

JAIPUR VIDYUT VITRAN NIGAM LIMITED
OFFICE OF THE SUPERINTENDING ENGINEER (MM-II)
OLD POWER HOUSE PREMISES, BANI PARK, JAIPUR - 302006

NO.JPD/SE/MM-II/SPO-V/TN-2557/D. 1846
TN-2557

DATED: 21/6/14

(PURCHASE OF EHV GRADE TYPE-II TRANSFORMER OIL)

CORRIGENDUM No. 1

The Appendix-I annexed with the Technical Specification of TN-2557 is hereby replaced and is enclosed herewith.

Encls.: As above.



(P.K.SHRIVASTAVA)

SUPERINTENDING ENGINEER (MM-II)

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SUPERINTENDING ENGINEER (MM-II)



APPENDIX-I

**IMPORTANT TECHNICAL PARTICULAR OF TYPE-II TRANSFORMER OIL TO BE
SUPPLIED AGAINST TN-2557**

Sr. No.	Property	Test Method	Limits (Type II Transformer Oil) as per IS 335: 2018 (Fifth revision)
A) Function			
i)	Viscosity at 40°C	IS 1448 (Part 25)	15 mm ^{2/s} , Max
ii)	Viscosity at 0°C ¹⁾	IS 1448 (Part 25)	1800 mm ^{2/s} , Max
iii)	Viscosity at -30°C ¹⁾	IS 1448 (Part 25)	-
iv)	Viscosity at -40°C ²⁾	IS 16084	-
v)	Pour Point	IS 1448 (Part 10/Sec 2)	-10°C, Max to be based on LCSET refer Table11) of IS
vi)	Water Content	IEC 60814	30 mg/Kg ³⁾ /40 mg/kg ⁴⁾ , Max
Vii)	Breakdown voltage	IS 6792	30 kV/70kV ⁵⁾ , Min
viii)	Density at 20°C	IS 1448 (Part 16)	0.895 g/ml, Max
ix)	DDF at 90°C	IS 16086	0.005, Max
x)	Particle content	IS 13236	No general requirement ¹⁰⁾
B.) Refining/stability			
xi)	Appearance	-	Clear, free from sediment and suspended matter
xii)	Acidity	IEC 62021-I	0.01 mg KOH/g, Max
xiii)	Interfacial tension	ASTM D971	No general requirement ⁶⁾
xiv)	Total sulphur content	ISO 14596 or ASTM D4294 12)	No general requirement
XV)	Corrosive Sulphur	DIN 51353	Not corrosive
xvi)	Potentially corrosive sulphur	IS 16310	Not corrosive
xvii)	DBDS	IS 16497 (Part 1)	Not detectable (<5mg/kg.)
xviii)	Inhibitors according to IS 13631/IEC 60666	IS 13631	(U) Uninhibited oil : not detectable (<0.01%)
xix)	Metal passivator additives according to IS 13631/IEC 60666	IS 13631	Not detectable (<5mg/kg.), or as agreed upon with the purchaser
xx)	Other additives	-	-
xxi)	2-Furfural and related compounds content	IS 15668	Not detectable (<0.05mg/kg.), for each individual compound

B or

C.) Performance			
xxii)	Oxidation stability	IS 12422 (Method C) Test duration (1) (U) Uninhibited oil : 164 h	For oils with other antioxidant additives and metal passivator Additives.
a)	* Total acidity 9)	1.9.4 of IS 12422	1.2 mg KOH/g, Max
b)	* Sludge 9)	1.9.1 of IS 12422	0.8%, Max
c)	* DDF at 90°C ⁹⁾	1.9.6 of IS 12422	0.500 ⁹⁾ , Max
xxiii)	Gassing tendency	IEC 60628, Method A	No general requirement ⁸⁾
Xxiv)	ECT	-	No general requirement ⁸⁾
D.) Health, Safety and Environment (HSE)			
xxv)	Flash Point	IS 1448 (Part 21)	135°C, Min
xxvi)	PCA Content	IP 346	3% Max
xxvii)	PCB Content	IS 16082	Not detectable (<2 mg/kg)

- 1) This is the standard LCSET for a transformer oil and can be modified depending on the climatic condition of each region. Pour point should be minimum of 10°C below LCSET.
- 2) Standard LCSET for low temperature switchgear oil.
- 3) For bulk supply
- 4) For delivery in drums and IBC.
- 5) After laboratory treatment
- 6) Where it is used as general requirement, a limit of minimum 40 mN/m is recommended.
- 7) The supplier shall declare the generic type of all additives and their concentrations in the case of antioxidant additives.
- 8) To be agreed upon between supplier and purchaser.
- 9) At the end of oxidation stability tests.
- 10) Particle content in drums at the delivery of the oil can be agreed between supplier and customer based on a statistical reference at delivery.
- 11) A DDF of maximum 0.020 after 2 h of oxidation (see IS 12422 or IEC 61125) can be used for application in EHV instrument transformers and bushings.
- 12) In case of any dispute, ISO 14596 should be used.

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