



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 62343:2022**  
**01-oktober-2022**

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**Dinamični moduli - Splošna specifikacija**

Dynamic modules - Generic specification

Dynamische Module - Allgemeines und Leitfaden

Modules dynamiques - Généralités et lignes directrices

**Ta slovenski standard je istoveten z: prEN IEC 62343:2022**

<https://standards.iteh.ai/catalog/standards/sist/aef528e1-c775-453f-85d2-9751d26938ce/osist-pren-iec-62343-2022>

**ICS:**

33.180.01	Sistemi z optičnimi vlakni na splošno	Fibre optic systems in general
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OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input checked="" type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

**Dynamic modules - Generic specification**

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

Please note that the title of this document has changed from "Dynamic modules - General and guidance" to "Dynamic modules - Generic specification"

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### DYNAMIC MODULES – GENERIC SPECIFICATION

#### FOREWORD

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  - 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.
- IEC 62343 has been prepared by subcommittee 86C: Fibre optic systems and active devices, of IEC technical committee 86: Fibre optics. It is an International Standard.
- This third edition cancels and replaces the second edition published in 2017. This edition constitutes a technical revision.
- This edition includes the following significant technical changes with respect to the previous edition:
- a) addition of terms and definitions for optical multicast switches (Clause 3.8);
  - b) revision of Clause 4, listing the requirements for standards in the IEC 62343 series;
  - c) addition of Clause 6 (Safety requirements).

88 The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

89 Full information on the voting for its approval can be found in the report on voting indicated in  
90 the above table.  
91

92 The language used for the development of this International Standard is English.

93 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
94 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement,  
95 available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by  
96 IEC are described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

97 A list of all parts of the IEC 62343 series, published under the general title *Dynamic modules*,  
98 can be found on the IEC website.

99 The committee has decided that the contents of this document will remain unchanged until the  
100 stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the  
101 specific document. At this date, the document will be

- 102 • reconfirmed,
- 103 • withdrawn,
- 104 • replaced by a revised edition, or
- 105 • amended.

106 [https://standards.iteh.ai/catalog/standards/sist/aef528e1-c775-453f-85d2-  
107 9751d26938ce/osist-pren-iec-62343-2022](https://standards.iteh.ai/catalog/standards/sist/aef528e1-c775-453f-85d2-9751d26938ce/osist-pren-iec-62343-2022)

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## INTRODUCTION

109 IEC 62343 applies to dynamic devices as defined in IEC TS 62538. This document contains  
110 general guidance for the IEC 62343 series related to dynamic devices and definitions which  
111 apply to dynamic devices. The dynamic module (DM), or device, has two distinguishing  
112 characteristics: dynamic and module.

113 "Dynamic" highlights the functions of the products to include "tuning, varying, switching,  
114 configuring, and other continuous optimization," often accomplished by electronics, firmware,  
115 software or their combinations. The dynamic device usually has a certain level of intelligence  
116 to monitor or measure its configuration or settings and make decisions for necessary  
117 (optimization) actions. The behaviour of dynamic modules can be characterized by transient  
118 characteristics as the dynamic module undergoes tuning, switching, configuring, and other  
119 continuous optimization. Characterization of transient characteristics will be considered in  
120 individual dynamic module standards.

121 "Module" defines that products covered by this standard are the integration of active and  
122 passive components (either or both), through interconnecting materials or devices. The  
123 controlling electronics can be inside or outside the optical package that contains all or most of  
124 the optical components and interconnection. The product can be a small printed wiring board  
125 (PWB) or child-board with mounted optical module, or it can be a small box (e.g., housing)  
126 with optical components and electronics enclosed. In the former case, it is more like an  
127 assembly (i.e., generally not packaged in a box or housing) than a module (i.e., generally  
128 packaged in a box or housing).

129 For historical reasons and convenience, a dynamic module or device is referred to as a  
130 dynamic module in the IEC 62343 series.

131 The number of dynamic modules and devices is rapidly growing as optical communications  
132 networks evolve. The following list provides some examples of the products covered by the  
133 IEC 62343 series. It should be noted that the list is not exhaustive and the products to be  
134 covered are not limited by the listed examples:

- 135 • channel gain equalizer;
- 136 • dynamic channel equalizer;
- 137 • dynamic gain tilt equalizer;
- 138 • dynamic slope equalizer;
- 139 • tuneable chromatic dispersion compensator;
- 140 • polarization mode dispersion compensator;
- 141 • reconfigurable optical add-drop multiplexer;
- 142 • switch with monitoring and controls;
- 143 • variable optical attenuator with monitoring and controls;
- 144 • optical channel monitor;
- 145 • wavelength selective switch;
- 146 • optical multicast switch.

147 The IEC 62343 series covers performance templates, performance standards, reliability  
148 qualification requirements, hardware and software interfaces, and related testing methods.

149 The structure of the IEC 62343 series, under the general title *Dynamic modules*, is as follows:

- 150 • 62343-1 series Part 1: Performance standards
- 151 • 62343-2 series Part 2: Reliability qualification

- 152 • 62343-3 series Part 3: Performance specification templates  
153 • 62343-4 series Part 4: Software and hardware interface standards  
154 • 62343-5 series Part 5: Test methods  
155 • 62343-6 series Part 6: Design guidelines

156 A complete set of standards related to a dynamic module or device should include the  
157 following:

- 158 • optical performance standards;  
159 • reliability qualification standards;  
160 • optical performance specification templates;  
161 • hardware and software interface standards;  
162 • test methods;  
163 • technical reports.

164 The safety standards related to dynamic modules are mostly optical power considerations,  
165 which are covered by IEC TC 76: Optical radiation safety and laser equipment.

166 Only those dynamic modules for which standards are complete or in preparation are included  
167 in Clause 3. To reflect the rapidly growing market for dynamic modules, additional terms and  
168 definitions will be added in subsequent revisions as the series expands.

169 It should be noted that optical amplifiers could be regarded as dynamic modules. They are not  
170 included in the IEC 62343 series but are covered in their own series of IEC standards.

171

172



## DYNAMIC MODULES – GENERIC SPECIFICATION

173  
174

### 1 Scope

176 IEC 62343 applies to all commercially available optical dynamic modules and devices. It  
177 describes the products covered by the IEC 62343 series, defines terminology, fundamental  
178 considerations and basic approaches.

179 The object of this document is to

- 180 • establish uniform requirements for operation, reliability and environmental properties of  
181 dynamic modules (DMs) to be implemented in the appropriate DM standard, and
- 182 • provide assistance to the purchaser in the selection of consistently high-quality DM  
183 products for his particular applications, as well as in the consultation of the appropriate  
184 specific DM standard(s).

185 This document covers performance templates, performance standards, reliability qualification  
186 requirements, hardware and software interfaces and related testing methods.

187 Since a dynamic module integrates an optical module/device, printed wiring board, and  
188 software/firmware, the standards developed in the series will mimic appropriate existing  
189 standards. On the other hand, since "dynamic module" is a relatively new product category,  
190 the dynamic module standards series will not be bound by the existing practices where  
191 requirements differ.

192 The safety standards as related to dynamic modules are mostly optical power considerations,  
193 which is covered by IEC TC 76: Optical radiation safety and laser equipment (see Clause 6).

### 2 Normative references

195 The following documents are referred to in the text in such a way that some or all of their  
196 content constitutes requirements of this document. For dated references, only the edition  
197 cited applies. For undated references, the latest edition of the referenced document (including  
198 any amendments) applies.

199 IEC 60050-731, *International Electrotechnical Vocabulary – Chapter 731: Optical fibre*  
200 *communication*

201 IEC TR 61931, *Fibre optic – Terminology*

202 IEC Guide 107, *Electromagnetic compatibility – Guide to the drafting of electromagnetic*  
203 *compatibility publications*

### 3 Terms and definitions

205 For the purposes of this document, the terms and definitions given in IEC 60050-731, IEC TR  
206 61931, and the following apply.

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

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

211 NOTE 1 Some terms and definitions included in this document were first published in  
212 IEC 62343 (all parts). After publication of this document, these terms and definitions will be removed from  
213 IEC 62343 (all parts) when the series is revised, and reference will be made to IEC 62343.

214 NOTE 2 The terms and definitions listed in Clause 3 refer to the meaning of the terms and definitions used in the  
215 specifications of dynamic modules. Only those parameters listed in the appropriate performance standard in  
216 IEC 62343-1 (all parts) and performance specification templates in IEC 62343-3 (all parts) are intended to be  
217 specified.

218 NOTE 3 The list of parameter definitions for dynamic modules given in Clause 3 is divided into subclauses  
219 according to the type of dynamic module.

## 220 3.1 General terms and definitions

### 221 3.1.1

#### 222 optical dynamic device

223 optical device designed to monitor and control dynamically some characteristics of one or  
224 more optical signals, by means of suitable electronic controls, in order to improve or to  
225 maintain definite performances of the system in which it is intended to be inserted

226 Note 1 to entry: Said characteristics may include optical paths, optical intensities, spectral characteristics,  
227 polarization states, dispersion, etc.

228 Note 2 to entry: Optical dynamic devices may comprise optical active and optical passive elements or  
229 components.

230 Note 3 to entry: The control/response time of optical dynamic devices is much larger than the signal time  
231 characteristics and typically may range from few microseconds to tens of seconds.

232 [SOURCE: IEC TS 62538:2008, 2.1.1]

### 233 3.1.2

#### 234 optical module

235 packaged integration of optical components and/or elements, accomplishing defined  
236 functionality, typically repairable and re-workable

237 [SOURCE: IEC TS 62538:2008, 2.2.5, modified – The notes to entry have been omitted.]

## 238 3.2 Dynamic module terms and definitions

### 239 3.2.1

#### 240 channel

241 signal at wavelength,  $\lambda$ , that corresponds to ITU grid (ITU-T Recommendation G.694.1) within  
242 the range of operating wavelength range

243 [SOURCE: IEC 62343-3-3:2014, 3.4]

### 244 3.2.2

#### 245 operating wavelength range

246 specified range of wavelengths from  $\lambda_{imin}$  to  $\lambda_{imax}$  about a nominal operating wavelength  $\lambda_1$ ,  
247 within which a dynamic optical module is designed to operate with a specified performance

### 248 3.2.3

#### 249 channel frequency range

250 frequency range within which a device is expected to operate with a specified performance

251 Note 1 to entry: For a particular nominal channel central frequency,  $f_{nomi}$ , this frequency range is from  
252  $f_{imin} = (f_{nomi} - \Delta f_{max})$  to  $f_{imax} = (f_{nomi} + \Delta f_{max})$ , where  $\Delta f_{max}$  is the maximum channel central frequency deviation.

### 253 3.2.4

#### 254 channel spacing

255 centre-to-centre difference in frequency (or wavelength) between adjacent channels in a  
256 device

### 257 3.3 Dynamic channel equalizer (DCE) terms and definitions

#### 258 3.3.1

#### 259 dynamic channel equalizer

#### 260 DCE

261 device capable of transforming, by internal or external automatic control, a multichannel input  
262 signal with time-varying averaged powers into an output signal in which all working channel  
263 powers are nominally equal or are set for a required level of pre-emphasis

264 Note 1 to entry: This device may also provide the extinction of one or more of the input channels.

#### 265 3.3.2

#### 266 channel non-uniformity

267 difference between the powers of the channel with the most power (in dBm) and the channel  
268 with the least power (in dBm)

269 Note 1 to entry: This applies to a multichannel signal across the operating wavelength range.

270 Note 2 to entry: Channel non-uniformity is expressed in dB.

#### 271 3.3.3

#### 272 in-band extinction ratio

273 within the operating wavelength range, the difference between the minimum power of the non-  
274 extinguished channels (in dBm) and the maximum power of the extinguished channels (in  
275 dBm)

276 Note 1 to entry: In-band extinction ratio is expressed in dB.

#### 277 3.3.4

#### 278 out-of-band attenuation

279 attenuation of channels that fall outside of the operating wavelength range

280 Note 1 to entry: Out-of-band attenuation is expressed in dB.

#### 281 3.3.5

#### 282 ripple

283 peak-to-peak difference in insertion loss within a channel frequency (or wavelength) range

#### 284 3.3.6

#### 285 channel response time

286 elapsed time it takes a device to transform a channel from a specified initial power level to a  
287 specified final power level desired state, when the resulting output channel non-uniformity  
288 tolerance is met, measured from the time the actuation energy is applied or removed

### 289 3.4 Tuneable dispersion compensator (TDC) or dynamic chromatic dispersion 290 compensator (DCDC) terms and definitions

#### 291 3.4.1

#### 292 tuneable dispersion compensator

#### 293 TDC

#### 294 dynamic chromatic dispersion compensator

#### 295 DCDC

296 two-port in-line device that is capable of transforming, by internal or external automatic  
297 control, an input signal with time-varying dispersion into an output signal in which an output  
298 channel dispersion value is set for a required level of value

#### 299 3.4.2

#### 300 insertion loss ripple

301 maximum peak-to-peak variation of the insertion loss within a channel frequency (or  
302 wavelength) range

303 **3.4.3**  
304 **dispersion tuning time**  
305 longest elapsed time it takes a module to change a dispersion setting from an arbitrary initial  
306 dispersion value to a desired final dispersion value, when the resulting dispersion target  
307 tolerance is met

### 308 **3.5 Dynamic gain tilt equalizer (DGTE) terms and definitions**

#### 309 **3.5.1** 310 **dynamic spectral equalizer**

311 **DSE**  
312 two port in-line dynamic module that converts an input signal with time-varying spectral shape  
313 into an output signal in which spectral shape is nominally flat, or is set for a required spectral  
314 shape for pre-emphasis

#### 315 **3.5.2** 316 **dynamic gain tilt equalizer** 317 **DGTE**

318 dynamic spectral equalizer used in an optical amplifier that converts input signals with time-  
319 varying gain tilt into output signals in which gain tilt is nominally flat, or is set for a required  
320 gain tilt

#### 321 **3.5.3** 322 **dynamic gain tilt range**

323 difference between the maximum and minimum deviation of attenuation over operating  
324 wavelength range, to which the dynamic gain tilt equalizer can be set

#### 325 **3.5.4** 326 **positive slope type** 327 type of DGTE for which dynamic gain tilt range can be set for positive gain tilt

#### 328 **3.5.5** 329 **negative slope type** 330 type of DGTE for which dynamic gain tilt range can be set for negative gain tilt

#### 331 **3.5.6** 332 **both slope type** 333 type of DGTE to which dynamic gain tilt range can be set for both positive and negative gain 334 tilt

#### 335 **3.5.7** 336 **slope linearity** 337 maximum deviation of attenuation between the spectral shape by dynamic gain tilt equalizer 338 and linear slope over the operating wavelength range

#### 339 **3.5.8** 340 **response time** 341 longest elapsed time it takes a dynamic gain tilt equalizer to change a gain tilt setting from an 342 arbitrary initial gain tilt value to a desired final gain tilt value, when the resulting gain tilt target 343 tolerance is met

### 344 **3.6 Optical channel monitor (OCM) terms and definitions**

#### 345 **3.6.1** 346 **input channel plan** 347 entire set of ITU channels on which the optical channel monitor is reporting