

# AMENDMENT NO. 4 MARCH 2021

TO

## IS 1180 (PART 1) : 2014 OUTDOOR/INDOOR TYPE OIL IMMERSED DISTRIBUTION TRANSFORMERS UPTO AND INCLUDING 2 500 kVA, 33kV — SPECIFICATION

### PART 1 MINERAL OIL IMMERSED

( *Fourth Revision* )

[*Foreword, para 5 (see also Amendment No. 2)*] — Substitute the following for the existing:

‘During this revision scope of both standards IS 1180 (Part 1): 1989 and IS 1180 (Part 2) : 1989 have now been clubbed to make one combined standard for distribution transformer and designated as IS 1180 (Part 1). With the publication of this standard, IS 1180 (Part 2): 1989 would be withdrawn. In this revision maximum losses at 50 and 100 percent loading have been incorporated and the scope is extended up to 2 500 kVA. Further, single phase (3.3 kV to 33 kV) distribution transformers up to 100 kVA rating, have also been included to make it a comprehensive standard on Distribution Transformers.’

(*Foreword, para 7, line 3*) — Substitute ‘1 star to 5 star’ for ‘3 star, 4 star and 5 star’.

(*Foreword, para 8*) — Substitute the following for the existing:

‘This standard specifies five energy efficiency levels: level 1, level 2, level 3, level 4 and level 5 corresponding to 1 star, 2 star, 3 star, 4 star and 5 star labelled transformers respectively, as prescribed by BEE. In due course of time with improvements in technology and materials, higher levels of energy efficient transformers shall be progressively used.’

(*Foreword, para 9*) — Substitute the following for the existing:

‘This standard is a part of IS 1180 series on distribution transformers. Other standards in the series are:

Part 3 Natural ester/ synthetic organic ester immersed’

[*Page 1, clause 1 (see also Amendment No. 1)*] — Insert following new entry under Note 1:

r) Transformers for Static VAR Compensator

(*Page 2, Table 1*) — Substitute following for the existing:

**Table 1 Standard Ratings**

( *Clause 6.1* )

SI No.	Nominal System Voltage	Standard Ratings (kVA)
(1)	(2)	(3)
i)	Up to and including 11 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200
ii)	Above 11 kV up to and including 22 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200
iii)	Above 22 kV up to and including 33 kV	*6.3, *10, 16, *20, 25, *40, 63, 100, 160 and 200

NOTE — \*Ratings are non-preferred.

Price Group 4

(Page 2, clause 6.6) — Insert following para at the end of clause:

‘Alternatively [Dyn1, see IS 2026 (Part 1)] can also be specified. If system and application requirements demand different vector groups, the same can also be adopted.’

[Page 3, Table 3 (see also Amendment Nos. 1 and 3)] — Substitute the following for the existing table:

**Table 3 Maximum Total Losses up to 11kV Class Transformers**  
( Clauses 6.8.1.1, 6.8.1.2, 6.8.1.3 and 6.8.2 )

Sl No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 percent Load	100 Percent Load
(1)	(2)	(3)	(4')	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	16	4.5	135	440	120	400	108	364	97	331	87	301
ii)	25	4.5	190	635	175	595	158	541	142	493	128	448
iii)	63	4.5	340	1 140	300	1 050	270	956	243	870	219	791
iv)	100	4.5	475	1 650	435	1 500	392	1365	352	1 242	317	1 130
v)	160	4.5	670	1 950	570	1 700	513	1547	462	1 408	416	1 281
vi)	200	4.5	780	2 300	670	2 100	603	1911	543	1 739	488	1 582

NOTE — For non-preferred ratings of Table 1, maximum losses are subject to agreement between the user and the supplier.

(Page 4, clause 7.8.2, line 2) — Substitute ‘is’ for ‘shall be’.

[Page 4, Table 6 (see also Amendment Nos. 1 and 3)] — Substitute the following for the existing table:

**Table 6 Maximum Total Losses up to 11kV Class Transformers**  
( Clause 7.8.1.1 )

Sl No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load
(1)	(2)	(3)	(4')	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
i)	250	4.50	980	2 930	920	2 700	864	2 488	811	2293	761	2 113
ii)	315	4.50	1 025	3 100	955	2 750	890	2 440	829	2164	772	1 920
iii)	400	4.50	1 225	3 450	1 150	3 330	1080	3 214	1 013	3102	951	2 994
iv)	500	4.50	1 510	4 300	1 430	4 100	1354	3 909	1 282	3 727	1 215	3 554
v)	630	4.50	1 860	5 300	1 745	4 850	1 637	4 438	1 536	4 061	1 441	3 717
vi)	800	5.00	2 287	6 403	2 147	5 838	2 015	5 323	1 892	4 853	1 776	4 425
vii)	1 000	5.00	2 790	7 700	2 620	7 000	2 460	6 364	2 310	5 785	2 170	5 259
viii)	1 250	5.00	3 300	9 200	3 220	8 400	3 142	7 670	3 066	7 003	2 991	6 394
ix)	1 600	6.25	4 200	11 800	3 970	11 300	3 753	10 821	3 547	10 363	3 353	9 924
x)	2 000	6.25	5 050	15 000	4 790	14 100	4 543	13254	4 309	12 459	4 088	11 711
xi)	2 500	6.25	6 150	18 500	5 900	17 500	5 660	16 554	5 430	15 659	5 209	14 813

[Page 5, Table 7 (see also Amendment No. 1)] — Substitute the following for the existing table:

**Table 7 Standard Ratings**  
( Clause 8.1 )

SI No.	Nominal System Voltage	Standard Ratings (kVA)
(1)	(2)	(3)
i)	Up to and including 11 kV	5, 10, 16, 25, *50, *75 and *100
ii)	Above 11 kV up to and including 22 kV	5, 10, 16, 25, *50, *75 and *100
iii)	Above 22 kV up to and including 33 kV	5, 10, 16, 25, *50, *75 and *100

NOTE — \*Ratings are non-preferred.

(Page 5, clause 8.3) — Substitute the following for the existing clause:

**‘8.3 Nominal System Voltage**

Nominal system voltage shall be chosen from the following:

HV — 3.3, 6.6, 11, 22, and 33 kV

LV — 415 (240 V, 1 Phase)’

[Page 5, Table 8 (see also Amendment No. 1)] — Insert the following new rows at the top and renumber the subsequent SI no.:

SI No.	Nominal System Voltage	Minimum BIL
(1)	(kV)	(kVp)
(1)	(2)	(3)
i)	3.3	40
ii)	6.6	60

(Page 5, clause 8.5) — Insert following no-load voltage ratios at an appropriate place:

‘3 300/√3 / 250 V ,    3 300 / 250 V  
6 600/√3 / 250 V ,    6 600 / 250 V’

(Page 5, clause 8.8.1.1, line 1) — Substitute ‘up to 11 kV’ for ‘11 kV’.

(Page 5, clause 8.8.2, line 2) — Substitute ‘is’ for ‘shall be’.

[Page 5, Table 9 (see also Amendment No. 1)] — Substitute the following for the existing table:

**Table 9 Maximum Total Losses up to 11kV Class Transformers**  
( Clauses 8.8.1.1, 8.8.1.2 and 8.8.1.3 )

SI No.	Rating (kVA)	Impedance (Percent)	Maximum Total Loss (W)									
			Energy Efficiency Level 1		Energy Efficiency Level 2		Energy Efficiency Level 3		Energy Efficiency Level 4		Energy Efficiency Level 5	
			50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load	50 Percent Load	100 Percent Load
(1)	(2)	(3)	(4)	(5)	(3)	(5)	(4)	(5)	(4)	(5)	(4)	(5)
i)	5	2.50	35	95	30	75	27	68	24	62	21	57
ii)	10	4.00	60	170	55	150	50	135	45	122	40	112
iii)	16	4.00	82	224	63	190	58	175	54	164	50	145
iv)	25	4.00	110	300	95	260	88	240	80	225	74	210
v)	50	4.00	210	590	190	520	177	480	160	451	148	420
vi)	75	4.00	310	880	285	780	265	720	242	670	223	625
vii)	100	4.00	410	1 140	375	1 030	350	964	320	900	299	842

[Page 6, clause 9.1(f)] — Delete NOTE.

(Page 6, clause 10.1.1, line 4) — Substitute ‘IS/IEC 60137’ for ‘IS 2099’.

(Page 6, clause 10.1.3, para 2) — Substitute the following for the existing:

‘The bushing shall conform to relevant Part/Section of IS 3347 depending on the voltage class.

NOTE — Any other suitable arrangement is subject to agreement between the user and the supplier.’

(Page 6, clause 10.1.5, informal table) — Insert following new entry at the end:

<i>Voltage Class</i>	<i>For Porcelain Parts</i>	<i>For Metal Parts</i>
52 kV bushings	IS 3347 (Part 8/Sec 1)	IS 3347 (Part 8/Sec 2)

[Page 6, clause 10.1.5, Notes (see also Amendment No. 1)] — Substitute following in place of the existing:

‘NOTES:

1 For heavily polluted atmosphere, dimensions of bushings shall conform to IS 8603 or IS 8603 (Part 4) depending on the voltage class.

2 Cast resin or polymer bushing can also be used with performance requirements as per IS/IEC 60137 and IS 7421.

3 Epoxy bushings can also be used with performance requirements as per agreement between the user and the supplier.’

(Page 6, clause 10.2, para 1, line 1) — Substitute ‘3.3/√3, 6.6/√3, 11/√3, 22/√3 and 33/√3 kV’ for ‘11/√3, 22/√3 and 33/√3 kV’.

(Page 6, clause 10.2, para 2, line 1) — Substitute ‘3.3, 6.6, 11, 22 and 33 kV’ for ‘11, 22 and 33 kV’.

(Page 6, clause 10.2, para 3) — Substitute following for the existing:

‘The HV bushings shall be fixed to the top cover or side walls and the LV bushings of 1.0 kV class shall be fixed to the transformer tank on sides or on the top cover.’

(Page 7, clause 13.4) — Substitute following for the existing:

**13.4** ‘The distribution transformer conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the distribution transformer may be marked with the Standard Mark.’

(Page 7, clause 14.4) — Insert following Note at the end:

‘NOTE — For single phase transformers above 25 kVA, base channels may be provided as per agreement between the user and the supplier.’

(Page 7, clause 15.1.5) — Substitute following for the existing:

‘For round shape single phase sealed type transformers, the circular base plate edges of the tank shall be folded upward for at least 25 mm, to have sufficient overlap with vertical sidewall of the transformer.’

(Page 8, clause 15.2.1, para 3) — Substitute the following for the existing:

‘For single phase transformers up to and including 100 kVA, the plain tank shall be capable of withstanding a pressure of 100 kPa and a vacuum of 760 mm of mercury. Limiting values of deflections are specified in **21.5.3.1**.

NOTE — Permanent deflection is not applicable for round tanks.

(Page 8, clause 15.2.2, para 1) — Insert the following at the end:

‘For single phase transformers up to 100 kVA, transformer tanks with corrugations shall be designed for a pressure of 15 kPa measured at the top of the tank with no leakage.

[Page 12, clause 20.1 (r) (see also Amendment No. 1)] — Insert the following Notes:

NOTES:

- 1 For cable box/ busduct arrangement, arcing horns are not required.
- 2 Providing arcing horn is optional in case lightning arrester is provided.

(Page 14, clause 21.4, line 1 to line 3) — Substitute following for the existing:

‘The following constitutes the special tests which may be carried out subject to mutual agreement between the user and the supplier.’

[Page 14, clause 21.5.1.1 (see also Amendment No. 1)] — Insert following as Note 2 and renumber the existing as Note 1:

- 2 Vacuum is not applicable for corrugations.

[Page 14, clause 21.5.2.1 (see also Amendment No. 1)] — Insert following as Note 2 and renumber the existing as Note 1:

- 2 Vacuum is not applicable for corrugations.

(Page 15, clause 21.5.3.1) — Substitute the following for the existing:

**‘21.5.3.1 Pressure test (type test)**

*For transformers up to and including 100 kVA*

The transformer tank shall be subjected to air pressure of 100 kPa for 30 min (15 kPa for 30 min for corrugated tanks) and vacuum of 760 mm of mercury for 30 min. There should be no air leakage at any point. The permanent deflection of flat plates, after pressure/vacuum has been released, shall not exceed the values given below:

<i>Length of Plate</i>	<i>Deflection</i>
Up to 750 mm	5 mm
751 mm to 1 250 mm	6.5 mm
1 251 mm to 1 750 mm	8.0 mm

NOTES:

- 1 Permanent deflection is not applicable for round tanks.
- 2 Permanent deflection is not applicable for corrugations.
- 3 Vacuum is not applicable for corrugations.’

(Page 15, clause 21.5.3.2) — Substitute the following for the existing:

**‘21.5.3.2 Pressure (routine test)**

*For transformers up to and including 100 kVA*

The transformer tank shall be tested at a pressure of 35 kPa for 10 min (15 kPa for 10 min for corrugated tanks). There should be no leakage at any point.’

(Page 15, clause 21.5.3.3) — Substitute the following for the existing:

**‘21.5.3.3 Oil leakage test (routine test)**

*For transformers up to and including 100 kVA*

The assembled transformer with all fittings including bushings in position, shall be tested at a pressure equivalent to twice the normal head measured at the base of the tank for 6 h. There should be no leakage at any point. Tank with corrugations shall be tested for oil leakage test at a pressure of 15 kPa measured at the top of the tank for 6 h. There should be no leakage at any point.’

## ‘ANNEX A

( Clause 2)

### LIST OF REFERRED INDIAN STANDARDS

<i>IS No.</i>	<i>Title</i>
191 : 2007	Copper — Specification ( <i>fourth revision</i> )
335 : 2018	New Insulating Oils — Specification ( <i>fifth revision</i> )
554 : 1999	Pipe threads where pressure tight joints are required on the threads — Dimensions, tolerances and designation ( <i>fourth revision</i> )
1576 : 1992	Solid pressboard for electrical purpose ( <i>first revision</i> )
1608	Metallic materials — Tensile testing
(Part 1) : 2018	Method of test at room temperature ( <i>fourth revision</i> )
(Part 3) : 2018	Method of test at low temperature
1747 : 1972	Nitrogen ( <i>first revision</i> )
1885	Electrotechnical vocabulary
(Part 38) : 1993	Power transformers and reactors ( <i>second revision</i> )
1897 : 2008	Copper strip for electrical purpose — Specification ( <i>third revision</i> )
2026	Power transformers
(Part 1) : 2011	General ( <i>second revision</i> )
(Part 2) : 2010	Temperature rise ( <i>first revision</i> )
(Part 3) : 2018	Insulation levels, dielectric tests and external clearances in air ( <i>fourth revision</i> )
(Part 5) : 2011	Ability to withstand short circuit ( <i>first revision</i> )
(Part 7) : 2009	Loading guide for oil-immersed power transformers
(Part 8) : 2009	Application guide
(Part 10) : 2009	Determination of sound levels
3024 : 2015	Grain oriented electrical steel sheets and strip ( <i>third revision</i> )
3347	Dimensions for porcelain transformer bushings for use in lightly polluted atmospheres
(Part 1/Sec 1) : 1979	Up to and including 1 kV, Section 1 Porcelain parts ( <i>first revision</i> )
(Part 1/Sec 2) : 1979	Up to and including 1 kV – Section 2 Metal parts ( <i>first revision</i> )
(Part 2/Sec 1) : 1979	3.6 kV bushings, Section 1 Porcelain parts ( <i>first revision</i> )
(Part 2/Sec 2) : 1979	3.6 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 3/Sec 1) : 1988	17.5 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 3/Sec 2) : 1982	17.5 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 4/Sec 1) : 1988	24 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 4/Sec 2) : 1982	24 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 5/Sec 1) : 1979	36 kV bushings, Section 1 Porcelain parts ( <i>second revision</i> )
(Part 5/Sec 2) : 1979	36 kV bushings, Section 2 Metal parts ( <i>first revision</i> )
(Part 8/Sec 1) : 1988	52 kV Bushings, Section 1 Porcelain parts
(Part 8/Sec 2) : 1992	52 kV bushings, Section 2 Metal parts
3639 : 1966	Fittings and accessories for power transformers ( <i>under revision</i> )
4253 (Part 2) : 2008	Cork composition sheet: Cork and rubber ( <i>second revision</i> )

<i>IS No.</i>	<i>Title</i>
6162	Paper-covered aluminum conductors
(Part 1) : 1971	Round conductors
(Part 2) : 1971	Rectangular conductors
7404	Paper covered copper conductors — Specification
(Part1) : 1991	Round conductors ( <i>first revision</i> )
7421 : 1988	Porcelain bushings for alternating voltages up to and including 1000 V ( <i>first revision</i> )
8603 : 2008	Dimensions for porcelain transformer bushings for use in heavily polluted atmospheres 12/17.5 kV, 24 kV and 36 kV ( <i>first revision</i> )
8603 (Part 4) : 2003	Dimensions for porcelain transformer bushings for use in heavily polluted atmospheres: Part 4 52 kV Bushings
8999 : 2003	Gauging practice for pipe threads where pressure tight joints are required on the threads
9335	Cellulosic papers for electrical purposes
(Part 1) : 1979	Definitions and general requirements
(Part 2) : 1998	Part 2 Methods of test ( <i>first revision</i> )
(Part 3/Sec 1) : 1984	Specifications for individual materials, Section 1 General purposes electrical paper
(Part 3/ Sec 3) : 1984	Specifications for individual materials, Section 3 Crepe paper
(Part 3/ Sec 5) : 1985	Specifications for individual materials, Section 5 Special papers
11149 : 1984	Specification for rubber gaskets
12444 : 2020	Copper wire rods for electrical applications — Specification ( <i>first revision</i> )
13730	Specification for particular types of winding wires:
(Part 0/Sec 1) : 2018	General requirements, Section 1 Enamelled round copper wire ( <i>second revision</i> )
(Part 0/Sec 2) : 2018	General requirements, Section 2 Enamelled rectangular copper wire ( <i>second revision</i> )
(Part 0/Sec 3) : 2012	General requirements, Section 3 Enameled round aluminum wire ( <i>first revision</i> )
(Part 17) : 2014	Polyvinyl acetal enameled rectangular copper wire, Class 105 ( <i>first revision</i> )
(Part 27) : 2018	Paper tape covered rectangular copper wire ( <i>first revision</i> )
IS/IEC 60137 : 2017	Insulated bushings for alternative voltages above 1 000 volts