



### POWEROIL TO 1020 - 60 U

POWEROIL TO 1020 - 60 U is an Uninhibited Transformer Oil meeting IEC 60296 - 2012 – 02 Edition 4.0 Standard Table – 2 - General Specifications. It also meets the ASTM D 1275 B Test requirement for Corrosive Sulphur.

Sr No	Characteristics	Unit	Test Method	Guaranteed Data	
				Min	Max
1	Appearance		Visual inspection of oil sample in transmitted light under a thickness of 10 cm at ambient temperature	Clear free from sediment and suspended matter	
2	Density at 20 ° C	g / ml	ISO 3675 or IEC 12185		0.895
3	Kinematic Viscosity at 40 ° C	mm <sup>2</sup> / sec	ISO 3104		12
	at - 30 ° C				1800
4	Flash Point, PMCC	° C	ISO 2719	135	
5	Pour Point	° C	ISO 3016		- 40
6	Inter Facial Tension at 25 ° C	mN / m	EN 14210 or ASTM D 971 ( Where it is used as general requirement )	No General Requirement 40 min	
7	Acidity	mg KOH/ gm	IEC 62021-1or IEC 62021-2		0.01
8	Water Content, Bulk/ Drum, IBC	mg / kg	IEC 60814		30 / 40
9	Breakdown Voltage		IEC 60156		
	As Delivered / After Treatment	kV		30 / 70	
10	Dielectric Dissipation Factor (Tan δ) at 90 ° C & 40 to 60 Hz		IEC 60247 or IEC 61620		0.005
11	Corrosive Sulphur Silver Strip, 100 ° C, 18 Hrs Copper Strip , 150 ° C, 48 Hrs		DIN 51353 ASTM D 1275 B	Not Corrosive Not Corrosive	
12	Potentially Corrosive Sulphur		IEC 62535	Not Corrosive	
13	DBDS	mg / kg	IEC 62697-1(in preparation)	Not Detectable (< 5 mg/kg )	
14	Total Sulphur Content	%	IP 373 or ISO 14596	No General Requirement	
15	Inhibitors of IEC 60666 ( Anti Oxidant additives )	%	IEC 60666	( U ) Uninhibited Oil Not Detectable (< 0.01 % )	
16	Metal Passivator additives of IEC 60666	mg / kg	IEC 60666	Not Detectable (< 5 mg/kg )	
17	Other Additives			Does not contain any additives	
18	Oxidation Stability at 120 ° C, 164 Hrs		IEC 61125 Method C		
	Total Acidity	mg KOH / gm	1.9.4 of IEC 61125 : 1992		1.2
	Sludge	%	1.9.1 of IEC 61125 : 1992		0.8
	DDF at 90 ° C		1.9.6 of IEC 61125 Amendment 1 ( 2004 ) + IEC 60247		0.500
19	Gassing Tendency	µ L / min	IEC 60628 : 1985 Method A	No General Requirement	
20	PCA Content	%	IP 346		3
21	PCB Content	mg / kg	IEC 61619	Not Detectable ( < 2mg /kg)	
22	2 – Furfural and related compounds content	mg / kg	IEC 61198	Not Detectable (< 0.05 mg/kg ) for each individual compound	
23	Stray Gassing		See 6.22 of IEC 60296	No General Requirement	
24	ECT		See 6.14 of IEC 60296	No General Requirement	
25	Particle Content		IEC 60970	No General Requirement	

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Sr No	Characteristics	Unit	Test Method	Poweroil TO 1020 60 U Guaranteed data as Specification Listed		Apar Poweroil TO 1020 60 U Laborelec Test Report	Nynas Nytro Libra Typical data	Shell diala B Typical data	Total Isovoltime II Typical data
				Min	Max				
1	Appearance		Visual inspection of oil sample in transmitted light under a thickness of 10 cm at ambient temperature	Clear free from sediment and suspended matter		Clear free from sediment and suspended matter	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter	Clear free from sediment and suspended matter
2	Density at 20 ° C	g /ml	ISO 3675 or IEC 12185		0.895	0.862	0.875	0.881	0.871
3	Kinematic Viscosity at 40 ° C	mm <sup>2</sup> / sec	ISO 3104		12	9.4	9.6	10	10
	at - 30 ° C				1800	618	1100	1400	Not Specified
4	Flash Point, PMCC	° C	ISO 2719	135		142	152	140	142
5	Pour Point	° C	ISO 3016		-40	-54	-51	-57	-51
6	Inter Facial Tension at 25 ° C	mN / m	EN 14210 or ASTM D 971 ( Where it is used as general requirement )	No General Requirement 40 min		43.3	48	Not Specified	Not Specified
7	Acidity	mg KOH/ gm	IEC 62021-1or IEC 62021-2		0.01	<0.01	<0.01	0.01	
8	Water Content,Bulk/ Drum,IBC	mg / kg	IEC 60814		30 / 40	19	<20	Not Specified	
9	Breakdown Voltage		IEC 60156						
	As Delivered / After Treatment	kV		30 / 70		39	40-60	>30	40-60
10	Dielectric Dissipation Factor (Tan δ ) at 90 ° C & 40 to 60Hz		IEC 60247 or IEC 61620		0.005	0.001	<0.001	0.002	
11	Corrosive Sulphur Silver Strip, 100 ° C, 18 Hrs Copper Strip , 150 ° C, 48 Hrs		DIN 51353 ASTM D 1275 B	Not Corrosive Not Corrosive		Not Corrosive Not Corrosive	Not Corrosive Not Corrosive	Not Corrosive Not Corrosive	Not Specified Not Corrosive
12	Potentially Corrosive Sulphur		IEC 62535	Not Corrosive		Not Corrosive	Not Corrosive	Not Corrosive	Not Specified
13	DBDS	mg / kg	IEC 62697-1(in preparation)	Not Detectable (< 5 mg/kg )		Not detected	Not detected	Not Specified	Not Specified
14	Total Sulphur Content	%	IP 373 or ISO 14596	No General Requirement		379	not specified	Not Specified	Not Specified
15	Inhibitors of IEC 60666 ( Anti Oxidant additives )	%	IEC 60666	( U ) Uninhibited Oil Not Detectable (< 0.01 % )		Not detected	Not detected	Not detected	Not detected
16	Metal Passivator additives of IEC 60666	mg / kg	IEC 60666	Not Detectable (< 5 mg/kg )		Not detected	Not detected	Not Specified	Not Specified
17	Other Additives			Does not contain any additives		Not Detected	Not Detected	Not Specified	Not Specified
18	Oxidation Stability at 120 ° C, 164 Hrs		IEC 61125 Method C						
	Total Acidity	mg KOH /gm	1.9.4 of IEC 61125 : 1992		1.2	0.35	0.55	0.9	Not Specified
	Sludge	%	1.9.1 of IEC 61125 : 1992		0.8	0.28	0.18	0.3	Not Specified
	DDF at 90 ° C		1.9.6 of IEC 61125 Amendment 1 ( 2004 ) + IEC 60247		0.500	0.15	0.08	0.1	Not Specified
19	Gassing Tendency	μ L / min	IEC 60628 : 1985 Method A	No General Requirement		16.6	not specified	Not Specified	Not Specified
20	PCA Content	%	IP 346		3	1.4	<3	Not Specified	Not Specified
21	PCB Content	mg / kg	IEC 61619	Not Detectable (< 2mg /kg)		Not detected	Not detected	Not Detected	Not Detected
22	2 – Furfural and related compounds content	mg / kg	IEC 61198	Not Detectable (< 0.05 mg/kg ) for each individual compound		Not detected	not specified	Not Specified	Not Specified
23	Stray Gassing		See 6.22 of IEC 60296	No General Requirement					
24	ECT		See 6.14 of IEC 60296	No General Requirement					
25	Particle Content		IEC 60970	No General Requirement					
26	Base Oil					100% Naphthenic	65%-85%	Naphthenic	Naphthenic
27	Product Introduced					More then 15 years	2007 as replacement of Nynas Nytro 10 GBN Because Of Corrosive Sulphur Problem in tropical area	More then 15 years	Unknown