

UTTAR & DAKSHIN HARYANA BIJLI VITRAN NIGAM



Specification No. CSC- XXXIV/DH/UH/P&D/2009-2010

TECHNICAL SPECIFICATION

FOR

**NEW INSULATING OILS FOR TRANSFORMER AND
SWITCHGEAR**

Issue of the Month: Jan. 2010

**Common Specifications Committee
UHBVN & DHBVN**

TECHNICAL SPECIFICATION FOR NEW INSULATING OILS FOR TRANSFORMER AND SWITCHGEAR.

1. **SCOPE:** This specification covers the requirement of new (unused insulating oil suitable for immersion or filling of transformers, switchgear and certain other electrical requirement in which oil is required as an insulating material and for the heat transfer medium. This specification also covers manufacturing, testing inspection and F.O.R delivery of material at site. The oils covered by this specification are low viscosity type oils free from additives.

This specification does not apply to:

- a) Inhibited oil.
- b) Oils required for cables and switchgear requiring high viscosity oil or for special impregnation purposes and,
- c) Synthetic dielectrics liquids.

2. **STANDARD:** -This Insulating oil shall conform to IS – 335 /1993 with latest up to date amendments.

3. **CLIMATIC CONDITIONS:**

1.	Max. ambient air temperature	60°C
2.	Min. ambient air temperature	(-)5°C
3.	Average Max. Daily ambient temperature	40°C
4.	Max. yearly weighed average ambient temperature	32°C
5.	Max. altitude above mean sea level (Meters)	1000
6.	Minimum Relative Humidity (%age)	26
7.	Max. Relative Humidity (%age)	95
8.	Avg. No. of Rainy days/year	120
9.	Avg. annual rainfall	900 mm
10.	Maximum wind pressure	195 Kg./m Sq.

4. **TECHNICAL PARTICULARS:**

The oil shall be pure hydrocarbon mineral oil, clean and sufficiently free from moisture or other foreign matter likely 'O' impair its properties; the characteristics of oil shall be as per IS-335/1995 or latest upto date amendments thereof expect of where modified as per technical particulars.

5. **TESTING: -**

The testes as per IS-335/1993 with latest upto date amendments shall be carried out.

6. **INSPECTION: -**

All tests and inspection shall be made at the place of supplier. However the purchaser shall have the right to get the transformer oil tested at supplier's works as well as at consignees and from any Government testing agency or NABL accredited laboratory. The supplier shall afford the inspecting officer of the Board all reasonable facilities without charge to satisfy him that the material is being furnished in accordance with the specifications.

The supplier shall be responsible to pay penalty of Rs 20,000/- for each occasion at which the fake inspection call has been made or the material is rejected during testing/inspection by the authorized agency/representative of the Nigam. This penalty would be in addition to the expenses incurred by the Nigam in deputing the Inspecting Officer, carrying out such inspection.

7. **TEST CERTIFICATES: -**

The supplier shall supply the test certificates in duplicate from a recognized Govt. Agency in respect of quality as per IS-335/1993 with latest upto date amendments.

8. **PACKING & TRANSPORT:-**

The transformer oil shall be delivered by the supplier in suitable perfectly clean steel drums of 200 itrs nominal capacity (non-returnable) conforming to type A or types B in IS-1783 (Part-I) 1983 & IS-1783 (Part-2) 1998 respectively. The drums may be coated from inside with suitable coating resistant to insulating oil. The outside surface of drum shall be coated with suitable primer and finished paint or not dip galvanized according to IS-4750-1984 for protection against corrosion. The drums shall be effectively sealed immediately after filling the oil to exclude moisture.

9. **MARKING:-**

Each sealed drum containing transformer oil shall be indelibly marked with the following:

- a) Manufacturer's name or trade name.
- b) Quantity of oil in liters.
- c) Gross weight.
- d) Net weight of transformer oil.
- e) Name of material.
- f) The words " Low viscosity type".
- g) Identification in code to enable the date & lot of manufacture to be traced back to the factory records.
- h) New Mineral insulating oil.
- i) Date & year of manufacture.
- j) The containers may also be marked with ISI certification mark.

10. Challenge Clause:-

The material offered/received after the inspection by the authorized inspecting officer may again be subjected to the test for or any parameter from any testing house/in-house technique of the Nigam & the results if found deviating unacceptable or not complying to approved GTP's the bidder shall arrange to supply the replacement within thirty (30) days of such detection at his cost including to & fro transportation. In addition ,penalty @10% of cost of the inspected lot of material shall be imposed.

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**FA & CAO/MM,
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**FA & CAO/MM,
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ANNEXURE

SCHEDULE OF CHARACTERISTICS AS PER ISS-335/1993

Sr. No	Description	Quantity	GTP as offered by bidder
1.	Appearance	Clear, transparent & free from suspended matter or sediments.	
2.	Density at 29.5 °C (Max)	0.89 g/cm ²	
3.	Kinetic viscosity (Max)		
	a) at 27°C	27 CST.	
4.	Interfacial Tension at 27°C (Min)	0.04 N/M	
5.	Flash point, per sky-marten (closed) (Min)	140°C	
6.	Pour point (Max)	-6 °C	
7.	Neutralization value		
	a) Total acidity (Max)	0.03 mg /KOH/G	
	b) In organic acidity	Nil	
8.	Corrosive sulphur	Non- corrosive	
9.	Electric strength (Min)		
	a) New unfiltered oil	30 KV (rms)	
	b) After filtration	60 KV (rms)	
10.	Dielectric dissipation factor (Tan Delta) at 90°C (Max)	0.002	
11.	Specific resistance (Resistivity)		
	a) at 90°C Min	35x 10 ¹² ohm-cm	
	b) At 27 °C Min	1500x10 ¹² ohm-cm	
12.	Oxidation stability		
	a) Neutralization value after oxidation (Max)	0.40 mg. KOH/g. 0.10% by weight	
	b) Total sludge after oxidation (Max)		
13.	Presence of oxidation (Inhibitor)	The oil shall not contain anti-oxidation additives.	
14.	Water contents (Max)	50 PPM	
15	Ageing characteristics after accelerated ageing (Open breaker method with copper catalyst):-	0.20	
	a) Dielectric dissipation factor at 90 °C (Max))	0.2.x10 ¹² ohm-cm	
	b) Specific resistance (Resistively) (Min)	2.5x10 ¹² ohm-cm (Min)	
	at 90°C	0.05 mg KOH/g	
	at 27°C		
	c) Total acidity mg/XOH/mm (Max)	0.05 Percent by wiegth	
	d) Sludge by n-heptanes % (Max) by weight.		

