

MARSHAL

DDB CABLE OIL

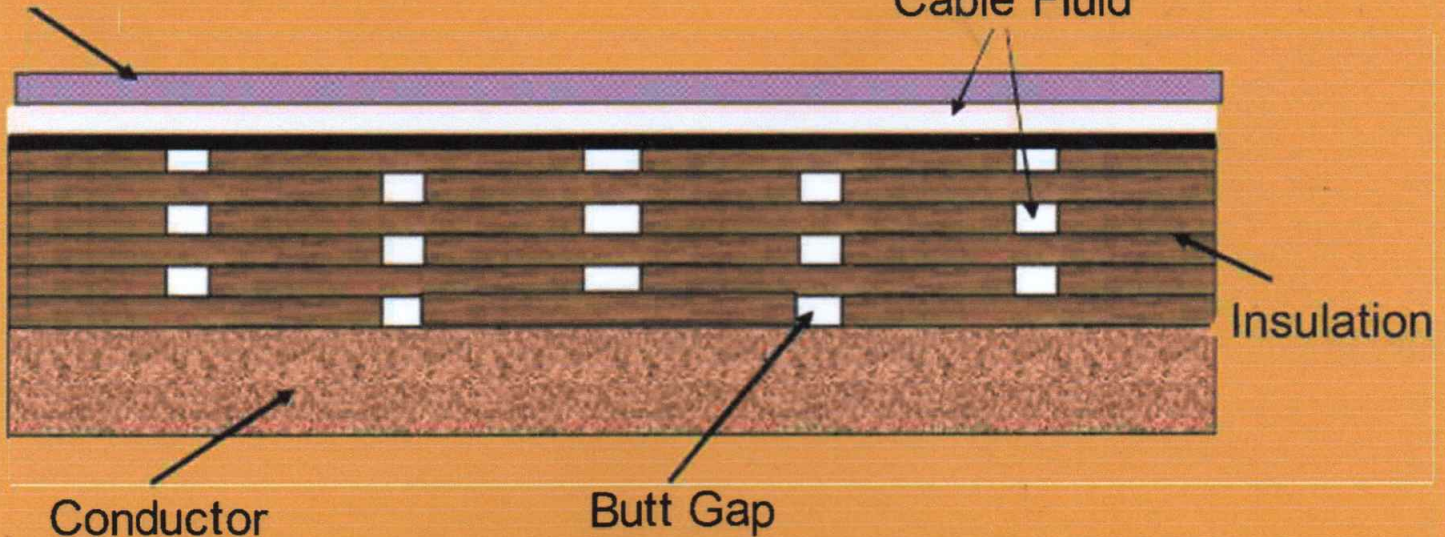


For Fluid Filled Cables

Fluid Filled Cable Design

Metallic Sheath

Cable Fluid



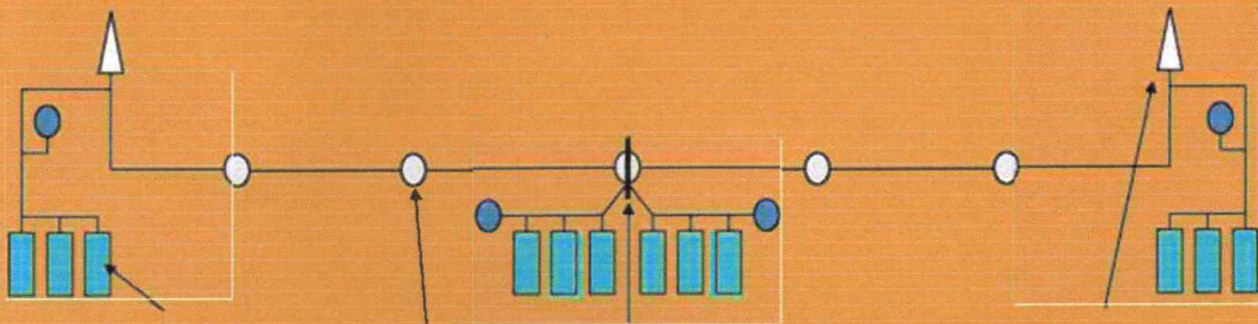
- The fluid forms an integral part of the cables insulation and prevents the formation of voids in the lapped papers around the conductor.
- In addition the fluid aids the conduction of heat away from the conductor allowing the cable to be run more efficiently than a cable without it.

Types of Cable Fluid

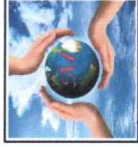
- Fluid filled cables have been used in the UK for over 80 years with some circuits installed in the 1930's still operating successfully today without any deterioration.
- Over the years a number of different type of fluid have been used:
 - Before 1965 - a heavy mineral fluid with low biodegradability;
 - 1965 to 1985 – a synthetic fluid made as a by product of the detergent industry;
 - 1986 to today – a light synthetic biodegradable fluid.

- Today most Distribution and Transmission Operators use a single product MARSHAL MECLEC-CO-11 (Type - 2)
- Most cable circuits, except those recently installed contain a mix of all three of the above fluids.

System Design and Fluid Movement



- The type of fluid filled cable used in the UK is termed a "Static" system.
- This means that under normal conditions the fluid in the system is total contained.
- When the cable is heated either by the amount of current passing through it or the ambient air temperature the fluid expands and consequently moves.

**MARSHAL**

PROPERTY	TEST METHOD	IEC 867-1993 PERMISSIBLE VALUE	MECLEC-CO-11
Physical Characteristic	IEC 867 (sub clause 5.1)	Clear, colourless, water like liquid with no suspended matter or sediment	Clear, colourless, water like liquid with no suspended matter or sediment
Density @ 20°C (kg/dm ³)	ASTM D 1298, ISO 3675	0.850 to 0.880	0.875
Kinematic Viscosity mm ² /s (cst) <u>@20°C @40°C @60°C</u>	ASTM D445-ISO 3104	at 20°C	Max 11
		at 40°C	
		at 60°C	
Flash Point (°C)	ASTM D 93 - ISO 2719	Min.	>135
Pour Point (°C)	ASTM D 97 - ISO 3016	Max.	-40
Mean co-efficient of expansion (°C)	ASTM D 1903		0.0008
Neutralization Value (mg KOH/g)	IEC 867	Max.	0.01
Chlorine Content (mg/kg)		Max.	< 2mg/kg
Water Content (mg/kg)	IEC 814	Max 30	30/40
Corrosive Sulphur	ASTM D 1275 -ISO - 5662	Max 75	
Biodegradability	OECD 301D, CEC L-33-T-82	Non Corrosive	Non Corrosive
Breakdown Voltage (kV)	IEC 156	Readily Biodegradable	Readily Biodegradable
Dielectric Dissipation Factor tan δ at 90°C and 40 Hz tp 60 Hz	IEC 247	Min.	30
		Max.	70
		Max.	0.005
Volume Resistivity at 90°C (TΩm)	IEC 247	Bulk 0.001	
Stability under electrical stress and ionization		Barrel 0.002	
Gassing (mm ³ /min)	IEC 628 Method A	Min. 0.5	1.524
Absorption (cm ³)	IEC 628 Method B	Min 20	29
		Min 2.5	2.9

