

## **PMT Signal Output Transformer—Construction and Testing Requirements**

October 29, 2003    Nobuyoshi Kitamura

### **Requirements Source**

IceCube ERD 9000-0039-02, §3.3.2.1

### **Toroidal core material**

Magnetics, Inc., ZH42206-TC (22 mm dia., 6 mm high,  $\mu_i=15000$  (nom.)), or equivalent.

### **Winding material**

Silicone-insulated 22AWG, 7/30 stranded, 10kV wire (0.110" OD, 40 mils insulation). Harbour Industries, Inc., BSR3239-2210, or equivalent.

### **Winding requirements**

5 ½ turns of bifilar winding with the bifilar pair kept close together (see Fig. 1).

### **Winding retention (suggested)**

Insert a nylon tubing (9 mm OD, 10 mm long) in the center.

### **PCB mounting (suggested)**

Insert a #8 nylon screw in the center and through the board mounting hole. Secure with a hex nut and a washer. (See Fig. 2)

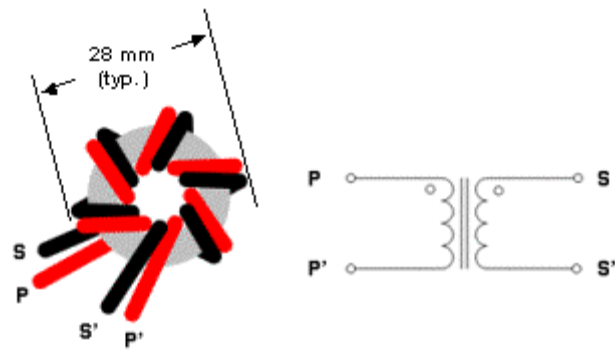
### **Visual inspection**

Verify the proper winding by the following criteria:

- (a) The overall diameter (see Fig. 1) shall be no greater than 28.5mm.
- (b) The winding portion of the bifilar pair shall be separated by no more than 2mm (see Fig. 3).

### **Electrical test**

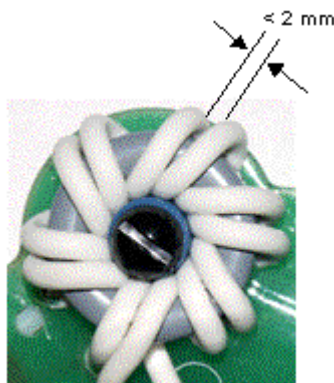
The high-frequency cut-off (-6dB) of the transformer, when the primary side is driven with a 50 $\Omega$  signal source and the response is observed across a 50 $\Omega$  termination across the secondary side, shall be no less than 130 MHz (TBR).



**Figure 1** Schematic illustration of the bifilar winding application.



**Figure 2** Sample transformer mounted on the PCB.



**Figure 3**