

Ion Implantor Oil-Filled Transformers Fire Risk

Is It Actionable?

What Do Insurers Say?

FM Global 7-7: Property Loss Prevention Data Sheets for Semiconductor Fabrication Facilities

- A. Provide air sampling smoke detection inside each enclosure.
- B. Replace mineral oil-filled transformers with dry-type transformers or motor-generators sets.
 - i. For implanters with cast resin dry-type transformers or motor-generator (MG) sets, install circuit breakers with equipment ground fault protection on the main breaker in the tool as well as any breakers that feed transformer circuits.
- C. If the oil filled transformers cannot feasibly be replaced, the following is needed:
 - i. Install circuit breakers with equipment ground fault protection on the main breaker in the implanter as well as any breakers that feed transformer circuits.
 - ii. Install current limiting fuses upstream of the main breakers to interrupt high-energy faults within the unit.
 - iii. Provide transformer tank overpressure protection in the form of a pressure relief device on all oil-filled transformer tanks per Institute of Electrical and Electronic Engineers (IEEE) standards. The pressure relief device should be connected to a properly sized pipe that does not restrict pressure relief flow. This pipe should terminate at a safe location.
 - iv. A liquid screening test should be done on the transformer oil annually. The test should evaluate dielectric strength, neutralization number, interfacial tension, color, and moisture content. Testing of the oil would indicate the presence of internal weaknesses and malfunctions that could lead to ultimate failure of the transformer.

What Do Suppliers Say?

Axcelis Bulletin - Oil-filled Transformer Position Paper

1. Ion Implantor transformers are custom designed for this application and are specifically exempted from some requirements specified in the National Electrical Code, NFPA 70. Also, the NFPA 318 (“Standard for the Protection of Cleanrooms”) Committee considered use of oil-filled transformers at their 1999 meeting, and chose not to restrict their use in ion implanters.
2. In more than twenty years of operation using oil-filled transformers in ion implanters, Eaton SEO/Axcelis is not aware of any electrical failure of an isolation transformer resulting in release and/or ignition of the oil contained within.
3. Axcelis’ internal risk assessment for the use of oil-filled transformers indicates the probability of an explosion or conflagration event is UNLIKELY. No matter what severity is assigned, our estimate of the overall risk (per SEMI S10 and S14) is LOW.
4. It is Axcelis’s position that all of our ion implanters are sufficiently safe in the configuration in which they were sold and no other changes are required to keep them safe.

What Do Users Say?

Help!!!

If we accede to insurers, then we may incur unnecessary cost and risk.

If we do nothing and a fire occurs, then we've made a career limiting decision.

What Is Happening to Reach Consensus?

Best Practices for Oil-Filled Transformers Maintenance Forum

When: Wednesday, October 15
10:00 AM to 12:00 PM

Where: Austin Marriott at the Capital

Speakers: Vincent DeGiorgio, FM Global
Steve Roberge, Axcelis
Lauren Crane, TUV America
Craig Ottesen, Texas Instruments

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