

## BUREAU OF INDIAN STANDARDS

### Program of Work

#### ETD 3 : Fluids For Electrotechnical Applications

**Scope:** To prepare product specifications, test methods as well as maintenance and use guides for liquid and gaseous dielectric. Also to prepare specifications and maintenance and use guides for lubricants and control fluids for turbines, generators and control systems as well as to assist in the preparations of test methods for such fluids

**Liaison:** **IEC TC-10 (P): Fluids for electrotechnical applications** **IEC TC-10 (P): Fluids for electrotechnical applications**

### Published Standards

S.No	IS No.	TITLE	Reaffirm M-Y	No. of Amds	Eqv.
1	IS 10593:2023 IEC 60599:2022 IEC 60599:2022	Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis		-	Identical under dual numbering
2	IS 11697:1986 Reviewed In : 2021 IEC Doc 10A (Central Office) 64	Guide for determination of lightning impulse electric strength of insulating liquids	October, 2021	-	Modified/Technically Equivalent
3	IS 12177:1987 Reviewed In : 2018	Methods of tests for oxidative ageing of electrical insulating petroleum oils by open beaker method	April, 2018	1	Indigenous
4	IS 12422:2023 IEC 61125:2018 IEC 61125:2018	Unused Hydrocarbon Based Insulating Liquids $i_c/2$ Test Methods for $i_c/2$ Evaluating the Oxidation Stability ( Second Revision )		-	Identical under dual numbering
5	IS 12475 (Part 1):1988 Reviewed In : 2023 Decision taken to Reaffirm and Archive IEC 60628	Specification for gassing of insulating liquid under electric stress and ionization: Part 1 methods of determination of gassing rate under hydrogen atmosphere	July, 2023	-	Modified/Technically Equivalent
6	IS 12475 (Part 2):1988 Reviewed In : 2018 IEC 60628	Specification for gassing of insulating liquids under electric stress and ionization: Part 2 method of determination of gassing rate under nitrogen atmosphere	April, 2018	-	Modified/Technically Equivalent
7	IS 12958:1990 Reviewed In : 2021 ASTM D 2112-1986	Oxidation stability of inhibited mineral insulating oil by rotating bomb - Method of test	October, 2021	1	Modified/Technically Equivalent
8	IS 13067:1991 Reviewed In : 2025 ASTM D 92 - 1985	Impregnants for power capacitors - Specification	May, 2025	-	Modified/Technically Equivalent

	& ASTM D 2441 - 1985				
9	IS 13072:2021 60376 : 2018 IEC 60376 : 2018	Specification of Technical Grade Sulphur Hexafluoride SF6 for Use in Electrical Equipment purposes		-	Identical under dual numbering
10	IS 13155:1991 Reviewed In : 2021	Method of test for carbontype analysis of mineral oils by infra - Red spectrophotometry	October, 2021	-	Indigenous
11	IS 13236:2013 IEC 60970 : 2007 Reviewed In : 2024 IEC 60970 : 2007	Insulating liquids - Methods for counting and sizing particles (First Revision)	May, 2024	-	Identical under dual numbering
12	IS 13503:2013 IEC 61039 : 2008 Reviewed In : 2024 IEC 61039 : 2008	Classification of insulating liquids (First Revision)	May, 2024	-	Identical under dual numbering
13	IS 13567:2018 IEC 60814 : 1997 Reviewed In : 2024 IEC 60814 : 1997	Insulating liquids - Oil - Impregnated paper and pressboard - Determination of water by automatic coulometric karl fischer titration (First Revision)	May, 2024	-	Identical under dual numbering
14	IS 13631:2017 Reviewed In : 2024 IEC 60666 : 2010	Detection and determination of specified additives in mineral insulating oils (First Revision)	May, 2024	-	Identical under dual numbering
15	IS 15668:2006 IEC 61198 (1993) Reviewed In : 2021 IEC 61198 (1993)	Mineral insulating oils - Methods for the determination of 2 - Furural and related compounds	June, 2021	-	Identical under dual numbering
16	IS 16081:2013 IEC 61099 : 2010 Reviewed In : 2024 IEC 61099 : 2010	Insulating liquids - Specifications for unused synthetic organic esters for electrical purposes	May, 2024	-	Identical under dual numbering
17	IS 16082:2013 IEC 61619 : 1997 Reviewed In : 2024 IEC 61619 : 1997	Insulating liquids - Contamination by polychlorinated biphenyls (PCBS) - Method of determination by capillary column gas chromatography	May, 2024	-	Identical under dual numbering
18	IS 16083:2013 IEC 60465 : 1988 Reviewed In : 2024 IEC 60465 : 1988	Specification for unused insulating mineral oils for cables with oil ducts	May, 2024	-	Identical under dual numbering
19	IS 16084:2013 IEC 61868 : 1998 Reviewed In : 2024 IEC 61868 : 1998	Mineral insulating oils - Determination of kinematic viscosity at very low temperatures	May, 2024	-	Identical under dual numbering
20	IS 16085:2023 IEC 61181:2012 (Ed 2.1) IEC 61181:2012 (Ed 2.1)	Mineral oil-filled electrical equipment - Application of dissolved gas analysis DGA to factory tests on electrical equipment		-	Identical under dual numbering
21	IS 16086:2013 IEC 61620 : 1998 Reviewed In : 2024 IEC 61620 : 1998	Insulating liquids - Determination of the dielectric dissipation factor by measurement of the conductance and capacitance - Test method	May, 2024	-	Identical under dual numbering
22	IS 16099:2013 IEC 61203 : 1992 Reviewed In : 2024	Synthetic organic esters for electrical purposes - Guide for maintenance of transformer esters	May, 2024	-	Identical under dual numbering

	IEC 61203 : 1992	in equipment			
23	IS 16310:2017 IEC 62535 : 2008 Reviewed In : 2024 IEC 62535 : 2008	Insulating liquids - Test method for detection of potentially corrosive sulphur in used and unused insulating oil	May, 2024	-	Identical under dual numbering
24	IS 16497 (Part 1):2017 IEC 62697-1 : 2012 Reviewed In : 2024 IEC 62697-1 : 2012	Test methods for quantitative determination of corrosive sulphur compounds in unused and used insulating liquids: Part 1 test method for quantitative determination of dibenzylsulfide (Dbds)	May, 2024	-	Identical under dual numbering
25	IS 16659:2017 IEC 62770 : 2013 Reviewed In : 2024 IEC 62770 : 2013	Fluids for electrotechnical applications - Unused natural esters for transformers and similar electrical equipment	May, 2024	-	Identical under dual numbering
26	IS 16785:2018 IEEE Std C57.155TM-2014 Reviewed In : 2024 IEEE C 57.155	Guide for Interpretation of Gases Generated in Natural Ester and Synthetic Ester- Immersed Transformers	May, 2024	-	Identical under dual numbering
27	IS 16838:2018 IEC 60836 : 2015 Reviewed In : 2024 IEC 60836 : 2015	Specifications for unused silicone insulating liquids for electrotechnical purposes	May, 2024	-	Identical under dual numbering
28	IS 16839:2019 IEC 60897 : 1987 Reviewed In : 2024 IEC 60897 : 1987	Methods for the determination of the lightning impulse breakdown voltage of insulating liquids	May, 2024	-	Identical under dual numbering
29	IS 16840:2018 IEC 60247 : 2004 Reviewed In : 2024 IEC 60247 : 2004	Insulating liquids - Measurement of relative permittivity, dielectric dissipation factor (Tan) and D.C. resistivity	May, 2024	-	Identical under dual numbering
30	IS 16841:2018 IEC 60944 : 1998 Reviewed In : 2024 IEC 60944 : 1988	Guide for the maintenance of silicone transformer liquids	May, 2024	-	Identical under dual numbering
31	IS 16859:2018 IEC 60963 : 1998 Reviewed In : 2024 IEC 60963 : 1988	Specification for unused polybutenes	May, 2024	-	Identical under dual numbering
32	IS 16863 (Part 1):2018 IEC 62021-1 : 2003 Reviewed In : 2024 IEC 62021-1 : 2003	Insulating Liquids â€” Determination of Acidity Part 1 Automatic Potentiometric Titration	May, 2024	-	Identical under dual numbering
33	IS 16863 (Part 2):2018 IEC 62021-2 : 2007 Reviewed In : 2024 IEC 62021-2 : 2007	Insulating Liquids â€” Determination of Acidity Part 2 Colourimetric Titration	May, 2024	-	Identical under dual numbering
34	IS 16863 (Part 3):2018 IEC 62021-3 : 2014 Reviewed In : 2024 IEC 62021-3 : 2014	Insulating Liquids â€” Determination of Acidity Part 3 Test Methods for Non-Mineral Insulating Oils	May, 2024	-	Identical under dual numbering
35	IS 16867:2018 IEC 61197 : 1993 Reviewed In : 2024	Insulating Liquids â€” Linear Flame Propagation â€” Test Method Using a Glass-Fibre Tape	May, 2024	-	Identical under dual numbering

	IEC 61197 : 1993				
36	IS 16868:2018 IEC 61144 : 1992 Reviewed In : 2024 IEC 61144 : 1992	Test Method for the Determination of Oxygen Index of Insulating Liquids	May, 2024	-	Identical under dual numbering
37	IS 16869:2018 IEC 61065 : 1991 Reviewed In : 2024 IEC 61065 : 1991	Method for Evaluating the Low Temperature Flow Properties of Mineral Insulating Oils After Ageing	May, 2024	-	Identical under dual numbering
38	IS 16870:2018 IEC TR 62874 : 2015 Reviewed In : 2024 IEC TR 62874 : 2015	Guidance on the interpretation of carbon dioxide and 2 - Furfuraldehyde as markers of paper thermal degradation in insulating mineral oil	May, 2024	-	Identical under dual numbering
39	IS 16871:2018 IEC/TR 62036 : 2007 Reviewed In : 2024 IEC/TR 62036 : 2007	Mineral insulating oils - Oxidation stability test method based on differential scanning calorimetry (DSC)	May, 2024	-	Identical under dual numbering
40	IS 16899:2023 IEC 62975:2021 IEC 62975:2021	Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers ( First Revision )		-	Identical under dual numbering
41	IS 17053:2023 IEC 60480:2019 IEC 60480:2019	Guidelines for the Checking and Treatment of Sulfur Hexafluoride (SF6) Taken from Electrical Equipment and Specification for its Re-Use ( First Revision )		-	Identical under dual numbering
42	IS 17244:2019 IEC TR 61946 : 2007 Reviewed In : 2024 IEC TR 61946 : 2007	Mineral Insulating Oils “ Characterization of Paraffinic / Naphthenic Nature ” Low Temperature Differential Scanning Calorimetry ( DSC ) Test Method	May, 2024	-	Identical under dual numbering
43	IS 17245:2019 IEC TR 61294 : 1993 Reviewed In : 2024 IEC TR 61294 : 1993	Insulating Liquids “ Determination of the Partial Discharge Inception Voltage ( PDIV ) ” Test Procedure	May, 2024	-	Identical under dual numbering
44	IS 1866:2017 IEC 60422 : 2013 Reviewed In : 2024 IEC 60422 : 2013	Mineral insulating oils in electrical equipment supervision and maintenance guidance (Fourth Revision)	May, 2024	-	Identical under dual numbering
45	IS 335:2018	New insulating oils - Specification (Fifth Revision)	-	1	Indigenous
46	IS/IEC 60867:2024 IEC 60867:2022 IEC 60867:2022	INSULATING LIQUIDS SPECIFICATIONS FOR UNUSED LIQUIDS BASED ON SYNTHETIC AROMATIC HYDROCARBONS		-	Identical under single numbering
47	IS 6104:2024 IEC 62961:2018 IEC 62961:2018	Insulating Liquids $\gamma_{i\frac{1}{2}}$ Determination of Interfacial Tension with the Ring Method $\gamma_{i\frac{1}{2}}$ Method of Test ( First Revision )		-	Identical under dual numbering
48	IS 6792:2023	Insulating liquids - Determination		-	Identical under dual

	IEC 60156: 2018 IEC 60156: 2018	of the breakdown voltage at power frequency - Test method			numbering
49	IS 6855:2023 IEC 60475:2022 IEC 60475:2022	Method of sampling insulating liquids		-	Identical under dual numbering
50	IS 9434:2019 IEC 60567 : 2011 IEC 60567 : 2011	Oil-Filled Electrical Equipment — Sampling of Gases and Analysis of Free and Dissolved Gases — Guidance ( Second Revision )	-	-	Identical under dual numbering

### Standards under Development

#### Projects Approved

SI. No.	Doc No.	Title
<i>No Records Found</i>		

#### Preliminary Draft Standards

SI. No.	Doc No.	Title
<i>No Records Found</i>		

#### Drafts Standards in WC Stage

SI. No.	Doc No.	Title
<i>No Records Found</i>		

#### Draft Standards Completed WC Stage

SI. No.	Doc No.	Title
<i>No Records Found</i>		

#### Finalized Draft Indian Standard

SI. No.	Doc No.	Title
<i>No Records Found</i>		

#### Finalized Draft Indian Standards under Print

SI. No.	Doc No.	Title
1	ETD 3 (06753) Revision of: IS 1866:2017	Mineral insulating oils in electrical equipment Supervision and maintenance Guidance
2	ETD 3 (06754) Revision of: IS 6855:2017	Method of sampling insulating liquids
3	ETD 3 (06755)	Fluids for electrotechnical applications Unused natural esters for transformers and similar electrical equipment
4	ETD 3 (06748) Revision of: IS 335:2018	New Insulating Oils
5	ETD 3 (06600) Revision of: IS 6792:2017	INSULATING LIQUIDS DETERMINATION OF THE BREAKDOWN VOLTAGE AT POWER FREQUENCY - TEST METHOD
6	ETD 3 (06601) Revision of: IS 12422:2017	UNUSED HYDROCARBON BASED INSULATING LIQUIDS - TEST METHODS FOR EVALUATING THE OXIDATION STABILITY
7	ETD 3 (06604)	INSULATING LIQUIDS - TEST METHOD FOR DETECTION OF POTENTIALLY CORROSIVE SULPHUR IN USED AND UNUSED INSULATING OIL
8	ETD 3 (06638)	TEST METHODS FOR QUANTITATIVE DETERMINATION OF CORROSIVE SULPHUR COMPOUNDS IN UNUSED AND USED INSULATING LIQUIDS PART 1 TEST METHOD FOR QUANTITATIVE DETERMINATION OF DIBENZYLDISULFIDE DBDS

9	ETD 3 (06602) Revision of: IS 13631:2017	Method of Test for Detection and Determination of Antioxidant Additives in Insulating Oils
10	ETD 3 (10321)	Guide for Interpretation of Gases Generated in Natural Ester and Synthetic Ester-Immersed Transformers
11	ETD 3 (11058)	Insulating liquids - Measurement of relative permittivity dielectric dissipation factor tan d and dc resistivity
12	ETD 3 (11061)	Specifications for unused silicone insulating liquids for electrotechnical purposes
13	ETD 3 (11062)	Methods for the determination of the lightning breakdown voltage of insulating liquids
14	ETD 3 (11063)	Guide for the maintenance of silicone transformer liquids
15	ETD 3 (11070)	Specification for unused polybutenes
16	ETD 3 (11071)	Method for evaluating the low temperature flow properties of mineral insulating oils after ageing
17	ETD 3 (11072)	Test method for the determination of oxygen index of insulating liquids
18	ETD 3 (11073)	Insulating liquids - Linear flame propagation - Test method using a glass-fibre tape
19	ETD 3 (11074)	Insulating liquids - Determination of acidity - Part 1 Automatic potentiometric titration
20	ETD 3 (11075)	Insulating liquids - Determination of acidity - Part 2 Colourimetric titration
21	ETD 3 (11076)	Insulating liquids - Determination of acidity - Part 3 Test methods for non-mineral insulating oils
22	ETD 3 (11082)	Mineral insulating oils - Oxidation stability test method based on differential scanning calorimetry DSC
23	ETD 3 (11083)	Guidance on the interpretation of carbon dioxide and 2-furfuraldehyde as markers of paper thermal degradation in insulating mineral oil
24	ETD 3 (11123)	Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers
25	ETD 3 (11756) Revision of: IS 9434:2019	Oil-filled electrical equipment Sampling of gases and analysis of free and dissolved gases- Guidance second revision
26	ETD 3 (11760) Revision of: IS 10593:2018	Mineral oil-filled electrical equipment in service Guidance on the interpretation of dissolved and free gases analysis third revision
27	ETD 3 (11765) Revision of: IS 13567:2018	Insulating liquids Oil-impregnated paper and pressboard Determination of water by automatic coulometric Karl Fischer titration first revision
28	ETD 3 (11773)	Guidelines for the checking and treatment of sulfur hexafluoride SF6 taken from electrical equipment and specification for its re-use
29	ETD 3 (11784)	Insulating liquids Determination of the partial discharge inception voltage PDIV Test procedure
30	ETD 3 (11788)	Mineral insulating oils Characterization of paraffinicnaphthenic nature Low temperature differential scanning calorimetry DSC test method
31	ETD 3 (14516) Revision of: IS 13072:2013	Specification of Technical Grade Sulphur Hexafluoride SF6 for Use in Electrical Equipment purposes
32	ETD 3 (15981)	Draft AMENDMENT NO 1 TO IS 335 2018 NEW INSULATING OILS SPECIFICATION FIFTH REVISION
33	ETD 3 (20475) Revision of: IS 6792:2017	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method
34	ETD 3 (20476) Revision of: IS 6855:2017	Method of sampling insulating liquids
35	ETD 3 (20478) Revision of: IS 10593:2018	Mineral oil-filled electrical equipment in service - Guidance on the interpretation of dissolved and free gases analysis
36	ETD 3 (20479) Revision of: IS 12422:2017	Unused Hydrocarbon Based Insulating Liquids Test Methods for Evaluating the Oxidation Stability Second Revision
37	ETD 3 (20480) Revision of: IS 16085:2013	Mineral oil-filled electrical equipment - Application of dissolved gas analysis DGA to factory tests on electrical equipment
38	ETD 3 (20481) Revision of: IS 17053:2019	Guidelines for the Checking and Treatment of Sulfur Hexafluoride SF6 Taken from Electrical Equipment and Specification for its Re-Use First Revision
39	ETD 3 (20483) Revision of: IS 16899:2019	Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers First Revision
40	ETD 3 (22410)	INSULATING LIQUIDS SPECIFICATIONS FOR UNUSED LIQUIDS BASED ON SYNTHETIC AROMATIC HYDROCARBONS
41	ETD 3 (22411) Revision of: IS 6104:1971	Insulating Liquids Determination of Interfacial Tension with the Ring Method Method of Test First Revision
42	ETD 3 (33620)	Method of test for carbontype analysis of mineral oils by infra - Red spectrophotometry
43	ETD 3 (33652)	Oxidation stability of inhibited mineral insulating oil by rotating bomb - Method of test

**Total Published Standards:48 Total Standards Under development:43**

## Aspect Wise Report

Product : 9  
 Code of Practices : 5  
 Methods of Test : 32  
 Terminology : 1  
 Dimensions : 0  
 System Standard : 0  
 Safety Standard : 0  
 Others : 2  
 Service Specification : 0  
 Process Specification : 0  
 Unclassified : 0

### Annexure-I :List of Indian Standards Withdrawn/Superseded

Sl. No.	IS No. & Year	Title
1	IS 11549:1986 Reviewed In : 2018	Specification for impregnating oils and compounds for paper insulated cables up to 33 KV
2	IS 12026 (Part 1):1986 Reviewed In : 2021	Guide for the determination of the aromatic hydrocarbon content of new insulating oils Part 1 adsorption chromatographic method
3	IS 12026 (Part 2):1986 Reviewed In : 2021	Guide for the determination of the aromatic hydrocarbon content of new insulating oils Part 2 infra - Red spectrophotometric method
4	IS 12463:1988 Reviewed In : 2013	Inhibited Mineral Insulating Oils
5	IS 12819:1989 Reviewed In : 2000	Transformer Oil Feed Stock tofs Base Stock tobs
6	IS 335:1993 Reviewed In : 2015 ISO 28594:2017	New Insulating Oils
7	IS 6103:1971 Reviewed In : 2021	Method of test for specific resistance Resistivity of electrical insulating liquids
8	IS 6262:1971 Reviewed In : 2021	Method of test for power factor and dielectric constant of electrical insulating liquids
9	IS 8264:1976	Air-drying and anti-tracking insulating varnishes for electrical purposes
10	IS 9960:1981 Reviewed In : 2017	Specification for electrical grade castor oil for use as capacitor impregnant

### Annexure-II :List of Indian Product Standards

Sl. No.	IS No. & Year	Title
1	IS 13067:1991 Reviewed In : 2025 ASTM D 92 - 1985 & ASTM D 2441 - 1985	Impregnants for power capacitors - Specification
2	IS 13072:2021 60376 : 2018	Specification of Technical Grade Sulphur Hexafluoride SF6 for Use in Electrical Equipment purposes
3	IS 16081:2013 IEC 61099 : 2010 Reviewed In : 2024 IEC 61099 : 2010	Insulating liquids - Specifications for unused synthetic organic esters for electrical purposes
4	IS 16083:2013 IEC 60465 : 1988 Reviewed In : 2024 IEC 60465 : 1988	Specification for unused insulating mineral oils for cables with oil ducts
5	IS 16659:2017	Fluids for electrotechnical applications - Unused natural esters for transformers and similar

	IEC 62770 : 2013 Reviewed In : 2024 IEC 62770 : 2013	electrical equipment
6	IS 16838:2018 IEC 60836 : 2015 Reviewed In : 2024 IEC 60836 : 2015	Specifications for unused silicone insulating liquids for electrotechnical purposes
7	IS 16859:2018 IEC 60963 : 1998 Reviewed In : 2024 IEC 60963 : 1988	Specification for unused polybutenes
8	IS 17053:2023 IEC 60480:2019	Guidelines for the Checking and Treatment of Sulfur Hexafluoride SF6 Taken from Electrical Equipment and Specification for its Re-Use First Revision
9	IS/IEC 60867:2024 IEC 60867:2022	INSULATING LIQUIDS SPECIFICATIONS FOR UNUSED LIQUIDS BASED ON SYNTHETIC AROMATIC HYDROCARBONS