AMICI

WP5.2: Harmonization - Material and Component Reference

Sebastien Bousson

Mohammed Fouaidy

CNRS/IN2P3/IPN Orsay

As stated in the AMICI proposal:

"Establish a **common knowledge**, background and use among Technological Infrastructures and related laboratories and industries **in relation to material and components** involved in **accelerator** and large superconducting **magnets**. "

Main idea:

- Accelerator performances are based not only on accelerator systems design but also on material or component choice and specifications.
- Data and characteristics of these are not easy to find in papers and knowledge sharing is more commonly done with private communications.
- Even on raw materials, non-standard use in an accelerator environment (radiation, cold temperature…) add difficulties to find corresponding data.

Main outcome:

Create a reference database for material/component used in accelerators (accelerating structures, magnets, diagnostics, ancillaries…) and start to fill it with relevant data.

To be listed in the database:

1. MATERIAL

Some examples:

- **Raw material, as used to fabricate accelerator systems**
  - ➢ *Niobium, Nb3Sn, NbTi, Stainless steel, Titanium,…*
  - ➢ *Ceramics (power couplers)*
  - ➢ *Magnetic material (μmetal ,co-netic, …)*
  - ➢ *…*

- **Material as used during processing/preparation**
  - ➢ *Chemical etching mixture*
  - ➢ *Ultra-pure water*
  - ➢ *Media for mechanical polishing*
  - ➢ *…*

To be listed in the database:

2. COMPONENT

Some examples:

- **ancillaries,** as used to implement accelerator systems
  - ➢ *Cables,*
  - ➢ *RF feedthrough, HV feedthrough*
  - ➢ *Screws, bolts*
  - ➢ *Gaskets*
  - ➢ *…*

- **Instruments as used in accelerators ?** *Specially when they are very specific*
  - ➢ *Temperature sensors*
  - ➢ *Piezo actuators*
  - ➢ *Vacuum gages*

Apart from material and component, other category to add to the database ?

Simulation tools (ex: multipacting software)?
Procedures ? (assembly, testing,

What about equipment of the technological infrastructures ?
Should be listed in the database or is within Amici/WP3 ?

1. Physical characteristics

Some examples:

- ➢ *Mechanical properties*
- ➢ *Thermal properties (conductivity, specific heat,…)*
- ➢ *Magnetic properties*
- ➢ *Electrical properties*
- ➢ *Radiation hardness*
- ➢ *…*

Some could be parameters-dependent (typically temperature-dependent)…

2. Chemical characteristics

Some examples:

- ➤ *Chemical composition*
- ➤ *Chemical properties*
- ➤ *…*

3. Economical properties

Some examples:

- ➤ *Cost*
- ➤ *Typical lead time ?*
- ➤ *Production capacity ?*
- ➤ *…*

4. References

Some examples:

> *Article*
> *Already existing database*
> *Lab having experience using the material/component*
> *Project having experience using the material/component*

Database implementation

Questions linked to implementation of the database:

- **Who has access ?** Amici contributors in the beginning, and then everybody who is requesting to have access ?
- **Who has grants to implement datas ?** Reference persons per Lab/company ?
- **Who is validating the data entered ?**

To take into account for the database implementation

- **Datas are not only numbers.** *But also tables, curves, datasheet, pictures, scientific articles, …*
- **Database sustainability ?** *Who is monitoring that datas entered are still "up-to-date"* **?**

Participants (as listed in the proposal)

- CNRS (Task leader)
- CEA
- DESY
- IFJ PAN

Other AMICI contributors (labs, industries) are welcome to advice, participate and actively contribute !

Distribution of work for the implementation of the database:

- Database skeleton : CNRS lead institute
- Software choice / IT work : IFJ PAN lead institute
- All AMICI participants: contributing to enter first sets of datas