

RIFOCS Corp.

Component Services Division

Overview

The Components Division is one of four business units within RIFOCS Corporation. The other three divisions are Instruments, Harsh Environments, and International. When Robert Rickenbach founded RIFOCS in 1990, the Corporation focused on providing high-end fiber optic cable assemblies and components. Shortly thereafter, the first Instruments Division products were introduced. In time, RIFOCS Corporation's experience and expertise manufacturing fiber optic cables was applied to the Military and Aerospace markets as the demand for high reliability fiber optic systems increased, thus, the formation of the Harsh Environments Division in 1998. The International Division sells RIFOCS, and other Greenlee Textron Data-Signal-Voice (DSV) products, outside the United States. RIFOCS Components has always focused on providing high-end fiber optic termination services to our many valued customers here and abroad—from the development of a complete line of polarization-maintaining (PM) connectors for the entire market to custom fiber bundles for a single customer. This commitment to serving our customers' unique needs continues today.

RIFOCS Corporation became a subsidiary of Textron Inc. in December 1999. RIFOCS currently maintains two manufacturing facilities, totaling 52,000 square feet, in Camarillo, California. The Components Division occupies one of these buildings, a few blocks from RIFOCS headquarters at 1340 Flynn Rd., and also maintains a production group in an east coast manufacturing facility.

Mission Statement:

Providing Superior Solutions to all Fiber optic Interfaces.

Vision Statement:

To continue building an ever-evolving workplace that encourages *teamwork*, *growth* and *profitability* by providing *quality*, *timely*, and *innovative* fiber optic assemblies.

RIFOCS Corporation

1340 Flynn Road Camarillo, CA 93012

Phone: (805) 389-9800

Fax: (805) 445-8991



Shop on-line at www.rifocs.com

Capabilities

RIFOCS, Component Services Division

Fiber Optic Components and Commercial Cable Assemblies:

RIFOCS Corporation offers the latest generation of high performance Super/Ultra PC and 8° APC fiber optic connectors that are suitable for the most demanding single-mode and multimode applications. All industry standard connector types are available, including LC, SMA, HP, FC, SC, ST, DIN, and E2000. Connectors terminated at RIFOCS assure low insertion loss, high return loss, and optimum performance in long-distance systems.

Specialty Polarization Maintaining Connector Termination Services:

RIFOCS specializes in the termination of polarization maintaining (PM) and polarizing (PZ) optical fibers. Our engineering staff also designs custom connectors for special applications. In addition, RIFOCS offers cable and pigtail terminations using customer-supplied components and specifications, and can deliver a complete turn-key termination laboratory that includes the installation of equipment and on-site training.

Manufacturing and Testing of Fiber Optic Assemblies:

RIFOCS builds assemblies for both component and equipment manufacturers, enabling them to concentrate on their core competencies of designing and marketing fiber optic equipment. RIFOCS builds sensitive fiber optic test equipment for handling fiber optic components on PC boards and in final assemblies.

On-Site Production:

Setting-up manufacturing within a customer's site offers many advantages. It allows our customers to reduce their production time, lower manufacturing costs, and learn the technology without tying-up internal resources. RIFOCS has successfully implemented on-site production for large manufacturers where the investment of setting up a production line can be shared over a large number of connectors.

Fiber Optic Component (Device) Termination:

RIFOCS terminates active and passive optical components such as lasers, LEDs, modulators, couplers, splitters, and receivers. All terminations are performed at our state-of-the-art facility in California as well as a select number of customer sites. RIFOCS actively aligns the fiber cores in the connector to guarantee low insertion loss for devices in which insertion loss cannot be measured (i.e., passive devices and/or devices that cannot be active for measurement purposes). We use continuously monitored ESD wrist straps during the termination process for maximum protection of your components.

Experience and specialized systems for terminating components assure proper handling and testing of your critical devices. RIFOCS builds fiber optic cables using DIAMOND™ actively aligned connectors and continually improves on these and other connectors, as well as their assembly procedures. New connectors are added as the market demands. A wide variety of fibers, cables, and connectors are stocked at our California facility.

Terminating a multitude of connectors and fibers allows customers one-stop shopping, i.e., to buy all of their connectors from one supplier—RIFOCS. RIFOCS can turn around custom cable assemblies in 24 hours. Our connectors offer low insertion loss to pass more power, high return loss to protect lasers, and high extinction ratios to maintain polarization. Our cables can be ordered over the Internet at www.rifocs.com.

Other Services:

RIFOCS also sells adapters and installation equipment to support our connectors. We sell bulkhead adapters used to mate similar connectors and hybrid adapters for mating dissimilar connectors. The hybrid adapters eliminate the need for a separate cable to mate two dissimilar connectors. We use 200x and 400x power microscopes for inspecting the ends of our connectors makes it possible to see the smallest dust particles and other contamination. If there is dust or other contaminants on the endface, our connector cleaners will remove it without damaging the end of the fiber.

Specifications

RIFOCS, Component Services Division

These specifications are applicable to the ST, SC, FC, and E2000 connector types.

Single-mode Applications: 9.3/125µm, 1300/1550nm

Parameter	Standard Connector	Reference Connector
Ferrule outside dimension	2.4990	2.4990
Connector endface geometry:		
Radius of curvature	PC: $10 \leq \text{ROC} \leq 25\text{mm}$	PC: $10 \leq \text{ROC} \leq 25\text{mm}$ APC: $5 \leq \text{ROC} \leq 12\text{mm}^*$
Apex offset	PC: $\leq 50\mu\text{m}$	PC: $\leq 50\mu\text{m}$ APC: $\leq 50\mu\text{m}$
Fiber height**	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$ APC: $-100 \leq \text{FH} \leq +100\text{nm}$
8° polish angle		APC: $\pm 0.3^\circ$
Polished ferrule length	Per FOCIS document requirements	Per FOCIS document requirements
Insertion loss	DIAMOND: $< 0.35\text{dB}$ (0.14dB typical) Ceramic: $< 0.5\text{dB}$	$< 0.15\text{dB}$
Return loss	PC: $\geq 50\text{dB}$ APC: $\geq 60\text{dB}$	PC: $\geq 55\text{dB}$ APC: $\geq 65\text{dB}$
Beam exit angle	Not applicable	≤ 0.5 degrees
Fiber core position	Not applicable	DIAMOND: $\leq 0.5\mu\text{m}$ Ceramic: $\leq 0.75\mu\text{m}$

Multimode Applications: 50/125µm and 62.5/125µm Graded Index, 1300nm, Restricted launch per TIA-568B.3

Parameter	Standard Connector	Reference Connector
Ferrule outside dimension	2.4990	2.4990
Connector endface geometry:		
Radius of curvature	PC: $10 \leq \text{ROC} \leq 25\text{mm}$	PC: $10 \leq \text{ROC} \leq 25\text{mm}$ APC: $5 \leq \text{ROC} \leq 12\text{mm}^*$
Apex offset	PC: $\leq 50\mu\text{m}$	PC: $\leq 50\mu\text{m}$ APC: $\leq 50\mu\text{m}$
Fiber height**	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$ APC: $-100 \leq \text{FH} \leq +100\text{nm}$
8° polish angle		APC: $\pm 0.3^\circ$
Polished ferrule length	Per FOCIS document requirements	Per FOCIS document requirements
Insertion loss	DIAMOND: $\leq 0.4\text{dB}$ (0.2dB typical) Ceramic: $\leq 0.5\text{dB}$	$< 0.3\text{dB}$
Return loss	$\geq 40\text{dB}$	PC: $\geq 40\text{dB}$ APC: $\geq 45\text{dB}$
Beam exit angle	Not applicable	≤ 0.5 degrees
Fiber core position	Not applicable	DIAMOND: $\leq 0.5\mu\text{m}$ Ceramic: $\leq 0.75\mu\text{m}$

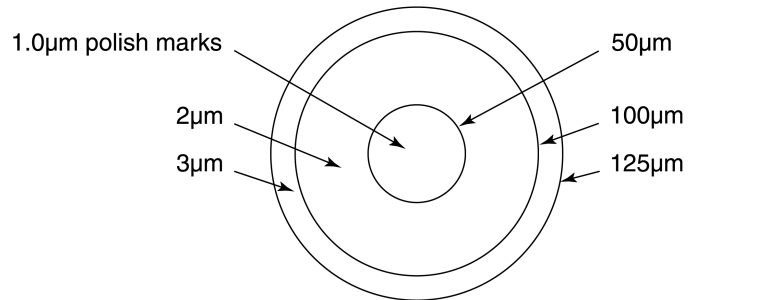
Polarization Maintaining Applications: Panda, 1300/1550nm

Parameter	Standard Connector	Reference Connector
Ferrule outside dimension	2.4990	2.4990
Connector end face geometry:		
Radius of curvature	PC: $10 \leq \text{ROC} \leq 25\text{mm}$	PC: $10 \leq \text{ROC} \leq 25\text{mm}$ APC: $5 \leq \text{ROC} \leq 12\text{mm}^*$
Apex offset	PC: $\leq 50\mu\text{m}$	PC: $\leq 50\mu\text{m}$ APC: $\leq 50\mu\text{m}$
Fiber height**	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$	PC: $-\text{IEC variable} \leq \text{FH} \leq +50\text{nm}$ APC: $-100 \leq \text{FH} \leq +100\text{nm}$
8° polish angle		APC: $\pm 0.3^\circ$
Polished ferrule length	Per FOCIS document requirements	Per FOCIS document requirements
Insertion loss	DIAMOND: $\leq 0.35\text{dB}$ Ceramic: $\leq 0.5\text{dB}$	DIAMOND: $\leq 0.2\text{dB}$
Return loss	PC: $\geq 40\text{dB}$ APC: $\geq 55\text{dB}$	PC: $\geq 40\text{dB}$ APC: $\geq 55\text{dB}$
Extinction ratio	$\geq 20\text{dB}$	$\geq 25\text{dB}$
Beam exit angle	Not applicable	< 0.5 degrees
Fiber core position	Not applicable	DIAMOND: $\leq 0.5\mu\text{m}$

Visual Inspection Criteria (single mode)

Diameter (Ø)	Criteria
0 to 50µm	Polish marks: $\leq 1.0\mu\text{m}$ wide Cracks: $\leq 1.0\mu\text{m}$ Ø*** Chips or voids: $\leq 2.0\mu\text{m}$ Ø Fixed contaminants: $\leq 2.0\mu\text{m}$ Ø
50 to 100µm	≤ 4 Scratches $\leq 2.0\mu\text{m}$ wide Cracks: $\leq 5.0\mu\text{m}$ Ø Chips or voids: $\leq 2.0\mu\text{m}$ Ø Fixed contaminants: $\leq 10.0\mu\text{m}$ Ø
100 to 400µm	Scratches $\leq 3.0\mu\text{m}$ wide Cracks: $\leq 10.0\mu\text{m}$ Ø Chips or voids: $\leq 10.0\mu\text{m}$ Ø Fixed contaminants: $\leq 20.0\mu\text{m}$ Ø

Allowable Scratches



Allowable scratches on fiber

*Diamond E-2000 APC radius of curvature is: $5 \leq \text{ROC} \leq 20\text{mm}$.

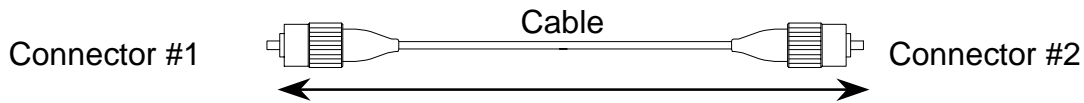
**Fiber height ~ Protrusion is positive (+), Undercut is negative (-)

*** RIFOCS does not specify "no scratches" in its Visual Inspection Criteria, since this is dependent on the equipment used, operator experience, and subjective interpretation. IEC and large system suppliers are looking at $1.0\mu\text{m}$ as a *minimum scratch width*.

Understanding Part Numbers

RIFOCS, Component Services Division

Use for specifying a patch cord, pigtail or termination of a device:



Order Length < 1 meter, Final Length -0%/ +10%

Order Length > 1 meter, Final Length -0%/ +5%

Minimum Order Length: 0.30 m (R3). For shorter lengths or tighter tolerances, please call

Examples using single-mode FC-PC terminations:

Patch cord, FC-PC to FC-PC, SMF-28, 3mm jacketed cable, 3 meters:

26 26 - 101 - 3

Patch cord, FC-PC to FC-PC, SMF-28, 3mm jacketed cable, 0.5 meters:

26 26 - 101 - R5

Pigtail, FC-PC, SMF-28, 900µm buffered fiber, 1.5 meters:

26 00 - 901 - 1R5

Termination of customer supplied fiber, FC to FC, adding 3mm fan-out-tubing, 0.7 meters:

26 26 - 003 - R7

Pigtail termination of customer supplied component, FC-PC, 5 meters:

26 02 - 000 - 5

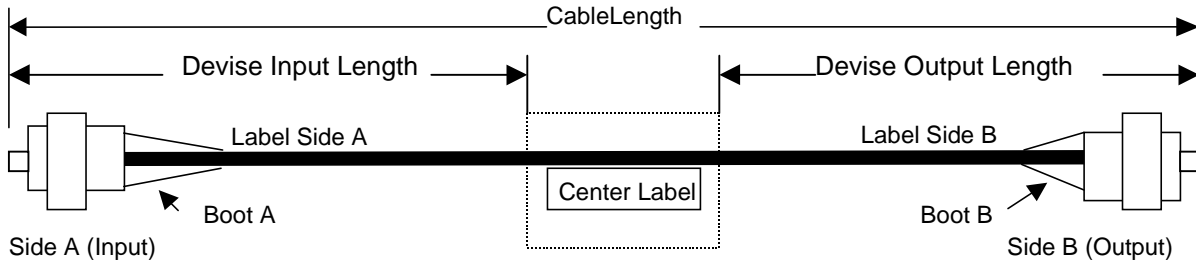
Custom Product Data Sheet

RIFOCS, Component Services Division

This data sheet is used for assemblies, with special requirements, which can not be defined by a standard part number. Fax sheet to 805-445-8991 attn: Application Engineering for a quotation.

CP:

Revision: _____



MATERIAL																
Termination A	_____															
Termination B	_____															
Special Cable, Boot, etc: _____																
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Cable: _____</td></tr> <tr><td>Fiber: _____</td></tr> <tr><td>Wavelength: _____</td></tr> <tr><td>Diameter: _____</td></tr> <tr><td>Length: MIN: _____ cm MAX: _____ cm</td></tr> </table>	Cable: _____	Fiber: _____	Wavelength: _____	Diameter: _____	Length: MIN: _____ cm MAX: _____ cm	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">for use with DEVICES</td></tr> <tr><td colspan="2">Input</td></tr> <tr><td>MIN: _____ cm</td><td>MAX: _____ cm</td></tr> <tr><td colspan="2">Output</td></tr> <tr><td>MIN: _____ cm</td><td>MAX: _____ cm</td></tr> </table>	for use with DEVICES		Input		MIN: _____ cm	MAX: _____ cm	Output		MIN: _____ cm	MAX: _____ cm
Cable: _____																
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Diameter: _____																
Length: MIN: _____ cm MAX: _____ cm																
for use with DEVICES																
Input																
MIN: _____ cm	MAX: _____ cm															
Output																
MIN: _____ cm	MAX: _____ cm															

TESTING	
Insertion Loss: _____ dB	Return Loss: _____ dB
Extinction Ratio: _____ dB	PM Alignment: _____

LABELING <i>(if required)</i>	
Side A Label: _____	Certificate of Compliance: _____
Side B Label: _____	End Face Geometry Cert: _____ (DORC)
Center Label: Line 1: _____	
Line 2: _____	
Line 3: _____	

Other Requirements:	
#1	_____
#2	_____
#3	_____
#4	_____

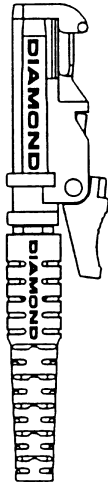
Connector Identifier

RIFOCS, Component Services Division

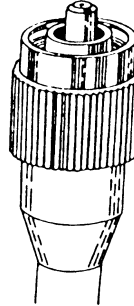
2.5 mm Ferrule Connectors:



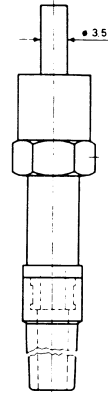
DIN



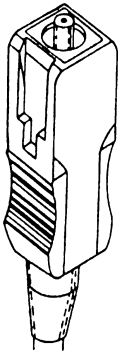
E2000



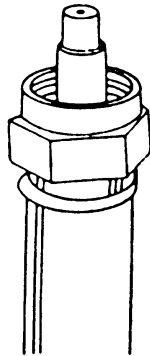
FC



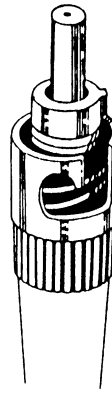
HMS-0



SC

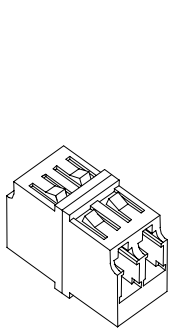


SMA



ST

Small Form Factor Connectors:



LC



MT-RJ and MTP



MU
(Mini SC)

Connector Cleaning Instruction

RIFOCS, Component Services Division

Cleaning:

To ensure maximum optical cable life, **all fiber optic connectors must be cleaned every time they are mated**. Failing to clean a fiber optic connector can destroy it the first time it is mated, while a properly cared for connector will last for more than 500 matings. The figure (below) depicts connector end faces before and after cleaning.

A **RIFOCS 945 All-In-One cleaning tool is a quick, convenient method for ensuring proper connector care**. The 945 All-In-One cleaning tool contains a special cloth tape that removes end face contaminants without additional consumables, such as alcohol.

Another way to clean a fiber optic connector is to wipe it with a lint-free non-abrasive paper tissue, such as Texwipe TX404 or Kimwipes EX-L, using a new spot on the tissue each time the end face is touched. If the connector is extremely dirty, moisten the tissue with reagent-grade isopropyl alcohol before cleaning. Make sure all residual alcohol has evaporated before mating the connector.

When mating fiber optic connectors together, make sure that nothing touches or scratches the end faces. To do so, **rock the connector into the adapter by first touching the side of the connector to the adapter**.

