GSI FAIR	Technical Guideline	Number	10.16e
B-MT	Documentation and Certificates for Cryogenic Modules	Status	2011-04-04

Contents

1. Scope

1) This document lists the certificates, documentation and structure of documentation to be delivered with complete cryogenic modules for applications like
   - magnet cryostats,
   - cryogenic supply systems,
   - cryogenic transport systems,
   - cryogenic current lead boxes,
   - auxiliary cryogenic systems

   within FAIR accelerators.
2) This document does NOT define any documentation of specific components fulfilling the function a module is dedicated to. This document is directed only to the documentation of cryogenic components of the module, independent of any other specific function.
3) This document is NOT a replacement for any requirements defined by [1].
4) This document is NOT related to any other purpose as aforementioned.

2. Definitions

1) *Cryogenic modules* in terms of this document are assembly like cryogenic equipment being fit for installation on site of operation.

3. Codes and Standards

1) The European pressure equipment directive 97/23/EC [1] defines the legal standards for components and assemblies being recognised as pressure equipment.

4. Required Documents and Certificates

1) At least the named documentation is required for each single cryogenic module delivered to the contracting entity.
2) In case any documentation is in common for a series of cryogenic modules equal in construction, the supplier must deliver this documentation completely to the contracting

entity. In case, the supplier must request a confirmation of the document delivery in writing from the contracting entity. Within the full set of documentation as defined as follows such confirmation shall replace the documentation delivered once for a series of equal modules.

3) Any documentation or certificate not listed but found to be required for any reason must be also delivered. In case, the documentation must be attached to the relevant documentation as defined in 4.1 - 4.3.
4) The named documentation as follows must be clearly identified as the corresponding documentation of the specific module, respectively a series of modules, by matching the identification number of the label plate with the corresponding data of the certificates and documentation.

4.1. Pressure Equipment related Documentation

1) In case of pressure equipment in terms of [1] the correlated CE – certificate as define by [1] must be delivered for each single cryogenic module.
2) In case of pressure equipment in terms of [1], the complete documentation of a hazard analysis must be delivered.
3) An operation manual as defined by 97/23/EC [1] in GERMAN AND ENGLISH language must be delivered, independent of the class of pressure equipment.
4) In any case of pressure equipment in terms of [1] the engineering documentation defined by [1] for the corresponding class of pressure equipment (see [1]) but at least for pressure equipment of a class I must be delivered.
5) The complete set of documentation and certificates for the over pressure safety system of the insulation vacuum vessel of the cryogenic module as defined by [9] must be delivered for each cryogenic module.

4.2. Further Engineering-, Component-, Material-, Production- and Testing Related Documentation

1) The following documentation must be delivered for each cryogenic module, respectively one for a series of modules if possible:
   - a complete set of documentation and certificates of sensor installation and sensor wiring as defined by [2],
   - a complete set of documentation and certificates for the installed thermal shield as defined by [3],
   - a complete set of documentation and certificates for the cryostat vacuum vessel as defined by [4],
   - a complete set of documentation and certificates for the vacuum testing of the complete cryogenic module as defined by [5],
   - a complete set of documentation and certificates for the pressurised leak testing of all cryogenic tubing being installed in the cryogenic module as defined by [6],
   - a complete set of documentation and certificates for the He-leak testing of all cryogenic tubing being installed in the cryogenic module as defined by [7],

- a complete set of documentation and certificates for the acceptance test of the thermal shield being installed in the cryogenic module as defined by [8],
- a complete set of documentation and certificates for the thermal links and thermal interceptions of the cryogenic module as defined by [10],
- a complete set of documentation and certificates for the sensor cabling installed in the cryogenic module as defined by [11],
- a complete set of documentation and certificates for the Multi Layer Insulation installed in the cryogenic module as defined by [12] and [13],
- a complete set of documentation and certificates for low voltage feed throughs installed in the cryogenic module as defined by [14],
- a complete set of certificates for the materials of the cryogenic tubing installed in the cryogenic module as defined by [15],
- a complete set of certificates for the materials of the cryogenic compensation bellows installed in the cryogenic module as defined by [16],
- a complete set of certificates for the composite materials of mechanical load bearing components installed in the cryogenic module as defined by [17].

4.3. Technical Drawings and CAD - Data

1) For any transfer of mechanical engineering data see [18].
2) A full set of technical drawings of the cryogenic module, showing the release note of the contracting entity, must be delivered.
3) A full set of technical drawings of special construction tooling and equipment must be delivered.
4) An electronic copy of the full CAD-Model of the module as defined by [18] must be delivered.

5. Structure of Documentation

1) All documentation and certificates (except mechanical engineering data as described in 4.3) must be transferred into EDMS – documents following the relevant EDMS – guidelines.
2) In case of text, tables, diagrams and pictures the electronic version must be delivered in the PDF-format without any access restrictions.
3) All documentation must be delivered within compiled and structured files, including a table of content.
4) Any certificates must be delivered compiled in files and must be electronically scanned for electronic compilation.
5) Documentation and certificates must be compiled well separated in dependence of the content.

6. References

[1] Directive 97/23/EC, European parliament and the council of the European Union, http://eur-lex.europa.eu, 1997

[2] Technical Guideline No. F-TG-K-13.5e: Temperature Sensor Installation for Cryogenic Purposes, F-TG-K-13.5e_T_sensor_Installation_20101102

[3] Technical Guideline No. F-TG-K-10.13e : Documentation and Certificates for Cryostat Thermal Shields , F-TG-K-10.13e_Documentation_and_Certificates_for_Cryostat_ Thermal_Shields_20101029

[4] Technical Guideline No. F-TG-K-10.8e: Documentation and Certificates for Cryostat Vacuum Vessels, F-TG-K-10.8e_Documentation_and_Certificates_for_Cryostat_ Vacuum_Vessels_20101029

[5] Technical Guideline No. F-TG-K-7.28e: Vacuum Testing of Complete Cryogenic Modules, F-TG-K-7.28e_Vacuum_Test_Cryogenic_Modules_20101129.pdf

[6] Technical Guideline No. F-TG-K-7.24e: Pressurised Leak Testing of Cryogenic Tubing, F-TG-K-7.24e_Pressurised_Leak_Testing_of_Cryogenic_Tubing_ 20101029

[7] Technical Guideline No. F-TG-K-7.23e: He Leak Testing of Cryogenic Tubing, F-TG-K-7.23e_He_Leak_Testing_of_Cryogenic_Tubing_20101101

[8] Technical Guideline No. F-TG-K-7.20e: Acceptance Test for Cryostat Thermal Shields, F-TG-K-7.20e_Acceptance_Test_for_Cryostat_Thermal_Shields_ 20101029

[9] Technical Guideline No. F-TG-K-3.62e: Overpressure Safety Systems for Cryostat Insulation Vacuum Vessels, F-TG-K-3.62e_Cryostat_Overpressure_Safety_Systems_ 20101112

[10] Technical Guideline No. F-TG-K-3.61e: Thermal Links and Interceptions in Cryogenic Applications, F-TG-K-3.61e_Thermalisation_Straps_20101013

[11] Technical Guideline No. F-TG-K-3.56e: Low Power Cabling for Cryogenic Purposes, F-TG-K-3.56e_Low_Power_Cabling_for_Cryogenic_Purposes_20101028

[12] Technical Guideline No. F-TG-K-3.54e: Design Principles for Multi Layer Insulation Blankets, F-TG-K-3.54e_MLI_Design_20101028

[13] Technical Guideline No. F-TG-K-2.34e: Materials for Multi Layer Insulation Blankets, F-TG-K-2.34e_MLI_Materials_20101102

[14] Technical Guideline No. F-TG-K-3.53e: Low Voltage Feedthroughs for Cryostat Applications, F-TG-K-3.53e_LV_Feedthroughs_20101102

[15] Technical Guideline No. F-TG-K-2.35e: Steel Materials for Pressurised Cryogenic Components, F-TG-K-2.35e_Materials_Cryogenic_Tubing_20101005

[16] Technical Guideline No. F-TG-K-2.38e: Materials for Compensation Bellows at Cryogenic Temperatures, F-TG-K-2.38e_Materials_Compensation_Bellows_at_ Cryogenic_Temperatures_20101206

[17] Technical Guideline No. F-TG-K-2.33e: Composite Materials for Cryostat Components, F-TG-K-2.33e_Epoxy_Fibre_Composite_Materials_for_Cryostat_ construction_20101028

[18] Terms and Conditions for the Exchange of Mechanical Engineering Data, GSI Helmholtzzentrum für Schwerionenforschung GmbH, Darmstadt, Germany, 2009