

TROMPETER GENERAL MATERIAL/FINISH SPECIFICATIONS

TFS-1: FINISH SPECIFICATIONS

TFS-1A .0001-.0003 max thk Bright Nickel per QQ-N-290, Class 1, Form SB (over) .000080-.000150 thk Bright Copper per MIL-C-14550 (over) .0005 max Electroless Nickel per AMS-2404C, Class 1 (On Aluminum Only)
TFS-1B .000020-.000030 thk Bright Gold ² per MIL-G-45204, Type II, Grade C, Class 3 (over) .000050-.000180 thk Bright Nickel ³ per QQ-N-290, Class 1 (over) .000080-.000150 thk Bright Copper ³ per MIL-C-14550
TFS-1C³ .0003 Watts Nickel per QQ-N-290, Form SB, Class 1 (over) .000010 Nickel per QQ-N-290, Class 1
TFS-1D .0001 min - .000120 max thk Electroless Nickel per AMS 2404C (over) .000080 min - .000150 max thk Bright Copper per MIL-C-14550
TFS-1E .0002 min - .0003 max thk Bright Electro Tin per MIL-T-10727, Type 1 and solder test per Para. 4.6.3.1
TFS-1E2 .0002 min - .0003 max thk Bright Electro Tin per MIL-T-10727, Type 1, and Solder Test per Para. 4.6.3.1 (over).000080 min - .000150 max thk Bright copper per MIL-C-14550
TFS-1F³ .000020 min - .000030 max thk Bright Gold per MIL-G-45204, Type II, Grade C, Class 00 (over).000080 min-.000150 max thk Bright Copper per MIL-C-14550 (over).000050 Nickel Strike per QQ-N-290, Class 1
TFS-1G .000020 min - .000030 max thk Bright Gold per MIL-G-45024, Type II, Grade C, Class 00
TFS-1H .0002 min - .0003 max thk Cadmium plate per QQ-P-416, Type II, (supplementary chromate treatment, golden iridescent), Class 3
TFS-1M⁴ .000200 min - .000300 max thk Silver per QQ-S-365, Type II (Semi-bright) Grade A (Chromate post treatment) (over).000080 min - .000150 max thk Bright Copper per MIL-C-14550
TFS-1N⁵ .0003 - .0005 thk Cadmium plate per QQ-P-416, Class 2, Type II, Olive Drab (over).0005 -.000550 thk Electroless Nickel plate per AMS 2404C
TFS-1P³ 1 .00010 min - .00012 max. thk Bright Gold per Mil-G-45204, Type II, Grade C, Class 2 2 .000050 min - .000070 max. thk Bright Gold per Mil-G-45204, Type II, Grade C, Class 1 3 .000020 min - .000030 max. thk Bright Gold per Mil-G-45204, Type II, Grade C, Class 00 (over).00010 min - .000150 max. thk Bright Copper per Mil-C-14550
TFS-1R1 .00010 min-.00012 max thk Bright Gold per MIL-G-45204, Type II, Grade C, Class 2 (over).000010 min-.000015 max thk Bright Gold Strike per MIL-G-45204, Type 1, Grade A, (over).00010 min-.00015 max thk Bright Copper per MIL-C-14550, Class 4

TFS-1T⁵ .000050 -.000100 Bright Tin per MIL-T-10727, Type I (Electro Deposited) (over).000150-.00020 Sulfamate Nickel per MIL-P-27418 (over).00010-.000150 Copper per MIL-C-14550, Class 4
TFS-1U⁵ .00020-.00030 thk Sulfamate Nickel per MIL-P-27418 (over).000080-.000150 max thk Copper per MIL-C-14550
TFS-1V³ .000200-.000300 max thk Silver per QQ-S-365, Type I (Matte), Grade A (over) .000050-.000180 max thk Sulfamate Nickel per MIL-P-27418, (over) .000080 min-.000150 max thk Bright Copper per MIL-C-14550
TFS-1W .00020 min-.00030 max thk Cadmium Plate per QQ-P-416, Type II Olive Drab, Class (over) .00020 min-.00030 max thk Sulfamate Nickel per MIL-P-27418 (over) .000080 min-.000150 max thk Copper per MIL-C-14550
TFS-1X .0002-.0003 thk Nickel per QQ-N-290, Class 1, Form SB Grade G (over) .000080 min-.000150 max Bright Cooper per MIL-C-14550

TROMPETER FINISH SPECIFICATION - 1 (TFS-1) NOTES:

- (2) Bright Gold plate on all connector center contacts, pins, sockets, shall be .000050 min - .000070 max thk, Class 1
- (3) Thickness is in accordance with MIL-G-45204B, Para 6.3 "Strikes and Underplating"
- (4) Copper Alloy articles on which a nickel undercoat is not used shall not be used for continuous service at temperatures above 149°C (300°F) QQ-S-365, Para. 3.3.5.
- (5) For use on Brass and Beryllium Copper body (shell) and accessory components when 500 hour salt spray test is specified.
(For test conditions, refer to MIL-C-38999, Para. 3.16 and 4.7.12.2, [Method 1001.1 of MIL-STD-1344])
- (6) Plating thickness variations, critical and noncritical areas must be plated to within specified lower limits, except where surfaces cannot be contacted by a .75 inch dia ball, noncritical areas total plating thickness may exceed the specified upper limits by .000150 maximum.

Materials	Alloy or Type	FED/MIL Spec.	Usage
ABS	Moldings Type 2	MIL-STD-1803 L-P-1883B	Looping plug handles, lock pins
Acetal	Dupont Delrin	L-P-392	Insulators, cases, bushings
Aluminum	2024-T351	QQ-A255/6	Backbars, cases
	6061-T6	QQ-A200/8	Stiffener bars
	6061-T6	QQ-A250/11	Patch panels
	6061-T6511	QQ-A200/8	Backbars, cases
Beryllium Copper	17200 (Bar)	ASTM-B-194	Contact & crescent springs
	17300 (Flat)	ASTM-B-196 & 197	Contact sockets, fingersprings, washers
Brass	C26000	ASTM-B-36	Ground lugs, washers
	C36000	ASTM-B-16	Connector bodies, coupling sleeves, clamp nuts, hex mtg. nuts, ctr. contact pins, cases
Dupont Acetal Resin #500TL	Homopolymer General Purpose w/ 1.5% Teflon Micropowder		Moldings
Fluorinated Ethylene Propylene	(FEP)	ASTM-D-2116	Insulators
Hylton	MFA Grade 640		Alternate material dielectric
Loctite	495 (Zinc Iridite per ASTM-B633)	QQ-2-325 Type 2 Class 2 Finish	
Nylon	6/6 or 6/12	L-P-410A	Insulating bushings
Perfluoroalkoxy (PFA)		ASTM-D-3307	Cable jackets
Phenolic	XXX	L-P-513 PBE	Patch panels, backbars
Phosphor Bronze	Alloy 544	ASTM-B-139	Contact springs, lockwashers
Polytetrafluoroethylene	(PTFE)	ASTM-D-1710	Dielectrics, insulators
Polyvinylidene Fluoride		MIL-I-23053/8	Sealing Sleeves
Rubber	Silicone	ZZ-R-765	Gaskets, O-rings, sealing members
Solder	Sn60, 62, 63, or 96	QQ-S-571	
Steel	C1010-1018	QQ-S-636	MPN cases
Steel CRS	Music Wire Type 17-4PH	ASTM-A228 SAE J178 AMS-5643 Tubing	Tension springs
Corrosion Resistant Steel	303	QQ-S-763	Connector bodies, coupling sleeves, hex mtg. nuts
	302	QQ-S-766	Designation strips
	301	ASTM-484, A582	
Thermo-plastic Polyester	Glass Filled	MIL-M-24519	Heat resistant molded insulators
Vinyl	Clear Rigid-Self ext.	ASTM-D-635	Designation strip window
	Opaque Rigid-Self ext.	ASTM-D-635	Designation strip marking strip
Zinc	Alloy #3	ASTM-B-240/B-86	Selected non-functional parts

TFS = Trompeter Finish Specifications

Frequency Range	Connectors					Patching		
	BNC	TNC	70 Series	150 Series	450 Series	WE Standard	WE Miniature	RCA Standard
	0-4 GHz	0-11 GHz	0-500 MHz	0-500 MHz	0-2 MHz	0-1 GHz	0-1 GHz	0-200 MHz
VSWR	1.30 Max.				Not Rated	1.04 @ 75 MHz 1.12 @ 100 MHz 1.18 @ 500 MHz	1.06 Max.	1.05 @ 50 MHz 1.09 @ 100 MHz 1.33 @ 500 MHz
Voltage Rating	500 VRMS @ Sea Level	500 VRMS @ Sea Level	400 VRMS @ Sea Level	250 VRMS @ Sea Level	150 VRMS @ Sea Level	500 VRMS @ Sea Level	250 VRMS @ Sea Level	500 VRMS @ Sea Level
	125 VRMS @ 70,000 ft.	125 VRMS @ 70,000 ft.	100 VRMS @ 70,000 ft.	62.5 VRMS @ 70,000 ft.	Not Rated	Not Rated		
Temperature Range	-65°C to 165°C					-65°C to 165°C		



BNC TOOL/WRENCH CRIMP ASSEMBLY ILLUSTRATIONS

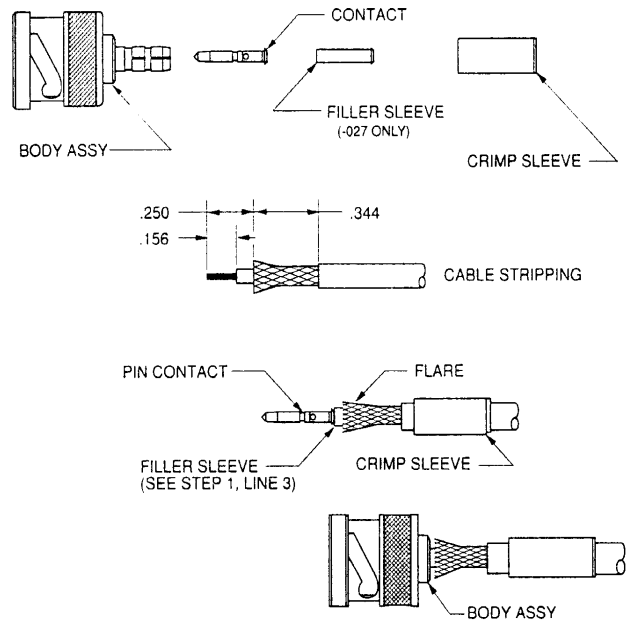
BNC Coax Tool Crimp Assembly Illustration ...

Step 1

1. Place crimp sleeve onto cable with the step located away from the cut end as shown.
2. Strip cable as shown and flare braid.
3. On connectors with cable group number -027 only, slide filler sleeve fully under braid.
4. Crimp contact pin in position shown.

Step 2

1. Push Cable assembly into the body until the contact pin snaps into place.
2. Slide crimp sleeve forward over braid, up against the body assembly and crimp in place.



BNC Coax Wrench Crimp Assembly Illustration ...

Step 1

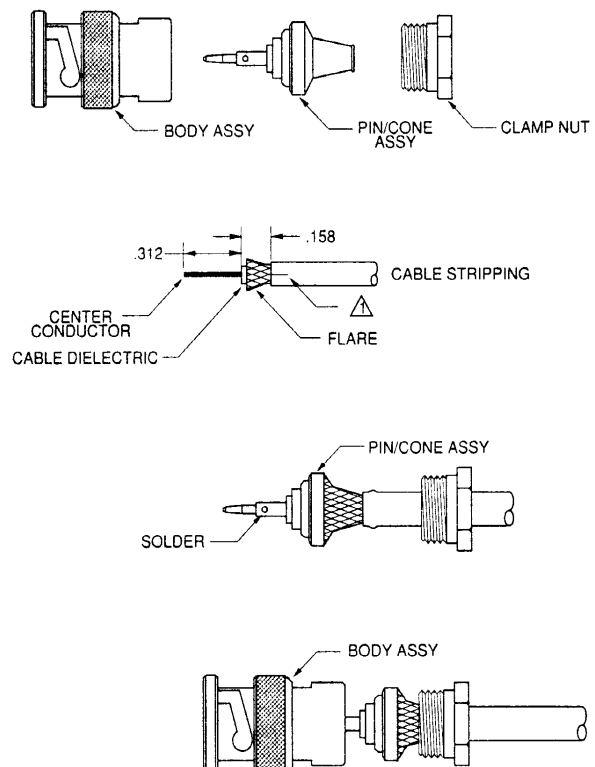
1. Place clamp nut onto cable.
2. Strip cable as shown and flare braid to allow free entry of cone (Lateral slits 180° apart may be required for very inflexible jacket materials).
3. Lightly tin center conductor (optional).

Step 2

1. Push edge of cone between cable dielectric and braid (or between foil and braid, if foil is present, and cone I.D. will accept it). Continue to push cable into cone until cable dielectric bottoms against cone dielectric. Center conductor should be visible in pin inspection hole.
2. Solder center conductor into pin.

Step 3

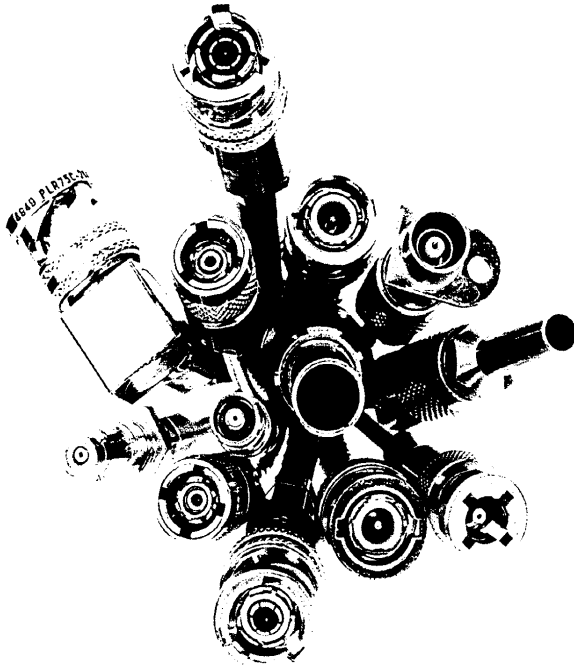
1. Bring Clamp nut up onto tapered portion of cable.
2. Assemble body and engage with clamp nut.
3. Wrench tighten to 25-30 inch-pounds torque.



Notes: For Illustration purposes only. Not intended to replace actual installation instructions.

TWINAX/TRIAX CONNECTOR INTRODUCTIONS

Twinax/Triax Connectors...



Built to Last with Premium Quality, Superior Mechanical Performance, Rugged Physical Properties, and Extreme Reliability.

When signals require protection from extraneous noise through non-signal carrying shielding. These interfacing connectors must provide contact surfaces isolated from each other, as well as from the outer shield. Trompeter twinaxial/triaxial connectors are designed with two (2) concentric contacts that are isolated from each other and the shielding connection.

FEATURES:

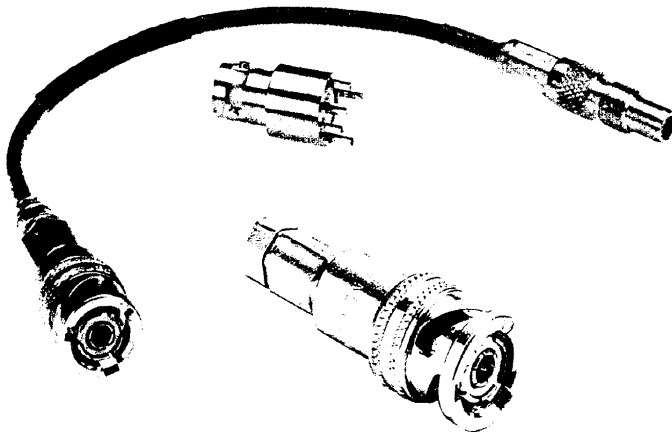
- ▲ All metallic parts are machined/formed to extremely close tolerances.
- ▲ All bodies are made of top quality brass with bright nickel-plated, non-tarnish finish.
- ▲ Fully enclosed, heat-treated, beryllium-copper outer conductor spring (not half hard slotted brass) a patented feature!
- ▲ Heat-treated, beryllium-copper center socket contact with 50 millionths inch gold plating.

70 Series ...

Miniature 2, 3, 4 lug, and Push-on (TRB)

370 Series ...

Miniature Threaded (TRT)



These concentric twinax/triax connectors are ideal for applications where weight is not a primary concern. They are commonly used in digital data bus, video pair, MIL-STD-1553B (airborne/ground, primary/redundant), base-band circuit and any application for "noise-free guarded" circuits.

FEATURES:

- ▲ Same size as BNC/TNC connectors. Large body versions are available to accommodate larger cables.
- ▲ Field serviceable, Wrench Crimp versions for cables with up to .475" outer diameters.
- ▲ Tool Crimp versions for quick termination of cables with up to .250" outer diameters.
- ▲ 3-lug, 4-lug, and threaded versions provide different levels of mechanical stability and keying.
- ▲ Does not require mechanical alignment for mating.
- ▲ QPL'd to MIL-C-49142 (see list on page 8).
- ▲ Meets MIL-C-49142, 48-hour salt spray requirement.
- ▲ Special plating available to satisfy MIL-STD-1344, 500-hour salt spray requirement.
- ▲ Push-on versions for test cable applications.
- ▲ Fewer pieces to assemble.
- ▲ Hermetically sealed versions are available (page 13).

SPACE QUALIFIED CONNECTORS

Outgassing Requirements for Space Rated Connectors...

Trompeter has a long and proud history of servicing space applications. NASA uses the specification (SP-R-0022), Vacuum Stability Requirements of Polymeric Material for Space Application, to qualify materials for use in spacecraft. This has also become the standard in the commercial space industry. This specification governs the "outgassing" of non-metallic materials. Outgassing occurs when a non-metallic material is placed into a vacuum, subjected to heat, and some of its constituents are volatilized.

One of the bi-products of outgassing is that the material will lose a portion of its mass. This is referred to as Total Mass Loss, or TML. Under the NASA specification, the material's TML should not exceed 1.0% of the total specimen mass. This issue is very important because shrinkage may contribute to the failure of a connector as the connector components will no longer fit properly.

Another bi-product of outgassing is Collectable Volatile Condensable Material (CVCM). This represents the quantity of outgassed matter that condenses and collects on a surface. Under the NASA specification, the maximum condensable material allowed is 0.1% of the total specimen mass. This is very critical in a thermal/vacuum environment because it is the condensed material that will contaminate optical and sensory surfaces causing them to possibly fail.

Some polymeric materials meet the requirements of a TML less than 1.0% and CVCM of less than 0.1% through the normal manufacturing process. Other polymeric materials, while not within limits after their manufacture, can be brought within vacuum stability limits by vacuum baking for a specific period of time (usually 48 hours at maximum use temperature at a pressure less than 10^{-5} torr). If a material cannot be vacuum baked, its exposure area is 13cm^2 or less, and is out of sight of a payload or other critical surfaces, then a TML not greater than 3.0% and a CVCM not greater than 1.0% is acceptable.

Test conditions are ASTM E-595 or ASTM E-1227. The test consists of heating a sample to 125°C for 24 hours under a 10^{-5} torr vacuum and measuring the weight loss and any material that condenses on an adjacent cold surface area (25°C). The most common candidates for outgassing in Trompeter product lines include:

1. Silicon rubber per ZZ-R-765E/GEN (Federal Spec) Class 2B, Grade 40, 50, 60, and 70: Almost all of Trompeter's gaskets are manufactured from this material. These materials require a post process (by Trompeter) at 200° centigrade for 6 hours minimum.
2. Ink: Trompeter uses Markem™ series 7224 inks (in a variety of colors) for marking. Only blue 7224 Markem ink has acceptable TML (0.43%) and CVCM (0.07%) readings after the bake process. While this is acceptable, Trompeter recommends impression stamping the connector rather than ink marking.
3. Shrinkable strain relief/sealing sleeve: Sleeves made from Kynar™ material meets the requirement for outgassing at 0.14% TML and 0.02% CVCM.
4. Insulators: At Trompeter, the majority of dielectric insulators are made from Teflon™ (Teflon™ is Dupont's trademark for PTFE, FEP, and PFA fluoropolymer resins). PTFE has an excellent TML (0.07%) and CVCM (0.01%) readings. The loss rate is about one-tenth of the acceptable maximum rates for spacecraft uses.

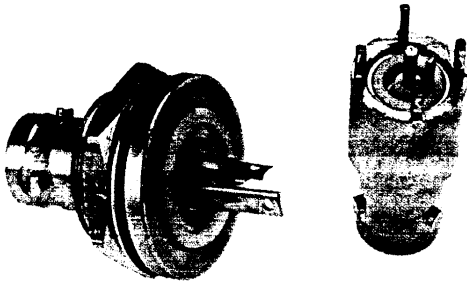
TWINAX/TRIAX CONNECTOR SPECIFICATIONS

Mil-Std-1553B Data Bus General Specifications Guide... (cont.)

Characteristic Requirements	70 Series TRB/TRT	80 Series TRC/TRN	150 Series TRS/TTM	450 Series TCS
Corona Level (min.)	200 VRMS @ 70,000 ft.	375 VRMS @ 70,000 ft.	125 VRMS @ 70,000 ft.	250 VAC @ 50,000 ft.
Rise time degradation (max.)	400 rs	N/A	800 rs	800 rs
Permeability of nonmagnetic material	<2.0 mu except hermetic versions			
Hermetic Seal (Where Applicable)	<1 x 10 ⁻⁸ cc/sec	N/A	<1 x 10 ⁻⁶ cc/sec	N/A
Connector Durability	500 cycles minimum @ 12 cycles per minute max.			
Temperature Range	-65° to +165°C	-65° to +165°C	-65° to +200°C	-65° to 125°C
Force to engage and disengage Longitudinal (max.) Torque (max.)	4 pounds 2.5 inch-pounds	5 pounds 4 inch-pounds	4 pounds 2.5 inch-pounds	3 pounds 2.5 inch-pounds
Center contact retention axial force (min.) Plug Jack	6 pounds 6 pounds	6 pounds 6 pounds	4 pounds 2 pounds	6 pounds 6 pounds
Coupling proof torque (Threaded types only)	15 inch-pounds	15 inch-pounds	10 inch-pounds	N/A
Coupling mechanism retention force (min.)	100 pounds	100 pounds	70 pounds	100 pounds
Cable Retention Force (min.)	40 pounds .200-.325 inch cable OD	65 pounds .242-.419 inch cable OD	40 pounds .120-.215 inch cable OD	40 pounds .120-.180 inch cable OD
Salt Spray (corrosion)	48 hours minimum exposure (Standard Nickel Plating) 500 hours minimum available (Call factory for plating types) Standard for 450 Series.			
Moisture resistance (10 cycles)	Total 240 hour minimum exposure			
Thermal shock (5 cycles) (No physical damage/Pass DWV)	Total 5 hours 50 minutes min -65°C to +85°C			-65°C to +125°C
Specified shock (sawtooth waveform, within peak - 50g's, duration -11ms)	No discontinuity allowed. Velocity-change of shock pulse 10% of ideal value			
Vibration, high-frequency (36 cycles) (15g peak, 10-2000 Hz-10Hz in 20 Minutes)	Total 12 hour minimum. No physical damage or loosening of parts. No discontinuity allowed.			

* Specifications are minimum unless otherwise stated. Trompeter connectors are designed to exceed all minimum specifications.

TWINAX/TRIAX CONNECTOR SPECIFICATIONS



Trompeter offers a broad line of connectors manufactured to meet or exceed the Mil-Specs governing twinax connectors. In fact, the Mil-Spec: Mil-C-49142 was created from the Trompeter concentric twinax/triax connector design.

The following information reflects the specification requirements for each family of connectors in both twinax and triax applications. Use this chart to determine the proper connector type to be used in your application based on the environment and electrical requirements of your design. Trompeter's Technical Support staff is available to answer any specification questions you may have.

Mil-Std-1553B Data Bus General Specifications Guide...

Characteristic Requirements	70 Series TRB/TRT	80 Series TRC/TRN	150 Series TRS/TTM	450 Series TCS
Nominal Impedance	Non-constant	Non-constant	Non-constant	Non-constant
Frequency Range	0-500 MHz	0-500 MHz	0-500 MHz	0-2 MHz
Voltage Rating (max.) @ sea level	400 VRMS	500 VRMS	400 VRMS	900 VRMS
Voltage Rating (max.) @ 70,000 ft.	100 VRMS	125 VRMS	100 VRMS	N/A
Insulation Resistance	5000 MΩ	5000 MΩ	5000 MΩ	5000 MΩ
Dielectric withstanding voltage (between center cond. & inter. cond.)	1200 VRMS	1500 VRMS	1200 VRMS	900 VAC
Dielectric withstanding voltage (between inter. cond. & outer cond.)	500 VRMS	500 VRMS	500 VRMS	N/A
RF High potential withstanding voltage (between center cond. & inter. cond.)	800 VRMS	1000 VRMS	500 VRMS	900 VAC @ 60 Hz.
RF High potential withstanding voltage (between inter. & outer cond.)	200 VRMS @ 5-7.5 MHz	350 VRMS @ 5-7.5 MHz	125 VRMS	N/A

Specifications continued on page 6...

** Specifications are minimum unless otherwise stated. Trompeter connectors are designed to exceed all minimum specifications.*