

TECHNICAL REPORT

Fibre optic communication system design guidelines – Part 5: Accommodation and compensation of chromatic dispersion



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CONTENTS

FOREWORD	4
1 Scope	6
2 Normative references	6
3 Terms, definitions and abbreviated terms	6
3.1 Terms and definitions	6
3.2 Abbreviated terms	6
4 Background	7
5 Impact of chromatic dispersion	8
5.1 Dependence on fibre type	8
5.2 Dispersion-unshifted fibres	8
5.3 Dispersion-shifted fibres	10
5.4 Pulse broadening	11
5.5 Pulse narrowing and signal peaking	13
5.6 Dispersion-limited transmission distance	14
6 Compensation and accommodation of dispersion	16
6.1 Passive dispersion compensation along the optical path	16
6.1.1 General	16
6.1.2 Dispersion compensating fibre	16
6.1.3 Chirped fibre Bragg grating	17
6.1.4 Etalon filter	18
6.2 Dispersion management	18
6.3 Accommodation of dispersion	20
6.4 Pre-distortion of the transmitted signal	20
6.5 Electrical accommodation in the receiver	21
6.6 Dispersion-assisted transmission	22
6.7 Mid-span spectral inversion	23
7 Passive dispersion compensator parameters	24
7.1 Compensated fibre length	24
7.2 Operating wavelength range	24
7.3 Chromatic dispersion	24
7.4 Dispersion slope	25
7.5 Insertion loss	25
7.6 Wavelength-dependent loss	25
7.7 Phase ripple	26
7.8 Reflectance	26
7.9 Polarization-mode dispersion	26
7.10 Polarization-dependent loss	27
7.11 Optical nonlinearity	27
7.12 Latency	27
8 Passive dispersion compensator applications	28
8.1 Unamplified fibre spans	28
8.2 Fibre links with in-line optical amplifiers	28
8.3 Multi-channel WDM transmission systems	29
8.4 Hybrid transmission systems	30
8.5 Multi-band WDM transmission systems	30

9 System parameters for passive dispersion compensators	30
Bibliography	32
Figure 1 – Range of the dispersion coefficient for B-652.D fibres	9
Figure 2 – Distortions in a 10 Gbit/s NRZ signal at various amounts of CD	14
Figure 3 – Summing the dispersions of a B-652 fibre and a DCF over the C-band	17
Figure 4 – Reflectivity and time delay of an FBG-based PDC	18
Figure 5 – Periodic dispersion map with span-by-span compensation	19
Figure 6 – Transmitter for generating pre-compensated optical signals	21
Figure 7 – Coherent optical receiver with electrical CD post-compensation	22
Figure 8 – Spectral inversion of a modulated signal via four-wave mixing	23
Figure 9 – Passive dispersion compensators placed at the receiver	28
Figure 10 – PDCs placed before optical booster amplifiers at the transmitter	28
Figure 11 – PDCs placed after pre-amplifiers at the receiver	28
Figure 12 – Optically amplified link with in-line PDCs	29
Figure 13 – Optically amplified WDM communication link with in-line PDCs	29
Figure 14 – WDM link with individual compensation of residual dispersion	30
Figure 15 – Two-band WDM link with OA and PDC in the C-band	30
Table 1 – Single-mode fibre types and range of dispersion coefficients at 1 550 nm	11
Table 2 – Dispersion-limited transmission distances over B-652 fibre at 1 550 nm	15
Table 3 – Primary system parameters for DCF-based PDCs	31
Table 4 – Primary system parameters for FBG-based PDCs	31

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IEC TR 61282-5, which is a Technical Report, has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics.

This second edition cancels and replaces the first edition, published in 2002, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) extends the application space for dispersion compensation and accommodation to communication systems that employ non-zero dispersion-shifted fibres;
- b) adds a discussion on the suitability of fibre types for long-haul transmission of wavelength-multiplexed signals;
- c) updates the dispersion coefficient limits for dispersion-unshifted fibres;

- d) adds information on the dispersion coefficients of dispersion-shifted fibres;
- e) updates the naming of the fibre types to the revised naming conventions defined in IEC 60793-2-50:2018;
- f) updates Table 2 to include the dispersion tolerance of phase-shift-keyed modulation formats used for the transmission of 40 Gbit/s and 100 Gbit/s signals;
- g) adds information on dispersion management in terrestrial and submarine communication systems;
- h) extends the description of passive dispersion compensators based on fibre Bragg gratings and etalons;
- i) adds information on electronic dispersion accommodation in coherent communication systems (including transmitters and receivers);
- j) updates the description of optical accommodation techniques to include soliton transmission and mid-span spectral inversion;
- k) extends the list of system parameters for passive dispersion compensators to include wavelength-dependent loss, phase ripple, and latency;
- l) updates the description of dispersion compensator applications in long-haul communication systems.

The text of this Technical Report is based on the following documents:

Draft TR	Report on voting
86C/1573/DTR	86C/1581/RVDTR

Full information on the voting for the approval of this Technical Report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 61282 series, published under the general title *Fibre optic communication system design guidelines*, can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

FIBRE OPTIC COMMUNICATION SYSTEM DESIGN GUIDELINES –

Part 5: Accommodation and compensation of chromatic dispersion

1 Scope

This part of IEC 61282, which is a Technical Report, describes various techniques for accommodation and compensation of chromatic dispersion in fibre optic communication systems. These techniques include dispersion compensation with passive optical components, advanced dispersion management, and electronic accommodation of dispersion in the transmitters and receivers.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.2 Abbreviated terms

ADC	analogue-to-digital converter
BER	bit-error ratio
CD	chromatic dispersion
CW	continuous wave
DAC	digital-to-analogue converter
DCF	dispersion-compensating fibre
DCM	dispersion compensation module
DGD	differential group delay
DPSK	differential phase-shift keying
DQPSK	differential quaternary phase-shift keying
DSF	dispersion-shifted fibre
DWDM	dense wavelength-division multiplexing
FBG	fibre Bragg grating
FWM	four-wave mixing
I	in-phase component
IL	insertion loss
ITU	International Telecommunication Union