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W. D. Lubic

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TECHNICAL DATA SHEET

No. IC/FF-54
(Date: Mo/Yr)

MCS-1238

CAPACITOR FLUID

MCS-1238 is suggested as a capacitor impregnant dielectric fluid to directly replace presently used polychlorinated biphenyl (PCB) fluids. If was designed to provide the outstanding dielectric characteristics of PCB impregnant fluids such as Aroclor® 1016.

MCS-1238 fluid consists of a chlorine-free synthetic aromatic hydrocarbon combined with a high dielectric constant aryl sulfone and additives to give good dielectric properties. Because of its relatively high dielectric constant and other characteristics, it can be used in present capacitor types with minimum dielectric redesign. MCS-1238 fluid is not as fire resistant* as the presently used Aroclor 1016; however, no flammability standards for capacitor impregnant fluids have been adopted and MCS-1238 appears to be somewhat less flammable than equivalent viscosity petroleum oils. Based upon initial test data, MCS-1238 is acceptable from human and environmental health considerations; it does biodegrade and does not bioaccumulate.

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In addition, MCS-1238 fluid compared to Aroclor 1016 has much better low temperature characteristics, can be used in metallized paper/film capacitors, is better in DC capacitors and has better high frequency characteristics.

Typical data for MCS-1238, determined on various samples of fluid, are given in the following sections. Material is available for evaluation.

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- Standard Disclaimer Clause (boxed)
- *Fire Resistance Disclaimer (boxed) from p. 12, Legal Guidelines
- Monsanto logo
- MIC Address Line

TYPICAL DATA*

ELECTRICAL PROPERTIES

Dielectric constant at 25°C, 60 Hz (ASTM D924)	6.0
Dielectric constant at 100°C, 60 Hz (ASTM D924)	5.1
Dissipation factor, 100°C, 60 Hz (ASTM D877)	0.046
Resistivity, 100°C, 10^9 ohm cm (ASTM D1169)	1,000

In MCS-1238 impregnated capacitors
(2 microfarad, 585 VAC, 2 layers .66 mil paper, 0.3% Unox added)

Capacitance at 25°C	1.97
Dissipation factor at 25°C	0.0037
Capacitance at 90°C	1.87
Dissipation factor at 90°C	0.0039

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* This data is based upon samples tested in the laboratory and is not guaranteed for all samples.

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TYPICAL DATA*

PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity, 25/25°C (ASTM D1810)	1.018
Viscosity, at 100°F (37.8°C) (ASTM D445)	9.1 cs.
Viscosity, at 210°F (98.9°C)	1.98 cs.
Pour Point (ASTM D97)	-60°F (-51°C)
Flash Point (ASTM D92)	303°F (150°C)
Fire Point (ASTM D92)	328°F (165°C)
Autogenous Ignition Temperature (ASTM D2215)	835°F (446°C)
Hydrolysis (NN after 168 hrs. at 210°F with 0.5% H_2O and aluminum and steel present)	0.00

Vapor Pressure		
	95°C	1 torr
	150°C	10 torr
	220°C	100 torr

* This data is based upon samples tested in the laboratory and is not guaranteed for all samples.

SPECIFICATIONS*

CHARACTERISTICS	LIMITS
Appearance	A clear colorless to light straw liquid.
Specific Gravity at 25°/25°C	1.01 - 1.03
Viscosity @ 37.8°C	9 - 12 cs.
Flash Point	300°F Minimum
Fire Point	320°F Minimum
Moisture	0.005% Maximum
Df 100°C/60 Hz	0.05 Maximum
DK 100°C	5.0 - 5.2

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* These specifications are tentative and subject to confirmation or change as experience is developed.

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MATERIALS COMPATIBILITY

MCS-1238 is compatible with all currently used dielectric materials; paper, polypropylene film, paper/film combination, metallized paper and metallized film. It is also generally compatible with other capacitor materials of construction used with Aroclor 1016 chlorinated hydrocarbons. One exception is that two part epoxy sealants should not be used with MCS-1238.

It is recommended that compatibility tests be conducted with the fluid and samples of the specific materials to be used under conditions simulative of actual use. ASTM D3255, Method for Investigating the Compatibility of Transformer Insulation and Construction Materials in Askarels, has been found useful in compatibility testing.

HANDLING PRECAUTIONS

Since MCS-1238 may cause a moderate degree of skin irritation, care should be taken to avoid prolonged or repeated skin contact with this product. Should dermal contact occur, remove contaminant by washing with soap and water. In case of eye contact, flush eyes thoroughly with large amounts of water.

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This product appears to possess no other acute toxicologic

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properties which would require special handling other than the good hygiene practices employed with any industrial chemical.

RECOMMENDATIONS FOR USE

An antioxidant and an epoxide scavenger should be used with MCS-1238. Ionol* (2,6-ditertiary butyl para cresol) antioxidant is present in the new fluid and 0.01% should be added to the fluid during each purification cycle in the capacitor impregnation process. A convenient method of handling the Ionol is to dissolve the required amount in a small amount of MCS-1238 and add the resulting solution to the batch of fluid.

The suggested sequence of MCS-1238 fluid preparation is similar to that used to Aroclor 1016 chlorinated hydrocarbons; specifically, remove moisture (20 ppm maximum), add epoxide, clay treat, add antioxidant, degas and then use the fluid for impregnation. Conditions for each step are determined by the specific equipment used; therefore, no operating details are listed.

SHIPPING INFORMATION

MCS-1238 is available in standard steel drums and cans. Shipping classification is Plastics Synthetic Liquid NOIBN.

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MCS-1238 labels must contain the following statement:

CAUTION - MAY CAUSE SKIN IRRITATION.

AVOID PROLONGED OR REPEATED CONTACT WITH SKIN.

FIRST AID: IN CASE OF CONTACT, WASH THOROUGHLY WITH WATER.

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