

# Connector Specifications

## TABLE OF CONTENTS

### Section

#### **1. TESTING ITEMS AND RESULTS**

- 1.1 Initial Characteristics
- 1.2 Environmental Condition
- 1.3 Mechanical Condition

#### **2. TEST METHODS**

- 2.1 Insertion Loss
  - 2.1.1 Test Method
  - 2.1.2 Result
- 2.2 Return Loss
  - 2.2.1 Test Method
  - 2.2.2 Result

#### **3. ENVIRONMENT TEST**

- 3.1 Thermal Age
- 3.2 Thermal Cycle
- 3.3 Humidity

#### **4. MECHANICAL TEST**

- 4.1 Vibration
- 4.2 Twist
- 4.3 Transmission with Applied Tensile Load
- 4.4 Impact

#### **5. Connector end-face**

#### **6. Connector Grade**

## 1. TESTING ITEMS

### 1.1 Initial Characteristics

The result of initial characteristics are in Table 1-1

Table 1-1 Initial Characteristics

Testing Item	Conditions	Specifications	Sample size	Pass/Fail
<b>Insertion Loss</b>	LD(1310/1550nm), Against master	0.30dB or less	10% or Internal standard	
<b>Return Loss</b>	LD(1310/1550nm), Against master	60.0dB or more	10% or Internal standard	

### 1.2 Environment condition

The environmental performance tests condition are in Table 1-2

Table1-2 Environmental condition

Testing Items	Conditions	Measurement	Sample size	Deviation	IEC
<b>Temperature Age</b>	70℃, 96 hrs.	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-18
<b>Temperature Cycle</b>	-25℃, +70℃ dwell trans.-1℃/min 12 cycles	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-22
<b>Humidity</b>	40℃, 93%RH, 96hr.	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-19

### 1.3 Mechanical Performance

The result of the mechanical tests condition are in Table 1-3

Table 1-3 Mechanical Performance

Testing Items	Conditions	Measurement	Sample size	Deviation	IEC
<b>Vibration</b>	10 ~ 55Hz, 45Hz/Min. Amplitude: 0.75 mm. 30min, 3 axes	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-1
<b>Torsion</b>	3lb. 1.5 turns and again 3 turns respectively, 10x	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-5
<b>Transmission with applied tensile load</b>	10s loads of 0.55lb at 0°,90°,135° 1.54lb at 0°and 90°	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-4
<b>Impact</b>	10 times, 1.5 Meter	Insertion Loss LD(1310/1550nm)	11	< 0.5dB (4ch<0.3dB)	61300 2-9

### 1.4 Test Performance

Test performances are shown in table 1-4

Table 1-4 Tset Performance

Test item	Insertion Loss	Return Loss	Appearance
<b>Environment test</b>	After test 0.3 dB or less	After test 55 dB or more	No appearance Damages
<b>Mechanical test</b>	After test 0.2 dB or less	After test 55 dB or more	No mechanical Damages

※ Notice : no mechanical damages

- Distortion, Cracks

## 2. TEST METHODS AND RESULTS

### 2.1 Insertion Loss

#### 2.1.1 Test method

The test samples are measured in the following system(Figure 1)

The insertion loss (I.L) is defined as  $I.L = -10\log P_o / P_i$

The result data of measurement is an average of values measured 3 times

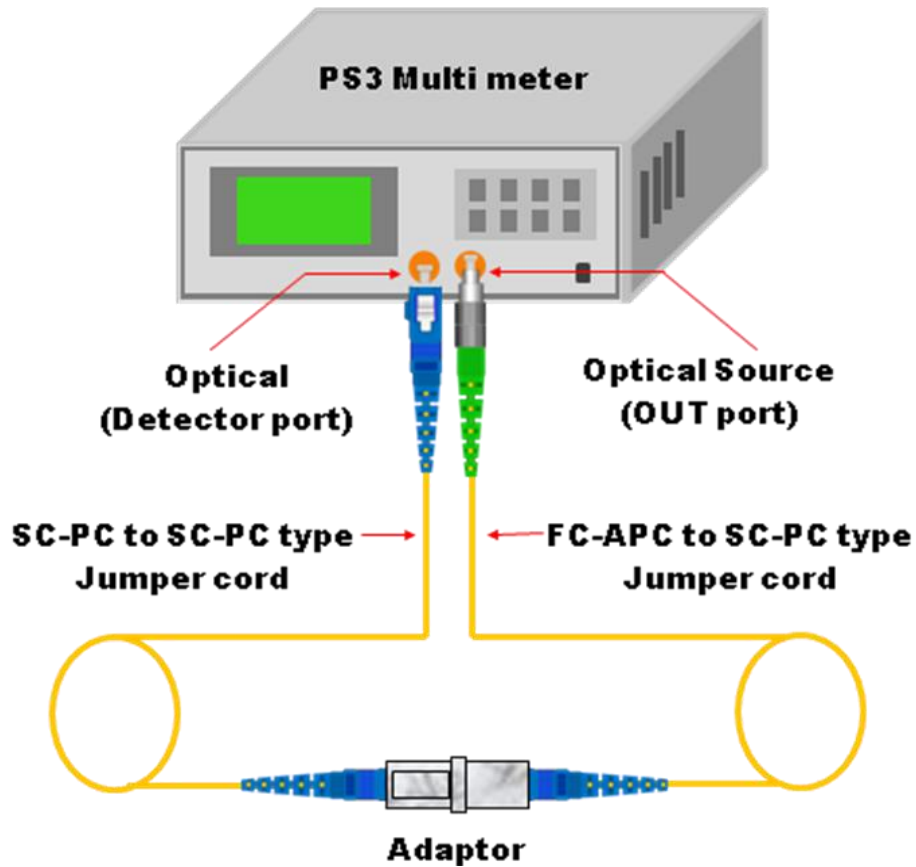


Figure 1. Insertion loss measuring system

Table 2-1 Master Plug

After APC Polishing(in process)	Standard Value
Eccentricity of core center for the center of ferrule outer diameter	Less than 0.5 $\mu\text{m}$
End curve offset	Less than 30 $\mu\text{m}$
End curve radius	R 5 to 12mm
Return Loss	55dB or more
Ferrule outer diameter	2.499 $\pm$ 0.5 $\mu\text{m}$

## 2.2 Return Loss

### 2.2.1 Test Method

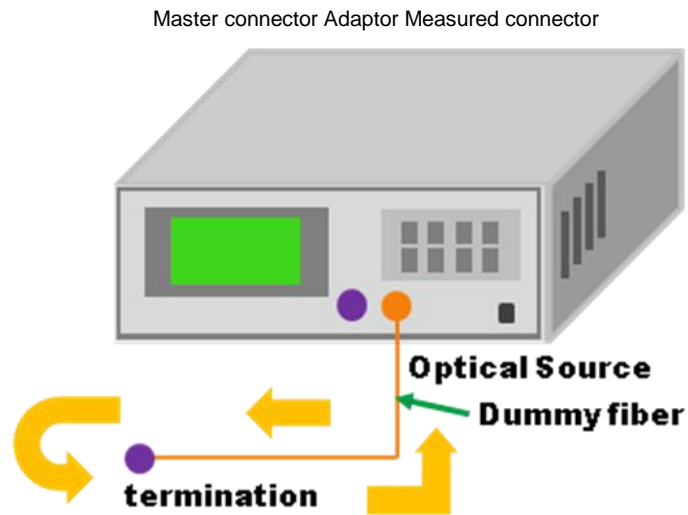


Figure 2. Return Loss Measuring system

### 3. Environmental test

#### 3.1 Temperature age

##### 3.1.1 Test Method

Temperature :  $70^{\circ}\text{C} \pm 2$

Humidity : Uncontrolled

Duration : 96hr(4days)

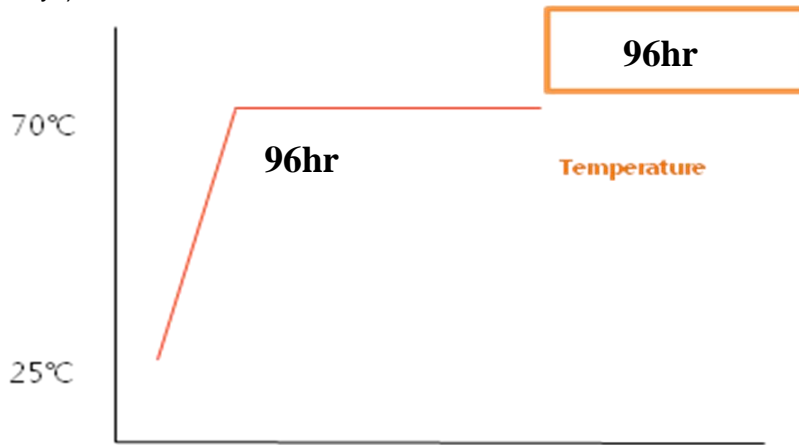


Figure 3 Temperature

#### 3.2 Temperature cycle

##### 3.2.1 Test Method

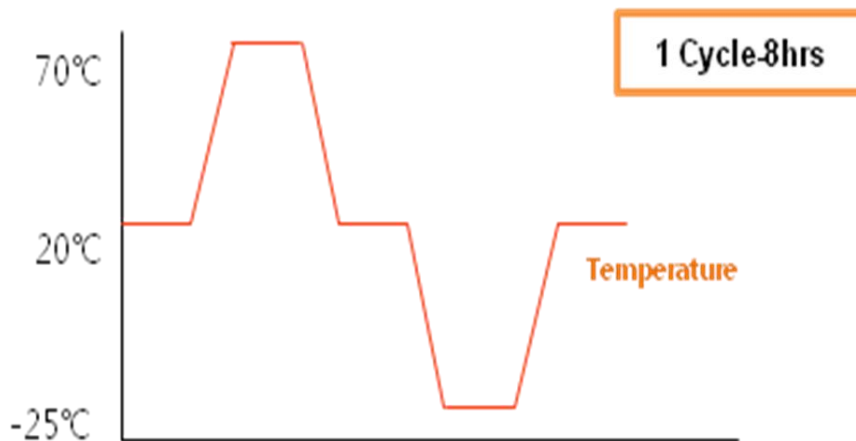


Figure 4 Thermal Cycle

### 3.3 Humidity

#### 3.3.1 Test Method

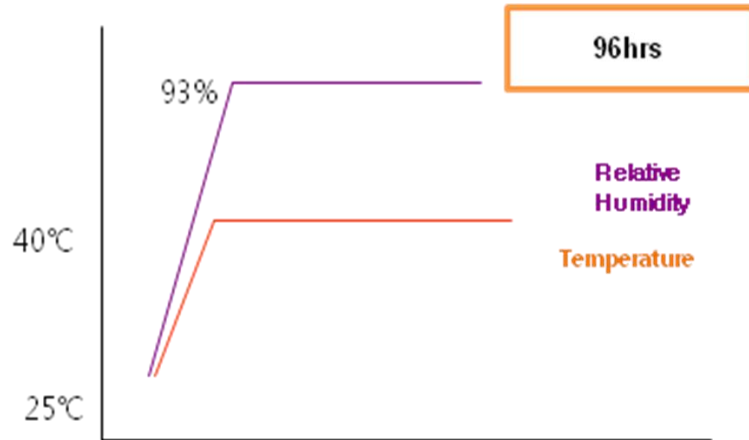


Figure 5. Humidity Test

### 4. Mechanical Performance

#### 4.1 Vibration

##### 4.1.1 Test Method

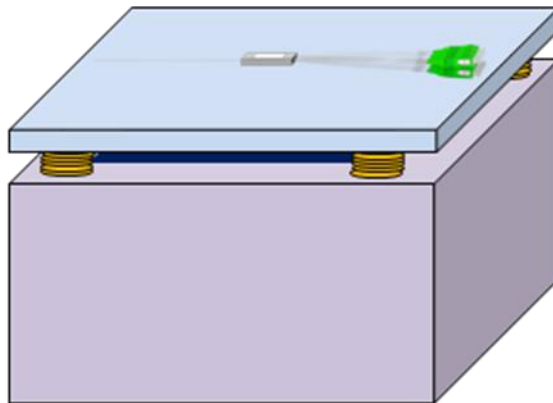


Figure 6. Vibration test

## 4.2 Twist

### 4.2.1 Tes

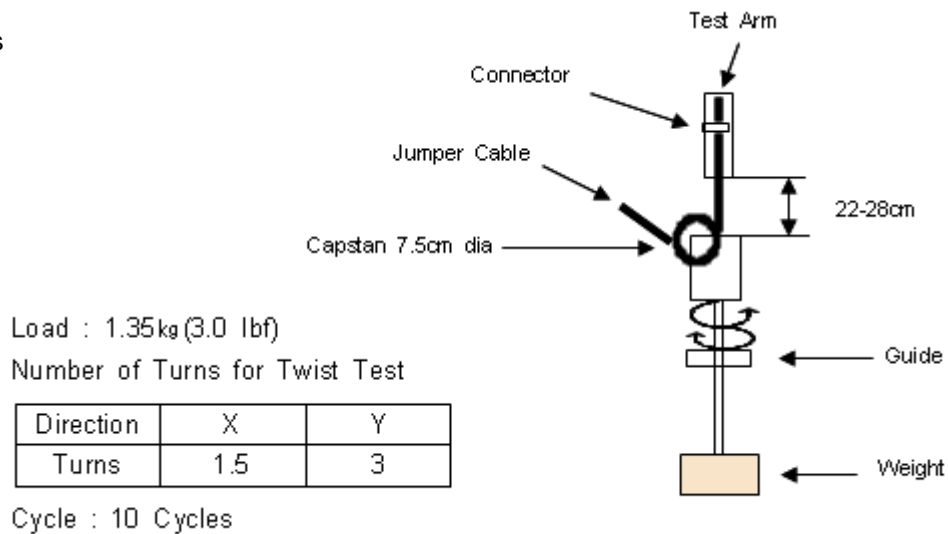
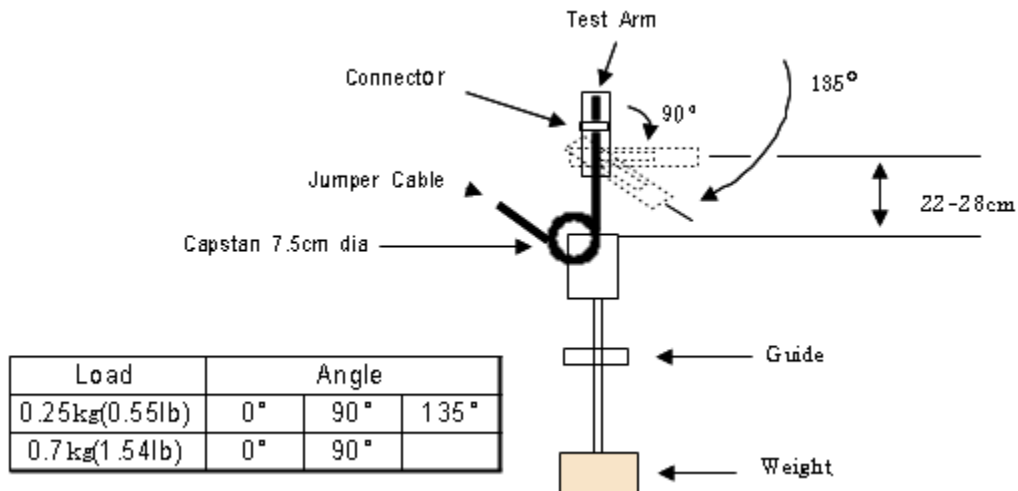


Figure 7. Twist Test

## 4.3 Transmission with Applied Tensile Load

### 4.3.1 Test Method





#### 4.4 Impact

##### 4.4.1 Test Method

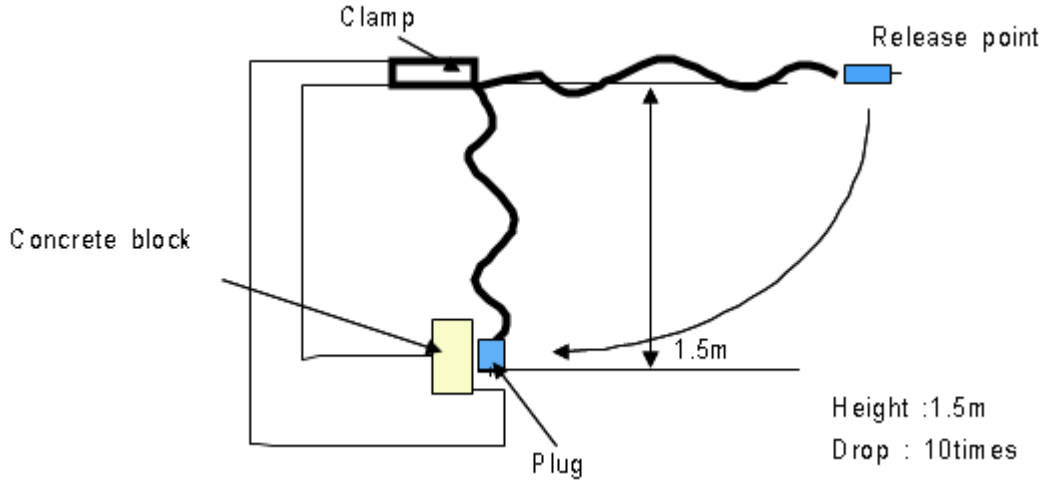
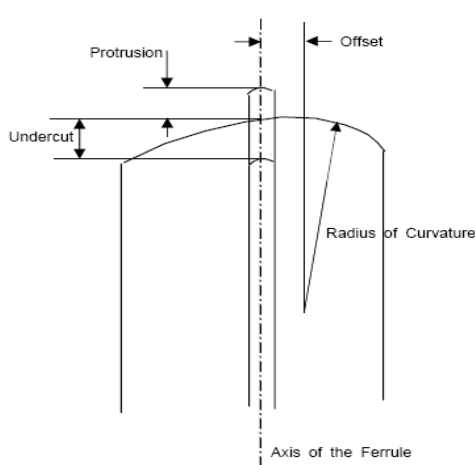
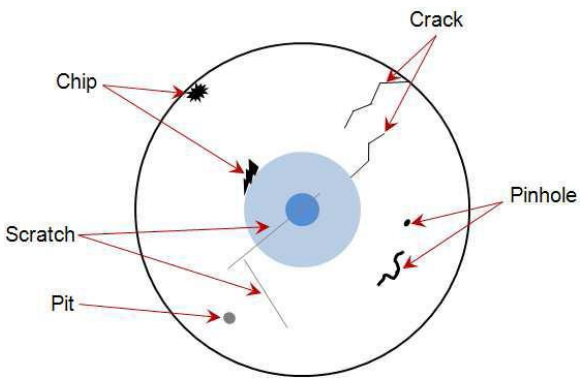


Figure 9. Impact test

#### 5. Connector end-face

Parameter	Unit	UPC	APC	Figure
Ferrule end - face offset	um	≤ 50 um	≤ 50 um	
Radius of Curvature	mm	10mm ~ 25mm	5mm ~ 12mm	
Ferrule end - face angle	-	-	8° +/- 0.3°	
Fiber Undercut	nm	≤ 50 nm	≤ 50 nm	
Fiber Protrusion	nm	≤ 50 nm	≤ 50 nm	
Pull-out strength	Max	≥ 1kg (Bellcore GR326 SPEC)		

Parameter		Result	
Scratch	<b>White Scratch (Light Scratch)</b>	Inside a core : <b>Reject</b>	
	<b>Black Scratch (Deep, Wide Scratch)</b>	On a clad layer : Accept under 3ea	
Chip	<b>Ferrule Chip</b>	<b>Reject</b>	
	<b>Fiber Chip</b>	On a core and clad layer : Reject	
	<b>Pit</b>	<b>Reject</b>	
Crack		<b>Reject</b>	
Pinhole		<b>Reject</b>	

## 6. Connector Grade

### 6.1 Optical Grade

Attenuation Grade	Attenuation random mated IEC 61300-3-34	
Grade A*	≤ 0.07 dB mean	≤ 0.15 dB max. for >97% of samples
Grade B	≤ 0.12 dB mean	≤ 0.25 dB max. for >97% of samples
Grade C	≤ 0.25 dB mean	≤ 0.50 dB max. for >97% of samples
Grade D	≤ 0.50 dB mean	≤ 1.00 dB max. for >97% of samples
Return Loss Grade	Return Loss Random mated IEC 61300-3-6	
Grade 1	≥ 60 dB (mated) and ≥ 55 dB (unmated)	