



SLS-TME-TA-1999-0008

April, 1999

Specifications of Beryllium windows for the Front Ends of 4S and 6S

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1. Introduction

These specifications cover the design, materials, manufacture, cleaning, testing and delivery of four Beryllium windows to be installed in the Front Ends of the Materials Science Beamline (X04S) and the Protein Crystallography Beamline (X06S) of the Swiss Light Source (SLS). Tenderers are requested to comment upon the specifications and are encouraged to make alternative proposals to PSI in addition to the quotation according to these specifications. However, after the contract has been placed, departures from the then agreed specifications will not be allowed, except with written permission of the PSI.

The following documents are integral parts of these specifications:

- UHV Materials and Technologies for SLS Front Ends and Beamlines, SLS-TME-TA-1998-0014
- Quality assurance requirements, ESRF/ENG/89/02

2. Description

2.1. X04SFE Plane beryllium window

The system assembly is shown in drawing 30040.26.014, and it is an ultra high vacuum (UHV) tight component.

An OFHC copper disk is joined to a double-sided CF63 flange by brazing. The axial length of this flange is 24 mm. In the center of this disk there is a window of width 45 mm and height 8 mm, onto which a beryllium foil with thickness 0.5 mm is brazed. A bent copper tube is inserted and brazed into the two holes through the assembly for cooling purposes. On the downstream side, near the conical aperture, two K-type thermocouples are fixed to measure the temperatures. The eight holes in the flange have M8 threads.

The beryllium foil must be the vacuum tight type and with purity of 99.9%.

The beryllium foil must be polished to a rms roughness of less than 0.1 μm .

2.2. X06SFE Beryllium window

The system assembly is shown in drawing 30040.36.008, and it is an ultra high vacuum (UHV) tight component.

An OFHC copper disk is joined to a double-sided CF40 flange by brazing. The axial length of this flange is 24 mm. In the center of this disk there is a window of width 12 mm and height 6 mm, onto which a beryllium foil with thickness 0.25 mm is brazed. A bent copper tube is inserted and brazed into the two holes through the assembly for cooling purposes. On the downstream side, near the conical aperture, two K-type thermocouples are fixed to measure the temperatures. The six holes in the flange have M6 threads.

The beryllium foil must be the vacuum tight type and with purity of 99.9%.

The beryllium foil must be polished to a rms roughness of less than 0.1 μm .

3. Scope of Supply

3.1 Four beryllium windows

The following four beryllium windows must be fully tested and delivered to PSI:

- Two X04SFE plane beryllium windows, as defined in section 2.1
- Two X06SFE beryllium windows, as defined in section 2.2

3.2 Drawings

The supplier will produce all drawings necessary to manufacture each component as required in this specification. All the drawings will be sent to PSI for checking as soon as they are available. This check is needed to verify the compatibility of the drawings with the specification, and the manufacturing of the components can only begin after completion of this check. PSI will then take possession of all the drawings and will be free to use them to manufacture items elsewhere.

3.3 Certificates and reports

The following material certificates must be provided by the supplier:

- AISI 316LN-ESR
- Copper OFHC
- Beryllium foil.

The following set of inspection documents is required at the end of the contract:

- reports of leak and vacuum testing
- brazing process records
- technical documents concerning components purchased by the contractor
- roughness measurement of Beryllium foils

4. Packing and Delivery

The supplier is required to take responsibility for packing and transportation of these windows to the SLS site at PSI.

The following is to be displayed clearly on the outside of the packaging:

- addressed to SLS/PSI CH-5232 Villigen, Switzerland
- the PSI contract number
- the weight of the loaded packaging

5. Quality assurance requirements

PSI prefers that manufacturers are registered to comply with ISO 9001 or an equivalent national standard.

The requirements of PSI for quality assurance are stipulated in the specification ESRF/ENG/89/02 "Quality assurance requirements".

6 List of annexed drawings

- 30040.26.014 X04SFE Plane beryllium-window
- 30040.36.008 X06SFE Beryllium window