



TRANSFORMERS • SERVICE • TRAINING • COMPONENTS

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**WAUKESHA ELECTRIC SYSTEMS
ENDORSEMENT OF ENVIROTEMP™ FR3™ FLUID**

To our valued customers:

Waukesha Electric Systems, Inc. is the largest manufacturer of power transformers in the United States and a valued supplier of transformer services, LTC training, reverse-engineered components and replacement parts. Over the past several years, we have developed a close working relationship with Cooper Power Systems, the manufacturer of Envirotemp™ FR3™ fluid, a leading brand of natural ester fluid worldwide. This relationship has afforded us the opportunity to complete sufficient research allowing us to offer FR3 fluid in our transformer product line. We extend our standard warranties for new transformers filled with this fluid and endorse this product for Waukesha Service field retrofills of existing transformers of many makes and models.

Over the last several years, Cooper Power Systems has done extensive testing to determine that FR3 fluid meets the requirements of industry standards for natural ester fluids, including applicable ASTM and IEEE requirements, and has worked to help develop new industry standards and guides. CPS work includes studies such as distribution transformer materials compatibility, accelerated life testing, special dielectric testing, thermal performance, dissolved gas analysis, field trials for new and retrofilled distribution transformers. This work has been supplemented by Waukesha Electric Systems for power class applications, including material compatibility, large gap dielectric breakdown and thermal performance studies as well as the development of manufacturing, field handling and processing procedures. We also studied FR3 fluid application in the Waukesha® UZD® load tap changer. Based on knowledge and experience gained, we believe that natural ester fluids will play an increasingly significant role in the medium and large power transformer industry.

Both Cooper and Waukesha continue to work collaboratively on building the body of knowledge necessary for our power industry to effectively work with natural ester fluids. As with mineral oil, there are still—and will continue to be—opportunities to gain further insight, and both companies are committed to continued testing and improvements of both product and process.

Waukesha stands ready to consult with you, our customer, to help you understand the nature and benefits of FR3 fluid and its application in your transformers. We look forward to assisting you in taking advantage of the many benefits this revolutionary material has to offer.

H. Jin Sim, P.E.

Vice President & Chief Technology Officer



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FR3-LTR-091