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ODI Product Specifications

Electrical

Sheet

- **Nautilus Series**

- Diver-Mate Wet-Mateable Connector E-01
- ROV Wet-Mateable Connector E-02
- Stab-Plate Wet-Mateable Connector E-03

Electric - Fiber Optic (Hybrid)

- **Rolling-Seal Hybrid Series**

- Diver-Mate Wet-Mateable Connector H-01
- ROV Wet-Mateable Connector H-02
- Stab-Plate Wet-Mateable Connector H-03

- **Submersible Series**

- Dry-Mate Submersible Connector S-01

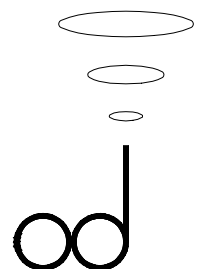
Ancillary Equipment

- **Oil-Filled Hose Series**

- Subsea Jumpers A-01

- **FITA Series**

- Cable Terminations A-02



Product Specification – Electrical

Nautilus™ Series

Diver-Mate Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	*As Specified (Minimum 1,500psi) _____ psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	Diver Operable
Number of Circuits:	4,6,7,8,9,12,19
Material:	316L SS, Titanium CP Gr2
Key Way:	Major - Single

Operational Characteristics:

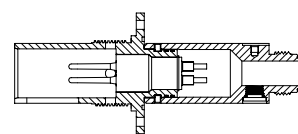
Amperage Rating:	30 Amps / per circuit
Voltage Rating:	3.3 KVDC / 2.3 KVAC RMS
Mate/Demate Cycles:	>1,000
Operational Temperature:	-2°C - +50°C
Storage Temperature:	-25°C - +60°C
Mating Force:	<5 lbs. Force / per circuit

Design Characteristics:

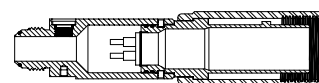
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 10,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

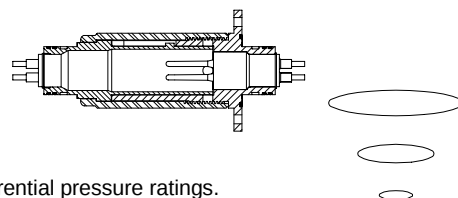
Fixed Mount Diver-Mate Connector



Cable End Diver-Mate Connector



General Diver-Mate Arrangement



Product Specification – Electrical

Nautilus™ Series

ROV Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	*As Specified (Minimum 1,500psi) _____ psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	ROV Operable
Number of Circuits:	4,6,7,8,9,12,19
Material:	Titanium CP Gr2
ROV Handle Type:	Flexible Paddle Type
Key Way:	Major - Single

Operational Characteristics:

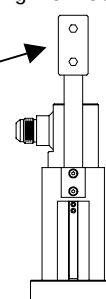
Amperage Rating:	30 Amps / per circuit
Voltage Rating:	3.3 KVDC / 2.3 KVAC RMS
Mate/Demate Cycles:	>1,000
Operational Temperature:	-2°C - +50°C
Storage Temperature:	-25°C - +60°C
Mating Force:	<5 lbs. Force / per circuit

Design Characteristics:

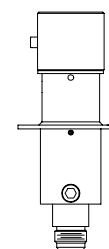
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 10,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

Flying ROV Connector



Fixed Mount ROV Connector



Product Specification – Electrical

Nautilus™ Series

Stab-Plate Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	*As Specified (Minimum 1,500psi) _____ psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	Stab-Plate Operable
Number of Circuits:	4,6,7,8,9,12,19
Material:	316L SS, Titanium CP Gr2
Key Way:	Major - Single

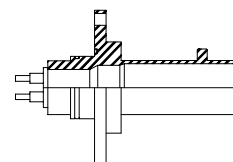
Operational Characteristics:

Amperage Rating:	30 Amps / per circuit
Voltage Rating:	3.3 KVDC / 2.3 KVAC RMS
Mate/Demate Cycles:	>1,000
Operational Temperature:	-2°C - +50°C
Storage Temperature:	-25°C - +60°C
Mating Force:	<5 lbs. Force / per circuit

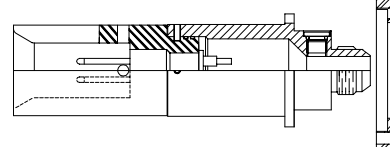
Design Characteristics:

Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

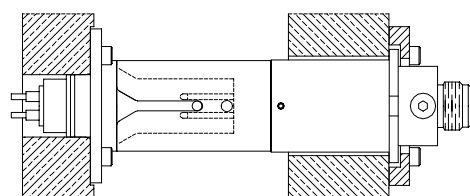
Fixed Mount Stab-Plate Connector



Floating Stab-Plate Connector



General Stab-Plate Arrangement



*Ambient Working Pressure: 10,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

Product Specification – Electric/Optic (Hybrid) Rolling-Seal Hybrid Series Diver-Mate Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	*As Specified (Minimum 1,500psi) _____psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	Diver Operable
Number of Circuits:	8
Material:	316L SS, Titanium CP Gr2
Key Way:	Major - Single

Operational Characteristics:

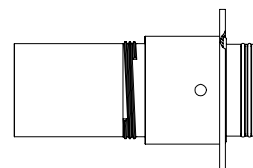
Amperage Rating:	5 Amps / per circuit
Voltage Rating:	1,000VDC /600VAC RMS
Insertion Loss:	<0.50 dB Matched, <0.75 dB Unmatched / per circuit
Mated Back Reflection:	> -30dB
Mate/Demate Cycles:	>100
Operational Temperature:	0°C - +50°C
Storage Temperature:	-23°C - +60°C

Design Characteristics:

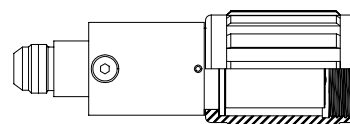
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 6,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

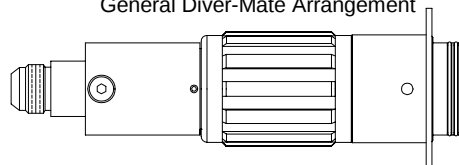
Fixed Mount Diver-Mate Connector



Cable End Diver-Mate Connector



General Diver-Mate Arrangement



Product Specification – Electric/Optic (Hybrid) Rolling-Seal Hybrid Series ROV Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	As Specified (Minimum 1,500psi) _____psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	ROV Operable
Number of Circuits:	8
Material:	Titanium CP Gr2
ROV Handle Type:	Flexible Paddle Type
Key Way:	Major - Single

Operational Characteristics:

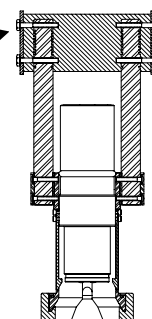
Amperage Rating:	5 Amps / per circuit
Voltage Rating:	1,000VDC / 600VAC RMS
Insertion Loss:	<0.50 dB Matched, <0.75 dB Unmatched / per circuit
Mated Back Reflection:	> -30dB
Mate/Demate Cycles:	>100
Operational Temperature:	0°C - +50°C
Storage Temperature:	-23°C - +60°C
Mating Force :	<80 lbs. Force

Design Characteristics:

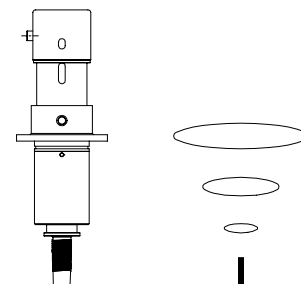
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 6,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

Flying ROV Connector



Fixed Mount ROV Connector



Product Specification – Electric/Optic (Hybrid) Rolling-Seal Hybrid Series Stab-Plate Wet-Mateable Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	*As Specified (Minimum 1,500psi) _____psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Bench Tests:	
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	Stab-Plate Operable
Number of Circuits:	8
Material:	316L SS, Titanium CP Gr2
Key Way:	Major - Single

Operational Characteristics:

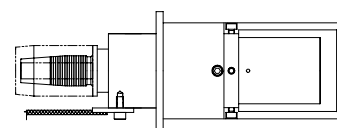
Amperage Rating:	5 Amps / per circuit
Voltage Rating:	1,000VDC / 600VAC RMS
Insertion Loss:	<0.50 dB Matched, <0.75 dB Unmatched / per circuit
Mated Back Reflection:	> -30dB
Mate/Demate Cycles:	>100
Operational Temperature:	0°C - +50°C
Storage Temperature:	-23°C - +60°C
Mating Force:	<80 lbs. Force

Design Characteristics:

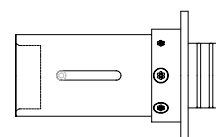
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 6,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

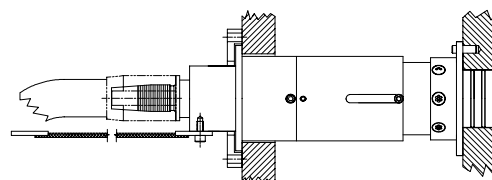
Floating Stab-Plate Connector



Fixed Mount Stab-Plate Connector



General Stab-Plate Arrangement



Product Specification – Electric/Optic (Hybrid) Submersible Series Dry-Mate Submersible Connector

Subsea Connectors - General

The connector(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable connector(s) shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each connector shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each connector. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The connector(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Bench Tests:	
Gas Leak:	30Minutes @ 30psi
Insulation Resistance:	Pin-Pin & Pin-Gnd 10GΩ Min @ 1,000Vdc
Insertion Loss:	<0.50 dB / per circuit
Mate/Demate Function:	1 Cycle Minimum

Table 2 – Standard Specifications

Physical Characteristics:

Type:	Dry-Mate
Number of Circuits:	1 thru18
Material:	316L SS, Titanium CP Gr2
Key Way:	Major - Single

Operational Characteristics:

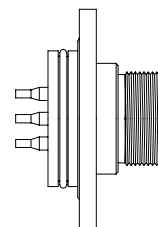
Amperage Rating:	5 Amps / per circuit
Voltage Rating:	1,000VDC / 600VAC RMS
Insertion Loss:	<0.50 dB Matched, <0.75 dB Unmatched / per circuit
Mated Back Reflection:	> -30dB
Mate/Demate Cycles:	>100
Operational Temperature:	-2°C - +50°C
Storage Temperature:	-23°C - +60°C
Mating Torque:	<35±5 in-lbs.

Design Characteristics:

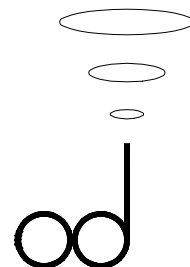
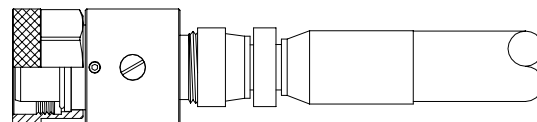
Contact Resistance:	<0.01Ω / per circuit
Design Life:	25 Years

*Ambient Working Pressure: 6,000psi; Please consult Ocean Design for through bulkhead, differential pressure ratings.

Fixed Mount Dry-Mate Submersible Connector



Cable End Dry-Mate Submersible Connector



Product Specification – Ancillary Equipment

Oil-Filled Hose Series

Subsea Jumpers

Cable Assemblies - General

The Jumper(s) supplied shall be specifically designed and qualified for subsea use. Each deliverable jumper shall be factory acceptance tested (FAT) as specified in Table 1. Batch testing is not acceptable. Each jumper shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each jumper assembly. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. At a minimum, the supplier shall meet or exceed all ratings as listed in Table 2. The supplier shall be ISO 9001 registered. The jumper(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements

Table 1 – Supplier Testing Standards

Hydrostatic Test:	As Specified _____ psi
Continuity Resistance:	End to End * ____ Ω @ * ____ Vdc
Insulation Resistance:	Pin-Pin, Pin-Gnd * ____ Ω @ * ____ Vdc
Insertion Loss:	< * ____ dB / per circuit
Bench Tests:	
Gas Leak:	30Minutes @ 30psi (Minimum)
Insulation Resistance:	Pin-Pin & Pin-Gnd * ____ Ω Min @ * ____ Vdc
Insertion Loss:	< * ____ dB / per circuit

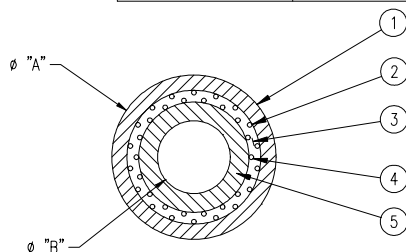
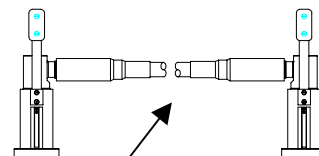
*Test specifications are evaluated based on wire and or fiber type used.

Table 2 – Standard Specifications

ODHOSE-12HBD	ϕ 1.150	ϕ 0.625	ITEM	DESCRIPTION	MATERIAL/LAY-UP (FROM OUTSIDE INWARD)
ODHOSE-8HBD	ϕ 0.850	ϕ 0.410	1.	OUTER JACKET/COVER	NBR/PVC BLEND, COLOR TO BE SPECIFIED ON PO.
ODHOSE-6HBD	ϕ 0.700	ϕ 0.310	2.	RADIAL REINFORCEMENT	POLYESTER
REF NUMBER	ϕ "A"	ϕ "B"	3.	INSULATION	HYPALON
			4.	AXIAL REINFORCEMENT	KEVLAR
			5.	INNER LINER/TUBE	NON-CONDUCTIVE NITRILE

FEATURE	-6 RATING	-8 RATING	-12 RATING
MINIMUM BEND RADIUS:	3" (76mm)	4" (102mm)	5" (125mm)
AXIAL LOAD:			
MAX WORKING:	300 lbs	400 lbs	600 lbs
MIN FAILURE:	450 lbs	600 lbs	900 lbs
MAX AXIAL STRETCH:	2% @ 300 lbs	3% @ 400 lbs	3% @ 600 lbs
PRESSURE RATING:			
MAX WORKING:	225psi	225psi	225psi
PROOF TEST:	450psi	450psi	400psi
MIN BURST:	900psi	900psi	900psi
MIN RADIAL EXPANSION:	15% @ 150 psi	15% @ 150 psi	15% @ 150 psi
LENGTH CHANGE UNDER PRESSURE:	+0/-1% @ 150 psi	+0/-1% @ 150 psi	+0/-1% @ 150 psi
FLUID COMPATABILITY:	SEAWATER & SILICONE OIL	SEAWATER & SILICONE OIL	SEAWATER & SILICONE OIL
TEMPERATURE RATING:			
LOWER LIMIT:	-2°C	-2°C	-2°C
UPPER LIMIT:	+50°C	+50°C	+50°C

Typical Jumper Assembly



Product Specification – Ancillary Equipment**FITA Series****Cable Terminations****Field Installable Testable Assemblies (FITA) - General**

The FITA(s) supplied shall be specifically designed and qualified for subsea use. Each FITA shall be Qualified for the cable that it will be installed to as specified in Table 1. Each FITA shall include a documentation package including all material certifications, material origins and test results. A Certificate of Conformance (C of C) shall be supplied for each FITA assembly. Upon request, one copy of the documentation package shall be provided to the buyer at no charge. The supplier shall retain a documentation package for a minimum period of 20 Years. The supplier shall be ISO 9001 registered. The FITA(s) shall be as manufactured by Ocean Design, Inc.

Quality Conformance - Requirements**Table 1 – Supplier Qualification Testing Standards**

Hydrostatic Test:	As Specified _____ psi - Minimum 12 Hours
Insulation Resistance:	Pin-Pin, Pin-Gnd * ____ Ω @ * ____ Vdc
Insertion Loss:	< * ____ dB / per circuit
Bench Tests:	
Water Flooded Termination	Insulation Resistance (IR)
Cable Load Test	As Specified by Application
Gas Leak:	30Minutes @ 20psi (Minimum)
Continuity Resistance:	End to End * ____ Ω @ * ____ Vdc
Insulation Resistance:	Pin-Pin & Pin-Gnd * ____ Ω Min @ * ____ Vdc
Insertion Loss:	< * ____ dB / per circuit

*Test specifications are evaluated based on wire and or fiber type used.

