

**SNS INSTRUMENTS
NEXT GENERATION – (SING)**

EQUIPMENT SPECIFICATION

**HYSPEC Highly Oriented
Pyrolytic Graphite Crystals**

**Document Number
SING14B-20-EQ0008-R00A**

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NEXT GENERATION (SING)
HYSPEC Highly Oriented Pyrolytic Graphite Crystals

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1 SCOPE

This specification defines the requirements for crystals of High Oriented Pyrolytic Graphite (HOPG) to be used in a focusing crystal array on the HYSPEC beamline at the Spallation Neutron Source facility (SNS) at Oak Ridge National Laboratory (ORNL).

Buyer shall be defined in the solicitation and the equipment specified herein shall be delivered to the Buyer at the Spallation Neutron Source facility (SNS) of the Oak Ridge National Laboratory (ORNL) under the U.S. Department of Energy (DOE). Seller shall refer to all parties responsible for providing the HOPG crystals.

2 INTRODUCTION

The SNS facility, being constructed in Oak Ridge, Tennessee, is a new neutron scattering facility with a powerful, pulsed neutron source. From the target or core of the facility, neutrons will be guided to various instruments via mirrored neutron guides creating a "neutron beam". Along these guides, various neutron choppers will be inserted to filter neutrons of a desired velocity or wavelength.

This specification refers to the HYSPEC instrument, which is located on beamline 14B at the SNS. In Figure 1 a schematic rendering of beamline 14B is shown. The neutron beam is carried from the SNS moderator out to an external building via a curved neutron guide and passes through 4 beam defining choppers. In the external building the beam enters a drum shield that contains a focusing array of HOPG crystals that will be used to focus the beam onto the sample. This specification sets out the requirements for the HOPG crystals in this array.

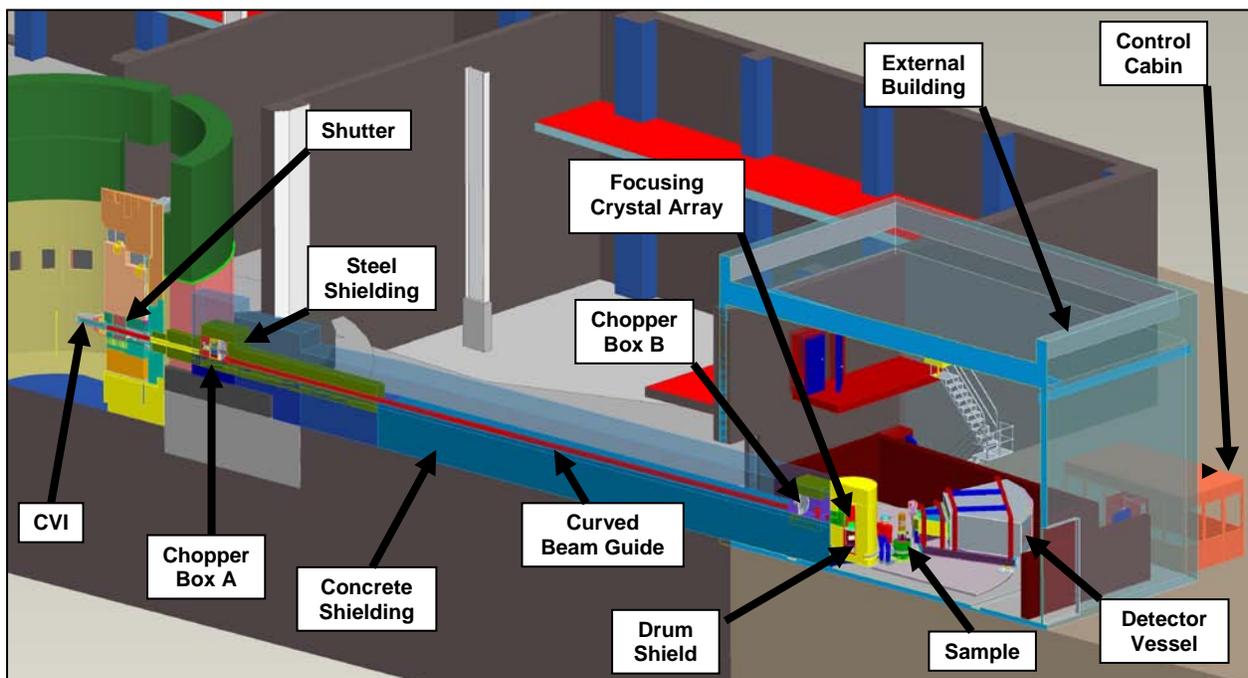


Figure 1: A 3-d rendering of the HYSPEC beamline from the Pro-E model.

It should be noted that this specification only covers the crystals and that the focusing array mechanism is not part of this specification.

3 TECHNICAL REQUIREMENTS

The crystals required are of a flat plate shape as illustrated in Figure 2. The length (L), height (H) and thickness (T), as defined in Figure 2 for the crystals required along with the appropriate tolerances are given in Table 1.

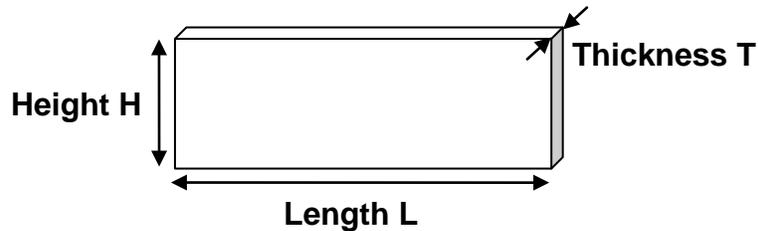


Figure 2: The dimensions of the HOPG crystal plates.

Table 1: Dimensions of the crystals required

Dimension	Value (mm)	Tolerance (mm)
Length (L)	50	±0.1
Height (H)	12	±0.1
Thickness (T)	2	±1

The crystals should have a mosaic spread of $0.8^{\circ} \pm 0.2^{\circ}$ full width at half maximum (FWHM).

A total number of 84 individual crystals, each of the dimensions given in Table 1, each with a mosaic spread of $0.8^{\circ} \pm 0.2^{\circ}$ FWHM, are required.