THOMAS JEFFERSON
NATIONAL ACCELERATOR FACILITY

SPECIFICATION FOR PURCHASE REQUISITION 193321

November 8, 2000

1 Introduction

The Thomas Jefferson National Accelerator Facility (TJNAF) is a continuous wave electron accelerator using superconducting accelerating cavities. The maximum energy of the accelerator is over 4000 MeV, and the maximum electron current to be used in nuclear physics experiments is 200 μA.

Three experimental halls A, B, and C, are equipped with various detectors and other experimental equipment necessary for conducting the scientific program. Experimental Hall A houses two High Resolution Spectrometers. The focal planes of both spectrometers are instrumented with drift chambers, time-of-flight (TOF) scintillation counters, Cerenkov counters, and lead-glass electromagnetic shower counters.

This specification is for coax cables used in counting work. The purpose of the cable is to provide low current, high voltage power to equipment.

2 Statement of Work

The vendor shall provide all labor, equipment, and facilities to fabricate, test, and deliver coax patch cables with performance and packaging as specified in this document.

3 Coax Patch Cable Specification

To enable users to quickly and safely connect high voltage power to equipment, lengths of coax patch cables, as specified below, are required by Hall A.

3.1 Cable

The cable used shall be Belden type 8241. Type RG-59/U with solid, copper covered steel center conductor. Solid polyethylene dielectric. 75 ohm nominal impedance. The color of the outer jacket shall be red. Alternative cable may be used subject to approval by TJNAF. Manufacturer shall submit specifications for proposed alternate cable.

The cable shall meet National Electrical Code (NEC) Article 725 class CL2 or class CL2X. The cable shall meet one or more of the vertical flame spread requirements specified in Underwriters Laboratories UL-1581.

3.2 Lengths of Assemblies

The length given is the tip-to-tip overall length.

Tip-to-tip overall length (in inches)

444 ± 4 inches

3.3 Labeling

Each manufactured cable shall be unlabled. No shrink-on tubing is to be applied over the junction of the cable and the connector ferrule.

3.4 Connectors

Both ends of the cable assembly shall have a SHV style high voltage connector. The connector shall have a gold plated center contact and a tarnish resistant finish on the outer body.

The SHV connectors may be one of, or shall be equivalent to;

- Kings part number 1705-1
- AMP part number 51426-5

Alternative connectors may be used subject to approval by TJNAF. Manufacturer shall submit specifications and drawings for proposed alternate connectors.

3.5 Electrical

The cable shall be free of open connections and have good continuity along the central conductor. The cable shall be free of open connections and have good continuity along the shield conductor. The cable shall be free of resistive shorts between the center conductor and the shield conductor. The cable shall be capable of withstanding the components' lowest rated voltage with leakage current in accord with the components' specifications.

3.6 Mechanical

Crimp tooling utilized shall be as recommended by the manufacturer. The center conductor shall be visible at the center pin inspection hole after the pin has been crimped. The cable outer jacket shall be securely crimped between the braid ferrule and the connector body. Sharp bending of the cable at the connector body shall not result in the outer jacket pulling away from the connector or exposure of the cable braid. Threaded connector parts shall be securely tightened during final assembly.

4 Acceptance Criteria

Acceptance of the coax patch cables will take place at TJNAF within 1 week after receipt. The acceptance tests consist of simple procedures which quickly check basic functioning of the cables. They are not intended to substitute for the manufacturer warranty on each individual cable meeting the specifications. Cables satisfying the following checks will be accepted.

4.1 Visual Inspection

Each coax patch cable will be inspected visually for physical damage. The cable will be inspected for broken connectors, cut jacketing or pinched cable indicating possible damage to the dielectric or conductors.

4.2 Performance

At a mimimum, the following performance tests will be performed.

- Five random cables from each group of coax patch cables will be tested to verify that they have a delay within the specified ranges and satisfy the electrical specifications.

5 Warranty

The manufacturer shall warrant the performance of all coax patch cables, as specified previously, to be free of defect in material or manufacture.

6 Experience

Previous experience of the company is relevant to this project. The manufacturer shall have experience in the last 2 years in manufacturing and marketing coaxial cable assemblies suitable for use in sensitive electronics applications. The manufacturer shall have supplied cable assemblies that have been successfully used in sensitive electronics applications.