





MATERIAL SPECIFICATION

VOCAB NUMBER	ITEM DESCRIPTION		
191004	TRANSFORMER OIL		
SPECIFICATION DETAILS			
<p>SCOPE: This specification covers the supply and delivery of unused Electrical Insulating Oil to the nominated PNG Power Stores.</p> <p>APPLICATION: The Electrical Insulating Oil to be used for the immersion and /or filling of transformers, switchgear and other electrical equipment in which oil is required as an insulant for heat transfer.</p> <p>STANDARDS: The Electrical Insulating Oil shall comply with the following standards :</p> <ul style="list-style-type: none"> - AS 1767.1 – 1999 "Specification for unused mineral insulating oils for transformers and switchgear." - BS 148 – 1984 "Specification for unused mineral insulating oils for transformers and switchgear." - IEC – 296 (1992),CLASS 1 "Specification for new insulating oils for transformers and switchgear." - IEC 60296 (2003) Table 2 Transformer Oil (uninhibited) <ul style="list-style-type: none"> • Unit of Measure: Drum • Rejection: PNG Power Ltd reserves all rights to reject whole or part of the order not complying with this specification and is not liable for any cost or loss with the return of rejects to the Supplier. Facilitation of Invoice Credit must commence between the supplier and PNG Power Ltd through the process of PNG Power Ltd Discrepancy Report provisions. 			
<p>Drawing References:</p> <p style="text-align: right;">Manufacturer's Product Code:</p>			
<u>STANDARDS COMMITTEE APPROVAL</u>			
<p>Approval by Alex Oa Chairman</p> <p>Signature:  Date: 2/11/2016</p>			
DATA REVIEW ENDORSEMENT			
NAME	TITLE	SIGNATURE	DATE
Grevasius Peni	Team Leader - Standards		18/10/16
	/		8/4/20

Typical Characteristics

			Specification requirements		Diala B		Diala B dried
Property	Units	Method	IEC 296 Class 1	IEC 60296			
Appearance		IEC 296	Clear, free of solids		Complies		
Density at 20°C	Kg/m³	ISO 3675	<895	<895	881		
Kinematic viscosity at 40°C	mm²/s	ISO 3104	16.5 max	12 max	11.6		
Kinematic viscosity at -15°C	mm²/s		800 max		340		
Kinematic viscosity at -30°C	mm²/s	ISO 3104		1800 max	1790		
Flashpoint P.M.	°C	ISO 2719 / ASTM D93	140 min	135 min	146		
Pourpoint	°C	ISO 3016	-30 max	-40 max	-57		
Neutralisation value	mg KOH/g	IEC 296 / IEC 62021	< 0.03	0.01 max	< 0.03		
Corrosive Sulphur		DIN 51353	Non-corrosive	Non-corrosive	Non-corrosive		
Breakdown voltage (after treatment)	kV	IEC 156 / IEC 60156	Min 50 After treatment	Min 70 After treatment	> 30 (>70 upon treatment)	>60 ex works (>70 upon treatment)	
Water content (ex works)	ppm	IEC 60814			<40 drums/IBC <30 bulk	10 – 15	
Dielectric dissipation factor at 90°C (after treatment)		DIN 57370 / IEC 247	0.005 max	0.005 max	0.001		
Oxidation Stability (164h/100°C)		IEC 1125 A					
Neutralisation value	mgKOH/g		0.40 max		0.2		
Sludge content	%m		0.1 max		0.02		
Oxidation Stability (164h/120°C)		IEC 1125 C / IEC 61125 C					
Total acidity	mg KOH/g		1.2 max	1.2 max	0.9		
Sludge	%m		0.8 max	0.8 max	0.3		
Tan delta 90°C				0.5 max	0.07		

These characteristics are typical of current production. Whilst future production will conform to Shell's specification, variations in these characteristics may occur.