

# JARYLEC® C101, the most efficient dielectric oil for HV capacitors and all capacitive HV equipments

JARYLEC® C101 has now by far the oldest experience with more than 25 years of use in impregnation of High Voltage capacitors all over the world. JARYLEC® C101 provides outstanding technical performances in high stress resistance, in ageing test results and in extreme environmental conditions, thanks to its molecular structure, its specific chemical composition of benzyltoluene isomers, and its epoxide additive ranking it in the top list of performing and cost saving dielectric oils.

**> Why does JARYLEC® C101 molecular structure make it the best choice for capacitors?**

**Jérémie Walker** – We performed over 25 years of research in dielectric fluids, from PCB's to Jarylec® C101 (PCB free). Our research experiences showed that the dielectric fluids should be made mainly of aromatics without short alkyl chains (like those present in PXE or PEPE) which can break easily under electrical stress, while aromatic structures like in benzyltoluene derivatives (JARYLEC® C101 components) offer stronger stress resistance.

**> How does epoxide additive act in giving such outstanding ageing performances?**

**J.W.** – In JARYLEC® and only, the epoxide additive improves significantly the stress resistance at high temperature and consequently the thermal ageing performances. The epoxide acts as an ion scavenger and minimizes the capacitor's losses. The specific aromatic chemical structure of JARYLEC® enables the epoxide to maximize its effects. Thus, with JARYLEC® C101, no failure is observed below 70 V/μm and a typical electrical stress between 80 and 90 V/μm can be applied in capacitors, when short alkyl chains will start failing over 55 V/μm; and under strong ageing test conditions, JARYLEC® C101 registered only 20% failure after 500 hours when other alkyl fluids, even with epoxide, registered 90% of failure after 300 hours.

**> What are the extreme environmental conditions which JARYLEC® can withstand?**

**J.W.** – In terms of temperature, JARYLEC® can be used in extreme environmental conditions as low as -60°C and till +60°C (and over). We currently performed our thermal ageing tests at 90°C.

**> Why is the specific benzyltoluene mixture of JARYLEC® C101 an advantage?**

**J.W.** – JARYLEC® is made of 75% benzyltoluene and 25% dibenzyltoluene. This mixture has been chosen to optimize the viscosity and pour point (as low as possible) and the electrical resistance (as high as possible) in order to meet the International Electrotechnical Committee standard IEC 60867 for capacitors. The low viscosity of JARYLEC® C101 at ambient temperature enables an easy and efficient impregnation of capacitors, avoiding any heating of the fluid.

**> What about other cheaper synthetic oils like PXE, PEPE, etc.? Why can't they reach the performance level of JARYLEC®?**

**J.W.** – Intrinsically, their chemical structure shows some weakness points with their short alkyl chain with 2 carbons. PXE, and PEPE would have less electrical strength and therefore they could not withstand electrical stress as high as JARYLEC® C101. Even with epoxide addition, their behaviour will not improve and overcome their molecular structure weakness. That

is why these fluids are not recommended for high voltage capacitors.

**> Using JARYLEC® C101 enable cost savings: how much?**

**J.W.** – Absolutely, our recent publication has demonstrated that with JARYLEC® C101, a stress resistance increase of 30% is possible; by this way, a capacitor volume reduction of nearly 40% is obtained with all cost savings such a reduction can imply. This is very interesting for improving capacitor manufacturer competitiveness.

**> What is JARYLEC® C101D? What are the differences with the C101?**

**J.W.** – Due to its strong aromatic composition which gives JARYLEC® the ground for its dielectric performances, JARYLEC® C101 has a strong odor which can disturb people working in capacitor manufacturing workshop. JARYLEC® C101D is a perfumed option, where the aromatic smell of benzyltoluene is reduced and made bearable for people. JARYLEC® C101D is an exclusivity of Arkema and its performances are exactly the same as for the JARYLEC® C101. The perfume has been specially chosen in order to keep the same outstanding stress resistance and ageing behaviour of JARYLEC® C101.



**Arkema will attend  
Cigré 2010 Session  
on stand n°55**

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**ARKEMA**  
The world is our inspiration