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(2) Is designed for use in—

(i) Applications in which the occupants of more than one household will be using the clothes washer, such as multi-family housing common areas and coin laundries; or

(ii) Other commercial applications.

*IWF* means integrated water factor, in gallons per cubic feet per cycle (gal/cu ft/cycle), as determined in section 4.2.12 of appendix J2 to subpart B of part 430 (when using appendix J2).

*MEF<sub>J2</sub>* means modified energy factor, in cu ft/kWh/cycle, as determined in section 4.5 of appendix J2 to subpart B of part 430 (when using appendix J2).

*WER* means water efficiency ratio, in pounds per gallon per cycle (lbs/gal/cycle), as determined in section 4.7 of appendix J to subpart B of part 430 (when using appendix J).

[87 FR 33405, June 1, 2022]

### TEST PROCEDURES

#### § 431.154 Test procedures.

The test procedures for clothes washers in appendix J2 to subpart B of part 430 must be used to determine compliance with the energy conservation standards at § 431.156(b).

[87 FR 33405, June 1, 2022]

### ENERGY CONSERVATION STANDARDS

#### § 431.156 Energy and water conservation standards and effective dates.

(a) Each commercial clothes washer manufactured on or after January 8, 2013, and before January 1, 2018, shall have a modified energy factor no less than and a water factor no greater than:

Equipment class	Modified energy factor (MEF), cu. ft./kWh/cycle	Water factor (WF), gal./cu. ft./cycle
Top-Loading .....	1.60	8.5
Front-Loading .....	2.00	5.5

(b) Each commercial clothes washer manufactured on or after January 1, 2018 shall have a modified energy factor no less than and an integrated water factor no greater than:

Equipment class	Modified energy factor (MEF <sub>J2</sub> ), cu. ft./kWh/cycle	Integrated Water factor (IWF), gal./cu. ft./cycle
Top-Loading .....	1.35	8.8

Equipment class	Modified energy factor (MEF <sub>J2</sub> ), cu. ft./kWh/cycle	Integrated Water factor (IWF), gal./cu. ft./cycle
Front-Loading .....	2.00	4.1

[76 FR 69123, Nov. 8, 2011, as amended at 79 FR 74541, Dec. 15, 2014; 81 FR 20529, Apr. 8, 2016]

## Subpart J—Fans and Blowers

SOURCE: 86 FR 46590, Aug. 19, 2021, unless otherwise noted.

#### § 431.171 Purpose and scope.

This subpart contains provisions regarding fans and blowers, pursuant to Part C of Title III of the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6311–6317. This subpart does not cover “ceiling fans” as that term is defined and addressed in part 430 this chapter, nor does it cover “furnace fans” as that term is defined and addressed in part 430 of this chapter.

#### § 431.172 Definition.

*Fan* or *blower* means a rotary bladed machine used to convert electrical or mechanical power to air power, with an energy output limited to 25 kilojoule (kJ)/kilogram (kg) of air. It consists of an impeller, a shaft and bearings and/or driver to support the impeller, as well as a structure or housing. A fan or blower may include a transmission, driver, and/or motor controller.

#### §§ 431.173–431.176 [Reserved]

## Subpart K—Distribution Transformers

SOURCE: 70 FR 60416, Oct. 18, 2005, unless otherwise noted.

#### § 431.191 Purpose and scope.

This subpart contains energy conservation requirements for distribution transformers, pursuant to Parts B and C of Title III of the Energy Policy and Conservation Act, as amended, 42 U.S.C. 6291–6317.

[71 FR 24995, Apr. 27, 2006]

#### § 431.192 Definitions.

The following definitions apply for purposes of this subpart:

*Autotransformer* means a transformer that:

- (1) Has one physical winding that consists of a series winding part and a common winding part;
- (2) Has no isolation between its primary and secondary circuits; and
- (3) During step-down operation, has a primary voltage that is equal to the total of the series and common winding voltages, and a secondary voltage that is equal to the common winding voltage.

*Auxiliary device* means a localized component of a distribution transformer that is a circuit breaker, switch, fuse, or surge/lightning arrester.

*Basic model* means a group of models of distribution transformers manufactured by a single manufacturer, that have the same insulation type (*i.e.*, liquid-immersed or dry-type), have the same number of phases (*i.e.*, single or three), have the same standard kVA rating, and do not have any differentiating electrical, physical or functional features that affect energy consumption. Differences in voltage and differences in basic impulse insulation level (BIL) rating are examples of differentiating electrical features that affect energy consumption.

*Distribution transformer* means a transformer that—

- (1) Has an input voltage of 34.5 kV or less;
- (2) Has an output voltage of 600 V or less;
- (3) Is rated for operation at a frequency of 60 Hz; and
- (4) Has a capacity of 10 kVA to 2500 kVA for liquid-immersed units and 15 kVA to 2500 kVA for dry-type units; but
- (5) The term “distribution transformer” does not include a transformer that is an—
  - (i) Autotransformer;
  - (ii) Drive (isolation) transformer;
  - (iii) Grounding transformer;
  - (iv) Machine-tool (control) transformer;
  - (v) Nonventilated transformer;
  - (vi) Rectifier transformer;
  - (vii) Regulating transformer;
  - (viii) Sealed transformer;
  - (ix) Special-impedance transformer;
  - (x) Testing transformer;

(xi) Transformer with tap range of 20 percent or more;

(xii) Uninterruptible power supply transformer; or

(xiii) Welding transformer.

*Drive (isolation) transformer* means a transformer that:

(1) Isolates an electric motor from the line;

(2) Accommodates the added loads of drive-created harmonics; and

(3) Is designed to withstand the additional mechanical stresses resulting from an alternating current adjustable frequency motor drive or a direct current motor drive.

*Efficiency* means the ratio of the useful power output to the total power input.

*Excitation current* or *no-load current* means the current that flows in any winding used to excite the transformer when all other windings are open-circuited.

*Grounding transformer* means a three-phase transformer intended primarily to provide a neutral point for system-grounding purposes, either by means of:

(1) A grounded wye primary winding and a delta secondary winding; or

(2) A transformer with its primary winding in a zig-zag winding arrangement, and with no secondary winding.

*Liquid-immersed distribution transformer* means a distribution transformer in which the core and coil assembly is immersed in an insulating liquid.

*Load loss* means, for a distribution transformer, those losses incident to a specified load carried by the transformer, including losses in the windings as well as stray losses in the conducting parts of the transformer.

*Low-voltage dry-type distribution transformer* means a distribution transformer that has an input voltage of 600 volts or less and has the core and coil assembly immersed in a gaseous or dry-compound insulating medium.

*Machine-tool (control) transformer* means a transformer that is equipped with a fuse or other over-current protection device, and is generally used for the operation of a solenoid, contactor, relay, portable tool, or localized lighting.

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*Medium-voltage dry-type distribution transformer* means a distribution transformer in which the core and coil assembly is immersed in a gaseous or dry-compound insulating medium, and which has a rated primary voltage between 601 V and 34.5 kV.

*Mining distribution transformer* means a medium-voltage dry-type distribution transformer that is built only for installation in an underground mine or surface mine, inside equipment for use in an underground mine or surface mine, on-board equipment for use in an underground mine or surface mine, or for equipment used for digging, drilling, or tunneling underground or above ground, and that has a nameplate which identifies the transformer as being for this use only.

*No-load loss* means those losses that are incident to the excitation of the transformer.

*Nonventilated transformer* means a transformer constructed so as to prevent external air circulation through the coils of the transformer while operating at zero gauge pressure.

*Per-unit load* means the fraction of rated load.

*Phase angle* means the angle between two phasors, where the two phasors represent progressions of periodic waves of either:

- (1) Two voltages;
- (2) Two currents; or
- (3) A voltage and a current of an alternating current circuit.

*Phase angle correction* means the adjustment (correction) of measurement data to negate the effects of phase angle error.

*Phase angle error* means incorrect displacement of the phase angle, introduced by the components of the test equipment.

*Rectifier transformer* means a transformer that operates at the fundamental frequency of an alternating-current system and that is designed to have one or more output windings connected to a rectifier.

*Reference temperature* means the temperature at which the transformer losses are determined, and to which such losses are corrected if testing is done at a different point. (Reference temperature values are specified in the

test method in appendix A to this subpart.)

*Regulating transformer* means a transformer that varies the voltage, the phase angle, or both voltage and phase angle, of an output circuit and compensates for fluctuation of load and input voltage, phase angle or both voltage and phase angle.

*Sealed transformer* means a transformer designed to remain hermetically sealed under specified conditions of temperature and pressure.

*Special-impedance transformer* means any transformer built to operate at an impedance outside of the normal impedance range for that transformer's kVA rating. The normal impedance range for each kVA rating for liquid-immersed and dry-type transformers is shown in Tables 1 and 2, respectively.

TABLE 1—NORMAL IMPEDANCE RANGES FOR LIQUID-IMMERSED TRANSFORMERS

Single-phase transformers		Three-phase transformers	
kVA	Impedance (%)	kVA	Impedance (%)
10 .....	1.0–4.5	15	1.0–4.5
15 .....	1.0–4.5	30	1.0–4.5
25 .....	1.0–4.5	45	1.0–4.5
37.5 .....	1.0–4.5	75	1.0–5.0
50 .....	1.5–4.5	112.5	1.2–6.0
75 .....	1.5–4.5	150	1.2–6.0
100 .....	1.5–4.5	225	1.2–6.0
167 .....	1.5–4.5	300	1.2–6.0
250 .....	1.5–6.0	500	1.5–7.0
333 .....	1.5–6.0	750	5.0–7.5
500 .....	1.5–7.0	1000	5.0–7.5
667 .....	5.0–7.5	1500	5.0–7.5
833 .....	5.0–7.5	2000	5.0–7.5
.....	.....	2500	5.0–7.5

TABLE 2—NORMAL IMPEDANCE RANGES FOR DRY-TYPE TRANSFORMERS

Single-phase transformers		Three-phase transformers	
kVA	Impedance (%)	kVA	Impedance (%)
15 .....	1.5–6.0	15	1.5–6.0
25 .....	1.5–6.0	30	1.5–6.0
37.5 .....	1.5–6.0	45	1.5–6.0
50 .....	1.5–6.0	75	1.5–6.0
75 .....	2.0–7.0	112.5	1.5–6.0
100 .....	2.0–7.0	150	1.5–6.0
167 .....	2.5–8.0	225	3.0–7.0
250 .....	3.5–8.0	300	3.0–7.0
333 .....	3.5–8.0	500	4.5–8.0
500 .....	3.5–8.0	750	5.0–8.0
667 .....	5.0–8.0	1000	5.0–8.0
833 .....	5.0–8.0	1500	5.0–8.0
.....	.....	2000	5.0–8.0
.....	.....	2500	5.0–8.0

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*Temperature correction* means the mathematical correction(s) of measurement data, obtained when a transformer is tested at a temperature that is different from the reference temperature, to the value(s) that would have been obtained if the transformer had been tested at the reference temperature.

*Terminal* means a conducting element of a distribution transformer providing electrical connection to an external conductor that is not part of the transformer.

*Test current* means the current of the electrical power supplied to the transformer under test.

*Test frequency* means the frequency of the electrical power supplied to the transformer under test.

*Test voltage* means the voltage of the electrical power supplied to the transformer under test.

*Testing transformer* means a transformer used in a circuit to produce a specific voltage or current for the purpose of testing electrical equipment.

*Total loss* means the sum of the no-load loss and the load loss for a transformer.

*Transformer* means a device consisting of 2 or more coils of insulated wire that transfers alternating current by electromagnetic induction from 1 coil to another to change the original voltage or current value.

*Transformer with tap range of 20 percent or more* means a transformer with multiple voltage taps, the highest of which equals at least 20 percent more than the lowest, computed based on the sum of the deviations of the voltages of these taps from the transformer's nominal voltage.

*Uninterruptible power supply transformer* means a transformer that is used within an uninterruptible power system, which in turn supplies power to loads that are sensitive to power failure, power sags, over voltage, switching transients, line noise, and other power quality factors.

*Waveform correction* means the adjustment(s) (mathematical correction(s)) of measurement data obtained with a test voltage that is non-sinusoidal, to a value(s) that would have been obtained with a sinusoidal voltage.

## 10 CFR Ch. II (1–1–23 Edition)

*Welding transformer* means a transformer designed for use in arc welding equipment or resistance welding equipment.

[70 FR 60416, Oct. 18, 2005, as amended at 71 FR 24995, Apr. 27, 2006; 71 FR 60662, Oct. 16, 2006; 72 FR 58239, Oct. 12, 2007; 78 FR 23433, Apr. 18, 2013; 86 FR 51252, Sept. 14, 2021]

### TEST PROCEDURES

#### § 431.193 Test procedure for measuring energy consumption of distribution transformers.

The test procedure for measuring the energy efficiency of distribution transformers for purposes of EPCA is specified in appendix A to this subpart. The test procedure specified in appendix A to this subpart applies only to distribution transformers subject to energy conservation standards at § 431.196.

[86 FR 51252, Sept. 14, 2021]

### ENERGY CONSERVATION STANDARDS

#### § 431.196 Energy conservation standards and their effective dates.

(a) *Low-Voltage Dry-Type Distribution Transformers.* (1) The efficiency of a low-voltage, dry-type distribution transformer manufactured on or after January 1, 2007, but before January 1, 2016, shall be no less than that required for the applicable kVA rating in the table below. Low-voltage dry-type distribution transformers with kVA ratings not appearing in the table shall have their minimum efficiency level determined by linear interpolation of the kVA and efficiency values immediately above and below that kVA rating.

Single-phase		Three-phase	
kVA	%	kVA	%
15 .....	97.7	15 .....	97.0
25 .....	98.0	30 .....	97.5
37.5 .....	98.2	45 .....	97.7
50 .....	98.3	75 .....	98.0
75 .....	98.5	112.5 .....	98.2
100 .....	98.6	150 .....	98.3
167 .....	98.7	225 .....	98.5
250 .....	98.8	300 .....	98.6
333 .....	98.9	500 .....	98.7
		750 .....	98.8
		1000 .....	98.9

NOTE 1 TO PARAGRAPH (a)(1): All efficiency values are at 35 percent per-unit load.