

BecFluid®

Dielectric cooling and insulating fluid

Product description

BecFluid® 9902 is a dielectric insulating fluid for transformers, tapchangers and electrical control equipment. BecFluid® 9902 conforms to IEC 61099:1992 "Specifications for Unused Synthetic Organic Esters for Electrical Purposes". It is classified as type T1, a halogen-free pentaerythritol ester.

BecFluid® is an environmentally friendly alternative to conventional coolants. BecFluid® meets the classification criteria as "non-water hazardous". (UBA No. 52330, data sheet 770 of the Federal Department of the Environment, Berlin).

BecFluid® is supplied with a low dissolved gas content and moisture level.

Areas of application

BecFluid® 9902 transformer fluid has a high fire point of 315°C and is therefore classified as a K-class liquid (fire point >300°C according to IEC 61100). This, coupled with a slow heating rate due to its high specific heat and thermal conductivity, gives the product its noted resistance to ignition.

Areas of use include:

- power transformers
- pole-type transformers
- distribution transformers in urban areas
- tapchangers
- thyristor cooling in power electronics

Properties

In addition to the properties set out in IEC 61099:1992, BecFluid® 9902 is characterised by:

Ecological compatibility

- readily biodegradable
- classified as "non-water hazardous" according to Federal Department of the Environment (UBA) in Germany
- low vapour pressure under operating conditions

Low acute and chronic toxicity

- non-toxic to aquatic life
- will not affect the degradation activity of activated sludge in biological sewage treatment plants
- not classified as hazardous.

Good thermal properties

- low thermal coefficient of expansion
- heat transfer properties comparable with mineral oil.

Excellent dielectric properties

- high breakdown strength
- low dependence of dielectric properties on the effects of moisture.

Excellent fire resistance

- high fire point
- will not ignite in the event of a major electrical fault and transformer rupture.

BecFluid® 9902 is further noted for its very good lubricating properties. BecFluid® 9902 is compatible with all insulating materials used in conventional transformer construction.

Retrofilling

BecFluid® 9902 is used to retrofill PCB and mineral oil filled transformers. BecFluid®'s thermal characteristics, cooling performance and electrical properties are equivalent to those of mineral oil. This ensures that there is no need to make any alterations to the design of the transformer or to downrate it when retrofilling with BecFluid® 9902.

During retrofill, contamination with other insulating fluids has to be minimised to avoid lowering the fire point or endangering the "non-water hazardous" classification.

Disposal

For disposal, it is recommended that used BecFluid® or remains of the insulating fluid be burnt in a suitable installation. Waste disposal code 130309 (readily biodegradable insulating and heat transmission oils) or 130308 (synthetic insulation and cooling liquid) applies.

Regulations

BecFluid® is not subject to the regulations for land, sea and air transport. It does not require labelling in accordance with the Dangerous Substances Regulations.

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Characterisation of type T1 transformer ester according to IEC 61099 and DIN VDE 0375

Physical properties according to IEC 61099

Property	Test method	Requirement	Value	Unit
Colour	ISO 2211	max. 200	< 200	HU
Appearance	IEC 61099 9.2	clear, free from suspended matter and sediment	clear, free from suspended matter and sediment	-
Density at 20°C	ISO 3675	max. 1.00	0.97	kg/dm ³
Kinematic viscosity at 40°C	ISO 3104	max. 35.0	25	mm ² /s
Kinematic viscosity at -20°C		max. 3000	1040	mm ² /s
Flash point	ISO 2719	min. 250	265	°C
Fire point	ISO 2592	min. 300	315	°C
Refractive index at 20°C	ISO 5661	± 0.01 of the value given by the manufacturer	1.453	-
Pour point	ISO 3016	Max. -45	<-50	°C
Crystallisation	IEC 61099 9.9	No crystals	No crystals	-
Velocity of sound in BecFluid® at 20°C	-	-	1385	m/s

Chemical properties according to IEC 61099

Property	Test method	Requirement	Value	Unit
Water content	IEC 60814	max. 200	50	mg/kg
Neutralisation	IEC 61099 9.11	max. 0.03	0.02	mg KOH/g
Oxidation stability	IEC 61125			
- Total acid content		max. 0.3	0.01	mg KOH/g
- Total sludge content		max. 0.01	0	% mass

Dielectrical properties according to IEC 61099

Property	Test method	Requirement	Value	Unit
Breakdown voltage	IEC 60156	min. 45	80	kV
Dielectric dissipation factor Tan δ at 90°C and 50 Hz	IEC 60247	max. 0.03	0.005	-
Volume resistivity DC at 90°C	IEC 60247	min. 2	6	G m

Our advice in application technology given verbally, in writing and by testing corresponds to the best of our knowledge and belief, but is intended as information given without obligo, also with respect to any protective rights held by third parties. It does not relieve you from your own responsibility to check the products for their suitability to the purposes and processes intended. The application, usage and processing of the products are beyond our reasonable control and will completely fall into your scope of responsibility. Should there nevertheless be a case of liability from our side, this will be limited to any damage to the value of the merchandise delivered by us. Naturally, we assume responsibility for the unobjectionable quality of our products, as defined in our general terms and conditions.