

Measure The Benefits A Guaranteed Payback!

The adoption of thermally upgraded Kraft paper and subsequent standardization of 55/65 ° C rise transformers by the electric transformer industry in the 1960's marked a pivotal point in the history of the industry. Since then, many would say that innovation has been stagnant.

Status quo technology served the electrical transformer industry well. Until today, that is.

Envirotemp[™] FR3[™] fluid is specially formulated for use in electrical transformers. Its unique environmental, fire safety and material properties are helping users take the next step in transformer innovation. Delaying conversion to FR3 fluid places the burden of today's issues onto tomorrow's generations.

Whatever the measurable benefits, some customers continue to struggle with the economics involved in the adoption of new technology. While it's true that there is an impact on the initial investment in FR3 fluid, when evaluated on total cost of ownership, the balance is heavily weighted towards this new technology.

Environmentally – FR3 Fluid Is Preferred

FR3 fluid is non-toxic¹ and readily biodegradable². Additionally, through a rigorous life cycle analysis³, FR3 fluid has been documented to be nearly carbon neutral, while mineral oil and alternative dielectric fluids are more harmful to our environment.

¹ Per OECD 203 and 420

² Per OPPTS 835.3110

³ BEES, Version 4.0e, Building and Fire Research Laboratory, National Institute of Standards and Technology, August 2007,
<http://www.bfrl.nist.gov/oea/software/bees>

While regulatory bodies consider differentiating biobased fluids from petroleum based oils, adopters of modern technology are busy realizing an almost immediate return on their investment.

In fact, those firms that reserve funds for future liability (for example, remediation costs for spills) have realized a significant benefit as a result of a smaller liability fund.

Additionally, the argument that a lack of regulatory relief is a barrier to conversion fails to acknowledge what we've learned from the past - long term financial risk must be considered when purchasing equipment designed for extended life. Many companies have been penalized out of existence (due to massive litigation or the onslaught of Federal regulation) for endangering the population and/or environment.

In light of the long term implications, converting to FR3 fluid is a responsible risk-mitigating action with quantifiable savings.

Fire Safety Isn't an Accident

It is widely accepted that the global transformer infrastructure is aging faster than it's being upgraded. Today's investments barely touch the installed base both in terms of MVA capacity and number of operating transformers. Due to the increasing customer demand and higher utilization rates, the number of catastrophic transformers failures (i.e. fire) is increasing.

Understandably, in our industry, there is a chorus singing 'we don't have fires'. Yet a simple web search for transformer fires yields a new hit nearly every day. The number and severity are increasing, and with each instance, the public exposure to

danger and subsequent power outages is increasing.

A review of substation design guidelines reveals an industry that is still focused on preparing for and containing the eventual fire rather than preventing the fire from occurring. Specifying FR3 fluid provides an additional margin of safety which mineral oil, deluge systems, fire walls, or spatial separation simply cannot provide – reduced risk exposure.

Extensive testing conducted by Factory Mutual Global over a ten year period indicates it's unlikely that a normally operating transformer (either power substation or small pole mount) will generate enough heat fast enough during failure to bridge the operating temperature and fire point (approximately 360 °C) of FR3 fluid. With those results in-hand, FM Global allows FM Approved fluids as a substitute for deluge systems and spatial separation distance, saving both initial investment and maintenance dollars.

Additionally, the NEC recognizes the benefits of less flammable fluids, allowing indoor installations without fire vaults.

Your liability increases as the utilization rates soar. Even one transformer fire is too many!

The Transformer Fountain of Youth

Tests show FR3 fluid substantially slows the aging rate of cellulose paper insulation, allowing the customer the benefit of extended asset life or increased loading on transformers.

By trading aging rate for operating temperature, the true technological advancement in specifying and designing transformers can be (*financially*) realized. Almost 40 years after the last technological advancement in insulation systems, Cooper

now advocates 75 °C rise transformers using the same arguments of the 1960's.

Increased loading allows users to realize increased savings in both the initial investment and conservation of our natural resources. As there was in the '60s, there will be much debate regarding the true impact of operating transformers at 75 °C rise. However, testing shows that the facts that won before will again win in the 2010's.

Specifying higher rise transformers involves very little risk. In fact some customers are already taking advantage of this new technology. They're learning that the larger the transformer, the bigger the potential savings realization. Yesterday's 2500KVA is becoming tomorrow's 3125KVA transformer.

Finally, a growing number of users are finding out that refilling existing transformers with FR3 fluid enables them to realize immediate benefits. Many have upgraded their environmental profile, improved fire safety margin, and gained short term overload-ability of their existing transformers.

Ingenuity, Sustainability, Profitability

As a key decision maker in specifying, ordering, and maintaining transformers, you have an obligation to all of your stakeholders to use products that have the least impact on our environment while conserving our natural resources and providing the highest margin of safety. Only FR3 fluid meets ALL of those requirements. Reliable, Responsible, Revolutionary!