

# VEGETABLE OIL LIQUID DIELECTRIC TRANSFORMERS



## DESCRIPTION

CAHORS designs immersed transformers that are compatible with vegetable oil dielectrics if required. These natural esters, more commonly known as vegetable oils, offer significant advantages :

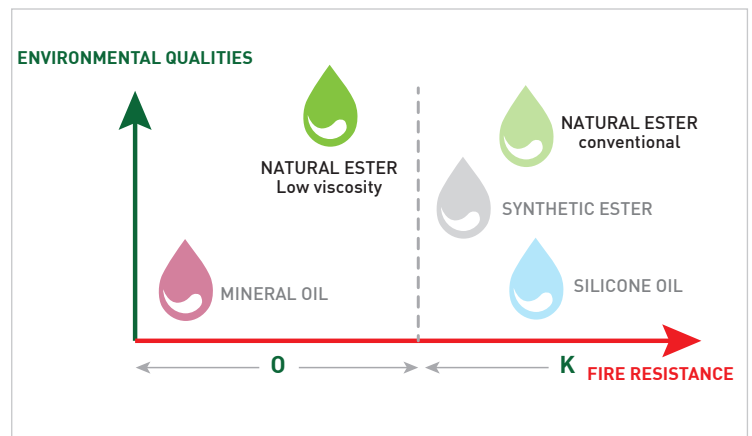
• **“Ready biodegradability”** classification in accordance with OECD standard 301.B. These non-toxic vegetable oils, which have a biodegradability that exceeds 97% after just 21 days of exposure to air, are used to produce products with a low carbon footprint and that are not harmful to the environment or to the health of living organisms.

• For K-class natural esters (fire point > 300°C), a **simplification of fire safety provisions** (standard NF C 17-300) preventing dry transformers being installed in a number of cases. Whenever class K is not essential and if substitution in relation to a mineral oil is primarily dictated by environmental conditions, we recommend the use of a **low viscosity vegetable oil**. Transformer ambient operation temperatures (from -25 to +40°C) enable unreserved external use, and the size of the transformer remains standard.

• A **significant increase in the service life of the transformer** due to a high thermal stability and ability to dry out cellulose insulations during transformer use.

• Very good dielectric properties **ensuring greater transformer reliability**.

• **Dimensions, weights and characteristics that remain the same.**



Organically-farmed rapeseed oil natural liquid dielectric free from petroleum, halogen, silicone and sulphur.

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## CLASSIFICATION OF OILS IN COMPLIANCE WITH IEC 61-100 :

- Nynas Taurus (Mineral oil) : class 0
- DuPont Nomex 970 FLD (Natural oil/natural ester) : class 0
- FR3 Cargill (Natural vegetable ester) : class K 2



Characteristics	Unit	Mean values		
		"Nynas Taurus in accordance with IEC 60-296"	"DuPont Nomex 970 FLD in accordance with IEC 62-770"	"FR3 Cargill in accordance with IEC 62-770"
<b>Functions</b>				
Viscosity 40 °C	mm <sup>2</sup> /s	10	17	32-34
Viscosity 0 °C	mm <sup>2</sup> /s	60	84	190
Viscosity 100 °C	mm <sup>2</sup> /s	2,5	4,6	15
Pour point	°C	-48	-28	-21
Density at 20 °C	kg/dm <sup>3</sup>	0,87	0,89	0,92
<b>Refining - Stability</b>				
Corrosive sulphur			Non-corrosive	
Potentially corrosive sulphur			Non-corrosive	
<b>Performance</b>				
Total acidity	mg KOH/g	0,5	<0.15	0,10
<b>Health, safety, environment</b>				
Flash point, PM	°C	152	200	255
Biodegradability in aqueous medium under 21 days	%	30	95	98
PCB		Non detectable		

### Classification of oils in compliance with IEC 61-100 :

Class 01 incorporates liquid dielectrics with a fire point less than or equal to 300°C and with a net calorific value greater than or equal to 42 MJ/kg.

Class K 1 incorporates liquid dielectrics with a fire point greater than 300°C and with a net calorific value greater than or equal to 42 MJ/kg.

Class K 2 incorporates liquid dielectrics with a fire point greater than 300°C and with a net calorific value greater than or equal to 32 MJ/kg and less than 42 MJ/kg.

Class K 3 incorporates liquid dielectrics with a fire point greater than 300°C and with a net calorific value greater than 32 MJ/kg.

Dielectric liquids (class L3) for which the fire point cannot be measured and with a net calorific values less than 32 MJ/kg are not considered to be flammable.