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AROCLOR 1342

BY Monsanto

Aroclor is Monsanto's trade mark for its capacitor impregnant composed of chlorinated biphenyl.

Aroclor is classed as a capacitor askarel. The term "askarel" as defined by ASTM, generally describes a broad class of non-flammable synthetic chlorinated hydrocarbon insulating liquids widely used in capacitors operated at power frequencies.

Aroclor was first used in U.S.A. in 1929 and is now extensively used by the capacitor industry throughout the world. Monsanto has been producing Aroclor at its Newport plant since 1951.

Aroclor has been used in impregnated paper capacitors since its introduction into industry. In more recent years its use has been extended to capacitors in which polypropylene film forms part of the dielectric.

Aroclor impregnated capacitors are used mainly to operate at power frequency. Some are used — with water cooling — at high frequencies and some — with suitable additives — in D.C. circuits.

Aroclor 1342

In recent years most capacitor manufacturers switched their production to use mainly trichloro biphenyl sold under the Monsanto name of Aroclor 1242. This grade offered the best cost performance and was essential for capacitors operating in a cold environment.

More recently Aroclor 1242 has been replaced by Aroclor 1342. It is functionally similar to Aroclor 1242 but has been modified to

Aroclor is a Registered Trade Mark

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reduce the content of highly chlorinated components. The reason for this change is that environmental studies suggest that the more highly chlorinated components, especially those containing five and six chlorine atoms per modecule, are more persistent and therefore more likely to accumulate in the environment. Aroclor 1342 complies with the CIGRE recommendations that capacitor askarels should not contain more than 3.5% of pentachlorobiphenyl and more highly chlorinated biphenyls.

Advantages of Aroclor

1. Capacitors having the least volume and mass per unit of reactive power can be built.
2. Raw material costs can be reduced because of this higher efficiency.
3. Labour costs can be reduced because smaller windings are required and plant throughput is increased.
4. Overload security is provided by uniform permittivity of impregnant and paper and in the case of mixed dielectric capacitors the stress is transferred to the polypropylene film.
5. Long lasting capacitors result from high stability and resistance to oxidation.
6. Reduced fire hazard.

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Tentative Sales Specification

Property	Test Method	Limits
Colour	ASTM D 1702	50 max.
Clarity	ASTM D1702	Clear
Density at 20° C (kg/m^3)	ASTM D 1810/ISO R649	1365 – 1385
Refractive Index at 20° C	ASTM D 1218	1.6230 – 1.6266
Viscosity at 20° C (Cstks)	ASTM D 445	41 – 61
Fire Point	ASTM D 92	None to boiling
Pour point (°C)	ASTM D 97	– 18 max.
Neutralisation number (mg. KOH/g)	Monsanto	0.01 max.
Inorganic Chlorides (ppm)	ASTM D 1821	0.1 max.
Water content (ppm)	ASTM D 1533/ISO R760	30 max.
Hydrolisable Chlorides (ppm)	ASTM D 2441	1.0 max.
Thermal stability (ppm)	ASTM D 1936	0.5 max.
Penta and higher chlorinated Biphenyls (%)	CIGRE Method	3.5 max.
Volume Resistivity at 100° C 500 V, after 1 min. (G ohm. m)	Monsanto	20 min. (1)
Dissipation Factor at 100° C and 50 Hz	Monsanto	0.02 max. (2)
Permittivity at 100° C and 50 Hz	Monsanto	4.7 – 5.1

(1) For deliveries in drums over long distances relaxed to 10 (min.)

(2) For deliveries in drums over long distances relaxed to 0.04 (max.)

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Storage, Handling and Disposal of Aroclor

CAUTION

Aroclor contains POLYCHLORINATED BIPHENYLS (PCBs) which some studies have shown may be persistent, an environmental contaminant and, possibly, injurious to certain forms of bird, aquatic and animal life.

DRUMS

Inside storage is recommended to prevent contamination of the product by water. If the drums have to be stored outside they should be stacked on their sides to prevent water accumulating around the bungs and being breathed into the drum during severe ambient temperature changes.

Drum storage areas should be organised so that any leakages are collected for safe disposal.

Partially emptied drums should not be left open to the air.

BULK

The supply of Aroclor in bulk tank car loads, offers many advantages to medium and large volume users, compared with drum deliveries. Unloading, storing and transferring to the production unit is safer, easier, faster and cheaper. Material losses due to spillage and incomplete emptying of drums are eliminated. The possibility of product contamination during handling is greatly reduced.

Even where storage and handling facilities are not at present available, the economics of bulk handling may quickly pay for the tanks and piping systems required.

A booklet indicating the type of system necessary for the efficient handling of Aroclor in bulk is available from Monsanto.

As soon as a changeover to bulk delivery is contemplated, experienced Monsanto personnel will be available for site discussions regarding the most efficient type of installation for the particular location and an offloading procedure appropriate to that particular installation.

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Handling Precautions

Aroclor drums and containers carry the following label which gives general instructions for handling:

IMPORTANT CHLOROBIPHENYLS (42%-54%) (or 60%) (PCB)

This product contains POLYCHLORINATED BIPHENYLS (PCBs) which some studies have shown may be persistent, an environmental contaminant and, possibly, injurious to certain forms of bird, aquatic and animal life.

PREVENT ANY ENTRY INTO THE ENVIRONMENT THROUGH SPILLS, LEAKAGE, DISPOSAL, VAPOURISATION, RE-USE OF CONTAINERS OR OTHERWISE.

SPILLS, LEAKAGES AND WASTE PRODUCTS MUST BE COLLECTED.

Use of this product must be restricted to applications which can be controlled so that entry into the environment does not occur and to applications in which it cannot come into contact with food, animal feedstuffs or pharmaceuticals.

HARMFUL SUBSTANCE IF TAKEN INTERNALLY OR IF IN PROLONGED CONTACT WITH THE SKIN.

CAUSES IRRITATION OF SKIN AND EYES.

DURING SHIPMENT AVOID SPILLS AND LEAKAGE INTO INLAND WATERWAYS AND THE SEA.

Store away from food, animal feedstuffs and pharmaceuticals.
Keep container tightly closed.
Do not eat or smoke when using.
Avoid breathing vapours, mist or fumes.
Do not wear contaminated clothing.
Wash product from skin with soap and water.
Wash eyes by flushing with water.

In addition to the foregoing we can add that:

1. Animal toxicity tests (small mammals) indicate that acute oral toxicity is low but that acute dermal toxicity may be moderate.

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2. When handling the fluid minimise contact with the skin and wash any off with soap and water. People with sensitive skins should wear gloves resistant to chlorinated solvents or apply a silicone hand cream.

3. Should Aroclor accidentally splash or be rubbed into the eyes, they should be rinsed thoroughly with water for a few minutes. It is suggested that all operators be provided with safety glasses as Aroclor will cause pain if it gets into the eyes.

4. Elementary rules of hygiene should be applied — such as not smoking, eating or drinking during handling and contaminated clothing should be discarded.

5. Aroclor should be handled at ambient temperatures in well ventilated areas. If hot Aroclor has to be handled, a respirator with an active carbon canister should be worn.

Disposal of Empty Drums and Waste Aroclor

Handling Aroclor in bulk will minimise the problems associated with handling of drums. Waste Aroclor should be disposed of by special high temperature incineration at 1000° C minimum with a residence time of 1.5 seconds or longer or alternatively by a method conforming to local regulations. Empty drums should not be re-used for anything except scrap Aroclor. If this is not possible each drum should be rinsed twice with kerosene and the washings incinerated as above. Drums should then be crushed and buried on an approved toxic dump in accordance with local regulations.

Care must be exercised during such disposals and the ultimate use of Aroclor to avoid pollution particularly of sewers and waterways.

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The information, recommendations and suggestions made herein are offered in the light of prevailing legislation and on the basis of present scientific information (1975) available to Monsanto.

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