

## Singlemode Build Out Attenuators

### Features

- A range of fixed attenuation values. Standard values of 1 through 20 and 25dB
- UPC and APC offer Excellent Return Loss
- FC, SC, ST, and D4 styles
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- Long term reliability
- Very low reflectance
- Excellent Price/Performance
- Vibration resistant
- Single and Dual Window
- Designed to comply with Bellcore GR-NWT-00910

### Applications

- Power leveling in DWDM transmission systems
- Test and Measurement
- Power attenuation at the receiver

### Available Collateral

- Application Specification 114-13055
- Test reports qualifying product to Bellcore 910
- Customer Drawings

### Customizable Features

- Attenuation tolerance
- PC and SPC configurations
- Attenuation values in 1dB increments
- Labeling
- Kitting/Packaging
- Wavelength Dependent Loss
- Reflectance
- Pass Band



Photo #110813 FC mod

Tyco Electronics' high performance Build Out Attenuators utilize a unique all-fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology, the design minimizes reflectance, attenuation tolerance and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

### Specifications

**Attenuation Values —**  
1-20dB and 25 dB (Fixed)

**Reflectance —**  
<-45dB, -50, -55 and -60dB for PC, SPC, UPC and APC polish respectively

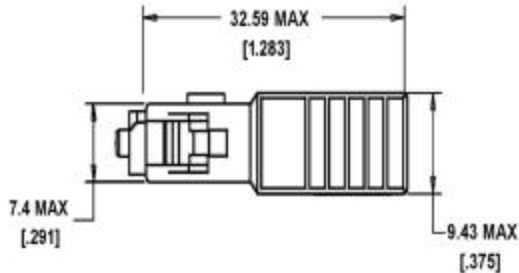
**Operating Temperature —**  
-40°C to +75°C

**Vibration Resistance —**  
<0.1 x attenuation



**Singlemode  
SC Attenuators, Build Out Style,  
Fixed Value**

**Dual Window and Bellcore Bandpass**



R=Reflectance

Note: Additional attenuation values available upon request.

**Dual Window Attenuators**

Part Numbers	Bandpass 1310/1550nm ±25nm
Attenuation (dB)	SC/UPC R ≤ -55 dB
1	209943-1
2	209943-2
3	209943-3
4	209943-4
5	209943-5
6	209943-6
7	209943-7
8	209943-8
9	209943-9
10	1-209943-0
11	1-209943-1
12	1-209943-2
13	1-209943-3
14	1-209943-4
15	1-209943-5
16	1-209943-6
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19	1-209943-9
20	2-209943-0
25	2-209943-5

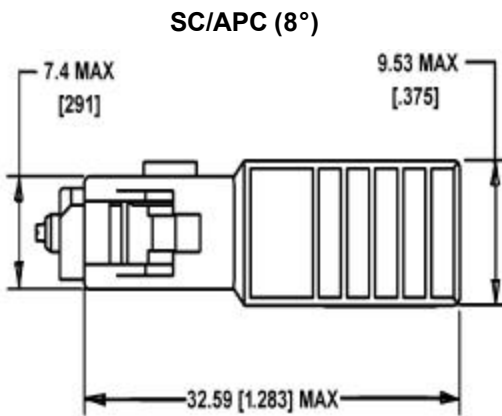
Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .10 x nominal attenuation value  
< 5 dB: ± 0.50 dB

**Bellcore Bandpass Attenuators**

Part Numbers	Bandpass 1260-1360nm & 1430-1580nm
Attenuation (dB)	SC/UPC R ≤ -55 dB
1	209250-1
2	209250-2
3	209250-3
4	209250-4
5	209250-5
6	209250-6
7	209250-7
8	209250-8
9	209250-9
10	1-209250-0
11	1-209250-1
12	1-209250-2
13	1-209250-3
14	1-209250-4
15	1-209250-5
16	1-209250-6
17	1-209250-7
18	1-209250-8
19	1-209250-9
20	2-209250-0
25	2-209250-5

Note: Attenuation Tolerance, Ambient ----  
≥ 5 dB: ± .15 x nominal attenuation value  
< 5 dB: ± 0.75 dB

**Singlemode  
SC Attenuators, Build Out Style  
Fixed Value**



R=Reflectance

Note: Additional attenuation values available upon request.

\*9° APC Available (417496-X)

**Dual Window Attenuators**

Part Numbers	Bandpass 1310/1550nm ±25nm
Attenuation (dB)	SC/APC R ≤ -60 dB
1	209597-1
2	209597-2
3	209597-3
4	209597-4
5	209597-5
6	209597-6
7	209597-7
8	209597-8
9	209597-9
10	1-209597-0
11	1-209597-1
12	1-209597-2
13	1-209597-3
14	1-209597-4
15	1-209597-5
16	1-209597-6
17	1-209597-7
18	1-209597-8
19	1-209597-9
20	2-209597-0
25	2-209597-5

Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .10 x nominal attenuation value  
< 5 dB: ± 0.50 dB

**Bellcore Bandpass Attenuators**

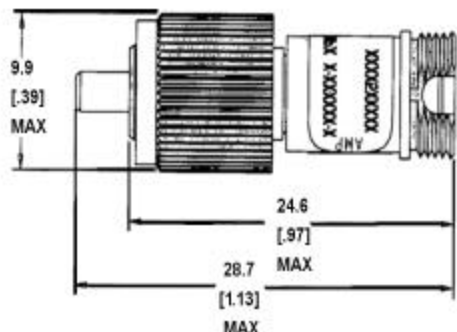
Part Numbers	Bandpass 1260-1360nm & 1430-1580nm
Attenuation (dB)	SC/APC (8°) R ≤ -60 dB
1	417021-1
2	417021-2
3	417021-3
4	417021-4
5	417021-5
6	417021-6
7	417021-7
8	417021-8
9	417021-9
10	1-417021-0
11	1-417021-1
12	1-417021-2
13	1-417021-3
14	1-417021-4
15	1-417021-5
16	1-417021-6
17	1-417021-7
18	1-417021-8
19	1-417021-9
20	2-417021-0
25	2-417021-5

Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .15 x nominal attenuation value  
< 5 dB: ± 0.75 dB



**Singlemode  
FC Attenuators, Build Out Style  
Fixed Value**

**Dual Window and Bellcore Bandpass**



R=Reflectance  
Note: Additional attenuation values available upon request.

**Dual Window Attenuators**

Part Numbers      Bandpass  
1310/1550nm ±25nm

Attenuation (dB)	FC/UPC R ≤ -55 dB
1	209948-1
2	209948-2
3	209948-3
4	209948-4
5	209948-5
6	209948-6
7	209948-7
8	209948-8
9	209948-9
10	1-209948-0
11	1-209948-1
12	1-209948-2
13	1-209948-3
14	1-209948-4
15	1-209948-5
16	1-209948-6
17	1-209948-7
18	1-209948-8
19	1-209948-9
20	2-209948-0
25	2-209948-5

Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .10 x nominal attenuation value  
< 5 dB: ± 0.50 dB

**Bellcore Bandpass Attenuators**

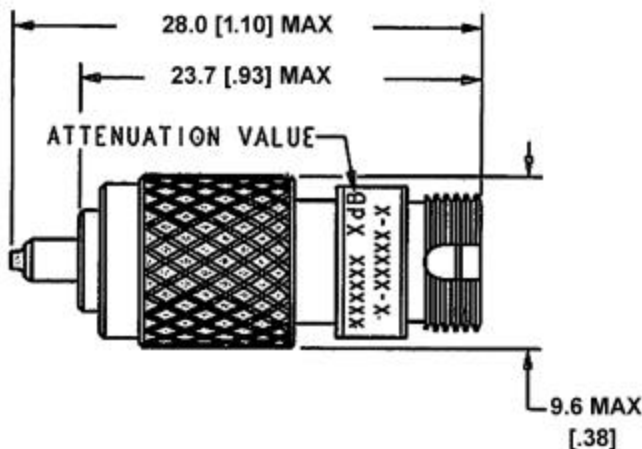
Part Numbers      Bandpass 1260-1360nm  
& 1430-1580nm

Attenuation (dB)	FC/UPC R ≤ -55 dB
1	209285-1
2	209285-2
3	209285-3
4	209285-4
5	209285-5
6	209285-6
7	209285-7
8	209285-8
9	209285-9
10	1-209285-0
11	1-209285-1
12	1-209285-2
13	1-209285-3
14	1-209285-4
15	1-209285-5
16	1-209285-6
17	1-209285-7
18	1-209285-8
19	1-209285-9
20	2-209285-0
25	2-209285-5

Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .15 x nominal attenuation value  
< 5 dB: ± 0.75 dB

**Singlemode  
FC Attenuators, Build Out Style  
Fixed Value**

**FC/APC (8°)**



R=Reflectance  
Note: Additional attenuation values available upon request.

**Dual Window Attenuators**

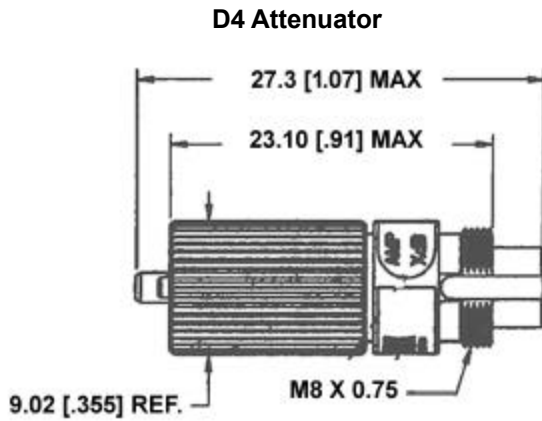
Part Numbers      Bandpass  
1310/1550nm ±25nm

Attenuation (dB)	FC/APC R ≤ -60 dB
1	209845-1
2	209845-2
3	209845-3
4	209845-4
5	209845-5
6	209845-6
7	209845-7
8	209845-8
9	209845-9
10	1-209845-0
11	1-209845-1
12	1-209845-2
13	1-209845-3
14	1-209845-4
15	1-209845-5
16	1-209845-6
17	1-209845-7
18	1-209845-8
19	1-209845-9
20	2-209845-0
25	2-209845-5

Note: Attenuation Tolerance, Ambient ---  
≥ 5 dB: ± .10 x nominal attenuation value  
< 5 dB: ± 0.50 dB



**Singlemode  
D4 Attenuators, Build Out Style  
Fixed Value**



R=Reflectance  
**Note:** Additional attenuation values available upon request.

**Dual Window Attenuators**

Part Numbers	Bandpass 1310/1550nm ±25nm
Attenuation (dB)	D4/PC R ≤ -45 dB
5	209570-5
10	1-209570-0
15	1-209570-5
20	2-209570-0

Note: Attenuation Tolerance, Ambient ---  
 ≥ 5 dB: ± .15 x nominal attenuation value  
 < 5 dB: ± 0.75 dB

## Variable Optical Attenuators

### Features

- Repeatable, variable attenuation from 2 to 40dB
- <-65dB reflectance (unconnectorized)
- Slim design allows dense mounting with easy access to adjustment screw
- Available with standard connector types or unterminated
- Polarization insensitive
- Low modal noise
- Long-term reliability

### Applications

- Test and measurement
- Power attenuation at the receiver
- Power leveling in DWDM transmission systems

### Available Collateral

- Customer Drawings

### Customizable Features

- Lead lengths
- Termination types, including LC, MU, SC, ST, FC

### Singlemode Variable Attenuators

Fiber Conn Type	Part Number	Lead Length
None	107059-1	1.2 meters
FC/PC	107059-2	1.0 meter
SC/PC	107059-5	1.0 meter
ST/PC	107059-6	1.0 meter
FC/SPC	1-107059-2	1.0 meter
SC/SPC	1-107059-5	1.0 meter
FC/APC	209544-1	1.0 meter
FC/UPC	209544-3	1.0 meter
SC/APC	209544-5	1.0 meter
SC/UPC	209544-6	1.0 meter
SC/APC	3-209544-5	3.0 meters
SC/UPC	3-209544-6	3.0 meters
SC/APC SC/UPC	3-209544-7	3.0 meters

### Connector Polish

Polish	Back Reflection
PC	-45 dB
SPC	-50 dB
UPC	-55 dB
APC	-65 dB



The Tyco Electronics' Variable Optical Attenuator achieves high reliability with a specially processed fiber that is conveniently adjusted to varying radii by the user. Cladding modes are well controlled by a specially processed fiber.

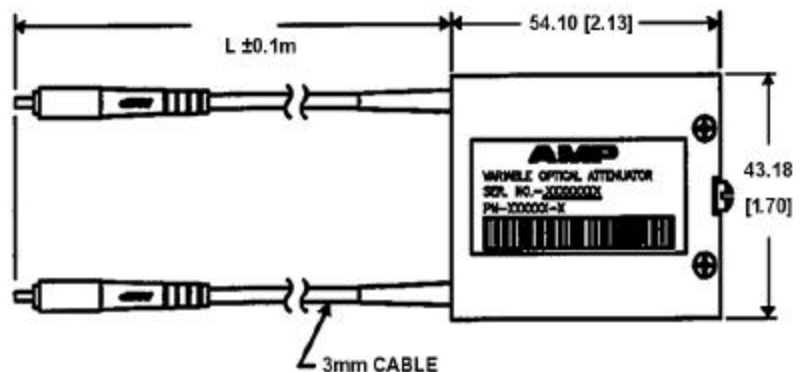
### Specifications

- Minimum Attenuation — < 2dB
- Maximum Attenuation — ≥ 40dB
- Operational Wavelength — 1250-1580nm
- Reflectance — ≤ -65dB unconnectorized

Operating Temperature — -40°C to +75°C

Vibration Resistance — < 0.15 x attenuation setting

Adjustment Resolution — Continuously Adjustable



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For drawings, technical data or samples, contact your Tyco Electronics sales engineer, call 1-800-522-6752, or visit our Website at: [http://www.amp.com/fiberoptics/attenuators/attenuator\\_family.stm](http://www.amp.com/fiberoptics/attenuators/attenuator_family.stm). Specifications subject to change. Consult Tyco Electronics for latest specifications.

## In Line Attenuators

### Product Facts

- A range of fixed attenuation values. Standard values of 1 through 20, and 25 dB
- UPC and APC offer Excellent Return Loss
- Attenuation is wavelength independent and polarization insensitive
- Low PDL
- Low modal noise
- Long term reliability
- <-60dB reflectance (unconnectorized)
- Low cost
- Vibration resistant
- Single and Dual Window
- Designed to comply with Bellcore GR-NWT-00910

### Applications

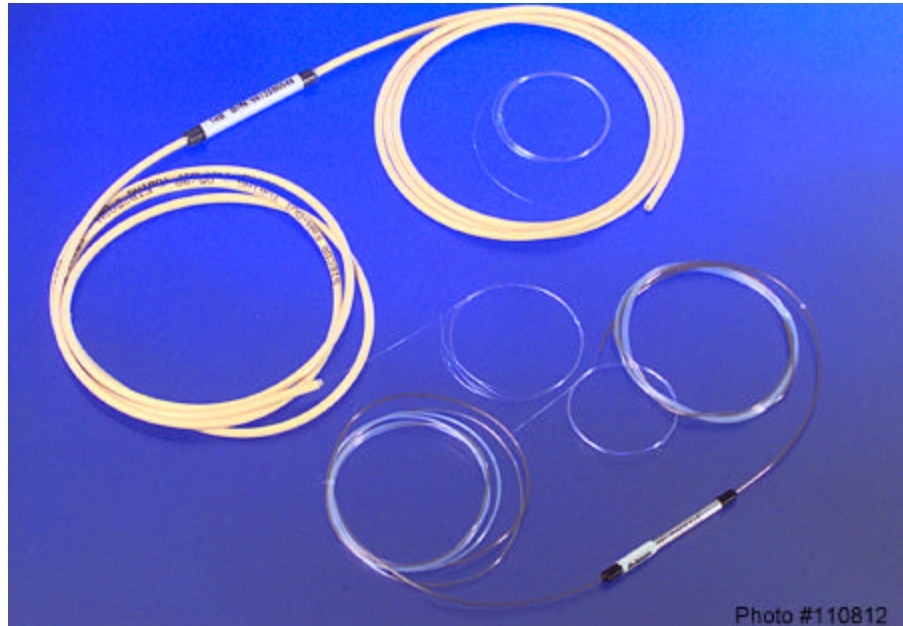
- Power leveling in DWDM transmission systems
- Test and Measurement
- Power attenuation at the receiver

### Available Collateral

- Product designed to meet Bellcore 910
- Customer Drawings

### Customizable Features

- Lead lengths
- Connectorized types, including LC, MU, SC, ST, and FC
- Available in Heavy Duty, Medium Duty, and Light Duty



Tyco Electronics' High Performance In Line Attenuators utilize a unique all fiber construction to absorb the optical signal.

By employing a Tyco Electronics' technology, the design minimizes reflectance, attenuation tolerance and PDL while maximizing reliability, environmental stability, and power handling. There are no filters, air gaps, or core mismatches.

### Specifications

#### Attenuation Values —

1-20dB and 25 dB (Fixed)

#### Reflectance —

<-45dB, -50, -55 and -60dB for PC, SPC, UPC and APC polish respectively

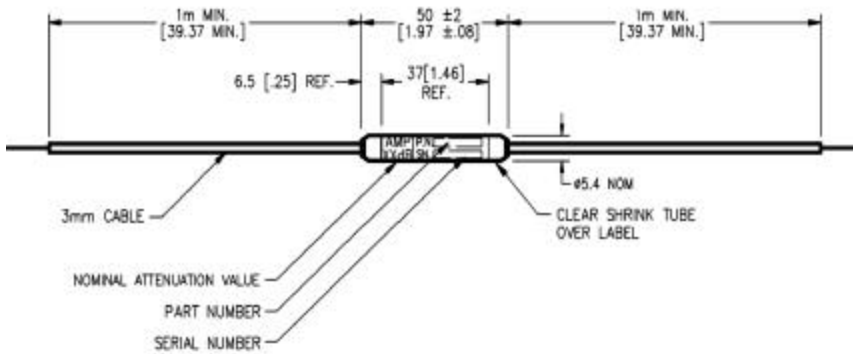
#### Operating Temperature —

-40°C to +75°C

#### Vibration Resistance —

<0.1 x attenuation

**Singlemode  
In Line Attenuators, Heavy Duty  
Fixed Value**



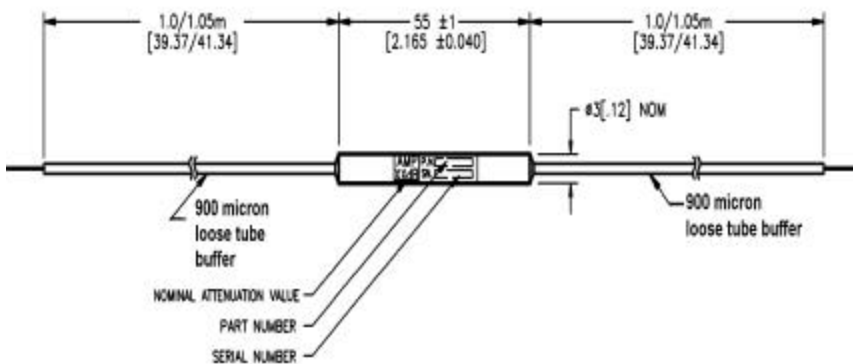
R=Reflectance  
Note: Connectorization available upon request.

**Dual Window In Line Attenuators**

Part Numbers	Bandpass 1310/1550nm ±25nm
	Attenuation (dB)
	R ≤ -60 dB
1	417277-1
2	417277-2
3	417277-3
4	417277-4
5	417277-5
6	417277-6
7	417277-7
8	417277-8
9	417277-9
10	1-417277-0
11	1-417277-1
12	1-417277-2
13	1-417277-3
14	1-417277-4
15	1-417277-5
16	1-417277-6
17	1-417277-7
18	1-417277-8
19	1-417277-9
20	2-417277-0
25	2-417277-5

Note: Attenuation Tolerance, Ambient, 25° C unconnectorized---  
 ≥ 5 dB: ± .10 x nominal attenuation value  
 < 5 dB: ± 0.50 dB

**Singlemode  
In Line Attenuators, Medium Duty  
Fixed Value**



R=Reflectance  
Note: Connectorization available upon request.

**Dual Window In Line Attenuators**

Part Numbers	Bandpass 1310/1550nm ±25nm
	Attenuation (dB)
	R ≤ -60 dB
1	1321273-1
2	1321273-2
3	1321273-3
4	1321273-4
5	1321273-5
6	1321273-6
7	1321273-7
8	1321273-8
9	1321273-9
10	1-1321273-0
11	1-1321273-1
12	1-1321273-2
13	1-1321273-3
14	1-1321273-4
15	1-1321273-5
16	1-1321273-6
17	1-1321273-7
18	1-1321273-8
19	1-1321273-9
20	2-1321273-0
25	2-1321273-5

Note: Attenuation Tolerance, Ambient, 25° C unconnectorized---  
 ≥ 5 dB: ± .10 x nominal attenuation value  
 < 5 dB: ± 0.50 dB

## Loopback Attenuators

### Features

- Fixed attenuation values of 0 to 14 dB. Other attenuation values available
- Simulates FDDI cable plant budget
- Compact package
- Mechanically and environmentally stable
- Wavelength independent

### Applications

- Test an FDDI station
- Attenuate signal at cross-connect panel
- Simulate system optical budget
- Shipping cover for transceiver modules

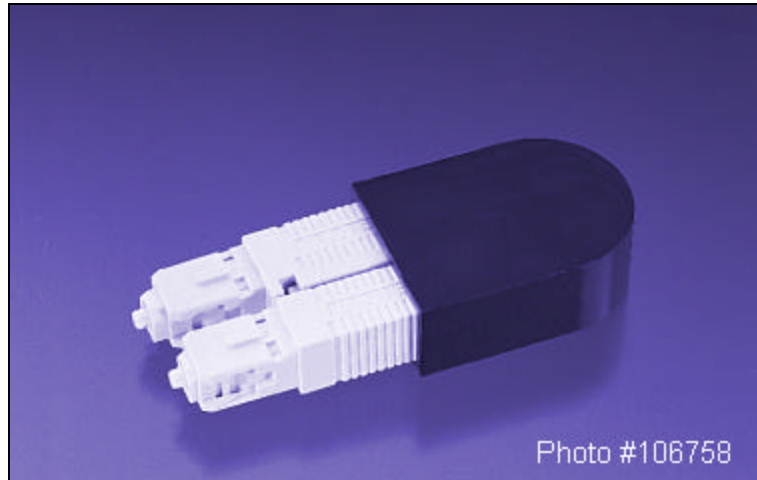


Photo #106758

Tyco Electronics' Loopback Attenuators utilize a unique all-fiber mechanism to cause a fixed attenuation of an optical signal. There are no filters, air-gaps, or core mismatches.

Tyco Electronic's fixed value attenuators use a patented fused fiber technology that relies on the natural physical property of evanescent coupling to create the desired attenuation level.

### Specifications

#### Various Attenuation Values —

0-14 dB (Fixed)

(Others available upon request)

#### Operational Wavelengths —

850, 1310, 1550nm

#### Operating Temperature —

-40°C to +75°C

#### Weight —

<1 oz.

#### Part Numbers      Operating Wavelength 600-1600nm Tested @ 1310nm

Attenuation (dB)	Fiber Size 62.5/125
0	417338-1
3	417338-3
6	417338-6
9	417338-9
11	1-417338-1
14	1-417338-4

Note: Attenuation Tolerance, Ambient:  
= ± 15%

Except 0 dB = + 0.6dB  
3 dB = ± 0.6dB  
6 dB = ± 1.0dB

#### Part Numbers      Operating Wavelength 600-1600nm Tested @850 nm

Attenuation (dB)	Fiber Size 62.5/125
0	417355-1
5	417355-5
6	417355-6

Note: Attenuation Tolerance, Ambient:

0 dB = + 0.6dB  
5 dB = ± 0.75dB  
6 dB = ± 1.0dB

