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IEEE C57.12.26-1992
(Revision of ANSI C57.12.26-1987)

IEEE Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers for Use With Separable Insulated High- Voltage Connectors (34 500 Grd Y/19 920 V and Below; 2500 kVA and Smaller)

Sponsor
**Transformers Committee of the
of the
IEEE Power Engineering Society**

Approved June 18, 1992
IEEE Standards Board

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American National Standards Institute

Abstract: This standard is intended for use as a basis for determining performance, interchangeability, and safety of the equipment covered, and for assisting in the proper selection of equipment. It covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of three-phase, 60 Hz, mineral-oil-immersed, self-cooled, pad-mounted, compartmental-type distribution transformers with separable insulated high-voltage connectors. These transformers are rated at 2500 kVA and smaller, with high voltages of 34 500 Grd Y/19 920 V and below and with low voltages of 480 V and below. These transformers are used generally for step-down purposes from an underground primary cable supply. Connector and terminal arrangements for both radial-feed and loop-feed systems are included.

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Foreword

(This foreword is not a part of IEEE C57.12.26, IEEE C57.12.26-1992, IEEE Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers for Use With Separable Insulated High-Voltage Connectors.)

The Accredited Standards Committee on Transformers, Regulators, and Reactors, C57, has for many years been developing standards on transformers, regulators, and reactors. The data has been obtained from many sources, including the standards of the Institute of Electrical and Electronics Engineers (IEEE) and the National Electrical Manufacturers Association (NEMA), reports of committees of the Edison Electrical Institute, and others.

This standard was prepared by the Working Group of the Subcommittee on Distribution Transformers, Overhead and Padmounted C57.12.2, and is a revision of the 1987 edition. Significant additions to this edition are the percent impedance voltage for transformers below 750 kVA, a drain value requirement, and additional sections on storage and installation.

The Accredited Standards Committee on Transformers, Regulators, and Reactors, C57, that reviewed and approved this document, had the following members at the time of approval:

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1. Purpose and Scope

1.1 Purpose

This standard is intended for use as a basis for determining the performance, interchangeability, and safety of the equipment covered, and for assisting in the proper selection of such equipment.

1.2 Scope

This standard covers certain electrical, dimensional, and mechanical characteristics and takes into consideration certain safety features of three-phase, 60 Hz, mineral-oil-immersed, self-cooled, pad-mounted, compartmental-type distribution transformers with separable insulated high-voltage connectors. These transformers are rated 2500 kVA and smaller, with high voltages of 34 500 Grd Y/19 920 V and below and with low voltages of 480 V and below. These transformers are used generally for step-down purposes from an underground primary cable supply.

NOTE — Refer to latest Federal regulations concerning polychlorinated biphenyl (PCB) contamination in transformers.

This standard covers connector and terminal arrangements for both radial-feed and loop-feed systems. Either certain minimum dimensions (see Figs 1-4) or certain specific dimensions (see Figs 5.A-8) shall be specified.

This standard does not cover the electrical and mechanical requirements of any accessory devices that may be supplied with the transformer.

2. References

All characteristics, definitions, terminology, voltage designations, and tests, except as otherwise specified herein, shall be in accordance with the following standards. When the standards listed here are superseded by an approved revision, the latest revision shall apply.

- [1] ANSI C57.12.28-1988, American National Standard for Switchgear and Transformers Pad-Mounted Equipment — Enclosure Integrity.¹
- [2] ANSI C57.12.70-1978 (Reaff 1987), American National Standard for Terminal Markings and Connections for Distribution and Power Transformers.
- [3] IEEE C57.12.00-1987, IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers (ANSI).²
- [4] IEEE C57.12.80-1978 (Reaff 1986), IEEE Standard Terminology for Power and Distribution Transformers (ANSI).
- [5] IEEE C57.12.90-1987, IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and Guide for Short-Circuit Testing of Distribution and Power Transformers (ANSI).
- [6] IEEE C57.91-1981 (Reaff 1991), IEEE Guide for Loading Mineral-Oil-Immersed Overhead and Pad-Mounted Distribution Transformers Rated 500 kVA and Less With 65 °C or 55 °C Average Winding Rise (ANSI).
- [7] IEEE C57.92-1981 (Reaff 1991), IEEE Guide for Loading Mineral-Oil-Immersed Power Transformers up to and Including 100 MVA With 55 °C or 65 °C Winding Rise (ANSI).
- [8] IEEE Std 386-1985 (Reaff 1991), IEEE Standard for Separable Insulated Connectors for Power Distribution Systems Above 600 V(ANSI, DoD).

3. Ratings

3.1 Kilovolt-Ampere Ratings

Kilovolt-ampere (kVA) ratings are continuous and are based on not exceeding either a 65°C average winding temperature rise or an 80°C hot-spot conductor temperature rise. The temperature rise of the insulating oil shall not exceed 65°C when measured near the top of the tank. These kVA ratings are based on the temperature and service conditions specified in IEEE C57.12.00-1987 [3]. The kVA ratings shall be as follows:

¹ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA.

²IEEE publications are available from the Institute of Electrical and Electronics Engineers, Service Center, 445 Hoes Lane, P. O. Box 1331, Piscataway, NJ 08855-1331, USA.

75	500
112.5	750
150	1000
225	1500
300	2000
	2500

3.2 Voltage Ratings

Voltage Ratings shall be in accordance with Table 1.

Table 1—Range of kVA and Voltage Ratings

High-Voltage Ratings (V)	kVA Ratings	
	Low-Voltage Ratings (V) 208Y/120, 240	Low-Voltages Ratings (V) 480Y/277, 480
Delta or wye		
2400	75–750	75–750
4160	75–1000	75–1000
4800	75–1000	75–1500
7200	75–1000	75–2000
12 000, 12 470	75–1000	75–2500
13 2000, 13 800, 16 340	75–1000	75–2500
Grounded wye		
22 860, 23 900, 24 940	75–1000	75–2500
34 500	75–1000	75–2500

NOTES:

- 1 — Kilovolt-ampere ratings that are separated by a dash indicate that all intervening ratings covered in this standard are included.
- 2 — Unsymmetrical loading of wye-wye connected units may cause heating of their tanks in excess of that which would be produced by balanced conditions. To reduce the probability of tank heating, such units shall be provided with a core construction that will not saturate when 33% zero sequence voltage is applied.
- 3 — For complete connector ratings, see IEEE Std 386-1985 [8].

3.3 Tap Ratings

Voltage taps shall be as given in Table 2. The tap changer handle in the terminating compartment shall be marked for deenergized operation.

Table 2—High-Voltage Taps

High-Voltage Taps					
75–500 kVA					
High-Voltage Ratings (V)	BIL (kV)	Low-Voltage Ratings 208Y/120 (V)	Low-Voltage Ratings 240, 480Y/277, 480 (V)		750–2500 kVA Low-Voltage Ratings 208Y/120, 240 480Y/277, 480 (V)
		Below	Above	Below	
2400	45	4–2-1/2%	2–2-1/2%	2–2-1/2%	2520/2460/2340/2280
4160	60	4–2-1/2%	2–2-1/2%	2–2-1/2%	4360/4260/4055/3950
4800	60	4–2-1/2%	2–2-1/2%	2–2-1/2%	5040/4920/4680/4560
7200	75	4–2-1/2%	2–2-1/2%	2–2-1/2%	7560/7380/7020/6840
12 000	95	4–2-1/2%	2–2-1/2%	2–2-1/2%	12 600/12 300/11 700/11 400
12 470	95	4–2-1/2%	2–2-1/2%	2–2-1/2%	13 090/12 780/12 160/11 850
13 200	95	4–2-1/2%	2–2-1/2%	2–2-1/2%	13 860/13 530/12 870/12 540
13 800	95	4–2-1/2%	*	*	14 400/14 100/13 500/13 200
16 340	95	*	*	*	17 200/16 770/15 910/15 480
22 860 Grd Y/13 200	125	4–2-1/2%	2–2-1/2%	2–2-1/2%	24 003/23 431/22 288/21 717
23 900 Grd Y/13 800	125	4–2-1/2%	2–2-1/2%	2–2-1/2%	25 095/24 497/23 302/22 705
24 940 Grd Y/14 400	125	4–2-1/2%	2–2-1/2%	2–2-1/2%	26 187/25 563/24 316/23 693
34 500 Grd Y/19 920	150 [†]	4–2-1/2%	2–2-1/2%	2–2-1/2%	36 225/35 363/33 638/32 775

*Taps are the same as those for 750–2500 kVA ratings (see last column).

[†]125 kV BIL may be specified with adequate surge protection.

4. Basic Lightning Impulse Insulation Levels and Dielectric Test Levels

4.1 Basic Lightning Impulse Insulation Levels

Basic lightning impulse insulation levels (BILs) shall be in accordance with Tables 2 and 3.

Table 3—Electrical Characteristics of Low-Voltage Terminals and Minimum Electrical Clearances

Low-Voltage Ratings (V)	BIL (kV)	60-Hz Dry 1 min Withstand (kV)	Minimum Clearance, Live Parts to Ground* (in)	Minimum Clearance, Live Parts Phase to Phase* (in)
208Y/120	30	10	1	1
240	30	10	1	1
480Y/277	30	10	1	1
480	30	10	1	1

*These dimensions should be increased whenever possible to allow for ease in making connections by the user.