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Industrijski sistemi, inštalacije in oprema ter industrijski izdelki - Načela strukturiranja in referenčne oznake - 1. del: Osnovna pravila

Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules

Industrielle Systeme, Anlagen und Ausrüstungen und Industrieprodukte - Strukturierungsprinzipien und Referenzkennzeichnung - Teil 1: Allgemeine Regeln

Systèmes industriels, installations et appareils, et produits industriels - Principes de structuration et désignations de référence - Partie 1: Règles de base

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IEC TC 3 : DOCUMENTATION, GRAPHICAL SYMBOLS AND REPRESENTATIONS OF TECHNICAL INFORMATION	
SECRETARIAT: Sweden	SECRETARY: Mr Thomas Borglin
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input checked="" 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 type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
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TITLE:

Industrial systems, installations and equipment and industrial products - Structuring principles and reference designations - Part 1: Basic rules

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL SYSTEMS, INSTALLATIONS
AND EQUIPMENT AND INDUSTRIAL PRODUCTS –
STRUCTURING PRINCIPLES AND REFERENCE DESIGNATIONS –**

Part 1: Basic rules

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- IEC 81346-1 has been prepared by IEC technical committee 3: Documentation, graphical symbols, and representations of technical information in close co-operation with ISO technical committee 10: Technical product documentation.
- It is published as a double logo standard and has the status of a horizontal publication in accordance with IEC Guide 108.
- This second edition cancels and replaces the first edition of IEC 81346-1, published in 2009. This edition constitutes a technical revision.
- This edition includes the following substantial changes with respect to the first edition of IEC 81346-1:
- the scope includes a reference to Guide 108 for being a horizontal publication
 - synchronization with IEC 81346-2:2019 and ISO 81346-12:2018
 - the introduction of the type aspect
 - introduction of an information model of the reference designation system

- 220 – introduction of an information model for the framework of reference designation system to
221 comply with IEC/ISO 81346 series
- 222 – introduction of recommendation for metadata for design structure management
- 223 – introduction of rules and method for designation of relations between objects
- 224 – Introduction of requirements for development of sector specific parts of the IEC/ISO 81346
225 series
- 226 – introduction of requirements for incorporation of sub-object in object structures
- 227 – introduction of recommendations for documentation of the application of the IEC/ISO 81346
228 series
- 229 – introduced definition of new terms used
- 230 – new rules added and existing rules modified

231 The text of this standard is based on the following documents:

FDIS	Report on voting
3/xxx/FDIS	3/xxx/RVD

232
233 Full information on the voting for the approval of this standard can be found in the report on
234 voting indicated in the above table. In ISO, the standard has been approved by xx members out
235 of xx having cast a vote.

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

237 A list of all parts of the International Standard 81346 series, under the general title *Industrial*
238 *systems, installations and equipment and industrial products – structuring principles and*
239 *reference designations*, can be found on the IEC website.

[https://standards.iteh.ai/catalog/standards/sist/1a8df869-c4c4-46f4-95ec-](https://standards.iteh.ai/catalog/standards/sist/1a8df869-c4c4-46f4-95ec-24ad668a445/osist-pre-en-iec-81346-1-2021)

240 The committee has decided that the contents of this publication will remain unchanged until the
241 maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data
242 related to the specific publication. At this date, the publication will be

- 243 • reconfirmed,
- 244 • withdrawn,
- 245 • replaced by a revised edition, or
- 246 • amended.

247

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

248

249

250

INTRODUCTION

251 0.1 General

252 This standard establishes a further development of earlier and withdrawn standards on item
253 designation. It provides basics for establishing models of plants, machines, buildings etc.

254 The standard specifies:

- 255 • principles for structuring of objects including associated information;
- 256 • rules on forming of reference designations based on the resulting structure.

257 By applying the structuring principles, even very large sets of information in a complex system
258 can be handled efficiently.

259 The structuring principles and the rules for reference designations:

- 260 • are applicable to objects of both physical and non-physical character.
- 261 • provide a system that is easy to navigate within and easy to maintain. This system provides
262 an excellent overview on a technical system since composite structures are simple to
263 establish and understand.
- 264 • support alternative design and engineering processes in the life cycle of an object since
265 they are based on the successively established results of this process and not on how the
266 engineering process itself is carried out.
- 267 • allow, by accepting more than one aspect, that more than one coding principle can be
268 applied. This technique also allows 'old structures' to be handled together with 'new
269 structures' by using multiple unambiguous identifiers.
- 270 • support individual management for the establishment of reference designations and enable
271 subsequent integration of modules into larger constructs. They also support the
272 establishment of reusable modules, either as functional specifications or as physical
273 deliverables.

274 NOTE The concept of reusable modules encompasses for example, for manufacturers: the establishment of
275 contract independent modules, and, for operators of complex assemblies: the description of requirements in
276 terms of supplier independent modules.

- 277 • support concurrent work and allow different partners within a project to add and / or remove
278 data to the structured project result as it proceeds.
- 279 • recognize time factor within the life cycle as important for the application of different
280 structures based on different views on the considered technical system.

281 The rules for structuring of information and for the construction of reference designations forms
282 the basis for creating a reference designation system (RDS) complying with the IEC/ISO 81346
283 series. Such systems are used for structuring and designating objects based on the needs of
284 the organization using them.

285 Annex A provides an information model of the framework described in this publication and
286 IEC 81346-2. Annex A includes also elements related to other publications where the
287 application of the reference designation in accordance with IEC/ISO 81346 series are
288 considered.

289 0.2 Basic requirements for this standard

290 The basic requirements were developed during the preparation of IEC 61346-1 Ed. 1 and
291 accepted by vote by the national committees.

292 NOTE These basic requirements concern the development of the structuring principles in this standard and not its
293 application. They are therefore not normative vis-à-vis the application of this standard.

- 294 • This standard should be applicable to all technical areas and enable a common application.
- 295 • This standard shall be applicable to all kind of objects and their constituents, such as plants,
296 systems, assemblies, software programs, spaces, etc.
- 297 • This standard should be capable of being consistently applied in all phases (i.e. conceptual
298 development, planning, specification, design, engineering, construction, erection,
299 commissioning, operation, maintenance, decommissioning, disposal, etc.) of the life time of
300 an object of interest, i.e. an object to be identified.
- 301 • This standard shall provide the ability to identify unambiguously any single object being a
302 constituent of another object.
- 303 • This standard shall support the incorporation of sub-object structures from multiple
304 organizations into objects from other organizations without change to the original object
305 structures and neither to the sub-object structures nor any of their documentation.
- 306 • This standard shall support a representation of an object independently of the complexity
307 of the object
- 308 • This standard should be easy to apply and the designations should be easy for the user to
309 understand.
- 310 • This standard should support the use of, and should be able to be implemented by,
311 computer-aided tools for conceptual development, planning, specification, design,
312 engineering, construction, erection, commissioning, operation, maintenance,
313 decommissioning, disposal, etc.

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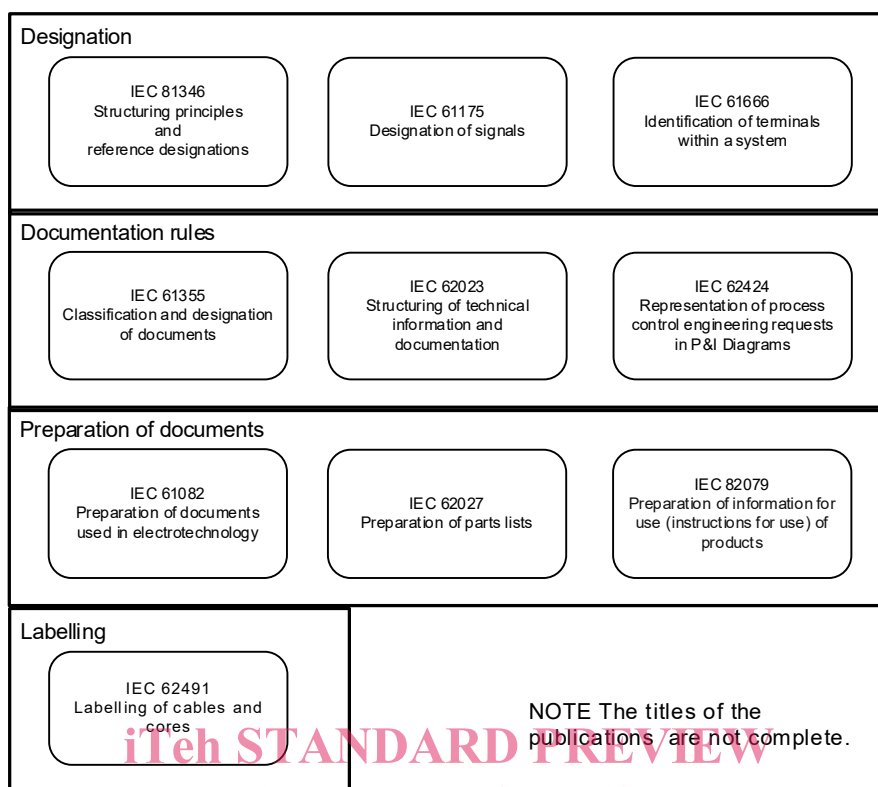
314 0.3 Required properties of the standard

315 The required properties were developed during the preparation of IEC 61346-1 Ed. 1 and
316 accepted by vote by the national committees.

317 NOTE 1 These required properties concern the development of the letter code classification system in this standard
318 and not its application. They are therefore not normative vis-à-vis the application of this standard.

- 319 • This standard shall not contain rules and restrictions that prohibit its use within a technical
320 area.
- 321 • This standard shall cover all its foreseeable applications within all technical areas.
- 322 • This standard shall support addressing of information to objects at all phases in their
323 lifetime.
- 324 • This standard shall allow construction of designations at any time from the currently
325 available information.
- 326 • This standard shall support the identification of objects based on a constituency principle.
- 327 • This standard shall contain rules that enable the formulation of unambiguous designations.
- 328 • This standard shall be open and allow a designation to be extended.
- 329 • This standard shall support modularity and reusability of objects.
- 330 • This standard shall support the description of different users' views on the object
- 331 • This standard shall provide rules for the interpretation of designations where needed.

332 Figure 1 provides an overview on international standards providing a consistent system for
333 designation, documentation, and presentation of information. 0 provides more information on
334 the relations between the IEC/ISO 81346 series and other publications applying reference
335 designations.



336
337
338 **Figure 1 – International standards providing a consistent system for designation, documentation and presentation of information**

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339 0.4 Framework of the IEC/ISO 81346 series

340 IEC 81346-1 describes the fundamental rules and methods for structuring of information and
341 for the definition of reference designation of objects within an industrial systems, installations
342 and equipment and industrial products. These rules form a basis for the establishment of
343 specific Reference Designation Systems (RDS) for use by industries, enterprises, projects or
344 other organizational contexts.

345 IEC 81346-2 establishes classification schemes with defined object classes and their
346 associated letter codes and is primarily intended for use in reference designations and for
347 designation of generic types. Classes can also be used for other purposes, e.g. by
348 manufacturers to show multiple potential use of a product. In this way, the classification can
349 enhance searchability.

350 Used in combination, IEC 81346-1 and IEC 81346-2 define a fundamental framework for
351 reference designations that is independent of the context in which reference designations are
352 applied and are applicable for objects in all technical disciplines and all branches of industry,
353 and is applicable through the whole life-cycle of objects.

354 The IEC/ISO 81346 series of standards additionally include parts that define sector-specific
355 Reference Designation Frameworks that tailor the fundamental Reference Designation
356 Framework of IEC 81346-1 and IEC 81346-2 to the needs of specific sectors. Requirements for
357 developing sector-specific parts of the IEC/ISO 81346 series are given in Annex J.

358

359 **INDUSTRIAL SYSTEMS, INSTALLATIONS**
 360 **AND EQUIPMENT AND INDUSTRIAL PRODUCTS –**
 361 **STRUCTURING PRINCIPLES AND REFERENCE DESIGNATIONS –**

362
 363 **Part 1: Basic rules**
 364

365 **1 Scope**

366 This part of IEC 81346, published jointly by IEC and ISO, establishes general principles for the
 367 structuring of systems including structuring of the information about systems.

368 Based on these principles, rules and guidance are given for the formulation of unambiguous
 369 reference designations for objects in any system.

370 The reference designation identifies objects for the purpose of creation and retrieval of
 371 information about an object, and where realized about its corresponding component.

372 A reference designation labelled at a component is the key to find information about that object
 373 among different kinds of documents.

374 The principles are general and are applicable to all technical areas (for example mechanical
 375 engineering, electrical engineering, construction engineering, process engineering). They can
 376 be used for systems based on different technologies or for systems combining several
 377 technologies.

378 This document is also a horizontal publication intended for use by technical committees in
 379 preparation of publications related to reference designations in accordance with the principles
 380 laid down in IEC Guide 108.

381 **2 Normative references**

382 The following referenced documents are indispensable for the application of this document. For
 383 dated references, only the edition cited applies. For undated references, the latest edition of
 384 the referenced document (including any amendments) applies.

385 IEC Guide 108, *Guidelines for ensuring the coherence of IEC publications – Horizontal*
 386 *functions, horizontal publications and their application*

387 IEC 81346-2:2019, *Industrial systems, installations and equipment and industrial products –*
 388 *Structuring principles and reference designations – Part 2: Classification of objects and codes*
 389 *for classes*

390 ISO 81346-10:20XX, *Industrial systems, installations and equipment and industrial products –*
 391 *Structuring principles and reference designations – Part 10: Power systems*¹

392 ISO 81346-12:2018, *Industrial systems, installations and equipment and industrial products –*
 393 *Structuring principles and reference designations – Part 12: Construction works and building*
 394 *services*

395 ISO/IEC 646, *Information technology – ISO 7-bit coded character set for information*
 396 *interchange*

¹ To be published

397 **3 Terms and definitions**

398 For the purposes of this document, the following terms and definitions apply.

399 NOTE Terms given in italics are defined elsewhere in this clause.

400 **3.1**401 **object**402 entity involved in a *process* of development, implementation, usage and disposal

403 Note 1 to entry: The object may refer to a physical or non-physical.

404 Note 2 to entry: The object has information associated to it.

405 **3.2**406 **system**407 set of interrelated *objects* considered in a defined context as a whole and separated from their
408 environment409 Note 1 to entry: A system is generally defined with the view of achieving a given objective, e.g. by performing a
410 definite function.411 Note 2 to entry: Elements of a system may be natural or man-made material objects, as well as modes of thinking
412 and the results thereof (e.g. forms of organisation, mathematical methods, programming languages).413 Note 3 to entry: The system is considered to be separated from the environment and from the other external systems
414 by an imaginary boundary, through which the system is related to the external systems.415 Note 4 to entry: The term “system” should be qualified when it is not clear from the context to what it refers, e.g.
416 control system, colorimetric system, system of units, transmission system.417 Note 5 to entry: When a system is part of another system, it may be considered as an object as defined in this
418 standard.419 [SOURCE: IEV 151-11-27, modified – the word “elements” replaced by “objects” in the
420 definition, in note 3 the phrase “surface , which cuts the links between them and the systems
421 replaced by “boundary, through which the system is related to the external systems”, note 5 to
422 entry added]423 **3.3**424 **aspect**425 specified way of viewing an *object*426 **3.4**427 **process**428 set of interacting operations by which material, energy or information is transformed,
429 transported or stored430 [SOURCE: IEV 351-42-33, modified – the words “complete” and “in a system” are deleted and
431 the word “matter” replaced by “material”, the examples and notes to entry are deleted]432 **3.5**433 **function**

434 intended or accomplished purpose or task

435 **3.6**436 **product**437 intended or accomplished result of labour, or of a natural or artificial *process*438 **3.7**439 **component**440 *product* used as a constituent in an assembled *product*, *system* or plant

- 441 **3.8**
442 **location**
443 intended or accomplished space
- 444 **3.9**
445 **structure**
446 organization of relations among *objects* of a *system*
- 447 Note 1 to entry: In the context of this standard the relations **considered** are partitive relations (see ISO 1087:2019,
448 3.2.14), i.e. consists-of / is-a-part-of relations
- 449 **3.10**
450 **identifier**
451 attribute associated with an *object* to unambiguously distinguish it from other *objects* within a
452 specified domain
- 453 **3.11**
454 **reference designation**
455 *identifier* of a specific *object* formed with respect to the *system* of which the *object* is a
456 constituent, based on one or more *aspects* of that *system*
- 457 **3.12**
458 **single-level reference designation**
459 *reference designation* assigned with respect to the *object* of which the specific *object* is a direct
460 constituent in one *aspect*
- 461 Note 1 to entry: A single-level reference designation does not include any reference designations of upper level or
462 lower level objects.
- 463 **3.13**
464 **multi-level reference designation**
465 *reference designation* consisting of concatenated **single-level reference designations**
- 466 **3.14**
467 **reference designation set**
468 collection of two or more *reference designations* associated with an *object* of which at least one
469 unambiguously identifies this *object*
- 470 **3.15**
471 **object occurrence**
472 the existence of an *object* when viewed using an *aspect*
- 473 **3.16**
474 **product individual**
475 one specimen of a product *type* irrespective of where or if it is being used
- 476 **3.17**
477 **class**
478 set of *objects* having at least one *characteristic* in common
- 479 Note 1 to entry: The characteristics may be embodied by the use of properties, operations, methods, relations,
480 semantics, etc.
- 481 [SOURCE: ISO 5127:2017, definition 3.8.5.03, modified – "elements" replaced by "objects", note
482 1 and 2 to entry removed and a new note 1 to entry added]
- 483 **3.18**
484 **characteristic**
485 distinguishing feature