase a solar water heating system must receive written operating and maintenance instructions. These instructions must be plainly mounted/displayed on or near the solar storage or backup water-heating tank. These instructions must at a minimum include:
  - (a) Clear instructions on how to determine if the system is functioning properly;
  - (b) Description and recommended frequency of homeowner maintenance;
  - (c) Diagram of the system noting location of valves and monitoring devices;
  - (d) What to do and who to call in an emergency and when the system needs professional maintenance and repairs; and
  - (e) How to protect the system from overheating due to stagnation during periods when the system is not in use during the summer months.
- (3) System designs and installations must comply with the following additional requirements:
  - (a) Collectors and piping must be securely mounted to withstand local wind loads;
  - (b) Piping and pump sizing must consider collector area, total flow rates, pressure drop across collectors, length of run from collectors to pump, and maximum allowable pressure drop for the system;
  - (c) Pipe insulation must be installed on all solar pipe runs and protected against damage from exposure in outdoor conditions and be rated for design condition temperatures;
  - (d) Any building insulation disturbed due to the system installation must be restored to previous condition;
  - (e) For systems using pressurized anti-freeze fluids, a pressure gauge must be installed to indicate pressure in the system; and
  - (f) Piping containing pressurized water in attics 24 hours a day must be of the appropriate material allowed by applicable Oregon plumbing codes. A minimum number of fittings must be used in the attic, and the fittings shall be copper or brass.
  - (g) Pipe materials (e.g. copper, PEX, polybutylene) must be capable of handling the temperature ranges that they will be exposed to (e.g. freezing or collector stagnation).
- (4) Freeze protection must be provided for systems where the heat transfer fluid may freeze. The freeze protection method shall follow these guidelines:
  - (a) The method must be clearly stated in the owner's manual.
  - (b) The method must work in the absence of utility electric power.
  - (c) Systems using tanks, piping, pumps and other components containing water in unheated spaces must be adequately protected from freezing.
  - (d) Recirculation is not an acceptable freeze protection measure, unless the collector used is a heat pipe type.
  - (e) Drain-down or manual drain systems are not acceptable freeze protection methods for solar domestic water heating systems.
  - (f) Drain-down or manual drain systems for pools or spas must be designed for gravity draining of the collector and piping.
  - (g) Thermosyphon systems may not connect power to the electric element in roof-mounted tanks as a freeze protection or backup measure.
- (5) The annual energy requirement for domestic water heating must be reduced by setting the water heater thermostat to 120 degrees F.

- (6) A method to show that the system is operating correctly must be provided.
- (a) For passive systems this must be a thermometer in line between solar storage and backup tank.
  - (b) For an active system this must be a flow meter in the supply line to the collectors and a thermometer on the outlet port of the solar storage tank.
  - (c) Equipment meeting this requirement must:
    - (A) Be a permanent part of the system;
    - (B) Not require any special tools or equipment to monitor; and
    - (C) Be in an accessible location.
- (7) The costs listed in subsection (8)(a) through (j) of this rule are guidelines. They do not include all eligible costs. Other costs will qualify if justified to ODOE's satisfaction as part of a solar water heating AED. Only total systems will qualify for the tax credit. All systems must comply with OAR 330-070-0010 through 330-070-0097.
- (8) Eligible costs include:
- (a) The cost of solar collectors;
  - (b) The cost of thermal storage devices;
  - (c) The cost of ductwork, piping, fans, pumps and controls that move heat from solar collectors to storage and to heat buildings;
  - (d) The cost of monitors, meters and controls;
  - (e) The cost of photovoltaic devices used to supply electricity to parts of the system;
  - (f) Installation charges;
  - (g) Fees paid for design or building;
  - (h) The cost of swimming pool blankets, if they are installed with a solar pool heating system;
  - (i) The cost of hot water conservation measures installed with a water heating AED; and
  - (j) Up to \$200 of the cost of solar access easements. A certified copy of the recorded easement and proof of the cost must be submitted with an application.
- (9) ODOE will provide a table of estimated annual energy savings or "yield chart" for most OG-300 systems common to Oregon and R&D systems. Annual energy savings will be based on the annual performance simulations provided by the SRCC modified for conditions required under state law.
- (a) OG-300 systems that meet ODOE approval do not have to be on the yield chart if there has been no request by a tax-credit certified technician that they appear on the yield chart.
  - (b) For the purposes of determining the tax credit, the annual energy savings will be reduced by 25 percent if the total solar resource fraction for the site is less than 75 percent, and by 100 percent if the total solar resource fraction for the site is less than 50 percent. Yields must be developed for each of the three weather zones defined by ODOE and updated at least annually.
- (10) All systems must meet the standards established by the SRCC OG-300 system certification in effect at the time the rules are adopted, or equivalent requirements as determined by the Director.
- (a) Temporary authorization will be granted to non-OG-300 systems under a special "Research & Development" status. ODOE will extend this temporary authorization for up to 12 systems of a specific design. The solar technician will need to submit a complete copy of the system design and operation documents provided to the consumer to ODOE for approval. ODOE shall determine that such system will perform well under the conditions it is designed for and will likely last in excess of 15 years without replacement of major components. Tax credit amounts under this status will be determined by ODOE based on 90 percent of the estimated annual energy output.
  - (b) Temporary authorization may be extended to non-OG-300 systems under an "OG-300 Applicant" status providing the system manufacturer is currently applying for OG-300 certification from SRCC. ODOE will extend an unlimited quantity of systems to be installed in a

12-month period, providing ODOE has reviewed a copy of the SRCC application and determined it to be reasonably likely to achieve OG-300 certification within the 12-month period.

(11) System yields shown in the yield charts may be increased by a tax-credit certified technician providing they sign a statement of compliance provided by ODOE and meet the following storage tank insulation levels:

(a) A one tank/aux. tanks adjustment of +100 kWh applies to the tank in a solar water heating system that has only one storage tank, such as a thermally stratified active system or ICS systems or the auxiliary tank in two tank systems. Such tanks generally have the ability to heat water by means other than solar energy. To qualify for this yield adjustment the tank must meet the insulation requirements as specified by ODOE.

(b) A solar tank adjustment of +100 kWh applies to the solar storage tank in a solar water heating system. Such a tank does not have a means of heating water other than solar energy and is almost always located upstream of the auxiliary tank. Because of their size and because they are usually not part of the original home design, they are generally located outside the conditioned space of the house. To qualify for this yield adjustment the tank must meet the insulation requirements as specified by ODOE.

(12) All technician tax-credit certified-installed systems must:

(a) Include an O&M manual which specifies installation instructions, operation instructions, maintenance plan, fluid quality, service and replacement parts, hazards, and warranty coverage;

(b) Provide clear labeling of on/off/bypass controls and safety issues;

(c) Have a means of indicating proper operation of the solar water heating system (flow indicators/meter or thermometers);

(d) Be installed to meet local building codes; and

(e) Have a tempering valve to prevent greater than 120 degree F. water downstream of the valve.

(13) Systems shall be installed with the OG-300 certification sticker located on the manual cover.

The manual and any supporting documentation shall be placed in a waterproof, clear plastic bag located on or near the solar or domestic hot water heater.

(14) Owner-built and site-built domestic water heating systems are exempt from the testing requirements. ODOE will evaluate the system design and assign it a yield based on 50 percent of its estimated annual energy performance.

[Publications: The publication(s) referred to or incorporated by reference in this rule are available from the Department of Energy.]

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 12(Temp), f. & ef. 10-14-77; DOE 3-1978, f. & ef. 3-7-78; DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 7-1984, f. & ef. 12-19-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1995, f. & cert. ef. 1-17-95; DOE 1-1996, f. & cert. ef. 4-1-96

### **330-070-0064**

#### **Guidelines for Photovoltaic AEDs**

- (1) Installations must be professional quality, comply with all applicable Oregon codes, comply with the requirements of the National Electric Code article 690, and be verified by an ODOE tax-credit certified solar technician.

- (2) A photovoltaic tax credit for a system installed on or after November 4, 2005, shall be limited to \$6,000 per PV system. The amount of the credit shall be based on \$3 per watt. The maximum tax credit given in a calendar year is \$1,500. If a system results in a tax credit larger than \$1,500, the remainder will be applied on to the subsequent year until either the \$6,000 limit or the total tax credit is provided.
- (3) System size shall be determined by the sum of all the photovoltaic module DC wattage ratings under standard test conditions (STC).
- (4) The minimum system size must be 200 Watts DC output under STC.
- (5) Photovoltaic AED costs eligible for the tax credit include the cost of:
  - (a) Photovoltaic modules;
  - (b) Inverters;
  - (c) Storage systems and regulators;
  - (d) Monitors, meters, and controls;
  - (e) Wiring and framing materials;
  - (f) Trackers;
  - (g) Installation charges; and
  - (h) Permits and fees, including up to \$200 of the cost of solar access easements. A certified copy of the recorded easement and proof of the cost must be submitted with an application.
- (6) For the purposes of determining the tax credit, the annual energy savings will be reduced by 25 percent if the total solar resource fraction for the site is less than 75 percent, and by 100 percent if the total solar resource fraction for the site is less than 50 percent. [Publications: The publication(s) referred to or incorporated by reference in this rule are available from the Department of Energy.]

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 1-1986, f & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-11996, f. & cert. Ef. 4-1-96

### **330-070-0070**

#### **Guidelines for Ground-Water Heat Pump and Ground Loop AEDs**

- (1) Only total systems will qualify for a tax credit. All systems must comply with OAR 330-070-0025 and 330-070-0040 and be of closed loop design and operation. See also OAR 330-070-0027.
- (2) Systems must limit waste of the resource.
- (3) Systems must not have adverse effects on:
  - (a) Other systems; and
  - (b) Water quality applying the standards of the Department of Environmental Quality.
- (4) Systems must not create hazards such as:
  - (a) Steam or water vapor;
  - (b) Vapors or odors;
  - (c) Noise; and
  - (d) Hazardous wellhead design.
- (5) System parts must have adequate:
  - (a) Structural strength;
  - (b) Resistance to weather and fire;
  - (c) Ease of upkeep; and
  - (d) Durability.
- (6) No system will cause harmful physical effects on people or unwanted tastes or odors.



- (7) Some heat transfer fluids need special handling. These include toxic, corrosive, and explosive fluids. Such fluids shall only be used when the system is designed to safely handle them.
- (8) Under normal operation, any part of a system that may be touched by people must be cooler than 141 degrees F. If this cannot be done, any part that reaches more than 140 degrees F. must have warning labels. Each system must include a device to limit water for domestic use to 140 degrees F.
- (9) Each system and nearby structures must be protected against pressures, vacuums and temperatures.
- (10) Systems must fully protect drinking water as specified in the Oregon Plumbing Specialty Code.
- (11) Systems must use storage tanks built by accepted methods. Each tank must be tested for leaks.
- (12) Expansion and contraction due to changing heat levels must not cause undue strain or distortion.
- (13) Systems that use heat transfer fluids that may freeze must have freeze protection.
- (14) Systems must use accepted methods to guard against the known corrosion/scaling level of the water.
- (15) Systems must also be designed for the least effect on groundwater.
- (16) Ground loop systems must cover enough ground to meet total annual heating requirements, as required by manufacturers' recommended design standards. Ground loops used for cooling must restore soil moisture.
- (17) Downhole heat exchangers will be reviewed on a case by case basis.
- (18) The system COP must be at least 3.3 for closed loop systems and 3.5 for direct expansion (DX) systems, including energy used by pumps. COP shall be determined by the following methods:
  - (a) For water source heat pumps, the COP must be determined in accordance with ARI Standard 325-85, at an entering water temperature of 50 degrees F.
  - (b) For water source or ground loop heat pumps using ambient surface water as an energy source and for solar assisted heat pumps, the COP must be the measured ratio of the heating season energy output divided by the heating season energy input. Both energy values must be expressed in the same units.
- (19) All other types of ground water heat pumps and ground loop AEDs must be reviewed on their COP.
- (20) Bermed or earth covered buildings will not qualify for the geothermal tax credit.
- (21) All ground water heat pumps and ground loop water heating AEDs must include setting the water heater thermostat to 120 degrees F as a hot water conservation measure.
- (22) A ground source heat pump system may receive a supplemental tax credit amount, determined by ODOE, based on additional energy savings, if the duct system to which it is attached is tested and certified in accordance with the protocols specified in Section 330-070-0073 (9) (a) through 330-070-0073 (9) (g). This amount is in addition to the tax credit amount for the ground source heat pump system itself, and in addition to the tax credit amount provided for the duct testing and certification itself. In order to earn the supplemental tax credit amount, the ground source system must be installed, the duct system must be tested and certified, and the applications for all tax credit amounts associated with the system must be received, as a single package, at ODOE by April 1<sup>st</sup> of the tax year following the tax year for which the credits are being claimed.

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 12(Temp), f. & ef. 10-14-77; DOE 3-1978, f. & ef. 3-7-78; DOE 5-1978, f. & ef. 9-27-78; DOE 6-1979, f. & ef. 11-13-79; DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 6-1983, f. 12-16-83, ef. 1-1-84; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1989, f. & cert. ef. 6-15-89 ; DOE 2-1989, f. 12-28-89, cert. ef. 1-1-90; DOE 1-1996, f. & cert. ef. 4-1-96

## Guidelines for Energy Efficient Appliances and Alternative Fuel Devices

(1) Energy efficient appliances must meet or exceed the following energy efficiency ratings, as measured in accordance with current United States Department of Energy (USDOE) test procedures where applicable, and be currently listed with ODOE as qualifying premium efficiency appliances.

(2) Where USDOE test procedures do not exist, ODOE will designate a nationally recognized test procedure that will apply instead.

### (3) Clothes washers

(a) For the purpose of this program, clothes washer efficiency performance is determined using the USDOE Appendix J1 test procedure for residential clothes washers in effect at the time the rules are adopted.

(b) Effective April 1, 2007, clothes washers shall have a minimum Modified Energy Factor (MEF) of 2.0 and a maximum Water Factor (WF) of 6.5 gal/cubic foot/cycle.

### (4) Refrigerator-Freezers

(a) Must have at least 20 percent lower energy consumption than that allowed by the July 1, 2001 USDOE standard for refrigerator/freezers;

(b) Must have a total net volume (sum of the fresh food compartment and freezer compartment volumes) of at least 12 cubic feet, but less than 30 cubic feet; and

(c) Must have a fully automatic defrost cycle.

### (5) Dishwashers

(a) Effective April 1, 2007, dishwashers must have an Energy Factor of 0.67 cycles/kWh or higher; and

(b) Dishwashers must have tax credit eligibility based on an Energy Factor derived from the DOE Dishwasher Test Procedure effective September 28, 2003.

(c) Dishwashers must have a maximum water use per cycle, as tested, of 6.5 gallons.

### (6) Water Heating Appliances

(a) Water heater efficiency requirements:

(A) Equipment efficiency requirements for units of nominal 1-ton or less capacity are based on the USDOE Energy Factor, as derived from the USDOE Appendix E test procedure for residential water heating equipment in effect at the time the rules are adopted. Efficiency requirements for units larger than 1-ton in capacity and smaller than 6-tons in capacity, are based on the system COP at 47 degrees F outdoor air temperature or other rating point appropriate for the system deemed equivalent by ODOE.

(B) Electric units of nominal 1-ton or less shall have an Energy Factor not less than 1.0; units with capacity greater than 1-ton and less than 6-tons shall have a COP rating of not less than 2.5.

(C) Natural gas, propane, or oil-fired units shall have an Energy Factor of 0.80 or greater as tested with natural gas fuel. If tankless, the water heater shall have a maximum firing rate of at least 140,000 Btu/hour and a minimum firing rate no higher than 24,000 Btu/hour.

(b) Combined space/water-heating system efficiency must be based on the water heating Energy Factor for Combined Systems ( $C_{EF}$ ) as derived from the American National Standards Institute/American Society of Heating, Refrigerating, and Air Conditioning Engineers (ANSI/ASHRAE) 124-1991 test method. Water heaters that are part of a combined space and water heating system may not receive a tax credit for space heating efficiency as a boiler in addition to the tax credit as a water heating appliance.

(7) For Wastewater Heat Recovery Systems, field performance data submitted to and approved by ODOE must be the basis for tax credit qualification. The following rules also apply:

(a) The systems must meet all plumbing code requirements for vented double-wall heat exchangers;

(b) The system must not interfere with the proper operation of the dwelling's wastewater system; and

(c) Energy recovered must be re-introduced into the dwelling's hot water supply system.

**(8) Performance Checked Space Conditioning Duct Systems** must meet the following requirements:

(a) All joints and seams in duct work outside the conditioned space must be sealed, when accessible, with mastics that meet NFPA class 1 requirements, that are UL 181 listed, and that meet ASTM standards C557 and C919-79.

(b) All closure systems must be applied according to the manufacturer's instructions or as specified by these standards.

(c) If the home serviced by the performance checked duct system is new, or the building envelope is being altered, the house must meet residential energy conservation requirements of the Oregon Structural Specialty Code or of the Oregon One and Two Family Dwelling Code in effect at the time the home is constructed or structurally altered.

(d) Duct leakage must be tested using ODOE-approved, calibrated duct testing equipment and ODOE approved testing protocols.

(e) Testing to verify that these standards have been achieved must be conducted by technicians approved by ODOE or by an ODOE-designated agent or representative. (f) In addition to general requirements (a) through (e), performance checked duct systems must meet situation specific standards for eligibility, materials, design, installation, air tightness and safety, as specified in the Oregon Department of Energy Premium Efficiency Duct System Standards, dated October 30, 2003.

(g) Measures eligible for the purpose of calculating a performance checked duct system tax credit include:

**(A) New construction**

(i) Duct sealing labor and materials;

(ii) Heating and cooling load calculations;

(iii) Duct system sizing and design calculations;

(iv) Labor and materials for installing multiple returns;

(v) Labor and materials for installing passive pressure relief grilles;

(vi) Duct testing; and

(vii) Labor and materials for bringing duct systems inside heated space.

**(B) New ducts in existing homes**

(i) Duct sealing labor and materials;

(ii) Heating and cooling load calculations;

(iii) Duct system sizing and design calculations;

(iv) Labor and materials for installing multiple returns;

(v) Labor and materials for installing passive pressure relief grilles; and

(vi) Duct testing.

**(C) Duct repair and sealing/existing ducts in existing homes**

(i) Duct sealing labor and materials;

(ii) Labor and materials for installing multiple returns;

(iii) Labor and materials for installing passive pressure relief grilles; and

(iv) Duct testing.

(h) To apply for a performance checked duct tax credit, the following information must be submitted in a form approved by ODOE:

(A) Application form;

(B) Test results worksheet for "new construction," "new duct systems in existing homes," or "duct repair and sealing"/existing ducts in existing homes, as applicable;

- (C) Copies of heating and cooling load calculations and/or duct sizing calculations, as applicable, shall be made available to ODOE upon request; and
  - (D) Itemized invoice identifying measures detailed in (g).
  - (i) The amount of the tax credit for performance checked duct systems must be 25 percent of the eligible costs detailed in (g), up to \$250.
- (9) Performance Checked Heat Pumps and Central Air Conditioners** must meet the following standards:
- (a) Systems must be tested and serviced as needed to confirm correct refrigerant charge and air flow by technicians certified by ODOE or its approved agent, based on procedures approved by ODOE.
  - (b) Approved supplemental air flow test methods must be used, including: flow grid, duct blaster, strip heat, or flow hood. Supplemental air flow test results must include pre-repair and post repair air flow readings in cubic feet per minute, cfm.
  - (c) To verify electronically commutated motor (ECM) installation results, the wattage of the existing fan motor and new ECM fan motor must be measured using a wattmeter or by clocking the revenue meter using the following procedure:
    - (A) Turn off all circuit breakers except the breaker to the AC/HP air handler.
    - (B) Turn on the air handler fan (cooling speed).
    - (C) At the meter, use a stopwatch, and for a period of at least 90 seconds, count the number of revolutions of the wheel. Record seconds and number of revolutions.
    - (D) Record meter data: kWh and multiplier if any.
    - (E) Calculate the watt draw of the fan:  $\text{Watts} = [\text{kWh} \times \text{number of revolutions} \times \text{multiplier} \times 3600] / \text{seconds}$ .
  - (d) Eligible measures must be confirmed by the system diagnostic tests using ODOE-approved protocols in use at the time of measure installation. Duplicate tax credits may not be claimed.
  - (e) Measures eligible for the purpose of calculating a performance checked heat pump/air conditioner tax credit include:
    - (A) System diagnostic tests;
    - (B) Adding or removing refrigerant when initial diagnostic tests indicate need for refrigerant adjustment and post repair tests indicate correct charge has been installed;
    - (C) Altering the duct system to improve air flow when initial diagnostic tests show low air flow and post repair tests show an air flow improvement of 10 percent or more;
    - (D) Cleaning the inside coil when initial diagnostic tests indicate low air flow and post repair tests show an air flow improvement of 10 percent or more; and
    - (E) Replacing an existing inside fan motor with an electronically commutated motor (ECM) when initial diagnostic tests show low air flow and tests after ECM installation show an air flow improvement of 10 percent or more.
  - (f) To apply for a performance checked heat pump/air conditioner tax credit, the following information must be submitted in a form approved by ODOE:
    - (A) Application form;
    - (B) Performance checked heat pump/AC diagnostics data entry form;
    - (C) Pre and post repair system air flow measurements using approved methods listed in (b), if applicable;
    - (D) Watt draw of existing fan motor and new ECM, if applicable; and
    - (E) Itemized labor and materials cost information for applicable measures, testing, and repairs.
  - (g) The amount of the performance checked heat pump/AC tax credit must be 25 percent of the cost of testing and repair, up to \$250.

**(10) Alternative Fuel Vehicles** must have equipment installed to make the vehicle capable of storing and utilizing an alternative fuel for vehicle propulsion. Equipment may consist of original equipment manufacturer components; or

- (a) Components for natural gas powered vehicles that meet EPA1-A requirements current at the time these rules are adopted; or
- (b) Components for hybrid vehicles must provide the hybrid vehicle with a combination of power between propulsion energy systems such that the peak power ratio of the vehicle is 0.10 or greater; or
- (c) Other components as recognized by ODOE as necessary for alternative fuel use.

**(11) Alternative Fuel Fueling Systems** must be installed to meet all state and local fire and life safety codes and be capable of re-fueling /recharging an alternative fuel vehicle within 14 hours. The following rules also apply:

- (a) On-board charging systems that feed into the rechargeable energy storage system in a hybrid vehicle must be high-voltage systems of 100 Volts or higher that have an active regenerative braking system integrated into the recharging system of the hybrid vehicle; and
- (b) The use of an on-board charging system on a hybrid vehicle must result in significant energy savings as determined by the Director of ODOE.

**(12) Energy Recovery Ventilators (ERVs)** must:

- (a) Be tested, rated and certified through the Home Ventilating Institute (HVI) Division of the Air Movement and Control Association (AMCA) International, Inc., and listed in the HVI directory;
- (b) Be capable of at least 30 percent Latent Recovery/Moisture Transfer (LRMT) at 32°F when operating on the lowest fan speed;  
Have a maximum  $EUI_{(HERV)}$  of 1.5 watts/cfm at the lowest fan speed for which performance data is published in the HVI directory; and
- (c) Have a minimum Sensible Recovery Efficiency (SRE) of:
  - (A) 65 percent at 32°F/0°C when operating at the lowest fan speed;
  - (B) 60 percent at 32°F/0°C when operating at the highest fan speed; and
  - (C) 60 percent at -13°F/-25°C when operating at the lowest fan speed, if rated at this condition.

**(13) Heat Recovery Ventilators** must:

- (a) Be tested, rated and certified through the Home Ventilating Institute (HVI) Division of the Air Movement and Control Association (AMCA) International, Inc., and listed in the HVI directory;
- (b) Have a maximum EUI of 1.5 watts/cfm at the lowest fan speed for which performance data is published in the HVI directory; and
- (c) Have a minimum Sensible Recovery Efficiency (SRE) of:
  - (A) 65 percent at 32°F/0°C when operating at the lowest fan speed;
  - (B) 60 percent at 32°F/0°C when operating at the highest fan speed; and
  - (C) 60 percent at -13°F/-25°C when operating at the lowest fan speed, if rated at this condition.

**(14) Very High Efficiency Air Conditioning Systems** must:

- (a) Be a central, split-system designed and installed to operate in conjunction with the air handling unit or furnace of a home's heating system;
- (b) Be tested and rated in accordance with the DOE test procedure for residential air-conditioning systems in effect at the time these rules are adopted, and certified by, and listed in the directory of the Air Conditioning and Refrigeration Institute (ARI) in effect at the time these rules are adopted;

- (c) Consist of a matched outdoor unit and indoor unit (air handler and coil or furnace and coil), as tested, rated and listed in the ARI Directory;
- (d) Have a minimum EER rating at DOE "A" conditions of 13.0; and
- (e) Be installed in accordance with the protocols specified in section 330-070-0073 (9) (a) through 330-070-0073 (9) (g) of these rules.

**(15) Very High Efficiency Air Source Heat Pump Systems must:**

- (a) Be a central, split-system;
- (b) Be tested and rated in accordance with the USDOE Appendix M test procedure for residential air-conditioning systems in effect at the time these rules are adopted, and be certified by, and be listed in the directory of the Air Conditioning and Refrigeration Institute (ARI) that is in effect at the time these rules are adopted;
- (c) Consist of a matched outdoor unit and indoor unit (air handler and coil or furnace and coil), as tested, rated and listed in the ARI Directory;
- (d) Have a minimum DOE Region IV HSPF rating of 9.0;
- (e) Have a minimum EER rating at DOE "A" conditions of 12.0; and
- (f) Be installed in accordance with the protocols specified in section 330-070-0073 (9)(a) through 330-070-0073 (9)(g) of these rules.

**(16) Very High Efficiency Warm Air Furnace Systems must:**

- (a) Be tested and rated in accordance with the USDOE Appendix N test procedure for furnaces in effect at the time these rules are adopted, and be certified by and listed in the directory of the Gas Appliance Manufacturers Association (GAMA) in effect at the time these rules are adopted;
- (b) Have a minimum AFUE rating of 0.90 (90 percent);
- (c) Use ducted outdoor air for combustion; and
- (d) The air handler for the unit must have an electronically commutated, permanent magnet variable speed DC (ECPM) motor, or have an EUI<sub>(FURNACE)</sub> of less than 0.02.

**(17) Very High Efficiency Air Handlers must:**

- (a) Be installed as part of a hydronic space heating system; and
- (b) Be equipped with an electronically commutated, permanent magnet variable speed DC (ECPM) motor.

**(18) Very High Efficiency Hot Water Boiler Systems must:**

- (a) Be tested and rated in accordance with the USDOE Appendix N test procedure for furnaces in effect at the time these rules are adopted, and be certified by and listed in the directory of the Gas Appliance Manufacturers Association (GAMA) in effect at the time these rules are adopted; and
- (b) Have a minimum AFUE rating of 0.88 (88 percent).

**(19) Very High Efficiency Air Conditioning, Air Source Heat Pump or Furnace systems** may receive a supplemental tax credit amount, determined by ODOE, based on additional energy savings if the duct system to which it is attached is tested and certified in accordance with the protocols specified in Section 330-070-0073 (9) (a) through 330-070-0073 (9) (g). This amount is in addition to the tax credit amount for the Very High Efficiency Air Conditioning, Air Source Heat Pump or Furnace system itself, and in addition to the tax credit amount provided for the duct testing and certification itself. In order to earn the supplemental tax credit amount, the air conditioning and/or heating system must be installed, the duct system must be tested and certified, and the applications for all tax credit amounts associated with the system must be received, as a single package, at ODOE by April 1<sup>st</sup> of the tax year following the tax year for which the credits are being claimed.

**(20)** Any other standards adopted by ODOE for energy efficient appliances and alternative fuel devices, their components, and/or systems as determined by the Director of the Oregon Department of Energy.

Stat. Auth.: ORS 469.086

Stats. Implemented: ORS 316.116

Hist.: DOE 1-1982, f. 1-12-82, ef. 2-1-82; DOE 1-1986, f. & ef. 2-7-86; DOE 4-1987, f. 12-18-87, ef. 1-1-88; DOE 1-1996, f. & cert. ef. 4-1-96