

Components & Protective Equipment
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Transformer Fluid Compatibility Testing

ASTM D471 - Fluid Immersion

Parameters: 70 hours @ room temperature

| Test | A37 Jacket Semiconductive EPDM | A53 Insulation Non-conductive EPDM |
|-------------------------|-----------------------------------|---------------------------------------|
| Transformer Oil | | |
| Durometer, point change | -31 | -23 |
| Volume, % change | +105% | +153% |
| Enviro Temp FR3 | | |
| Durometer, point change | -1 | -4 |
| Volume, % change | +1% | +2% |

ASTM D471 - Fluid Immersion




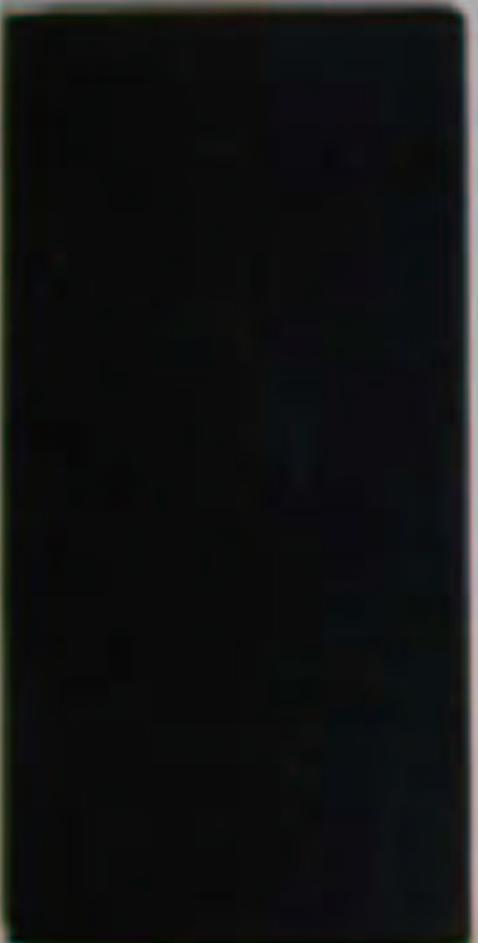


Parameters: 70 hours @ 65°C

| Test | A37 Jacket Semiconductive EPDM | A53 Insulation Non-conductive EPDM |
|-------------------------|-----------------------------------|---------------------------------------|
| Transformer Oil | | |
| Durometer, point change | -36 | -24 |
| Tensile, % change | -63 | -69* |
| Elongation, % change | -73 | -84* |
| Volume, % change | +162% | +202% |
| Enviro Temp FR3 | | |
| Durometer, point change | -8 | -10 |
| Tensile, % change | -5 | -15 |
| Elongation, % change | -3 | -12 |
| Volume change | +5% | +7% |

* A53 specimens broke at the clamp. Data is indicative of the state of deterioration but not reportable per the ASTM standard.

Conclusion: Transformer oil is severely deteriorating to both insulation and semiconductive rubber compounds. Volume swells at these levels could cause distortion in molded parts despite the constraints imposed by part geometry, exposure time, and oil volume on installed parts. Incidental spills can be expected to produce visible changes on the part surface. FR3 is significantly less aggressive towards both compounds. The physical property changes seen at 65°C suggest that the compounds are acceptable for long term contact with unoxidized FR3. Incidental spills are not expected to cause distortion of the parts.

Edine M. Heinig
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| | 1" x 2" Specimen Control | Envirotemp FR3 70 hours @ 65°C | Transformer Oil 70 hours @ 65°C |
|-------------------|---|---|---|
| A53 Insulation |  |  |  |
| A37 Jacket |  |  |  |