

# Safety considerations for the purchase of Printed Circuit Boards or PCBs.

# Background

- IS41 prohibits the use of halogenated plastics - toxicity, corrosivity, smoke density of fire effluent.
- Fire retardant additives used in the manufacture of traditional FR4 laminates for PCBs contain bromine.
- The search for alternative (conforming) materials began at CERN in 2000.

# Research into alternative materials

- Fire tests (2000) and electrical tests (2001-2) performed on alternative materials.
- Fire tests (IEC, AST, Airbus test) showed that the alternative materials had better fire behaviour properties (in terms of toxicity, corrosivity, smoke density) and passed the test pass criteria as defined in the standards and CERN's IS41.
- Mechanical and Electrical tests showed that even for complex PCBs the alternative materials were comparable to standard FR4 materials.
- Problem areas remaining (Jan 2002): availability; ageing characteristics; slightly higher price. Weighed against: better fire behaviour; lower cost of disposal.

# Policy as described in the Memorandum sent February 2005

- Memo addressed to LHC and non-LHC Experiments.
- Market Surveys to ask for conforming materials if possible.
- Calls for tenders shall exclusively ask for halogen free material, unless the Market Survey shows that competitive tenders are not possible (e.g. problems of availability).
- Note: The RoHS Regulations – Restriction on the use of certain Hazardous substances in Electrical and Electronic Equipment regulations 2004 (lead, mercury, cadmium, chromium VI & brominated fire retardants). Comes into force 1<sup>st</sup> July 2006.

# Treating issues of non-conformity

- Request for derogation to be submitted to SC for approval
- Issues: compensatory measures discussed & defined; presence recorded in experiment's inventory; record of why the material could not be substituted.