

AIEE-FEMA-NEMA STANDARDS PUBLICATION FOR ARC FURNACE TRANSFORMERS

First Report

A Report of

The Joint Committee of the Foundry Equipment Manufacturers Association, the American Institute of Electrical Engineers, and the National Electrical Manufacturers Association on Standards for Arc Furnace Transformers, developed with the view to eventual submission to ASA Sectional Committee C57 for approval as an American Standard.

SUMMARY

This First Report covers electrical characteristics and mechanical features of transformers used for supplying electric power to direct arc ferrous-melting furnaces.

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AIEE-FEMA-NEMA Standards Publication for Arc Furnace Transformers

17-00. GENERAL

17-00.010 Scope

17-00.011 This standard covers electrical characteristics and mechanical features of 3-phase, 60-cycle, 2-winding, mineral-oil-immersed indoor transformers rated 250 to 35000 kva, inclusive, high voltage 2400 to 34400 volts, inclusive, used for supplying electric power to direct arc ferrous-melting furnaces.

17-00.012 All characteristics and definitions, except as specifically covered in this standard, shall be in accordance with the *American Standard Requirements, Terminology and Test Code for Distribution, Power and Regulating Transformers, and Reactors Other Than Current-Limiting Reactors*, C57.12-1958, or the latest revision thereof approved by the American Standards Association, Incorporated.

Certain information in the American Standard and in this First Report may eventually be included in sections which will be prepared for general requirements, terminology and test code for arc furnace transformers.

17-01. RATINGS

17-01.100 Transformer Kilovolt-Ampere Ratings

17-01.110 Kilovolt-ampere ratings shall be as shown in Column 1 of Table 17-01.110.

17-01.111 These ratings are continuous and based on not exceeding a 55 C average conductor temperature rise and a 65 C hot-spot temperature rise, with rated high-voltage and with any rated kva low-voltage connection.

17-01.112 Ratings up to and including 10000 kva shall be water cooled (OW). Ratings above 10000 kva shall be forced-oil-cooled with forced-water cooler (FOW).

17-01.500 High- and Low-Voltage Ratings

17-01.510 High-voltage ratings shall be as shown in Table 17-01.510.

17-01.530 Rated maximum low-voltage ratings for each kilovolt-ampere rating shall be as shown in Column 2 of Table 17-01.110.

17-01.531 In addition to the rated maximum low voltage, transformers shall have eleven voltages below the maximum rating. (See Section 17-04, Connections.)

17-01.532 The minimum low voltage, with high-voltage delta connected, shall be not less than the value shown in Column 3 of Table 17-01.110.

**TABLE 17-01.110
Transformer Ratings**

Kva	Maximum Low Voltage, Volts	Minimum Delta Low Voltage Volts*	Maximum Line Current thru Electrode, Amperes
(1)	(2)	(3)	(4)
250	200	133	850
400	200	133	1350
750	210	140	2400
1000	220	146	3200
1500	230	153	4800
2000	240	160	6100
3000	250	166	8700
4000	255	170	11000
5000	260	173	13500
6000	270	180	16000
7500	280	186	19500
10000	300	200	24000
12500	325	217	27000
15000	350	233	30000
18750	375	250	34000
22500	425	283	37000
25000	460	306	38000
30000	500	333	41500
35000	550	366	44000

*The minimum low-voltage volts with high voltage in delta is based upon a 50 percent high-voltage winding extension.

**TABLE 17-01.510
Voltage Ratings for All Kilovolt-Ampere Ratings**

High-Voltage Rating, Volts	
2400	12000
4160	13200
4800	13800
6900	22900
7200	26400
	34400

NOTE 1: For applied high-voltage of between 100 and 105 percent of rating, transformers shall be capable of delivering, for each connection, a maximum kva equal to the rated kva output of that connection at 100 percent applied high voltage without exceeding the limits of temperature rise given in Section 17-05.110.

NOTE 2: For applied high voltage of between 95 and 100 percent of rating, transformers shall be capable of delivering, for each connection, a maximum current equal to the rated current output of that connection at 100 percent applied high voltage without exceeding the limits of temperature rise given in Section 17-05.110.