

GEW122-14

608.8.1.1, 903.1

Proponent: Brenda Thompson, Chair, representing Sustainability, Energy, High Performance Code Action Committee (SEHPCAC@iccsafe.org)

Delete without substitution:

608.8.1.1 Transformer efficiency. Distribution transformers installed on the load side of the service disconnecting means shall comply with the provisions of Tables 608.8.1.1(1), 608.8.1.1(2) and 608.8.1.1(3), and the Energy Policy Act of 2005 as applicable.

Exception: The following transformers are exempt from the efficiency standards of Section 608.8.1.1:

1. Transformers not covered by the Energy Policy Act of 2005.
2. Transformers for special purpose applications, and not used in general purpose applications.
3. Transformers with multiple voltage taps where the highest tap is not less than 20 percent more than the lowest tap.
4. Drive transformers, rectifier transformers, auto-transformers, uninterruptible power supply transformers, impedance transformers, regulating transformers, sealed and nonventilating transformers, machine tool transformers, welding transformers, grounding transformers, and testing transformers.

TABLE 608.8.1.1(1)
LOW-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS
(Maximum 600 Volt Primary)^a

SINGLE PHASE		THREE PHASE	
kVA Rating	Minimum Efficiency (%)	kVA Rating	Minimum Efficiency (%)
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

a.— All efficiency values for low-voltage transformers are at 35 percent of nameplate-rated load, determined in accordance with the DOE test procedure. 10 CFR Part 431, Sub-part K, Appendix A.

TABLE 608.8.1.1(2)
MEDIUM-VOLTAGE DRY-TYPE DISTRIBUTION TRANSFORMERS
(Maximum 34,500 Volt Primary, Maximum 600 Volt Secondary)^a

SINGLE PHASE				THREE PHASE			
kVA Rating	20-45 kV BIL Minimum Efficiency (%)	46-95 kV BIL Minimum Efficiency (%)	>96 kV BIL Minimum Efficiency (%)	kVA Rating	20-45 kV BIL Minimum Efficiency (%)	46-95 kV BIL Minimum Efficiency (%)	>96 kV BIL Minimum Efficiency (%)
15	98.10	97.86	—	15	97.50	97.18	—
25	98.33	98.12	—	30	97.90	97.63	—
37.5	98.49	98.30	—	45	98.10	97.86	—
50	98.60	98.42	—	75	98.33	98.12	—
75	98.73	98.57	98.53	112.5	98.49	98.30	—
100	98.82	98.67	98.63	150	98.60	98.42	—
167	98.96	98.83	98.80	225	98.73	98.57	98.53
250	99.07	98.95	98.91	300	98.82	98.67	98.63
333	99.14	99.03	98.99	500	98.96	98.83	98.80
500	99.22	99.12	99.09	750	99.07	98.95	98.91
667	99.27	99.18	99.15	1000	99.14	99.03	98.99
833	99.31	99.23	99.20	1500	99.22	99.12	99.09
—	—	—	—	2000	99.27	99.18	99.15
—	—	—	—	2500	99.31	99.23	99.20

BIL = Basic impulse insulation level.

a.—All efficiency values for medium-voltage transformers are at 50 percent of nameplate-rated load, determined in accordance with the DOE test procedure. 10 CFR Part 431, Sub-part K, Appendix A.

TABLE 608.8.1.1(3)
MEDIUM-VOLTAGE LIQUID-IMMERSED DISTRIBUTION TRANSFORMERS
(Maximum 34,500 Volt Primary, Maximum 600 Volt Secondary)^a

SINGLE PHASE		THREE PHASE	
kVA Rating	Minimum Efficiency (%)	kVA Rating	Minimum Efficiency (%)
10	98.62	15	98.36
15	98.76	30	98.62
25	98.91	45	98.76
37.5	99.01	75	98.91
50	99.08	112.5	99.01
75	99.17	150	99.08
100	99.23	225	99.17

SINGLE PHASE		THREE PHASE	
167	99.25	300	99.23
250	99.32	500	99.25
333	99.36	750	99.32
500	99.42	1000	99.36
667	99.46	1500	99.42
883	99.49	2000	99.46
—	—	2500	99.49

a. —All efficiency values for medium-voltage transformers are at 50 percent of nameplate-rated load, determined in accordance with the DOE test procedure, 10 CFR Part 431, Sub-part K, Appendix A.

Revise as follows:

903.1 General. Where application is made for construction as described in this section, the registered design professional in responsible charge or approved agency shall perform commissioning during construction and after occupancy as required by Table 903.1. Where Table 903.1 specifies that commissioning is to be done on a periodic basis, the registered design professional in responsible charge shall provide a schedule of periodic commissioning with the submittal documents that shall be reviewed and *approved by the code official*.

The approved agency shall be qualified and shall demonstrate competence, to the satisfaction of the *code official*, for the commissioning of the particular type of construction or operation. The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency provided those personnel meet the qualification requirements of this section to the satisfaction of the *code official*. The approved agency shall provide written documentation to the *code official* demonstrating competence and relevant experience or training. Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of commissioning activities for projects of similar complexity and material qualities.

**TABLE 903.1
COMMISSIONING PLAN**

CONSTRUCTION OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANCY	POST-OCCUPANCY	METHOD	OCCURRENCE		SECTION/REFERENCED STANDARD
				Preoccupancy	Post-occupancy	
Chapter 6: Lighting						
Auto demand reduction control system functionality	X	X	Functional testing	Final inspection	18-24 months	604.4
Plug load controls	X	None	Functional testing	Final inspection	None	608.6
Connection of appliances to switched receptacles	—	X	Field inspection	None	18-24 months	608.6
Specified transformer nameplate efficiency rating	X	None	Field inspection	Final inspection	None	608.8.1.1
Verification of lamp	X	X	Field inspection	Final inspection	18-24 months	608.10
Verification of ballast	X	None	Field inspection	Final inspection	None	608.10
Lighting controls						

CONSTRUCTION OR SYSTEM REQUIRING VERIFICATION	PREOCCUPANCY	POST-OCCUPANCY	METHOD	OCCURRENCE		SECTION/REFERENCED STANDARD
				Preoccupancy	Post-occupancy	
a. Installation	X	None	Field inspection	Post-installation	None	608.11
b. Calibration	X	X	System installer/contractor or commissioning agent	Post-installation	18-24 months	611.3.3

For SI: 1 square foot = 0.0929 m².

Reason: This proposal was submitted by the ICC Sustainability Energy and High Performance Code Action Committee (SEHPCAC). The SEHPCAC was established by the ICC Board of Directors to pursue opportunities to improve and enhance International Codes with regard to sustainability, energy and high performance as it relates to the built environment included, but not limited to, how these criteria relate to the International Green Construction Code (IgCC) and the International Energy Conservation Code (IECC). This includes both the technical aspects of the codes as well as the code content in terms of scope and application of referenced standards. In 2012 and 2013, the SEHPCAC has held six two-day open meetings and 50 workgroup calls, which included members of the SEHPCAC as well as any interested parties, to discuss and debate proposed changes and public comments. Related documentation and reports are posted on the SEHPCAC website at: <http://www.iccsafe.org/cs/SEHPCAC/Pages/default.aspx>.

Code change CE329-13 was approved in 2013. It added electrical transformer requirements to the IECC. The resulting text of the 2015 IECC is shown below. Therefore, the provisions in the IgCC are not a significant energy improvement over the IECC. The SEHPCAC proposes to delete the provisions. If other proponents pursue proposals which will take the new IECC provisions and enhance their energy savings when applied under the IgCC, the SEHPCAC will consider withdrawal of this proposal. This proposal is to delete the transformer section of the IgCC in Chapter 6 and to remove the related provisions from Table 903 addressing commissioning requirements.

C405.7 Electrical transformers (Mandatory). Electric transformers shall meet the minimum efficiency requirements of Table C405.7 as tested and rated in accordance with the test procedure listed in DOE 10 CFR 431. The efficiency shall be verified through certification under an approved certification program or, where no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the transformer manufacturer.

Exceptions: The following transformers are exempt:

1. Transformers that meet the Energy Policy Act of 2005 exclusions based on the DOE 10 CFR 431 definition of special purpose applications.
2. Transformers that meet the Energy Policy Act of 2005 exclusions that are not to be used in general purpose applications based on information provided in DOE 10 CFR 431
3. Transformers that meet the Energy Policy Act of 2005 exclusions with multiple voltage taps where the highest tap is at least 20 percent more than the lowest tap.
4. Drive transformers
5. Rectifier transformers
6. Auto-transformers
7. Uninterruptible power system transformers
8. Impedance transformers
9. Regulating transformers
10. Sealed and nonventilating transformers
11. Machine tool transformer
12. Welding transformer
13. Grounding transformer
14. Testing transformer

**TABLE C405.7
Minimum Nominal Efficiency Levels for 10 CFR 431 Low Voltage Dry-Type Distribution Transformers**

Single Phase Transformers		Three Phase Transformers	
kVA ^a	Efficiency (%) ^b	kVA ^a	Efficiency (%) ^b
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

- a. kiloVolt-Amp rating.
- b. Nominal efficiencies shall be established in accordance with the DOE 10 CFR 431 test procedure for low voltage dry-type transformers.

Cost Impact: Will not increase the cost of construction. The proposal removes potentially conflicting provisions between the IECC and IgCC.

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