Failure Analysis of Failed PMTs
Progress report

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Failed PMT ZL1193

- Fracture origin identified as a chipping/score on outside surface, about 27 mm from base
- Inspection before potting: rated “Worst”, 3 score lines on the outside surface in the middle (1/3) region, severe inside scores
Outside surface of PMT ZL1193

Defect that causes failure
Modulus of RTV566

Temperature, °C

Complex modulus, MPa

Made in 2003

CN03504
Lot 873
Summary

• Both failed NG tubes (AA0393 & ZL1193, 12 cycles between -30°C and +45°C) fractured from outside surface flaws
• Modulus of RTV varies between lots, but not significantly.
• Curing shrinkage about 0.2% (volume), mostly in the first 24 hrs.