Coarse Wavelength Division Multiplexing (CWDM) Solutions

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Features and Benefits

Passive and outside plant hardened
No power or temperature-controlled environment required

Epoxy-free optical path
Higher reliability

Low insertion loss and high isolation
Minimum impact on insertion loss budgets and lower transmission costs

Transport protocol independent
Flexibility

Corning coarse wavelength division multiplexing solutions (CWDM) multiplexers and demultiplexers utilize advanced thin-film-filter technology designed for use with less expensive, non-temperature controlled lasers. CWDM filters are available in industry-standard 20 nm spacing with options for a 1310 nm RF overlay bypass as well as single or bidirectional test ports.

Packaging options include stand-alone single filters for quick splicing into existing splice trays as well as multiple preconnectorized, wavelength color-coded and clearly labeled headend (HE) and outside plant (OSP) platforms that make the installation and wavelength management a much easier task.

Standards

Approvals and Listings Telcordia qualified

Single-width (ECL) and Double-width (EC2) Eclipse Hardware Modules | Photo ICH106

LDC Module (LGX-compatible) with LC APC Adapters | Photo CRR470

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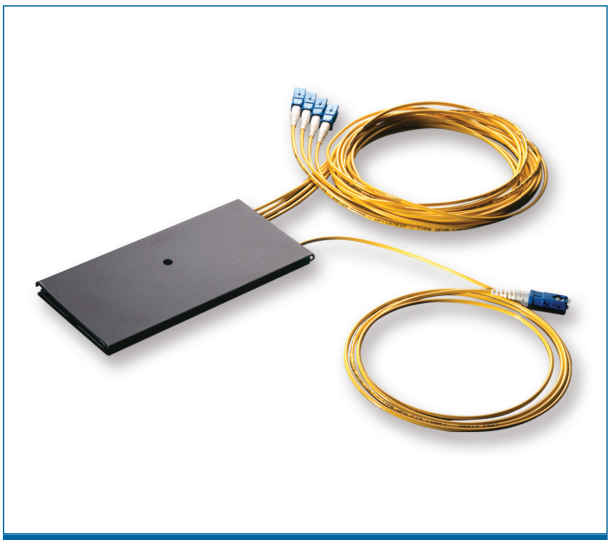

Cassette
| Photo CNPS1523

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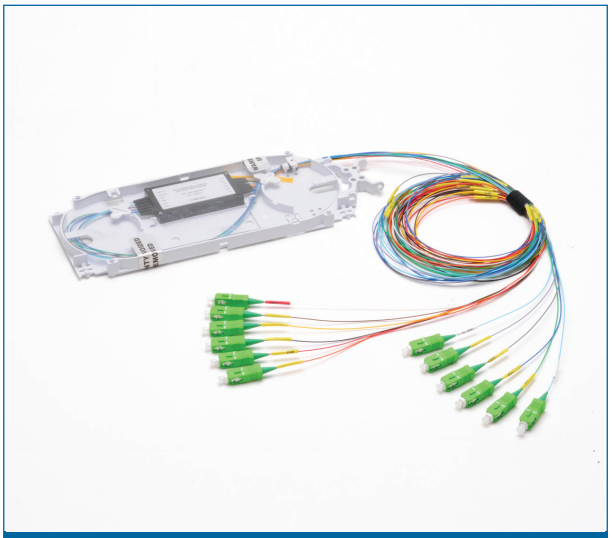
CWDM Cassettes for Sealed Outdoor Applications

CWDM cassettes are available in many formats.
1. Sheet Metal Cassette, preconnectorized with connectors of choice and 2.0 mm pigtails for use in Corning UCAO OptiSheath® sealed terminal.
2. Sheet Metal Cassette, not connectorized, with 250 µm fiber legs protected by color-coded buffer tubes for use in closure platform.
3. FOSC Tray, connectorized with connectors of choice or 250 µm color-coded and labeled pigtails.
4. FOSC “B” Basket, connectorized with connectors of choice or 250 µm color-coded and labeled pigtails.

The sheet metal cassette provides added vibration protection and improved strain-relief features that make Corning CWDM cassettes suitable for the most stringent OSP environments. FOSC-type platforms have been modified to improve strain-relief and ensure CWDM devices are vibration proof.

Labeling and pigtail color coding is of utmost importance when installing CWDMs. Corning cassettes identify each wavelength by color, and labeling is added to each individual pigtail at a predetermined spacing. This adds craft-friendliness to wavelength management and installation. See color code/wavelength table at right.



FOSC Tray "A" with Color-Coded, Labeled and Connectorized Pigtails | Photo TRCLS035

Wavelength		Fiber color
1270	1470	Slate
1290	1490	Violet
1310	1510	Blue
1330	1530	Green
1350	1550	Yellow
1370	1570	Orange
1390	1590	Red
1410	1610	Brown
1430		White
1450		Black
Test Rx		Rose
Test Tx		Aqua
COM		White
EXP		Black
Y		Slate
W		Slate
T		Slate

Color Codes for CWDM Wavelengths

Coarse Wavelength Division Multiplexing (CWDM) Solutions

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Part Number	Description	Units per Delivery
C2ANC04BEYZZUN	CWDM, cassette, UCA, mux OR demux, 1470-1530 + 1310, 250 µm legs in 3 m transport tube, 8.2 x 3.57 x 0.3 in (L x W x H)	1/1
C2ANC04FJ-ZZUN	CWDM, cassette, UCA, mux OR demux, 1550-1610, 250 µm legs in 3 m transport tube, 8.2 x 3.57 x 0.3 in (L x W x H)	1/1
C216C44JF-ZZUN	CWDM, cassette, UCA, mux AND demux, 1610-1550, non-connectorized 2 mm pigtails, 1 m, 8.2 x 3.57 x 0.3 in (L x W x H)	1/1
C6ANC08BJ-ZZUN	CWDM, cassette, FOSC "A", mux OR demux, 1470-1610, 250 µm legs in transport tube, 10.2 x 3.81 x 0.52 in (L x W x H)	1/1
C3ANC08BJ-ZZUN	CWDM, cassette, FOSC "D", mux OR demux, 1470-1610, 250 µm legs in transport tube, 10.2 x 3.81 x 0.52 in (L x W x H)	1/1

Note: For additional information, contact your Corning Customer Care Representative at 800-743-2675.

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Coarse Wavelength Division Multiplexing (CWDM) Solutions

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Inside Plant Product Platforms

Rack-Mounted Hardware

Rack-mountable CWDM product sets are engineered around Corning hardware platforms, including Eclipse®, LDC and ACH™ families. These housings may utilize modules with either SC APC or LC APC connectors for increased density. Preconnectorized cassettes or splice cassettes provide the operator with an organized and functional CWDM-capable headend (HE).

Note: For more information on Eclipse hardware, reference specification sheet EVO-461-EN.

Eclipse Hardware
| Photo FOH085

Part Number	Description	Units per Delivery
CAX6C06UEYZZUT	CWDM, module, Eclipse, mux OR demux, 1430-1530 + 1310 with 95/5 test port, SC APC	1/1
CAX6C04BEYZZUN	CWDM, module, Eclipse, mux OR demux, 1470-1530 + 1310, SC APC	1/1
CAX6C04EBYZZUN	CWDM, module, Eclipse, mux OR demux, 1530-1470 + 1310, SC APC	1/1
CCXB322MZ-FZUN	CWDM, module, LDC (platinum), mux AND demux, 1310 & 1550, Duplex LC APC	1/1

Note: For additional information, contact your Corning Customer Care Representative at 800-743-2675.

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Inside Plant Product Platforms (continued)

Eclipse® Hardware CWDM Shelf

The Eclipse hardware CWDM shelf is a convenient and cost-effective way to provide CWDM multiplexers/de-multiplexers in an indoor rack-mount environment where space is limited to one or two rack units. The Eclipse hardware CWDM shelf is capable of 22 SC simplex or 32 SC duplex adapter ports per rack and up to 44 adapter ports with LC duplex connectors in any multiplexer/de-multiplexer.

Note: For more information on Eclipse hardware, reference specification sheet EVO-461-EN.

High-Density Coupler/Splitter Shelf with SC APC Adapters

CWDM Module Capacities

	Single-Wide		Double-Wide	
	Mux OR Demux	**Mux AND Demux**	**Mux OR Demux**	**Mux AND Demux**
Eclipse*	Up to 5 ch with SC Up to 12 ch with LC	Up to 4 ch (22) with SC Up to 10 ch (55) with LC	Up to 12 ch with SC Up to 26 ch with LC	Up to 10 ch (55) with SC Up to 24 ch (99) with LC
ACH**	Up to 4 ch with SC Up to 10 ch with LC	Up to 2 ch (11) with SC Up to 8 ch (44) with LC	N/A	N/A
LDC*	Up to 5 ch with SC Up to 12 ch with LC	Up to 4 ch (22) with SC Up to 10 ch (55) with LC	Up to 12 ch with SC Up to 26 ch with LC	Up to 11 ch (55) with SC Up to 24 ch (99) with LC
SCA	Up to 6 ch with SC Up to 14 ch with LC	Up to 4 ch (22) with SC Up to 12 ch (66) with LC	N/A	N/A

**7 SC or LC duplex adapters in single-wide.*
14 SC or LC duplex adapters in double-wide.

***6 SC or LC duplex adapters.*

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Part Number	Description	Units per Delivery
CFX6CA6KP-SJUT	CWDM, Eclipse®, 1U shelf, mux OR demux, 1270-1350, 1410-1610 with 95/5 test port, SC APC	1/1
CFX6C88KNYSBUD	CWDM, Eclipse, 1U shelf, mux AND demux, 1270-1330, 1410-1470 + 1310 with bi-directional 99/1 test port, SC APC	1/1
CHX6C04KJ-ZZUN	CWDM, 1U shelf, LDC (LGX® compatible-platinum), mux OR demux, 1270-1610, SC APC	1/1
CHX6C04JB-ZZUN	CWDM, 1U shelf, LDC (LGX compatible-platinum), mux AND demux, 1610-1470, SC APC	1/1
CTX6C04VJ-ZZUT	CWDM, Centrix Cassette, 4 Quadplexers,1310/1490,1550,1610, SC APC, 95/5 Test port	1/1

Note: For additional information, contact your Corning Customer Care Representative at 800-743-2675.

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Coarse Wavelength Division Multiplexing (CWDM) Solutions

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CWDM Single Filter for Indoor/ Outdoor Applications

Corning single filters are an excellent choice in low-density customer applications where wavelength management is minimally required. Filters are typically used in splice closures where splice trays already exist or may be easily added. The common and individual wavelength legs are spliced as necessary in either a mux or demux configuration.

Labeling and pigtail color coding are of utmost importance when installing CWDMs. Corning single-channel filters identify each wavelength by an individual color. This adds craft-friendliness to wavelength management and installation. See color code/wavelength table at right.

Wavelength		Fiber color
1270	1470	Slate
1290	1490	Violet
1310	1510	Blue
1330	1530	Green
1350	1550	Yellow
1370	1570	Orange
1390	1590	Red
1410	1610	Brown
1430		White
1450		Black
Test Rx		Rose
Test Tx		Aqua
COM		White
EXP		Black
Y		Slate
W		Slate
T		Slate

Color Codes for CWDM Wavelengths

Part Number	Description	Units per Delivery
CXANC01BZ-ZZUN	Single Channel, CWDM Filter 1470 nm, 250U	1/1
CXANC01CZ-ZZUN	Single Channel, CWDM Filter 1490 nm, 250U	1/1
CXANC01DZ-ZZUN	Single Channel, CWDM Filter 1510 nm, 250U	1/1
CXANC01EZ-ZZUN	Single Channel, CWDM Filter 1530 nm, 250U	1/1
CXANC01FZ-ZZUN	Single Channel, CWDM Filter 1550 nm, 250U	1/1
CXANC01GZ-ZZUN	Single Channel, CWDM Filter 1570 nm, 250U	1/1
CXANC01HZ-ZZUN	Single Channel, CWDM Filter 1590 nm, 250U	1/1
CXANC01JZ-ZZUN	Single Channel, CWDM Filter 1610 nm, 250U	1/1

Note: For additional wavelengths, contact your Corning Customer Care Representative at 800-743-2675.

Coarse Wavelength Division Multiplexing (CWDM) Solutions

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CWDM specifications |

Single-Channel CWDM Devices – Unconnectorized	
Parameters	
Operating Temperature	-40˚ to +85˚C
Storage Temperature	-40˚C
Optical Power	< 23 dBm
Center Wavelengths	1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611
Channel Spacing	20 nm
Channel Passband	± 6.5 nm
Transmitted Insertion Loss	≤ 0.8 dB
Reflected Insertion Loss	≤ 0.5 dB
Adjacent Channel Isolation	≥ 35 dB
Non-Adjacent Channel Isolation	≥ 40 dB
Express Channel Isolation	≥ 15 dB
Directivity	≥ 50 dB
Return Loss	≥ 45 dB
Polarization Dependent Loss	≤ 0.1 dB
Polarization Mode Dispersion	≤ 0.1 dB
Ripple	≤ 0.5 dB

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Multi-channel CWDM Connectorized – Concatenated			
Parameters	**4 Channel**	**8 Channel**	**16 Channel**
Operating Temperature	-40˚ to +85˚C	-40˚ to +85˚C	-40˚ to +85˚C
Central Wavelengths (nm)	1271, 1291, 1301, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611		
Mux and Demux with Connectors			
Channel Spacing (nm)	20	20	20
Channel Passband (nm)	± 6.5	± 6.5	± 6.5
Ripple within passband (dB)	≤ 0.5	≤ 0.5	≤ 0.5
CWDM Channel Insertion Loss (dB)	≤ 2.2	≤ 3.8	≤ 4.5
Optical Express Channel Insertion Loss (dB)	≤ 1.9	≤ 3.5	≤ 3.9
Non-Adjacent Channel Isolation (dB)	≥ 40	≥ 40	≥ 40
Adjacent Channel Isolation (dB)	≥ 30	≥ 30	Ri
Directivity (dB)	≥ 50	≥ 50	≥ 50
Return Loss (dB)	≥ 45	≥ 45	≥ 45
Polarization Dependent Loss (dB)	≤ 0.1	≤ 0.15	≤ 2.0
Polarization Mode Dispersion (dB)	≤ 0.1	≤ 0.1	≤ 0.1
Mux and Demux with Connectors and 1310 nm port			
CWDM Channel Insertion Loss	≤ 2.6	≤ 4.2	≤ 4.9
Isolation of 1310 nm channel	≥ 40	≥ 40	≥ 40
Mux and Demux with Connectors and 1 percent monitoring port			
CWDM Channel Insertion Loss	≤ 2.7	≤ 4.3	≤ 5.0
Monitoring Port Insertion Loss*	≤ 24	≤ 24	≤ 24

*Notes: *Monitor port insertion loss = Measurement from Mon port - Measurement from Com port*
Methodology for calculating the specification for multiple channel CWDM devices
Reflect IL 0.4 dB – Pass IL 0.7 dB – Connectors (pair) IL 0.3 dB

Examples:

A 4 channel CWDM. Maximum IL = 0.4 x3 + 0.7 = 1.9 dB, when it is with connector the maximum IL = 1.9 + 0.3 = 2.2 dB
An 8 channel CWDM. Maximum IL = 0.4 x 7 + 0.7 = 3.5 dB, when it is with connector the maximum IL = 3.5 + 0.3 = 3.8 dB

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CWDM Specifications Connectorized Compact						
Parameters	**4 channel**	**8 channel**	**16 channel**	**4 channel**	**8 channel**	**16 channel**
Operating Temperature	-40° to +85° C			-10° to +60° C		
Central Wavelengths (nm)	1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611			1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611		
Mux and Demux with Connectors						
Channel Spacing (nm)	20	20		20	20	
Channel Passband (nm)	± 6.5	± 6.5		± 6.5	± 6.5	
Ripple within Passband (dB)	≤ 0.5	≤ 0.5		≤ 0.5	≤ 0.5	
CWDM Channel Insertion Loss (dB)	≤ 1.8	≤ 2.1		≤ 1.6	≤ 1.9	
Optical Express Channel Insertion Loss (dB)	≤ 1.8	≤ 2.1		≤ 1.6	≤ 1.9	
Non-Adjacent Channel Isolation (dB)	≥ 45	≥ 45		≥ 45	≥ 45	
Adjacent Channel Isolation (dB)	≥ 30	≥ 30		≥ 30	≥ 30	
Directivity (dB)	≥ 50	≥ 50		≥ 50	≥ 50	
Return Loss (dB)	≥ 45	≥ 45		≥ 45	≥ 45	
Polarization Dependent Loss (dB)	≤ 0.2	≤ 0.2		≤ 0.2	≤ 0.2	
Polarization Mode Dispersion (dB)	≤ 0.2	≤ 0.2		≤ 0.2	≤ 0.2	
Mux and Demux with Connectors and 1310 nm port						
CWDM Channel Insertion Loss	≤ 2.0	≤ 2.3		≤ 1.8	≤ 2.1	
Isolation of 1310 nm channel	≥ 40	≥ 40		≥ 40	≥ 40	
Mux and Demux with Connectors and 5 percent monitoring port						
CWDM Channel Insertion Loss	≤ 2.2	≤ 2.5		≤ 2.0	≤ 2.3	
Monitoring Port Insertio Loss	≤ 15.5	≤ 15.5		≤ 15.5	≤ 15.5	
Mux and Demux with Connectors and 1 percent monitoring port						
CWDM Channel Insertion Loss	≤ 2.2	≤ 2.5		≤ 1.9	≤ 2.2	
Monitoring Port Insertio Loss	≤ 24	≤ 24		≤ 24	≤ 24	

Notes: Monitor port insertion loss = Measurement from Mon port - Measurement from Com port
Methodology for calculating the specification for multiple channel CWDM devices
Reflect IL 0.4 dB – Pass IL 0.7 dB – Connectors (pair) IL 0.3 dB

Examples:
A 4 channel CWDM. Maximum IL = 0.4 x3 + 0.7 = 1.9 dB, when it is with connector the maximum IL = 1.9 + 0.3 = 2.2 dB
An 8 channel CWDM. Maximum IL = 0.4 x 7 + 0.7 = 3.5 dB, when it is with connector the maximum IL = 3.5 + 0.3 = 3.8 dB

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Ordering Information

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1 2 3 4 5 6 7 8

1 Select product family.

Cassettes
T = Centrix™ platform

Modules
A = Eclipse® module
B = ACH module
C = LDC module
D = SCA module

Shelves
F = 1U Eclipse shelf
H = 1U LDC shelf
J = 2U Eclipse shelf

Splice Cassettes
1 = SCA cassette
2 = UCA cassette
3 = FOSC D tray
5 = FOSC B basket
6 = FOSC A tray

Device Only
X = Single/Compact

2 Select fiber type and length (applies to cassettes only).

X = Standard configuration for modules, shelves and Centrix platform
A = Cassettes/single filter with 250 µm fiber legs, 3 m
2 = 2 mm cable pigtail, 2 m
E = 900 µm, 1 m (for single and compact device only)

3 Select connector type.

NC = Non-connectorized (cassettes only)
3C = SC UPC simplex (3C)
6C = SC APC simplex (6C)
A9 = SM UPC LC duplex adapters*
B3 = SM APC LC duplex adapters*
**Not available for cassettes*

4 Select number of channel devices.

01 = 1 device mux or demux
02 = 2 devices mux or demux
03 = 3 devices mux or demux
04 = 4 devices mux or demux
05 = 5 devices mux or demux
06 = 6 devices mux or demux
07 = 7 devices mux or demux
08 = 8 devices mux or demux
09 = 9 devices mux or demux
10 = 10 devices mux or demux
A1 = 11 devices mux or demux
A2 = 12 devices mux or demux
A3 = 13 devices mux or demux
A4 = 14 devices mux or demux
A5 = 15 devices mux or demux
A6 = 16 devices mux or demux
A7 = 17 devices mux or demux
A8 = 18 devices mux or demux
A9 = 19 devices mux or demux
BO = 20 devices mux or demux
11 = 1 device mux and demux
22 = 2 devices mux and demux
33 = 3 devices mux and demux
44 = 4 devices mux and demux
55 = 5 devices mux and demux
66 = 6 devices mux and demux

5 Select first range of two adjacent wavelengths (channels must be consecutive).

Z = No wavelength

K = 1270	A = 1450
L = 1290	B = 1470
M = 1310	C = 1490
N = 1330	D = 1510
P = 1350	E = 1530
Q = 1370	F = 1550
R = 1390	G = 1570
S = 1410	H = 1590
U = 1430	J = 1610

T = Triplexer (1310 + 1490/1550)
W = 1310/1550
VH = 1590 Quadplexer
VJ = 1610 Quadplexer

6 Select 1310 option.

- = No 1310 WDM option
Y = With 1310 option

7 Select second range of two adjacent wavelengths (channels must be consecutive).

Z = No wavelength

K = 1270	A = 1450
L = 1290	B = 1470
M = 1310	C = 1490
N = 1330	D = 1510
P = 1350	E = 1530
Q = 1370	F = 1550
R = 1390	G = 1570
S = 1410	H = 1590
U = 1430	J = 1610

8 Select test port.

T = Single 95/5 test port
D = Bi-directional 99/1 test port
N = No test port

Notes:
1) For selections 5 & 7, must choose a total of 4 digits — 2 for each set of adjacent wavelengths; wavelengths not to exceed total number of channels chosen in Selection 4.
2) If choosing mux OR demux channels, wavelength digit "Z" (no wavelength) will be chosen for one or more of the 4 wavelength digits.
3) *Choose the number of devices in '4' For instance 3 quadplexers, or 4 'W' devices e.t.c*

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Notes

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