

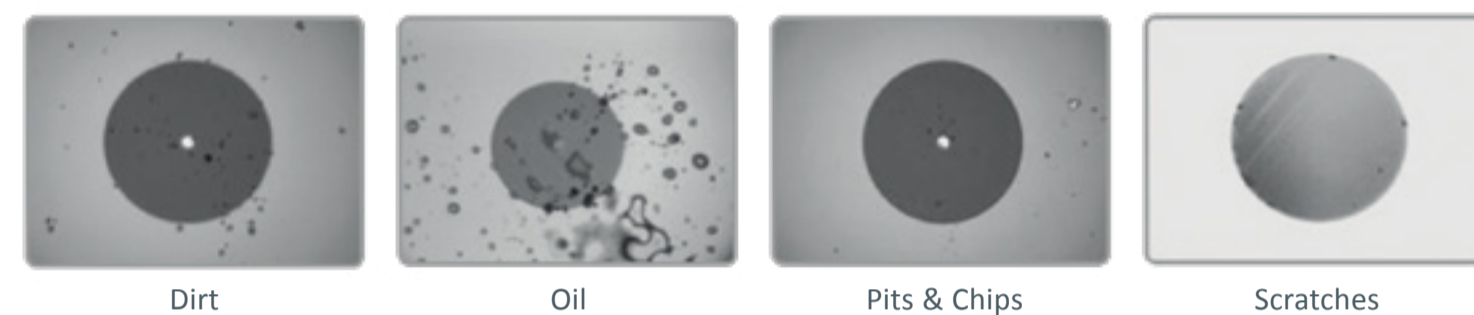
# BASICS OF FIBER CERTIFICATION

## FIBER INSPECTION



Make sure to have clean connector installed. A dirty connector will increase the power loss! Inspect your connector before and after cleaning.

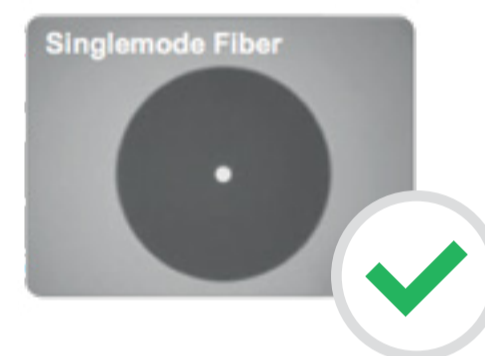
### PICTURES OF DIRTY/DAMAGED CONNECTORS



### END FACE INSPECTION

- According to IEC 61300-3-35
- Sees dirt on the fiber end faces
- Dirt is the main reason for not working fiber links
- Dirt can destroy the fiber end face
- Always inspect fiber end face before you connect

### PICTURE OF CLEAN CONNECTOR



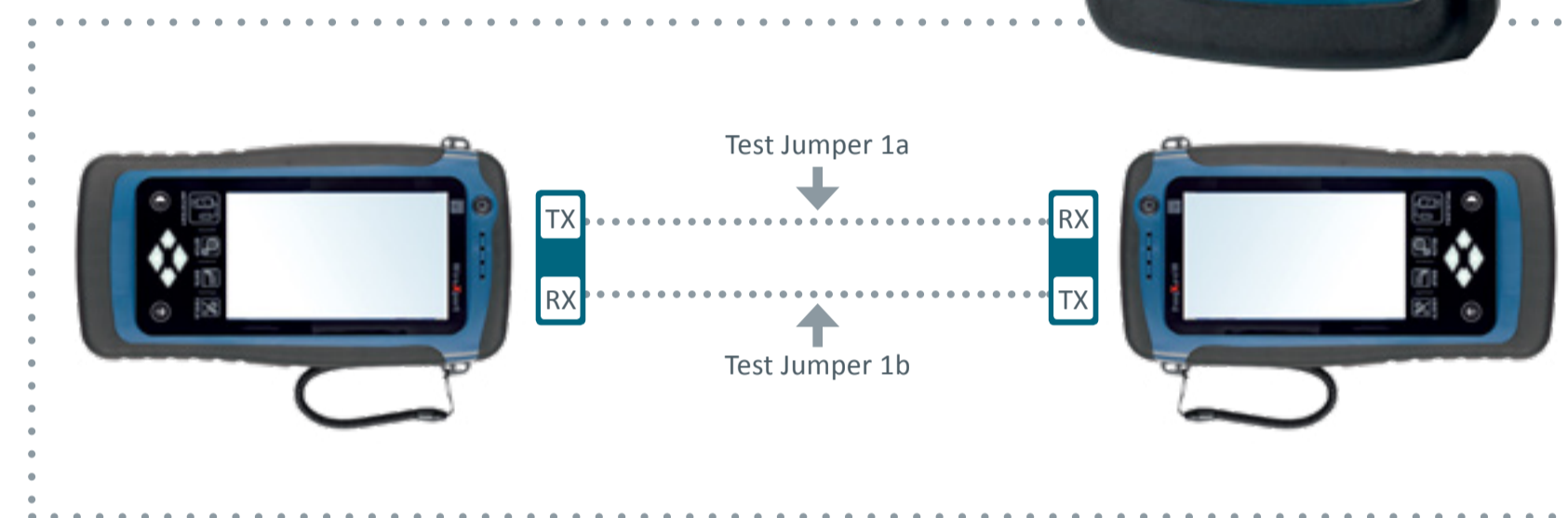
## OPTICAL CONNECTOR TYPES

Connector	Diameter of Ferrule		Image
	2.5 mm	1.25 mm	
SC	•		
FC	•		
ST (BFOC)	•		
MTRJ	-	-	
DIN (LSA)	•		
E2000	•		
E2000PS	•		
F3000		•	
LC		•	
MU (Mini-SC)		•	
MPO	-	-	

## TIER 1 CERTIFICATION

### OLTS (OPTICAL LOSS TEST SET)

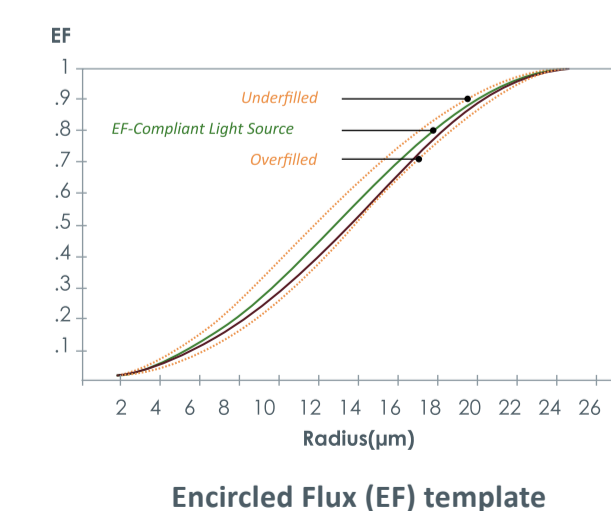
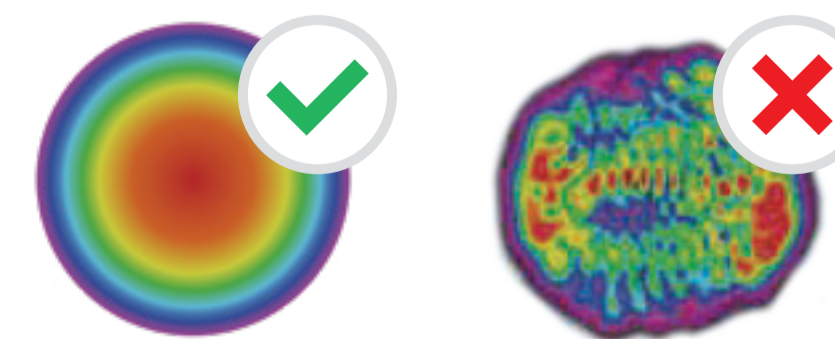
- Measures the total loss, length, and polarity of a fiber channel
- Conforms to TIA-568-C (TIA-526-14A and TIA-526-7) and ISO 11801 & IEC 14763-3
- Budget Loss testing with LS/PM
- Verify polarity using bi-directional testing or duplex OLTS



Core diameter	62,5				50				9					
Wavelength (nm)	850	1300	850	1300	1310	1550	850	1300	1310	1550	850	1300	1310	1550
Overfilled Launch (MHz*km)	160	200	500	400	500	1500	3500	400	400					
„Laser“ Launch (MHz*km)						2000	4700							
class	OM1				OM2	OM3	OM4	OM1	OM2	OS1/OS2				
	Loss	Length	Loss	Length	Loss	Length	Loss	Length	Loss	Length	Loss	Length	Loss	Length
<b>Ethernet</b>														
1 G	2.33	220	2.53	275				2.32	550					
10 G	2.60	26	2.50	33	2.50	300	2.20	66	2.30	82	2.60	300	2.90	400
40 G											1.90	100	1.50	150
100 G											1.90 (SR10) 1.80 (SR4)	100 (SR10) 70 (SR4)	1.50 (SR4) 1.90 (SR4)	150 (SR10) 100 (SR4)
													6.30 (LR4) 15/18 (ER4)	10000 (ER4) 30/40km (ER4)
														4.00
														2000
														30km

Source: IEEE 802.3. Some vendors allow greater distances. Length in „m“, Loss in „dB“

### ENCIRCLED FLUX



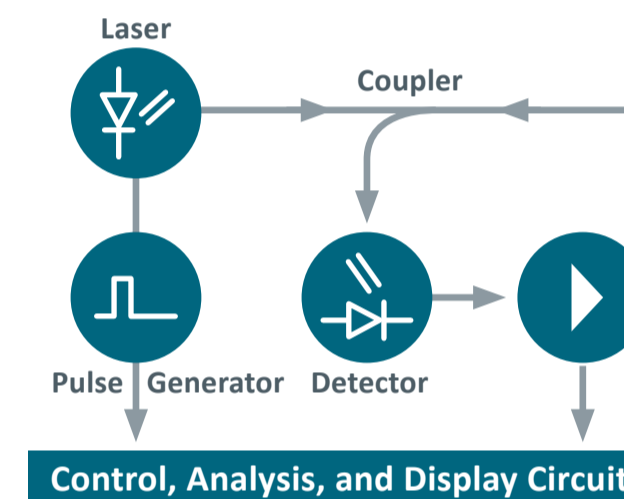
## TIER 2 CERTIFICATION

### OTDR (OPTICAL TIME DOMAIN REFLECTOMETRY)

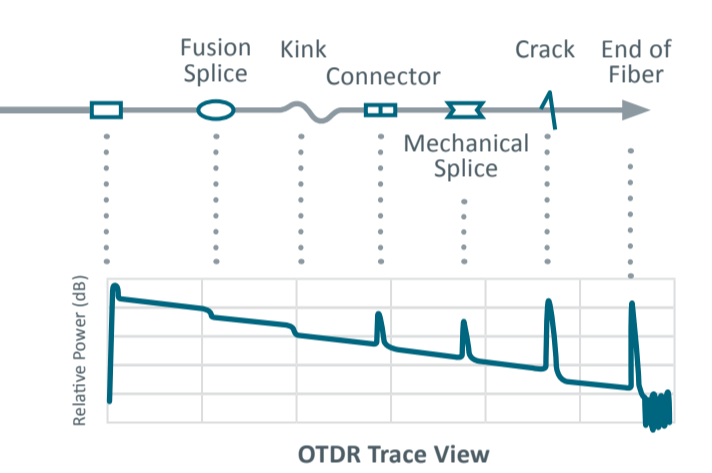
- Provides evidence that cable is installed without degrading events (e.g. bends, connections, splices)
- Conforms to TIA-568-C and ISO 11801 & IEC 14763-3
- Sets optical budgets for each individual event
- Identifies segment lengths, connector locations & losses, as well as losses within segments



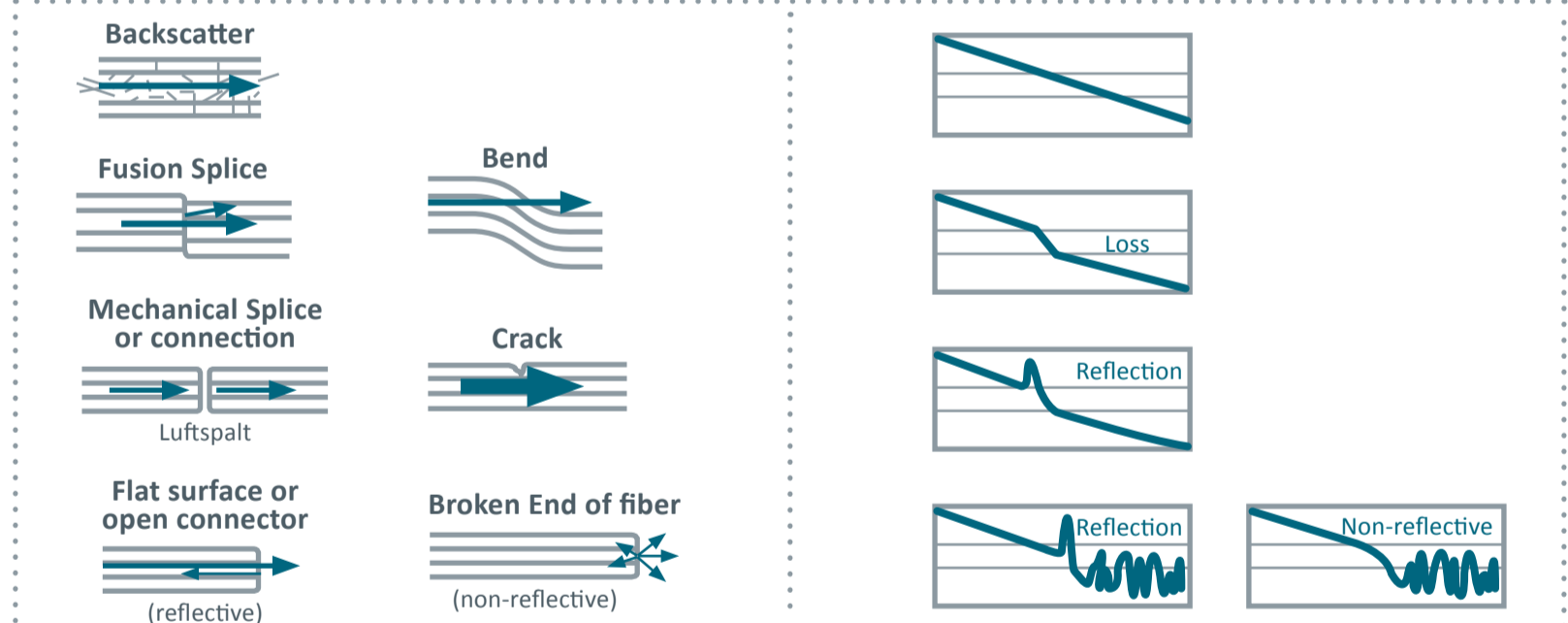
### Optical Time Domain Reflectometer



### Fiber link



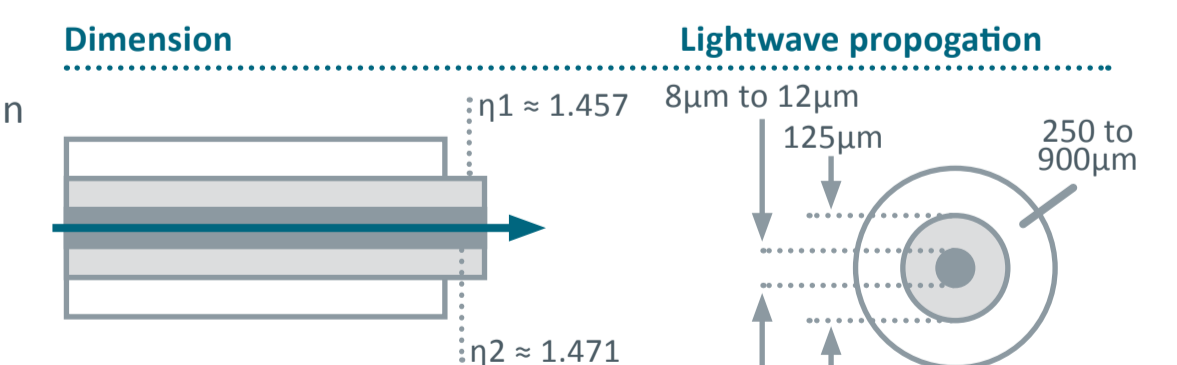
## TYPICAL EVENTS



## OPTICAL FIBER TYPES

### 1. SINGLEMODE FIBER

- 1260 to 1640 nm transmission wavelengths
- Low attenuation
- Access/medium/long haul networks (>200km)
- Nearly infinite bandwidth



### 2. MULTIMODE FIBER

- 850 to 1300 nm transmission wavelengths
- High attenuation
- Local networks (< 2,000 m)
- Limited bandwidth

