DrakaElite™ Compact NDCM Low Loss C-Band

Best compromise between insertion loss, non-linear effects and residual dispersion

Specialty Fiber

Issue date: 12/09
Supersedes: 05/09

Product Type: Compact Dispersion Compensation Module for G.652 SMF in C-Band

For the Telecommunication industry

- Chromatic Dispersion Compensation in Telecommunications networks

VALUE INNOVATION

Value Innovation is a way of looking at the world. How we can help our customers do more, make more, save more, achieve more.

DrakaElite

Dispersion Compensation Module for G.652 type of Single-Mode Fiber in C$^+$-band

Draka's Dispersion Compensating Modules are based on Dispersion Compensating Fibers, specially developed by Draka Communications, using proprietary processes. Thanks to its more than ten-year long experience, Draka Communications is able to accurately manufacture complex index-profile shapes that have the best compromise between insertion loss, non-linear effects and residual dispersion over the whole C+-band for G.652 type single-mode fibers. The extended C+-band ranges from 1529 to 1569 nm.

Package and connectors

Dispersion Compensating Modules standard dimensions are 224 x 238 x 45 mm^3. Available on request for compensation up to 140 km.
The standard modules are delivered with input and output MU/SPC connectors. Other connectors are available on request.

Draka's DC Modules comply with or exceed the following requirements/directives: Telcordia GR-2854-CORE, EC 2002/96/EC (WEEE directive), EC 2002/95/EC (RoHS directive)

Features	Benefits
Low insertion loss	Increased optical signal-to-noise ratio margins
Low polarization mode dispersion	Reduced signal spreading and distortion due to polarization effects
Reduced non-linear effect	Reduced interference, distortion and attenuation of signals due to non-linearity
Low residual dispersion	All WDM channels experience the same, optimized dispersion management in the C$^+$-Band

Draka Communications
fibersales@draka.com
www.drakafiber.com | www.draka.com

Netherlands: Tel: +31 (0)40 29 58 700 Fax: +31 (0)40 29 58 710
France: Tel: +33 (0)3 21 79 49 00 Fax: +33 (0)3 21 79 49 33
USA: Toll free: 800-879-9862 Outside US: +1.828.459.9787 Fax: +1.828.459.8267

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Common Specifications

The following parameters are applicable to all the Dispersion Compensation Module series whatever the length of G.652 type single-mode fiber to compensate. These parameters are guaranteed during 20 years operating life and over the full range of operating conditions. These parameters are guaranteed over the whole C⁺-band.

Residual Dispersion	**Typical**	**Max. Value**
Residual Dispersion	0.1 ps/(nm.km)	0.4 ps/(nm.km)
Polarization Dependent Loss		
Polarization Dependent Loss		0.1 dB
Multi Path Interference		
Multi Path Interference		- 45 dB

Key Optical Specifications

The following parameters depend on the module's size. These parameters are guaranteed during 20 years operating life and over the full operating conditions. Other lengths are available on request up to a compensation of 140 km of G.652 type single-mode fibers.

Length (km)	**Dispersion (ps/nm)**		
	1530 nm	1550 nm	1569 nm
3	- 47 ± 1	- 50 ± 1	- 53 ± 1
10	- 156 ± 4	- 167 ± 4	- 178 ± 4
20	- 312 ± 8	- 335 ± 8	- 356 ± 8
30	- 467 ± 12	- 502 ± 12	- 535 ± 12
40	- 623 ± 16	- 669 ± 16	- 713 ± 16
60	- 935 ± 24	- 1004 ± 24	- 1069 ± 24
80	- 1246 ± 32	- 1339 ± 32	- 1426 ± 32
100	- 1558 ± 40	- 1673 ± 40	- 1782 ± 40

Length (km)	**Insertion Loss over the whole C⁺-Band (dB)**	
	Typical	Max.
3	1.8	2.2
10	2.3	2.7
20	2.6	3.4
30	3.2	4.1
40	3.9	4.8
60	5.1	6.1
80	6.5	7.5
100	7.7	8.9

Length (km)	**Wavelength Dependent Loss (dB)**	
	Typical	Max.
3	0.3	0.5
10	0.3	0.5
20	0.3	0.5
30	0.3	0.5
40	0.3	0.5
60	0.3	0.5
80	0.3	0.64
100	0.3	0.69

Key Optical Specifications

Length (km)	**Polarization Mode Dispersion (ps)**		**Non-linear effect quality figure at 1550 nm (dB)**
	Typical	Max.	Max.
3	0.11	0.17	2.0
10	0.15	0.29	7.3
20	0.2	0.4	10.7
30	0.25	0.48	12.9
40	0.3	0.55	14.5
60	0.4	0.66	17.2
80	0.5	0.75	19.3
100	0.6	0.83	21.2

The Non-Linear Effect Quality[1, 2] takes into account the non-linear effect and insertion loss of the module.
Its definition is given by the following formula:

$$NLEQF = IL + 10Log(NLC)$$

$$NLC = 100\frac{n_2}{A_{eff}\alpha_{DCF}10^{\frac{\Gamma}{10}}}\left[1-10^{\frac{D_{DCM}}{10FOM_{DCM}}}\right]$$

$$IL = 2\Gamma - \alpha_{DCF}\frac{D_{DCF}}{D_{DCM}}$$

$$FOM_{DCF} = -\frac{D_{DCF}}{\alpha_{DCF}}$$

n_2 is the non linear coefficient (10^{-20} m²/W)
A_{eff} is the effective area (µm²)
α_{DFC} is the attenuation of the DC fiber (dB/km)
Γ is the splice loss between pigtail and DC fiber (dB)
D_{DCM} is the dispersion of the DC fiber (ps/nm)
L_{DCF} is the length of the DC fiber (km)
FOM_{DCF} is the figure of merit of the DC fiber (ps/(nm.dB))

Environmental Specifications

Operating	**Min. Value**	**Max. Value**
Case Temperature	- 5°C	+ 70°C
Relative humidity, non-condensing 50% RH max. at > 45°C	5 %	95 %
Optical power handling	+ 15 dBm	

Storage and transportation	**Min. Value**	**Max. Value**
Temperature	- 40°C	+ 85°C
Relative humidity, non-condensing 50% RH max. at > 45°C	5 %	100 %

[1] *P. Sillard et al., OFC'04, Los Angeles, FA3, (2004)*
[2] *J.-C. Antona and P.Sillard, OFC'06, Anaheim, OWJ2, (2006)*

How can we be of service to you?

Value Innovation is a way of looking at the world. How can we help our customers do more, make more, save more, achieve more?
Take DrakaElite™. Based on our proprietary manufacturing process and our control of all technological building blocks, we offer an extensive portfolio of specialized optical fibers that have been designed, developed, manufactured and tested for every environment. Whether you want to guide, amplify, transmit, process, control or sense light, Draka has the fiber you need, whatever your environment. And if for some reason we don't have exactly what you need, well, we'll just make it.
That's Value Innovation in action.

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fibersales@draka.com
www.drakafiber.com | www.draka.com