

**High-NA Wide-Bandwidth  
Hard Plastic Clad Silica Optical Fiber  
for  
IEEE1394b**

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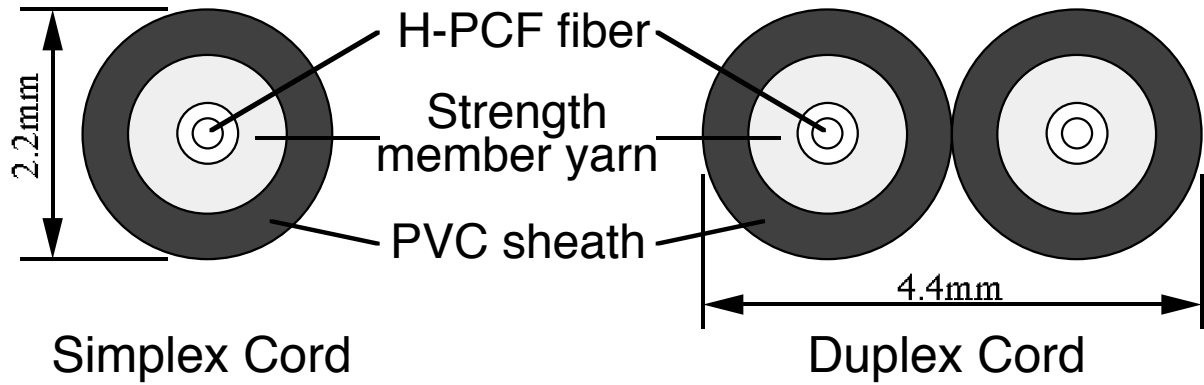
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## Features of H-PCF

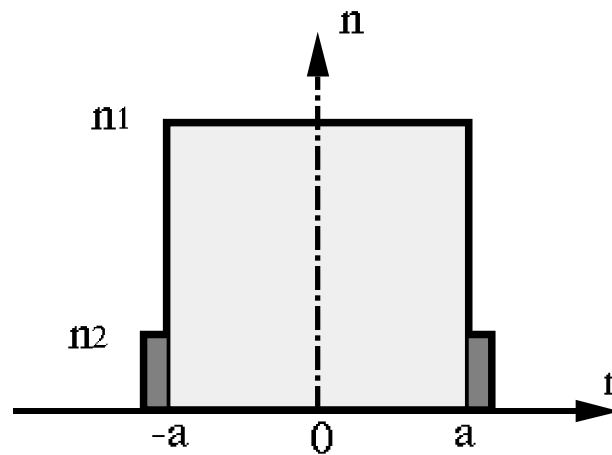
- EMI/EMC immunity
- High NA and large core diameter accomplish high coupling efficiency with LED and allow to using potentially economical data-link devices and connectors
- Easy filed connector assembly works by using "Climp & Cleave" optical connectors



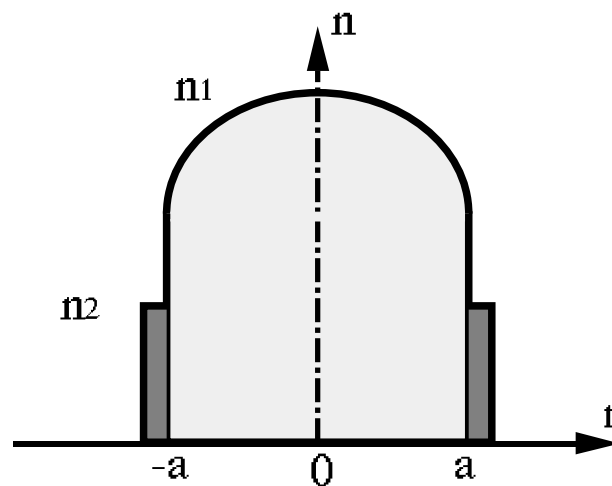
## Typical Cord Constructions



## Index Profiles



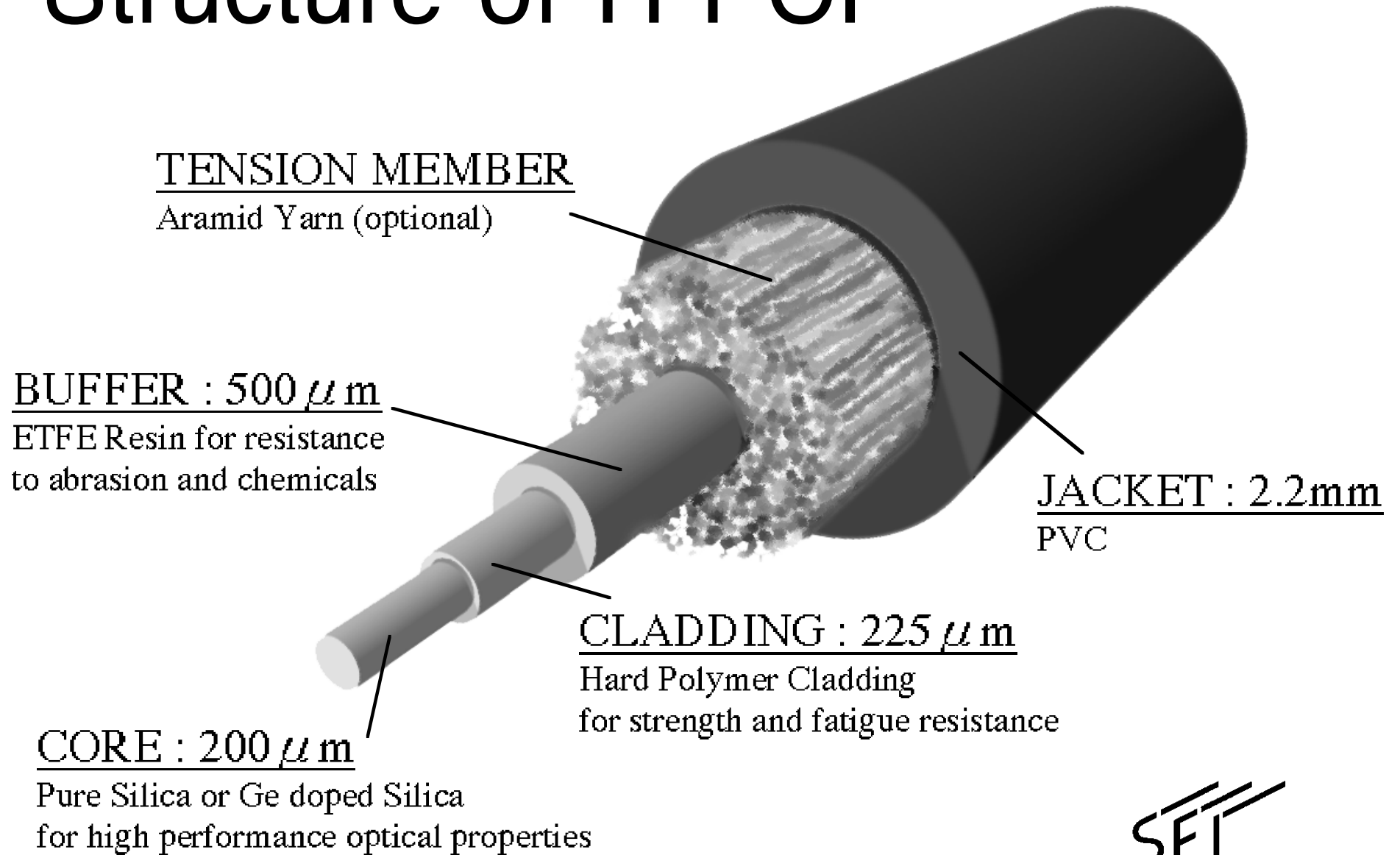
Conventional SI H-PCF

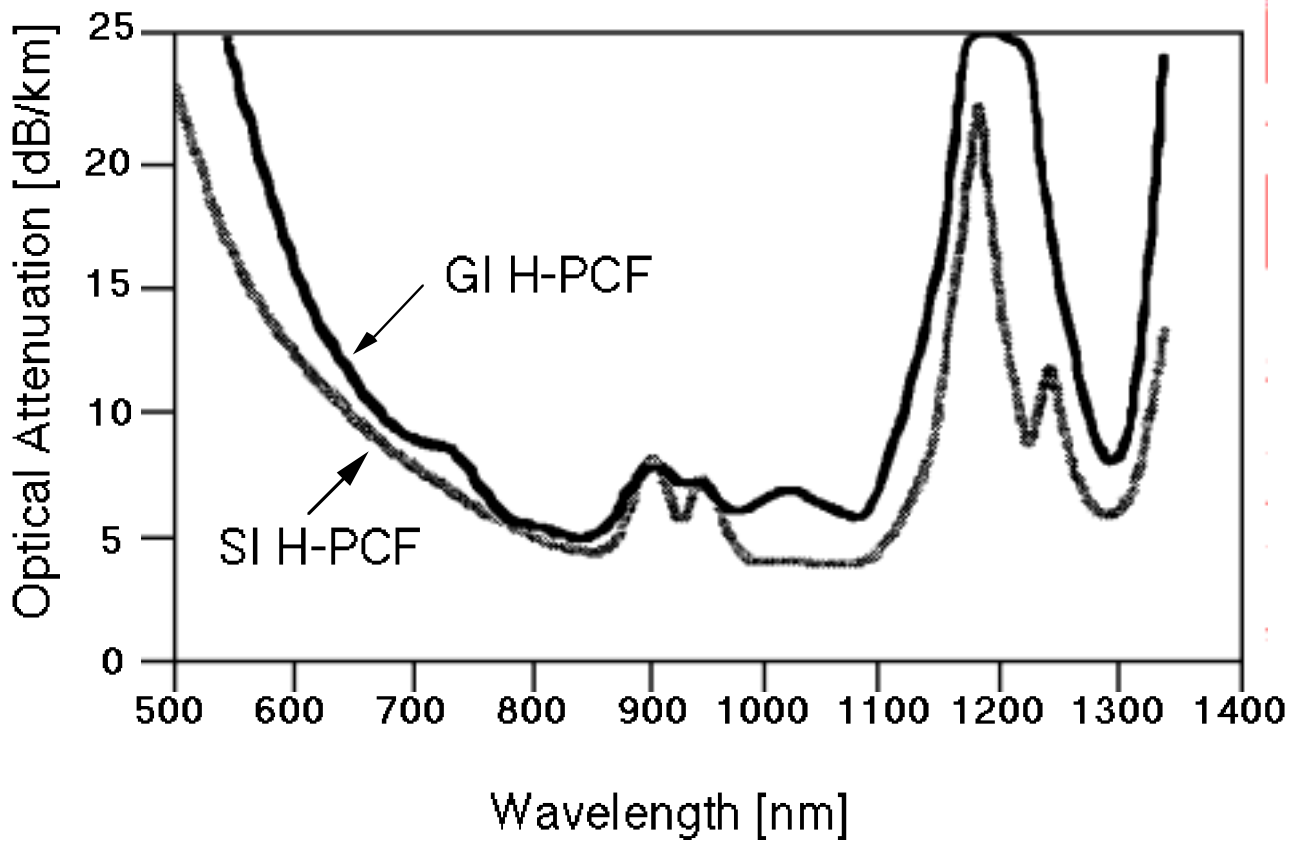


Truncated GI H-PCF



# Structure of H-PCF

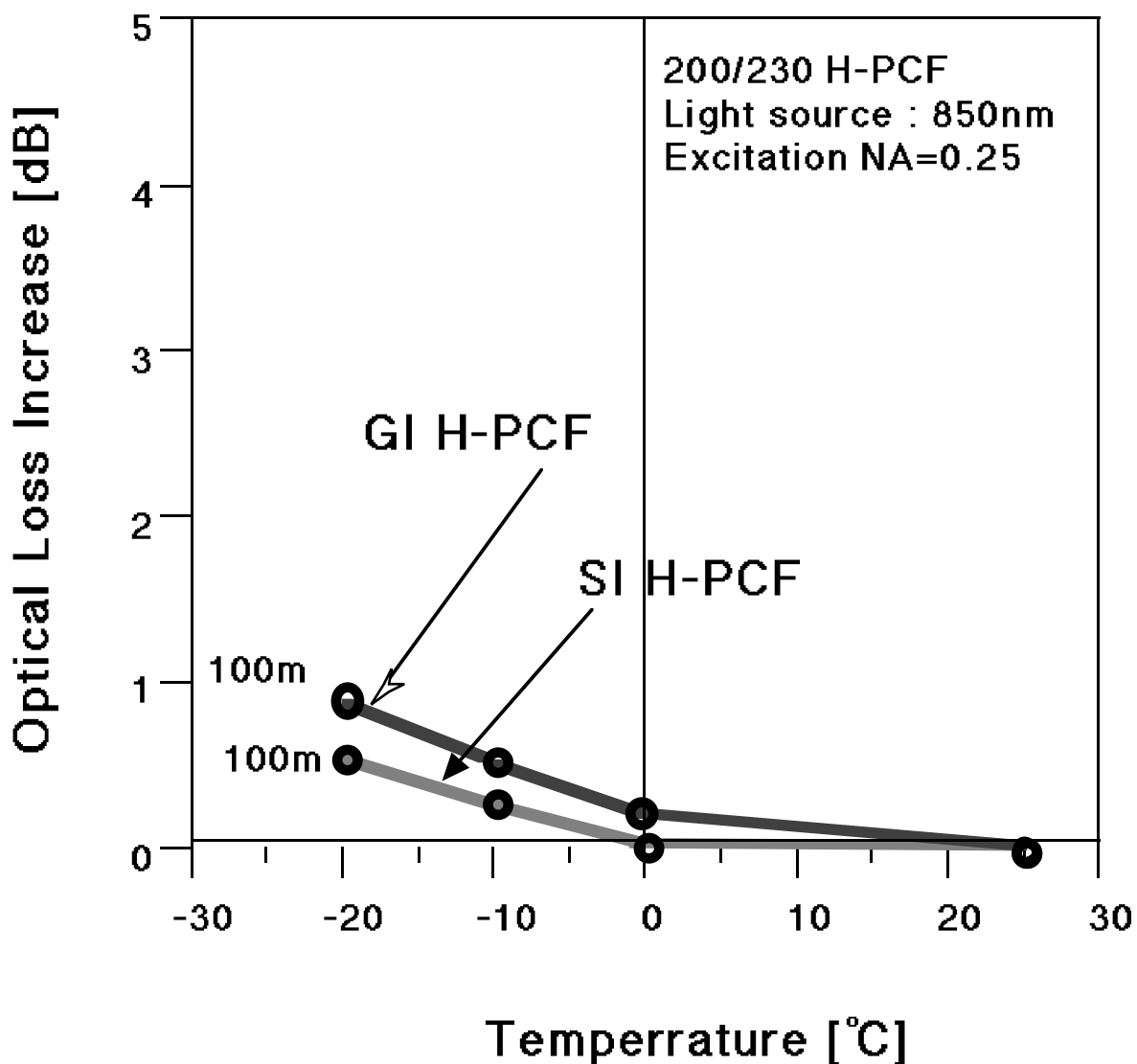




Typical spectral loss for  
200/230  $\mu\text{m}$  GI and SI H-PCF simplex fiber cords  
( $L=1\text{km}$ ,  $NA=0.25$ )

	850nm	1300nm
Attenuation loss for GI H-PCF	4.8 dB/km	7.7 dB/km
Attenuation loss for SI H-PCF	4.2 dB/km	5.9 dB/km



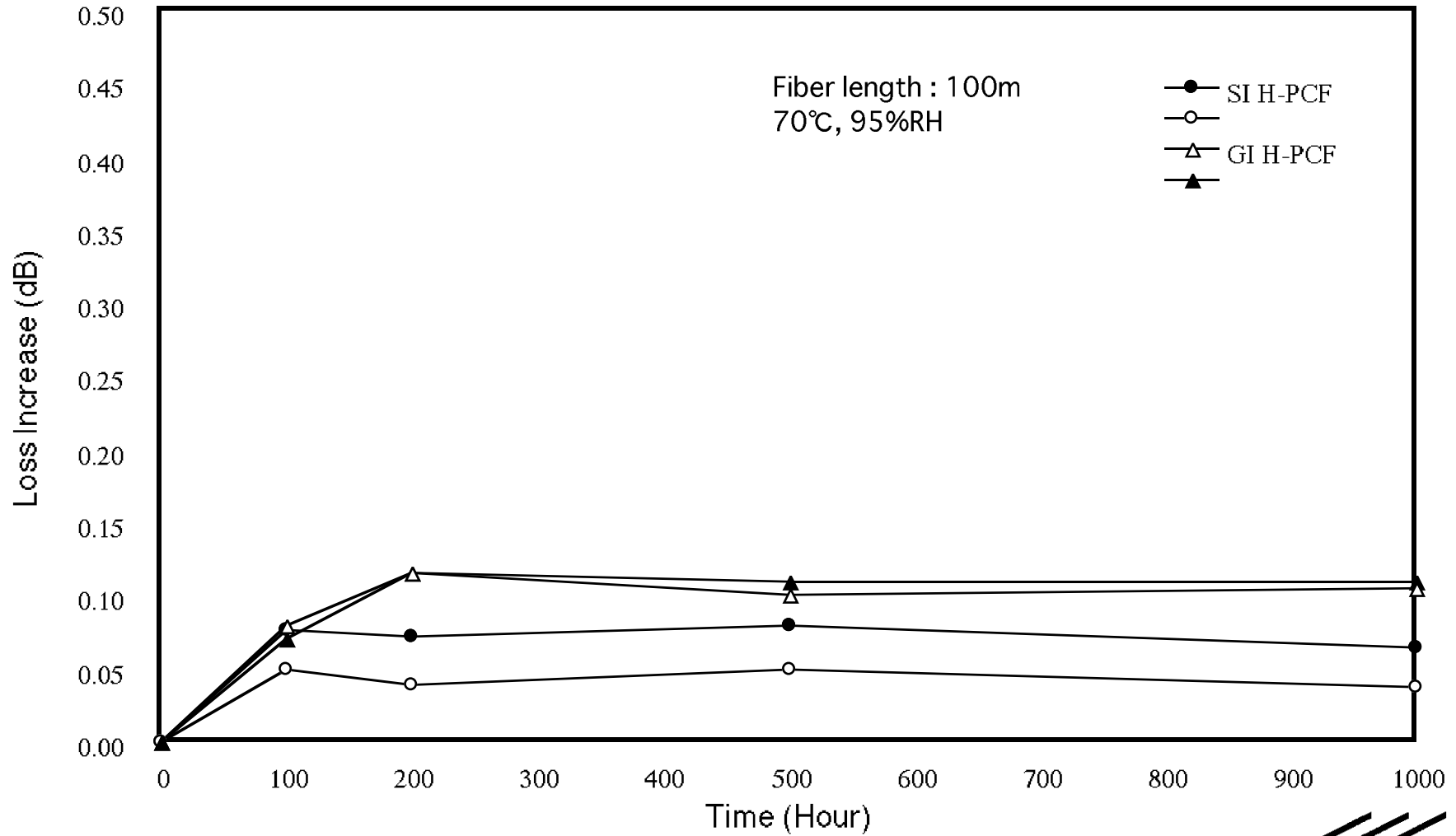


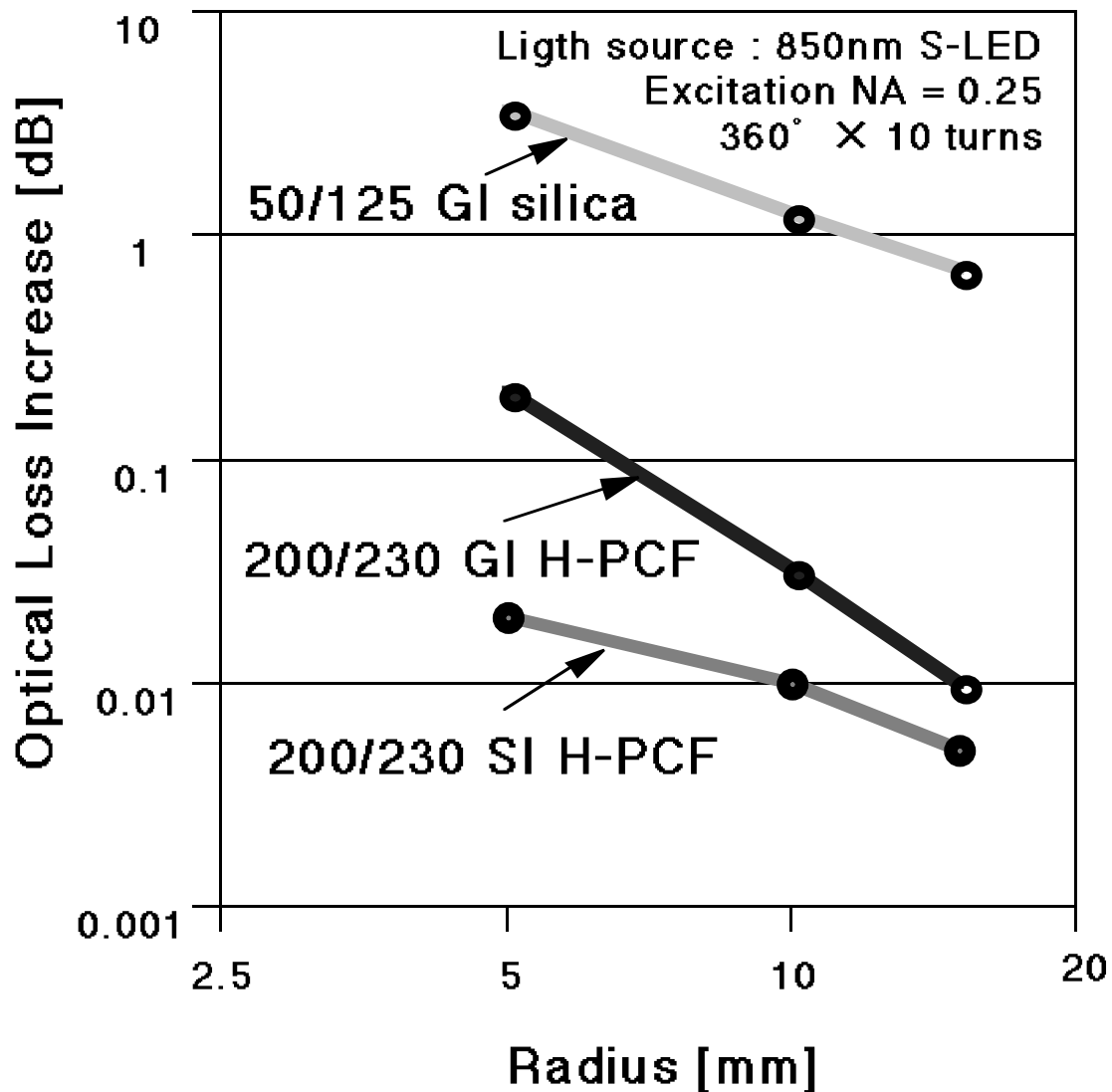
Typical low temperature optical loss increase  
for 200/230  $\mu\text{m}$  GI and SI H-PCF  
(850nm LED, Excitation NA=0.25)



# High Temperature and Humidity

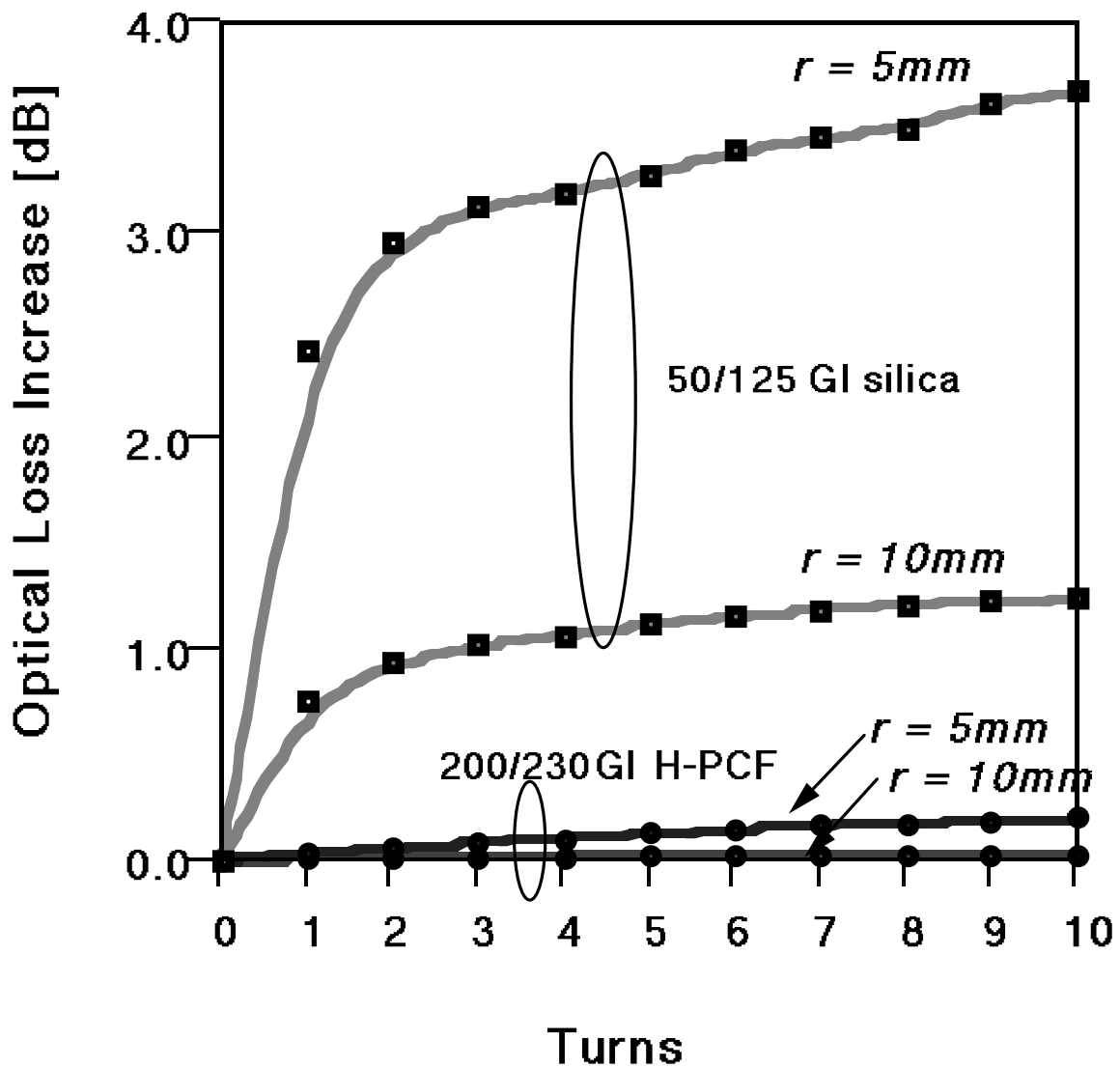
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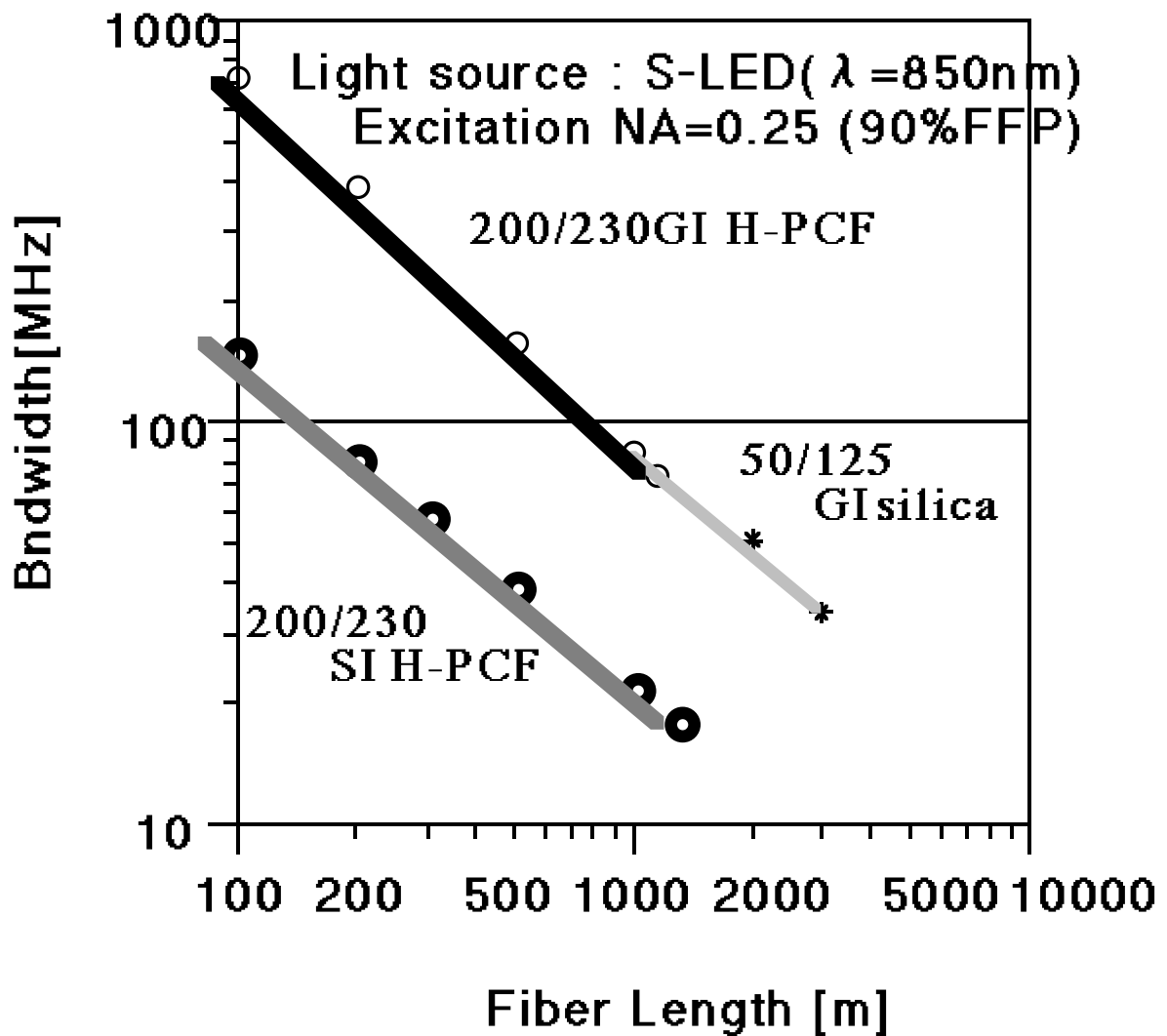
Typical bending loss characteristics as a function of bend radius for 200/230  $\mu\text{m}$  GI and SI H-PCF fibers and a conventional 50/125  $\mu\text{m}$  GI silica fiber (850nm LED, Excitation NA=0.25)





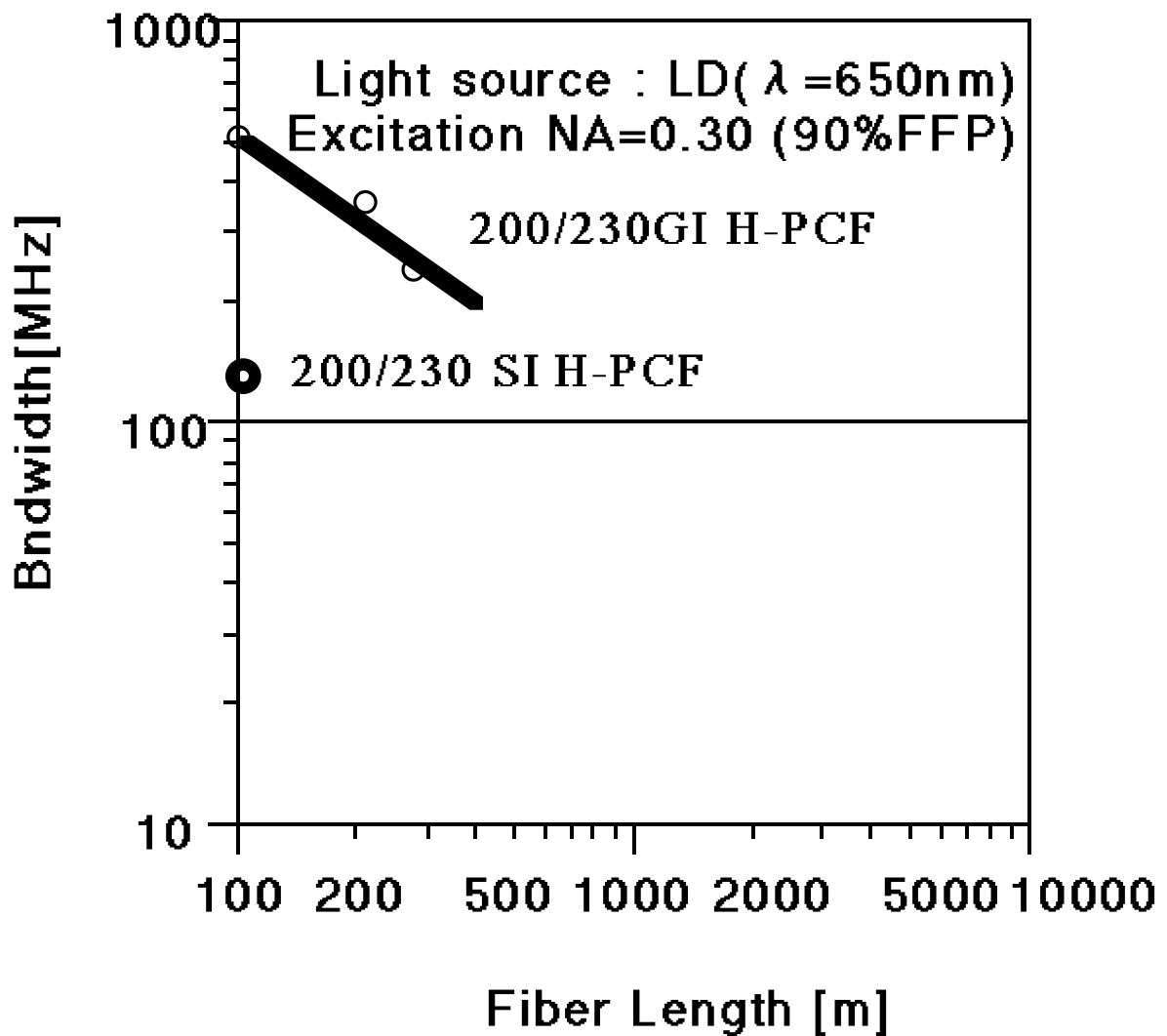
Typical bending loss characteristics  
for 200/230  $\mu\text{m}$  GI H-PCF fibers  
and a conventional 50/125  $\mu\text{m}$  GI silica fiber  
(850nm LED, Excitation NA=0.25)





Bandwidth characteristics  
for the 200/230  $\mu\text{m}$  GI and SI H-PCF fibers  
and atypical 50/125  $\mu\text{m}$  GI silica fibers  
(850nm LED, Excitation NA=0.25)



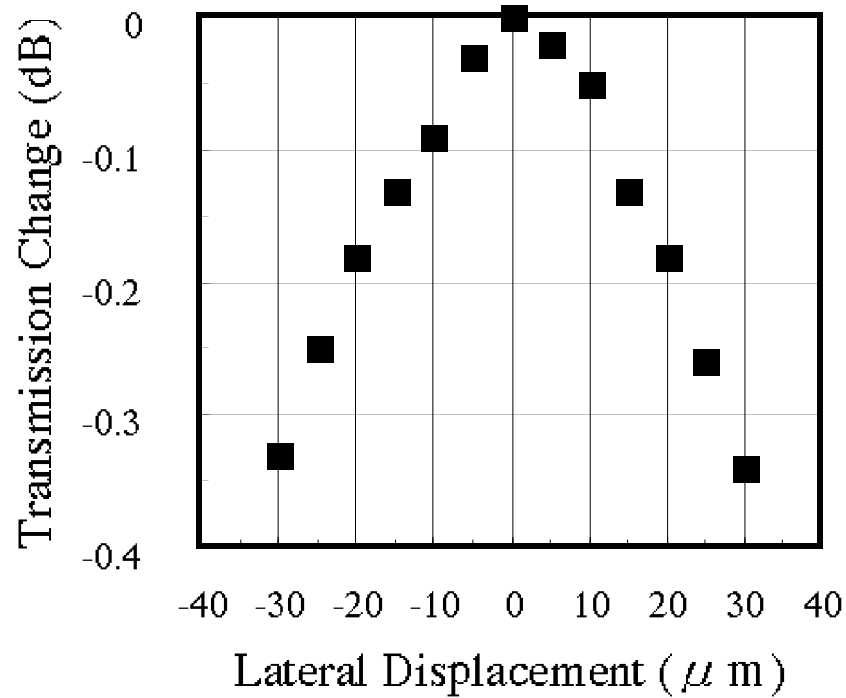


Bandwidth characteristics  
for the 200/230  $\mu\text{m}$  GI and SI H-PCF fibers  
(650nm LD, Excitation NA=0.30)

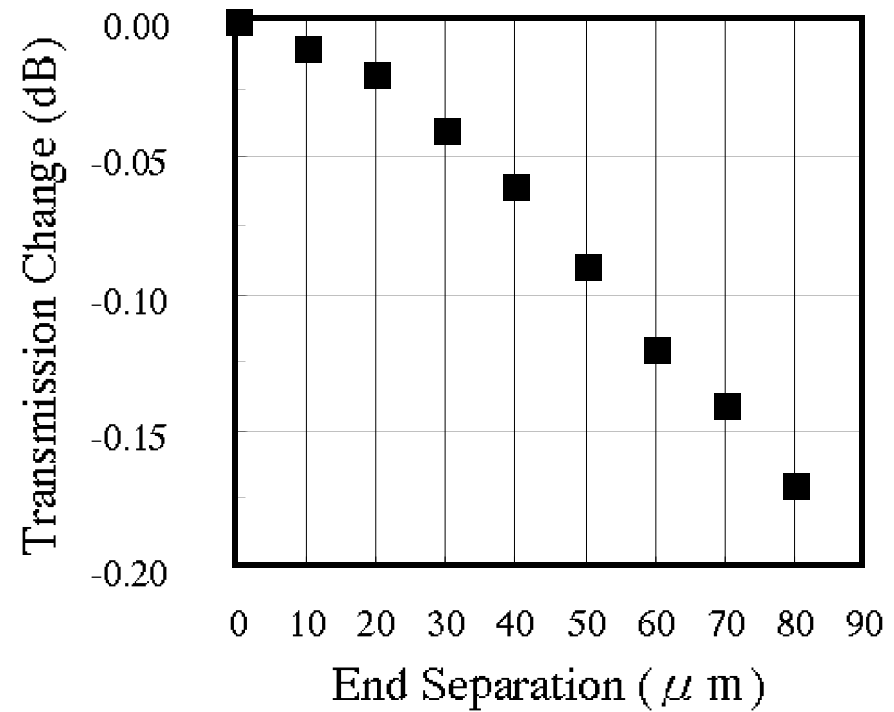


# Lateral Offset and End Separation of SI H-PCF

Lateral Offset

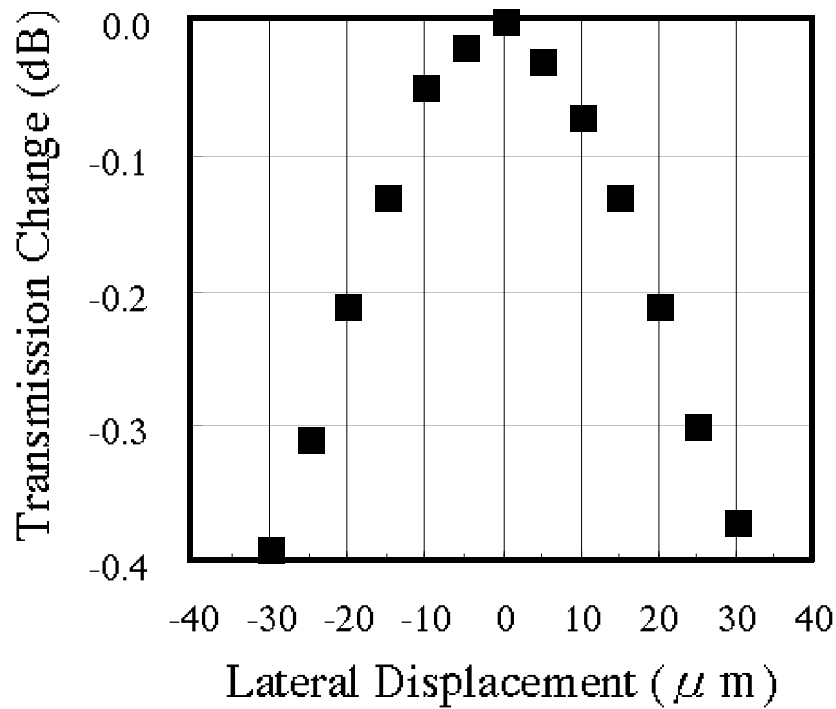


End Separation

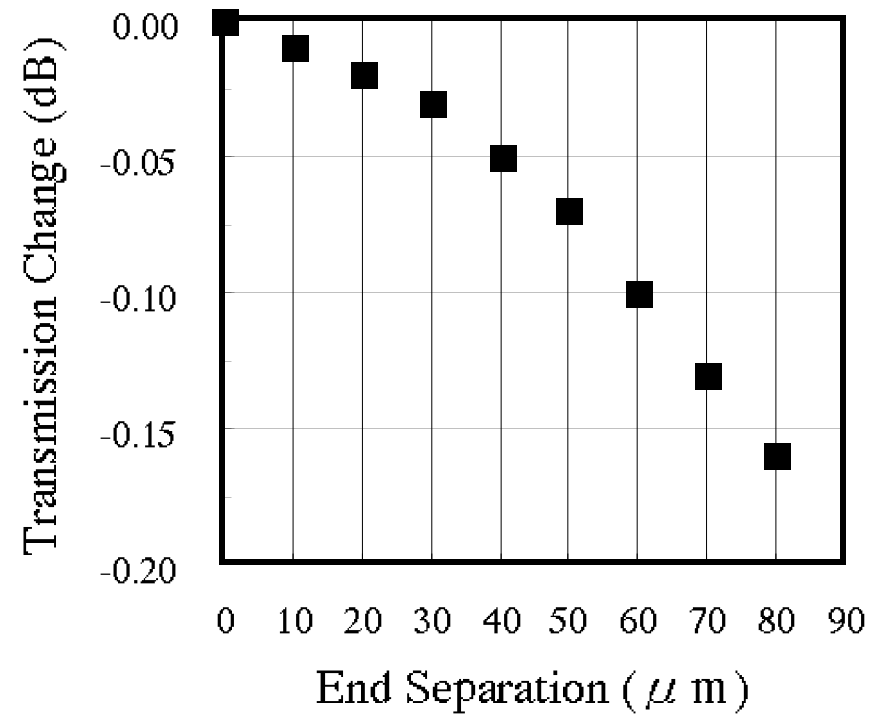


# Lateral Offset and End Separation of GI H-PCF

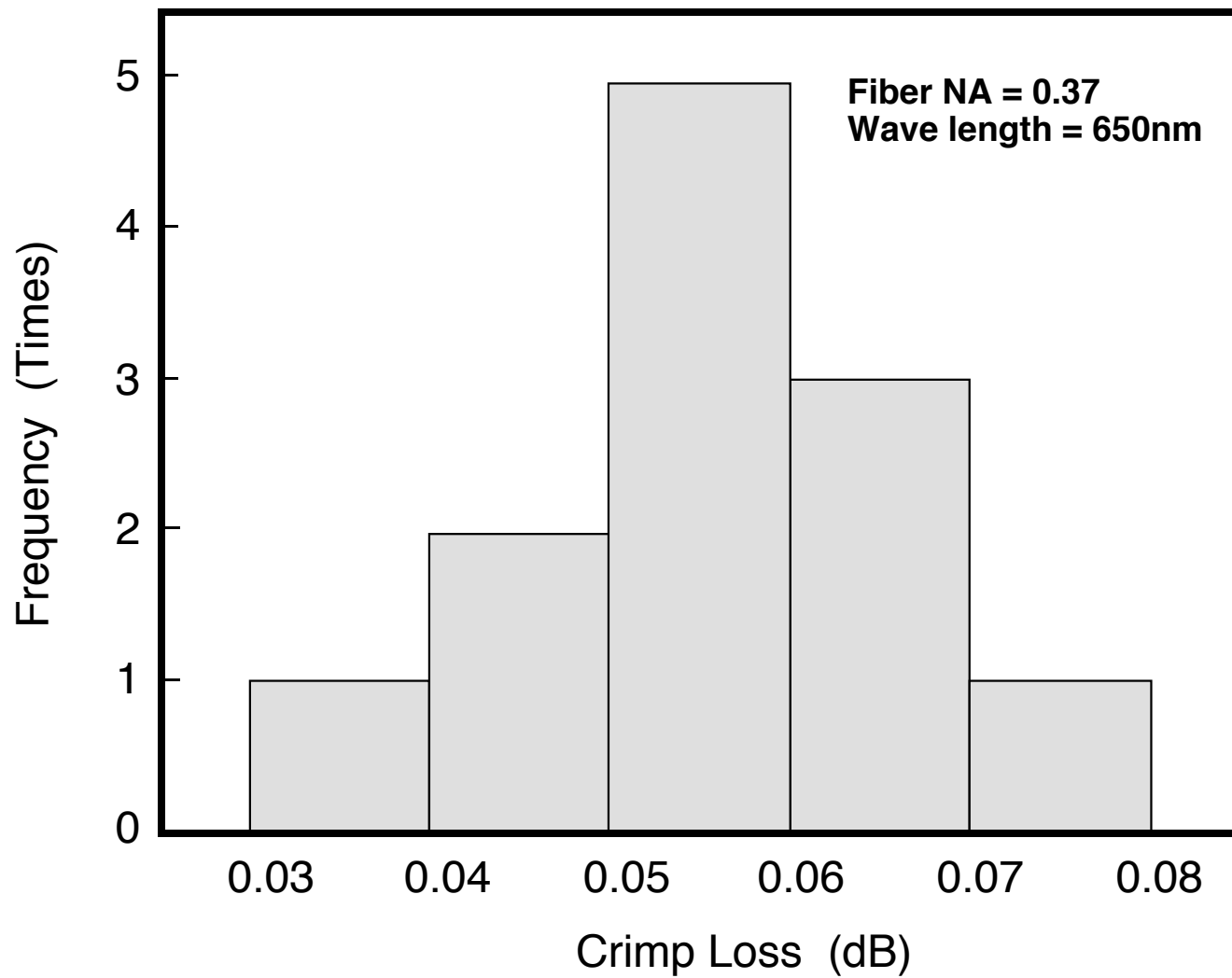
Lateral Offset



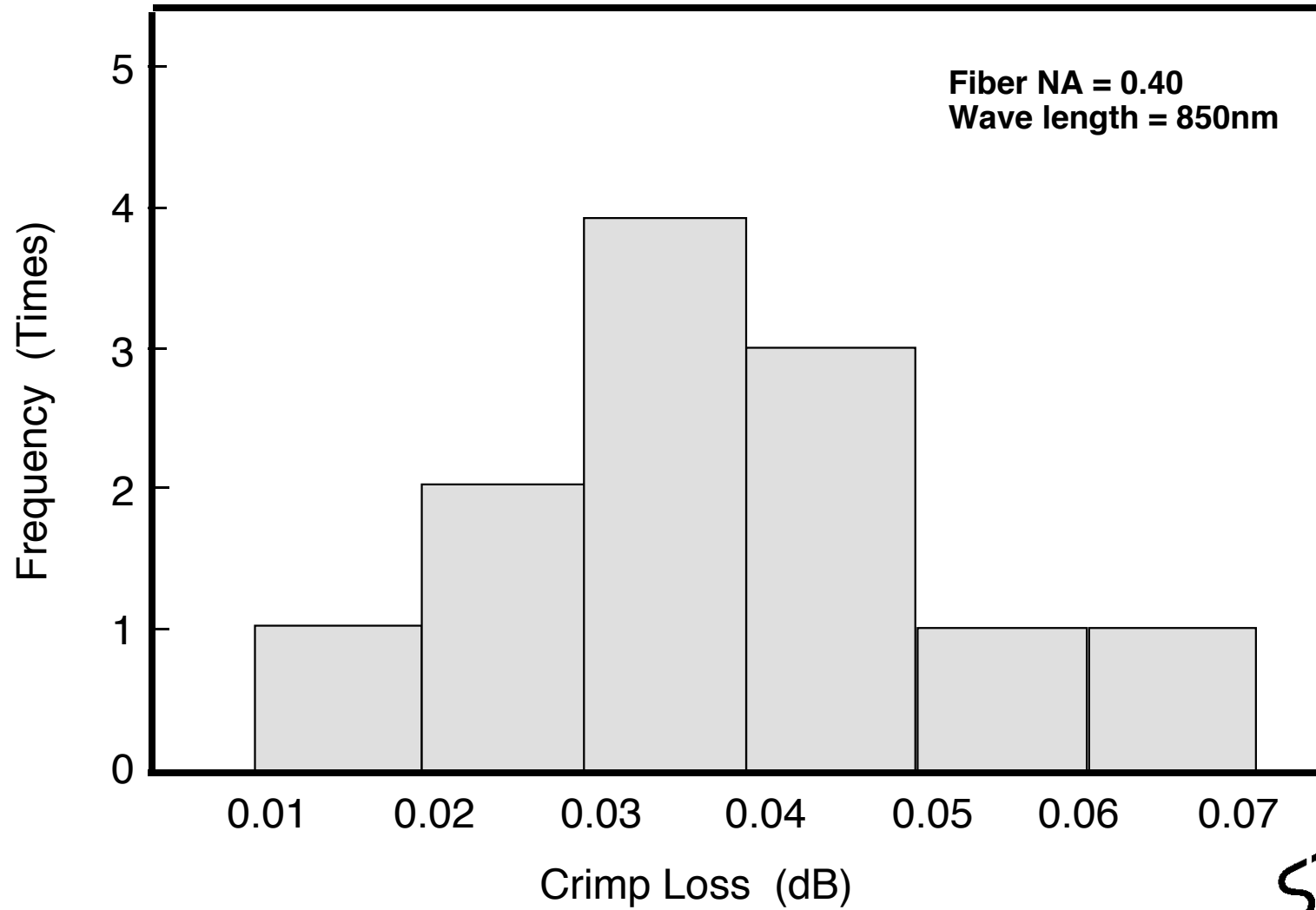
End Separation



# Crimp Loss of SI H-PCF



# Crimp Loss of GI H-PCF



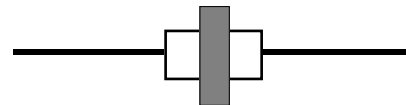
# Jumper Loss

	SI H-PCF	GI H-PCF
<b>Crimp loss</b> (1 Crimp *)	<b>0.1</b>	<b>0.1</b>
<b>Connection loss</b> (1 Connection **)	<b>1.0</b>	<b>1.1</b>



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Connector  
Sumitomo Electric  
CF-2071



HPCF product data sheet

	Measured			Unit	TestMethod		
	SIH-PCF (650nm)	GIH-PCF			IEC #	IEC Status	Procedure
		(650nm)	(850nm)				
FiberDiameter	227	227		$\mu$ m	793-1-A4	published	mechanical
NumericalAperture	0.37	0.40			793-1-A1	published	refractedindexprofile
Attenuation							
Base Loss	0.88	1.30	0.50	dB/100m	793-1-C1A	published	cut back technique
Environment	0.64	1.00	1.00	dB/100m	793-1-C10A	published	
Static Bend	0.07	0.07	0.06	dB	794-1-E11	to be appended	
Launch NA	0.03	0.03	0.03	dB	793-1-C1A	published	
total	1.62	2.40	1.59	dB/100m			cut back technique
Bandwidth	123	500	700	MHz·100m	793-1-C2B	published	frequencyresponce
Crimp Loss	0.1	0.1	0.1	dB			
Connection Loss	1.0	1.1	1.1	dB			

	650nm		850nm	Unit
	100Mbps	200Mbps	200Mbps	
Minimum Launch Power	-20.0	-21.5	-8.0	dBm
Minimum Receiver Input Power	-26.5	-24.5	-22.0	dBm
Loss Budget	6.5	3.0	14.0	dB



# Conclusion

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## SI & GI H-PCF exhibits remarkable bandwidth properties

### ○ 650 nm LED

SI H-PCF is sufficient to realize S100 more than 100m distance

GI H-PCF is sufficient to realize S200 more than 100m distance

### ○ 850 nm LED

SI H-PCF is sufficient to realize S200 up to 100m distance

GI H-PCF will be sufficient to realize S400 up to 100m distance

## SI & GI H-PCF preserve attractive features

○ High NA which realizes coupling with LED and small bending loss

○ Easy assembling work with crimp & cleave optical connectors



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