

## FESHM 9150: HIGH VOLTAGE COAXIAL CONNECTORS

### Revision History

Author	Description of Change	Revision Date
Dave Mertz	<ul style="list-style-type: none"><li>• Revised entire document format to match current Fermilab Environment, Safety, and Health Manual (FESHM) template</li><li>• Made grammatical edits as needed to match outline format</li><li>• Identified persons to approve exceptions.</li></ul>	January 2016
Michael J. Utes	Checked all connectors in document for correct part numbers and obsolescence and made changes where appropriate. Kings brand part numbers were unchanged; Amp connectors have been replaced with Tyco connectors and otherwise have the same names. The 10kV cable connector was changed from Reynolds 167-4535 to 167-3554. The 10kV bulkhead adapter was changed from Reynolds 167-3705 to Kings 1069-1. Also the Fermilab Stock catalog numbers were updated, meaning they all had 00 added to the end of the old numbers.	December 2010

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## 1.0 INTRODUCTION

This chapter identifies certain requirements and prohibitions pertaining to the use of high voltage coaxial connectors. Recommendations are made for standard connectors to be used for several voltage ranges.

## 2.0 PROCEDURES

Requirements apply to the use of high voltage coaxial connectors for both operational and experimental use. Exceptions to these requirements require approval from the electrical Authority Having Jurisdiction or her or his designee. Recommendations of manufacturers' part numbers are provided to guide the selection of standard connectors for several voltage ranges to foster compatibility at the laboratory.

### 2.1 Requirements

The following policies apply to all high voltage coaxial connectors used at the laboratory.

#### 2.1.1. Incompatibility with signal cables

Connectors for high voltage use are to be chosen such that they are incompatible with connectors for signal cables.

#### 2.1.2. Voltage rating

Connector components properly rated for the intended application shall be used. Systems requiring voltages above 20 kilovolts (kV) direct current (DC) shall utilize connectors specified for the maximum design voltage.

#### 2.1.3. MHV connectors prohibited

Because of the well-known physical compatibility of Miniature High Voltage (MHV) connectors with Bayonet Neill Concelman (BNC) connectors, which have a lower voltage rating, the use of MHV connectors is prohibited.

#### 2.1.4. Cable jacket color

When available as a commercial product, red-jacketed cable shall be used for high voltage applications. Cables of other colors operating at high voltage shall bear "high voltage" warning labels near each termination.

#### 2.1.5. Chassis connector grounding

The chassis connector shell shall be solidly grounded to the panel on which it is mounted.

### **2.1.6. Chassis connector mounting hole**

A "D" hole shall be used for mounting all panel connectors except flange mount type connectors.

## **2.2 Recommendations**

The following manufacturers' part numbers are provided to guide the selection of standard Safe High Voltage (SHV) connectors for several voltage ranges to foster compatibility at the laboratory. The citing of certain manufacturers' products is to provide an example only and does not indicate a preference for those products.

### **2.2.1. Standard Connectors for a System up to 5 kV DC**

- a. The standard coaxial cable connector shall be the Kings Electronics 1705-2, TYCO 51426-1 (old #-AMP 51426-1) (for use with RG 58C/U), or equivalent (STK#1435-211000).
- b. The standard coaxial panel connector for flange mount type should be either Kings Electronics 1707-1 or TYCO 51421-2 (old #-AMP 51421), or equivalent (STK#1435-212000).
- c. The standard coaxial panel connector for "D" hole mount type should be either Kings Electronics 1704-1, TYCO 51494-2 (old #-AMP 51494), or equivalent (STK#1435-211500).
- d. The standard bulkhead adapter for coaxial applications shall be Kings Electronics 1709-1, TYCO 225064-2 (old #-AMP 225064-2), or equivalent (STK#1435-210000).

### **2.2.2. Standard Connectors for a System up to 10 kV DC (20 amps root mean square [rms])**

- a. The standard coaxial cable connector shall be the Teledyne/Reynolds Inc P/N167-3554, the Kings Electronics 1065-2 (cable group 40) for use with type C cable, or equivalent (STK#1435-170000).
- b. The standard coaxial panel connector shall be the Teledyne/Reynolds Inc P/N167-3555, the Kings Electronics 1064-1, or equivalent (STK#1435-480000).
- c. The standard coaxial panel feed-through shall be the Kings 1069-1 or equivalent (not a stockroom item).

**2.2.3. Standard Connectors for a System up to 20 kV DC (20 amps rms)**

- a. The standard coaxial cable connector shall be the Teledyne/Reynolds Inc P/N167-3516 (for use with RG 213/U) or equivalent (STK#1435-175000).
- b. The standard coaxial panel connector shall be the Teledyne/Reynolds Inc P/N167-3517 or equivalent (STK#1435-490000).