Aging Reference Lab R&D Proposal

Starting point for 2008 (July - December): preparation of documentation and support for compilation of available information on materials for gas detectors assembly, gas systems and cooling systems.

1. **Prepare documents with description of tests type and set-up**
   a. Aging test in lab
      Prepare document with typical dose rates/accumulated charge per detector type, taking into account operating parameters (gas gain, gas mix, etc). Explain accelerator factors in lab aging tests and prove validation strategy.
      *See **Appendix I** for a detailed list of relevant parameters (by A. Romaniouk)*
   b. IR analysis
   c. GC/MS analysis
   d. SEM and optical microscopes

2. **Prepare DB of materials**
   a. **Section Materials/Components for gas and cooling systems**
      Gas Pipes
      Connectors
      Joints
      Active components (Pressure regulators, MFC, rotameters, valves, pumps, etc)
      Sensors
      Bubbler fillings
      Sealants and lubricants
      Filtering elements
      Section Detector Assembly Materials
      Epoxies
      Rubbers
      Rigid Materials
      Metallic wires

   b. **Fields in the DB (Catalogued properties)**

Use	**Material/Component Characteristics:**	**Use and compatibility:**	**Test:**	**Updates**
Gas Detector	Name:	Candidate to be used as:	Sample Internal ID:	Date
Gas system	Chemical Formula:	Used by:	Type of test:	
Cooling system	Basic components in contact with fluid/gas:	Comments on experience of use:	Link to Test description:	
	Special treatment, if any (lubricant, cleaning…):	Known incompatibilities:	Test requested by:	
	Supplier:	Generic recommendations of use:	Test performed by:	
	Supplier reference:		Date and place of test:	
	Aprox. cost:		Sample preparation:	
			Result:	
			Comments:	
			Link to Report:	
			Recommendation:	

3. **Prepare a document with a proposal to upgrade the existing aging test lab (CERN B.155).**

Appendix I: Details about the aging tests carried out by ATLAS TRT

1. Internal and external sources of the ageing agents
2. Type of ageing agents: Hydrocarbons and Si
3. Type of wire deposits
4. Behavior in time and under irradiation
5. Behavior difference for Si and H-Carbon deposits
6. Sources of Si:
   a) Si compounds
   b) Origin
   c) Ageing phenomena
   d) Calibrated source of Si
   e) Experimental set-up
   f) Comparison with other sources
7. Experimental aging set-up.
8. Choice of working parameters
   a) Criteria
   b) Gas mixtures (Ar/Xe), effects of CF4, CO2 Oxygen
   c) Gas gain
   d) Gas flow
   e) Irradiation area
   f) Dose rate
   g) Hydrocarbon specifics (Dose rate and gas flow)
9. Sensitivity of the method
10. Comparison with the IR method
11. Time and criteria to pass the tests (passed, failed, repeat)
12. Experience

Materials DB - Catalogued Properties

Major Categories of Use:
GAS DETECTORS / GAS SYSTEMS / COOLING SYSTEMS

Material/Component Characteristics:
Name:
Chemical Formula:
Basic components in contact with fluid/gas:
Special treatment, if any (lubricant, cleaning…):
Supplier:
Supplier reference:
Aprox. cost:

Use and compatibility:
Candidate to be used as:
Used by:
Comments on experience of use:
Known incompatibilities:
Generic recommendations of use:

Test:
Sample Internal ID:
Type of test:
Link to Test description:
Test requested by:
Test performed by:
Date and place of test:
Sample preparation:
Result:
Comments:
Link to Report:
Recommendation:

Updates
Information last updated on:

Materials/Components for gas and cooling systems
Gas Pipes
Connectors
Joints
Active components (Pregulators, MFC, rotameters, valves, pumps, etc)
Sensors
Bubbler fillings
Sealants and lubricants
Filtering elements

Detector Assembly Materials
Epoxies
Rubbers
Rigid Materials
Metallic wires