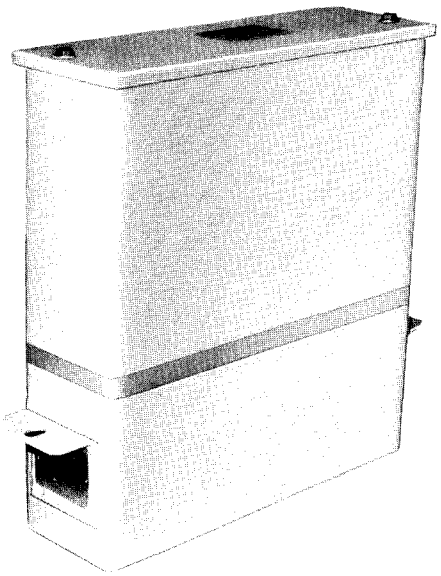
Westinghouse Electric Corporation
Distribution Apparatus Division
Bloomington, Indiana 47401

July, 1977
New Information

Mailed to: E, D, C/2001-2002/1986/PL

WEMCOL A Replacement for PCB's in Capacitors



The replacement for PCB's (Inerteen•) in Westinghouse capacitors is a fluid called WEMCOL which is Isopropylbiphenyl (a synthetic aromatic hydrocarbon). Development of the new fluid began in 1970 and included detailed evaluations of more than 15 substances. WEMCOL was selected due to its excellent combination of environmental, electrical and flame resistant characteristics and because tests demonstrate clearly that capacitors with WEMCOL are very reliable and durable.

Environmental Characteristics
WEMCOL biodegrades rapidly and completely:

- In sewage sludge tests, WEMCOL biodegrades 60 percent in 24 hours and 100 percent in less than 7 days.
- Tests on rats show that WEMCOL does not bioaccumulate and that inhaling high vapor concentrations is not harmful.
- WEMCOL is less toxic than table salt, vitamin D and silicon fluids.
- Because WEMCOL does not contain chlorine, WEMCOL can be disposed of by burning in conventional incinerators (alkaline scrubbers to remove HCL are not needed) or in local land fills according to federal, state and local regulations.

Electrical Characteristics
The electrical characteristics of WEMCOL are superior to those of PCB throughout the operating temperature range: At low temperatures, WEMCOL is enhanced by its reduced pour point; at high temperatures, by its superior heat transfer capabilities. Its resistance to voltage stress is higher than that of PCB: It demonstrates higher dielectric strength during AC, DC and impulse tests, increased partial discharge inception and extinction voltage, and greater endurance to partial discharges which occur during switching.

The power factor of WEMCOL capacitors is low even in extremely low temperatures and capacitance is very stable throughout a wide temperature range.

Flame Resistant Characteristics
The risk of fire in a capacitor filled with WEMCOL fluid is extremely low when the capacitor is properly designed to limit the effects of case rupture. Tests demonstrate that the rate of gas pressure generation due to internal arcing is similar in PCB and WEMCOL capacitors assuring adequate protection with present fusing practices. Case rupture tests demonstrate that fracturing the case of WEMCOL capacitors can result in burning of the internal windings if they are expelled from the case and exposed to air. Steps have been taken to insure that all Westinghouse capacitors containing WEMCOL fluid are designed such that the windings will not be expelled from the case even after the most violent explosion.

OSHA classifies electrical insulating fluids for flammability by flash point. The highest class is OSHA Class IIIB which consists of fluids having flash points above 93.4°C. WEMCOL is considered an OSHA Class IIIB fluid. The current National Electric Code states that equipment containing less than 3 gallons of an OSHA Class IIIB fluid can be used indoors without taking special fire precautions. Each capacitor unit is judged as an equipment or container and thus, would be acceptable for indoor applications.

Reliability
In 1976, Westinghouse began to field test several hundred WEMCOL capacitors of industrial and utility types. They have operated for 200 million Kvac hours: Only one failure was reported, the result of installing the capacitor at the wrong voltage rating. Our tests on WEMCOL capacitors have been confirmed by the experiences of four Japanese manufacturers who have been using similar synthetic aromatic hydrocarbons as their capacitor dielectrics. Their experience has resulted in a low rate of failure, no fires and no environmental safety or health problems.

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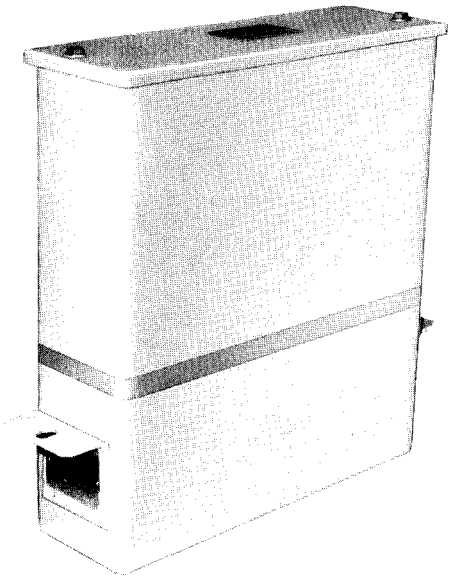

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