

भारतीय मानक ब्यूरो
(केंद्रीय मुहर विभाग III)

हमारा संदर्भ : सी एम डी- III/16 : आई एस 1180 (Pt 1), आई एस 1180 (Pt 3)

29 10 2021

विषय : आई एस 1180 (Pt 1) से आई एस 1180 (Pt 3) में माइग्रेशन के गाइडलाइन एस्टर आधारित ट्रांसफार्मर के लिए ।

सभी शाखा कार्यालय से आग्रह है कि गाइडलाइन का अनुपालन तत्काल प्रभाव से सुनिश्चित करें।

औरोस्मिता कबिराज
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सभी क्षेत्रीय/शाखा कार्यालय

BUREAU OF INDIAN STANDARDS
(Central Marks Department-III)

Our Ref: CMD-III/16: IS 1180 (Pt 1), IS 1180 (Pt 3)

29 10 2021

Subject: Guidelines for Migration to IS 1180 (Pt 3) from IS 1180 (Pt 1) for manufacturers of Outdoor/Indoor Type Liquid Immersed Distribution Transformers up to and including 2 500 kVA, 33 kV -Natural/Synthetic Organic Ester Liquid Immersed

This has reference to the subject mentioned above.

BOs may kindly ensure implementation of the guidelines with immediate effect.

Aurosmita Kabiraj
Sc-C (CMD-III)

Head (CMD-III)

Circulated to: All ROs/BOs

CENTRAL MARKS DEPARTMENT-III

Ref: CMD-III/16: IS 1180 (Pt 1), IS 1180 (Pt 3)

29 10 2021

Subject: Migration to IS 1180 (Pt 3) from IS 1180 (Pt 1) for manufacturers of Outdoor/Indoor Type Liquid Immersed Distribution Transformers up to and including 2 500 kVA, 33 kV - Natural/Synthetic Organic Ester Liquid Immersed

IS 1180 (Part 1): 2014 covers distribution transformer filled with mineral oil. This standard also allowed use of Natural/Synthetic Ester Oils subject to agreement between user and supplier. In March 2021, a separate Standard IS 1180 (Part 3): 2021 was published for "Outdoor/Indoor Type Liquid Immersed Distribution Transformers up to and including 2 500 kVA, 33 kV - Natural/Synthetic Organic Ester Liquid Immersed". Amendment 4 to IS 1180 (Part 1): 2014 published on 31.03.2021, and with last date of implementation as 30 March 2022, also formally removes the use of other insulating liquids namely natural ester, synthetic organic ester as per IS 16081 from IS 1180 (Part 1). In this context, transformer Licensees engaged in production of Ester liquid immersed DTs now need to migrate to IS 1180 (Pt 3) as these transformers cease to be covered in IS 1180 (Pt 1) now. The procedure given below shall be followed for such migration:

1. The licensees shall be informed explicitly about the publication of IS 1180 (Pt 3): 2021 on Ester liquid immersed DTs and the need to obtain a separate licence as per IS 1180 (Pt 3): 2021 in case he is manufacturing the same.
2. The differences between IS 1180 (Pt 1) and IS 1180 (Pt 3) as informed by ETD are Annexed. For the purpose of implementation of IS 1180 (Pt 3) for existing Licensees of IS 1180 (Pt 1), compliance to the following additional/ modified requirements are to be ensured:

Cl No. of IS 1180 (Pt 3)	Requirement
16.2	Conservator for non-sealed type transformers are required have suitable liquid preservation system protecting exposure of natural esters to atmosphere.
6.10, 7.10, 8.10, 13	Type of cooling is KNAN instead of ONAN as per IS 1180 (Pt 1)
6.10.2, 7.10.2 and 8.10.2, 21.3	i. Two types of dielectric systems are mentioned in the standard- Type A & Type B ii. The temperature rise limits have been specified for each dielectric system Type A and Type B which are different than the temperature rise limits specified in IS 1180 (Part 1).
15.4	Gaskets are required to be compatible with high contact temperature i.e. thermal class of 130 °C
20.1(c), 20.1(e)	Requirements for standard fittings 20.1(c), 20.1(e) have been updated to make them suitable for ester immersed DTs, i.e. i. Air release device shall be provided for non-sealed type transformers, where natural esters are not used and, ii. Dehydrating breather (connecting the air bags if present) shall be provided for non-sealed type transformers

21.4(e)	Under special tests for BDV and moisture test, which are done on mutual agreement between manufacturer and purchaser, the tests are to be carried out as per the relevant standards for used and unused esters specified in the standard.
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3. The product manual for Ester liquid immersed DTs has been issued as **PM/ IS 1180 (Pt 3)/ 1/ October 2021.**

4. For Licensees manufacturing both mineral oil immersed DTs (IS 1180-1) and ester liquid immersed DTs (IS 1180-3), the following actions are to be taken:

i. The Licensee shall be advised to apply for a separate Licence as per IS 1180 (Pt 3): 2021 through manakonline specifying the scope as per the Product Manual, and pay the requisite fees.

ii. The licensee needs to upload the bare minimum documents for submitting the application online.

iii. The Licensee has to ensure compliance to all requirements of IS 1180 (Pt 3) based on the grouping guidelines through Factory test reports/ Independent Test Reports or Test Certificates or a combination thereof, as applicable. For this purpose, he shall submit Test Reports as per IS 1180 (Pt 3) as per requirements in Table above along with the existing compliance reports as per IS 1180 (Pt 1) (for ester based transformer varieties). The TRs should be such that the existing TR as per IS 1180 (Pt 1) (for ester based transformer varieties) read in conjunction with the supplementary TR for IS 1180 (Pt 3) covers the complete requirements for IS 1180 (Pt 3).

Alternately, he may submit a complete TR as per IS 1180 (Pt 3).

Along with the TR, the Licensee shall declare the varieties as per IS 1180 (Pt 3) and the technical parameters as per Table in Annex 1 of Annex A of Product Manual. Other documents may not be insisted upon by BO, as licensee was already holding a licence for the product.

iv. The application shall be processed for grant of licence directly, waiving all intermediate steps. Licence shall be granted on receipt of applicable marking fee.

v. An endorsement shall also be issued for the existing licence for IS 1180 (Pt 1) by deleting the ratings that are that are only ester liquid immersed and not covered in IS 1180 (Pt 1).

vi. Verification of implementation of IS 1180 (Pt 3), may be done during the next visit **which may normally be completed within six months after 30 March 2022.**

5. i. For Licensees manufacturing only ester liquid immersed DTs, the case may be treated as a Changeover to IS 1180 (Pt 3): 2021 from IS 1180 (Pt 1): 2014. The Licensee shall submit Test reports and Certificates in accordance with 4.iii above.

ii. Verification of implementation of IS 1180 (Pt 3), wherever required, may be done during the next visit **which may normally be completed within six months after 30 March 2022.**

iii. If the Licensee fails to complete all actions by **30 March 2022** it shall be dealt with as per the prevailing guidelines.

6. Licensees not engaged in manufacturing of Ester Liquid immersed DTs and therefore do not need to implement IS 1180 (Pt 3) shall give an undertaking to this effect before 30 March 2022.

7. Any difficulty in implementation of these guidelines shall be brought to the notice of CMD III at the earliest but in any case at least 30 days before 30 March 2022. BOs shall ensure that no Licences for ester liquid immersed DTs are under operation as per IS 1180 (Pt 1) after 30 March 2022. The status of implementation of these guidelines shall be confirmed by Head (BO) to CMD-III within two weeks of 30 March 2022.

8. **APPLICATIONS FOR GRANT OF LICENCE:**

(i) Existing Applications for Ester liquid immersed DTs where Sample has been submitted in the Laboratory/Test Report has been issued by the Laboratory may be processed as per IS 1180 (Pt 1). However, if the Applicant is desirous of considering the Application as per 1180 (Pt 3), a declaration may be obtained from the Applicant to that effect and the Application may be processed accordingly. An undertaking shall also be obtained from such Applicants that if the sample fails in new test requirements, Licence will not be granted by BIS.

(ii) Applications for Ester liquid immersed DTs which are recorded henceforth may be processed as per 1180 (Pt 3) only.

(iii) Beyond 30 March 2022 no Licence for Ester liquid immersed DTs shall be granted as 1180 (Pt 1).

9. **CHANGE IN SCOPE OF LICENCE:**

(i) For change in scope of licence, the relevant provisions as given above for Applicants shall apply.

(ii) However, processing of such applications for change in scope of licence for Ester liquid immersed DTs as per IS 1180 (Pt 1) shall be permitted only upto the date of implementation of IS 1180 (Pt 3) or upto 30 March 2022 whichever is earlier.

10. All actions in line with the above shall be completed by the last date of concurrent running of Amendment 4 to IS 1180 (Pt 1): 2014 i.e. 30 March 2022.

11. This issues with the approval of Competent Authority.

Aurosmita Kabiraj
Sc C

Head (CMD III)
DDG (Certification)

1. The following was mentioned in the foreword of IS 1180 (Part 1) regarding ester immersed distribution transformers:

This standard (Part 1) is for distribution transformer filled with mineral oil. As mineral oil is semi bio-degradable it is expected that in future from environmental considerations, use of Natural/Synthetic Ester Oils shall increase. This standard also allows use of such oils subject to agreement between user and supplier. When sufficient experience is available, separate standard to Distribution transformers filled with Natural/Synthetic Esters shall be brought out.

2. The major difference between IS 1180 (Part 1) and IS 1180 (Part 3) are given below:
 - a) The foreword of IS 1180 (Part 3) mentions the advantages of ester immersed DTs over mineral oil immersed DTs (please see para 4 and para 5). It also mentions the other IS standards from which assistance has been drawn in the preparation of IS 1180 (Part 3).
 - b) The scope of IS 1180 (Part 3) specifies the insulating liquid as natural/synthetic organic ester liquid whereas IS 1180 (Part 1) specifies insulating liquid as mineral oil.
 - c) As natural esters are prone to oxidation, a para has been added under the scope clarifying the limitation of usage of natural esters in non-sealed distribution transformers. This para is not there in IS 1180 (Part 1).
 - d) A para has been added in the definition of non-sealed transformers (clause 3.2) that transformers equipped with suitable liquid preservation system such as airbags, which prevents direct contact of atmosphere with the liquid in the conservator, are covered under the category of non-sealed type transformers. This para is not there in IS 1180 (Part 1).
 - e) Definition of K class insulating liquids, natural esters, and synthetic organic esters has been mentioned in the standard along with their respective standards and guidance for the user regarding limitation of usage of these liquids in non-sealed transformers.
 - f) Pad mounted transformers have been included under the scope of this standard.
 - g) Since the temperature rise limits for ester immersed transformers are higher compared to mineral immersed DTs, maximum total losses at 85 °C will be of more importance for these ester immersed DTs. A note has been added under 6.8.1.3, 7.8.1.3 and 8.8.1.3 that maximum total losses at 85 °C are under consideration and as per discussion in the committee, these will be added once the reference test data is available with the laboratories.
 - h) The type of cooling is KNAN as per IS 1180 (Part 3) and ONAN as per IS 1180 (Part 1).
 - i) This standard mention two dielectric systems under clause 6.10.2, 7.10.2 and 8.10.2:

Type 'A' — which permits use of conventional kraft paper insulation on winding conductors and all other insulating materials of conventional type (e.g. radial/axial spacers, cylinders and barriers, static end ring if any, moulded angle ring/cap if any, shall be of conventional pressboard) immersed in ester liquid.

Type 'B' — which permits use of Thermally Upgraded Paper (TUP) [see IS 2026 (Part 7) and IS 2026 (Part 14)] or class 130 °C/140 °C paper on winding conductors or enamel coating of minimum 130 °C class and all other insulating materials of conventional type, immersed in ester liquid.

Such classification is not there in IS 1180 (Part 1).

- j) The temperature rise limits have been specified for each dielectric system Type A and Type B which are different than the temperature rise limits specified in IS 1180 (Part 1).
 - k) A note has been added under clause 7.7.3 that wherever the requirement of OLTC is envisaged, OLTC with a proven design and testing should be used in order to ensure the suitability and prevention of liquid exposure to the atmosphere. This will ensure that ester liquids are not exposed to atmosphere.
 - l) Fig. 1 and Fig 2 have been updated – ester liquid has been mentioned in place of oil and KNAN has been mentioned in place of ONAN.
 - m) New clause 14.5 has been added for constructional features and fixing details of pad mounted transformers.
 - n) Clause 15.4 has been updated for gaskets to comply with thermal class of 130 °C.
 - o) A para has been added under clause 16.2 for protecting exposure of natural esters to atmosphere.
 - p) Requirements for standard fittings 20.1(c), 20.1(e) have been updated to make them suitable for ester immersed DT's
 - q) Requirement for optional fitting Self protection/disconnection devices has been deleted from IS 1180 (Part 3) whereas the same is allowed as an optional fitting in IS 1180 (Part 1).
 - r) Under clause 21.3, notes have been added under temperature rise test for different dielectric systems.
 - s) Under special tests 21.4(e) – BDV and moisture test, relevant standards for used and unused esters have been specified in the standard.
 - t) A new annexure (Annex B) has been added on the list of international standard, CIGRE brochures available on the ester liquids, pad mounted transformers
 - u) Density of ester liquid (which is different than mineral oil) has been mentioned in the Annex F and the sample calculation of pressure has been updated as per density of ester liquid
3. Ester liquid has been mentioned in IS 1180 (Part 3) at all places where mineral oil is mentioned in IS 1180 (Part 1) (more than 40 places).