REVISIONS				
SYMBOL	PREP BY	DESCRIPTION	DATE	APPROVAL

PREPARED BY G. Jacobs/UNISYS CORP.	DATE 12/16/87	TITLE Cable, Fiber Optic, Single Fiber, Multi-mode, Flexible Detail Specification for
APPROVED G. Kiernan/UNISYS CORP.	12/16/87	
APPROVED J. Lawrence/GSFC	1/7/88	
APPROVED H. Chernikoff/GSFC	1/7/88	
		#S-311-339/1

OFFICE OF FLIGHT ASSURANCE
PARTS BRANCH

NASA
National Aeronautics and Space Administration

GSFC
Goddard Space Flight Center
Greenbelt, Maryland
20771

3.4.3 Radiation - For a 10 meter length of cable, attenuation shall not increase by more than 1 dB at radiation total dose levels up to 10 kilorads(Si) at 50 rads/min dose rate, and for up to 1 Megarad (Si) at 500 rads/min dose rate attenuation shall not increase by more than 3 dB. Following radiation, cable attenuation shall return to the original values (anneal) within 0.5 dB, at 24 hours. Radiation tests and measurements shall be performed at 25°C ±5°C.

3.4.4 Temperature cycling - For a 10 meter length of cable, attenuation shall not increase by more than 1 dB.

3.4.5 Tensile load - Cable attenuation shall not increase by more than 0.5 dB for tensile load of 100 N (23 lbs load).

3.4.6 Impact resistance - Cable attenuation shall not increase by more than 0.5 dB.

3.4.7 Crush - Cable attenuation shall not increase by more than 0.5 dB.

3.4.8 Moisture resistance - Cable attenuation shall not increase by more than 0.5 dB.

3.4.9 Twist-bend - Cable attenuation shall not increase by more than 0.5 dB when subjected to the twist bend test.

3.4.10 Vibration - Cable attenuation shall not increase by more than 1.0 dB.

3.4.11 Shock - Cable attenuation shall not increase by more than 1.0 dB.

3.4.12 Numerical aperture (N.A.) - Cable (fiber) numerical aperture shall be as specified in Table 1.

3.4.13 Thermal stability - Cable attenuation change shall be less than ±3 dB for a 10 meter sample over the rated temperature range of -55°C to +85°C, using the 25°C light power measurement as the reference.

3.4.14 Operating life - Cable attenuation shall not increase by more than 3 dB at any interval of the life test.

3.4.15 Flammability - When tested as specified, the after-flame time shall be 10 seconds maximum and the after-flame travel shall be 1 cm maximum.

4.0 QUALITY ASSURANCE PROVISIONS

See GSFC specification S-311-339.

5.0 PREPARATION FOR DELIVERY

See GSFC specification S-311-339.

6.0 NOTES

See GSFC specification S-311-339.

6.1 Reference is made to GSFC specifications S-311-488 and S-311-488/1 for compatible types of connectors and DOD-C-85045 for fiber optic cables.

Custodian:

The Goddard Space Flight Center

Parts Branch, Code 311

Greenbelt, Maryland 20771

1.0 SCOPE

1.1 Purpose

This specification defines the requirements for fiber optic cables for use in space flight and critical ground support equipment applications. Cable types covered by this specification shall be flexible, single fiber, multimode with graded index profiles and loose inner jacket (buffer tube).

1.2 GSFC general specification

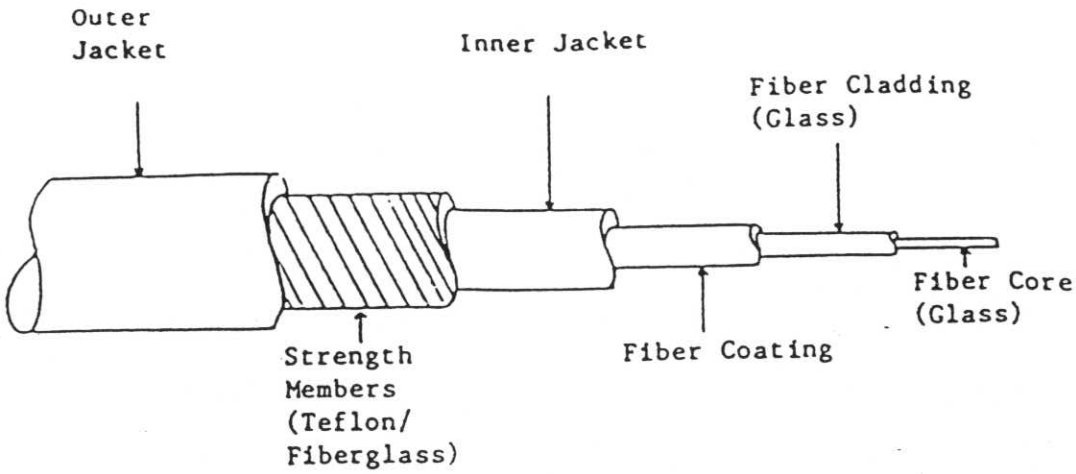
Unless otherwise specified in this detail specification, all cable provisions of GSFC specification S-311-339 apply to this specification.

1.3 Part number and ratings - The part number and cable ratings shall be as specified in Table 1.

Table 1. Description

Part Number	Rated Temperature Range (°C)	Index of Refraction Profile	Numerical Aperture (N.A.)	Bandwidth MHz-km (minimum)	Maximum Attenuation dB/km λ = 850 $\pm$ 30 nm	Buffer Type
S-311-339/1-1	-55 to +85	graded	0.29 $\pm$ .02	100	10	loose

1.4 Dimensions and configuration - See Figure 1 for cable dimensional requirements and configuration.



Part Number	Fiber Diameter (um)		Fiber Coating Diameter (maximum) (um)	Buffer Diameter inches and (mm)			Jacket Diameter inches and (mm)	
	core	cladding		I.D.	O.D.	type	I.D.	O.D.
S-311-339/1-1	100±4	140±6	500±50	0.029 +0.003 (0.9) (±0.1)	0.059 +0.003 (1.5) (±0.1)	loose	0.10 +0.005 (2.5) (±0.1)	0.12 +0.002 (3.0) (±0.1)

Figure 1. Configuration

2.0 APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on the date of invitation for bid or request for proposal, form a part of this specification to the extent specified herein. In case of conflicts, this detail specification shall have precedence.

GSFC

S-311-339 - Cables, Fiber Optic, Single Fiber, Flexible, General Specification for,

S-311-488 - Connectors, Fiber Optic, Single Fiber, General Specification for,

S-311-488/1 - Connectors, Fiber Optic, Single Fiber, Detail Specification for,

MILITARY

DOD-C-85045 - Cables, Fiber Optic, General Specification for,

3.0 REQUIREMENTS

3.1 Dimensions - Cable dimensions and design shall be as shown in Figure 1.

3.2 Materials - Materials shall be as listed below. No other materials (such as silicone lubricants) shall be used in processing. The cable outer jacket, strength members and inner jacket shall be mechanically removable (unbonded) from the fiber. The fiber coating shall be removable by chemical solvent(s).

Outer Jacket: ethylene - tetrafluoroethylene (ETFE) polymer (Tefzel-200)

Strength members: fiberglass - polytetrafluoroethylene braid (Fluorglass)

Inner Jacket polyester elastomer (Hytrel 5555HS)

Fiber coating: acrylate polymer

Fiber core/cladding: silica based glass doped with boron and germanium

3.3 Weight - Weight shall be a maximum of 10 grams (0.36 oz.) per meter.

3.4 Performance - Performance characteristics are specified in the following paragraphs. Unless otherwise specified herein all tests shall be performed as prescribed in GSFC specification S-311-339.

3.4.1 Attenuation - Cable attenuation shall be as specified in Table 1 and herein. Maximum attenuation for a 100 meter cable length shall be 1 dB.

3.4.2 Bandwidth - Cable bandwidth shall be as specified in Table 1 and herein. Bandwidth (BW) per kilometer length shall be calculated from the pulse rise time (tr) where BW (MHz-km) = 350/tr (ns). Minimum bandwidth for a 100 meter cable length shall be 100 MHz and maximum measured rise time shall be 3.5 ns.