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Specialty Fiber

DrakaElite™ Dispersion Compensating Modules

Powered by Draka's plasma technologies

Dispersion Compensating Fibers and Modules take benefit of Draka more than 10 years long experience in this field, to offer the best compromise between insertion loss, non-linear effects and residual dispersion over the C^{+} or L bands for the most popular ITU-T fiber types.

Features	Advantages
Low insertion loss	Increases optical signal-to-noise ratio margins
Low PMD	Reduces total PMD, permits longer reach
Reduced non-linear effect	Reduces interference, distortion and attenuation of signal due to non-linearity
Low residual dispersion	Optimizes dispersion management in the C+ -band, all WDM channels experience the same chromatic dispersion
Standard dual acrylate coating	Provides superior life time

Did you know?

Draka is using its proprietary Plasma Chemical Vapor Deposition process (PCVD) to manufacture its dispersion compensating fibers. The PCVD process offers unrivalled ability to manufacture complex index profile shapes. It has made Draka the undisputed champion of ultrahigh bandwidth gradient index multimode fibers. Thanks to PCVD it is possible to design and manufacture optical fiber able to compensate dispersion and slope of any type of SMF or NZDSF while using one single type of dispersion compensating fiber per DCM; to the immediate benefit of the insertion loss, PMD, compactness and costs.

Draka Communications
fibersales@draka.com
www.draka.com/communications

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

Negative dispersion modules

Draka offers a DCM solution for the most popular ITU-T optical fibers. Thanks to the Draka proprietary PCVD process, only one compensating fiber is needed per module. The optical path way is accordingly perfectly symmetric. PMD, insertion loss and residual dispersion are kept at the best state-of-the-art level.

Type of transmission fiber compensated	Corresponding ITU-T recommandation	Compensated band*	Compensated length (min / max)	Insertion Loss (module, typical, dB)	Residual dispersion (typical, ps/nm.km)
SMF	G.652	C^+	Min: 3 km / Max: 140 km	1.8 / 7.7	≤ 0.1
BendBright-XS**	G.652.D / G.657.A2	C^+	Min: 3 km / Max: 140 km	1.8 / 7.7	≤ 0.1
LongLine**	G.654.B	C^+	Min: 3 km / Max: 120 km	1.8 / 7.7	≤ 0.1
TeraLight**	G.655.E / G.656	C^+	Min: 10 km / Max: 200 km	3.0 / 10.5	upon request
Large A_{eff} NZ-DSF	G.655.D	C^+	Min: 10 km / Max: 150 km	1.8 / 7.7	≤ 0.3

* C^+: 1530 – 1569 nm or 1528 – 1565 nm; compensation in other bands upon request

** BendBright-XS, LongLine and TeraLight are registered trade marks of Draka

Positive dispersion modules

Draka offers best-in-class positive dispersion compensating modules, especially for the long lengths (>60km) for which a specific dispersion compensating fiber has been developed, allowing very low state-of-the-art insertion loss & PMD in small physical dimension modules.

Type of transmission fiber compensated	Corresponding ITU-T recommandation	Compensated band	Compensated length** (min / max)	Insertion Loss (module, typical, dB)	Residual dispersion (typical, ps/nm.km)
Negative NZ-DSF	G.655.C	Sub-band compensation in C- or L-band	Min: 3 km / Max: 80 km	0.9 / 13.5	na*

* na: non applicable ; ** equivalent SSMF length

Housings and connectors

As standard DCMs come with Mu or LC connectors and metallic housings. Housings have been specifically designed to preserve optical components for mechanical ingressions and to cope with standards rack. Options include other housing design, EEPROM memory and several types of connectors.

Standard dimensions* (L x l x h_1 /h_2 /h_3 mm^3)	Max **SMF** length compensated (km)	Max **Large A_{eff} NZ-DSF** length compensated (km)	Max **Negative NZ-DSF** compensated (km**)	Max length compensated other fiber (km)	**Connectors***/ EEPROM**
220 x 225 x 45	120	150	/	Upon request	Mu / No
245 x 235 x 18.5 /41 /63.5	20 /100 /140	- - / 120/ - -	/	Upon request	LC / Yes
220 x 225 x 45 /95 /145	/	/	15 /40 /80	Upon request	Mu / No

* Other dimensions on request; ** equivalent SSMF length; *** Other connectors on request

Dispersion compensating modules guide

The first parameter to consider when selecting dispersion compensating modules is obviously the type of transmission fiber compensated. Draka is offering a solution for the most popular ITU-T optical fiber types (G.65x series). The residual dispersion, the lower the better, characterizes the ability of the DCM to compensate for the dispersion slope of the transmission fiber. It finally dictates the bit rate and the bandwidth that can be used. All in it, it impacts the total capacity.

Further insertion loss (IL), polarization mode dispersion (PMD) and other non-linear properties are of primary importance. Modules IL and PMD contribution to the overall loss and PMD budget are not negligible. In the early ’00, Draka has defined a non-linear effect quality figure (NLEQF) for negative dispersion compensation modules [1]. It takes into account both added-loss impact and nonlinear induced impairments.

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

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

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

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

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))

NLEQF accurately characterizes DCM impact on system performance [2]. Reduction of NLEQF can be directly translated into increase of achievable distance or into extra margins in systems. Therefore Draka designs aim at minimizing NLEQF rather than improving one single DCM parameter.

[1] P. Sillard et al., Simple criterion of quality to evaluate DCM impact on WDM system performance, OFC’04, paper FA3

[2] J.C. Antona, P. Sillard, Relationship between the Achievable Distance of WDM Transmission Systems and Criterion of Quality for DCM, OFC’06, paper OWJ2

Common Specifications

Environmental Specifications – Operating	
Case temperature	- 5 to + 70 ℃
Relative humidity, non condensing 50% RH max. at >45℃	5 to 95 %
Optical power handling	≥ 15 dBm

Environmental Specifications – Storage and transportation	
Temperature	- 40 to + 85 ℃
Relative humidity, non condensing 50% RH max. at >45℃	5 to 100 %

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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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