SLOVENSKI STANDARD
oSIST prEN IEC 61512-1:2024

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Nadzor šarže - 1. del: Modeli in terminologija

Batch control - Part 1: Models and terminology

Chargenorientierte Fahrweise - Teil 1: Modelle und Terminologie

Contrôle-commande des processus de fabrication par lots - Partie 1: Modèles et terminologie

Ta slovenski standard je istoveten z: prEN IEC 61512-1:2024

ICS:

01.040.25	Izdelavna tehnika (Slovarji)	Manufacturing engineering (Vocabularies)
25.040.40	Merjenje in krmiljenje industrijskih postopkov	Industrial process measurement and control
35.240.50	Uporabniške rešitve IT v industriji	IT applications in industry

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65A/1108/CDV

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IEC SC 65A : SYSTEM ASPECTS	
SECRETARIAT:	SECRETARY:
United Kingdom	Ms Stephanie Lavy
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT	☐ QUALITY ASSURANCE ☐ SAFETY
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TITLE:
Batch control - Part 1: Models and terminology

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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8   **IEC 61512-1 Ed 2.0**

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10   **Batch Control –**

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12   **Part 1:**

13   **Models and Terminology**

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15   **2nd October 2023**

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170   INTERNATIONAL ELECTROTECHNICAL COMMISSION

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209   rights. IEC shall not be held responsible for identifying any or all such patent rights.

210 International Standard IEC 61512-1 has been prepared by subcommittee 65A: System aspects,
211 of IEC technical committee 65: Industrial-process measurement and control.

212 The text of this part of IEC 61512 is based on the following documents:

FDIS	Report on voting
65A/XX/FDIS	65A/XX/RVD

213

214 Full information on the voting for the approval of this part of IEC 61512 can be found in the
215 report on voting indicated in the above table.

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

217 This version of IEC 61512-1 replaces IEC 61512-1 Ed1.0:1997. The following major changes
218 were made to this part of IEC 61512 from the previous version (Annex E for further details).

219 a) Models and text are modified to provide more detail and clarity. Key clarifications are:

220   1) Two types of equipment modules are defined: generic and recipe-aware. All recipe-
221   aware equipment modules contain procedural control and can be used as phases in the
222   recipe.

223   2) Execution of all procedural control contained directly in units is part of the Unit
224   Supervision activity.

225   3) The relationships between types of recipes, recipe components, and equipment control
226   are more fully described and illustrated.

227   4) Entity relationship diagrams have been replaced with more intuitive UML instance
228   diagrams, except for the *equipment entity model*.

229   5) The transition diagram for the procedural states example has been updated with a more
230   intuitive and complete UML state diagram.

231   6) References to other standards in the series and to IEC 62264 are included to provide
232   direction for further clarification of selected topics.

233   7) Defined terms are italicised in the body of this document to avoid misinterpretation based
234   on meanings outside of IEC 61512.

235   8) Activity names are capitalised to help prevent confusion with similar terms, such as their
236   underlying functions.

237 b) Previous Clauses 4 through 6 (now 4 through 8) were rearranged to provide a clearer top-
238 down organisation of the document. Key changes are:

239   1) Removing the lower levels of the physical (role-based equipment) model (see subclause
240   4.4.2) to eliminate redundancy because their groupings are defined by the associated
241   functionality in the equipment entity model and are not meaningful for batch control
242   without those associations.

243   2) Describing equipment control and the equipment entity model immediately after the
244   physical (role-based equipment) model and describing each level as completely as
245   possible without excessive use of forward references (see subclause 4.4.3).

246   3) Combining the descriptions of basic, procedural, and coordination control with their
247   usage in each type of equipment entity, providing a single consolidated discussion of
248   each type of control (see Clause 5)

249   4) Additional considerations to support application of the models have been grouped in
250   Clause 7 to clarify their supporting relationship to the core models.

251 c) Clause 9 was added to define completeness, compliance, and conformance in relation to
252 this part of IEC 61512.

253 d) Annex B was added to provide a more expansive procedural state reference model. The
254 model found in Clause 7 may be considered a collapsed version of this more general model.

255 e) Annex C was added to clarify a number of points concerning the models, their application,
256 and the new Clause 9 on conformance and compliance.

257 f) Annex E was added to more fully describe the changes in this update to IEC 61512-1
258 Ed1.0:1997.

259 The list of all the parts of the IEC 61512 series, under the general title *Batch control*, can be
260 found on the IEC website.

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

264 • reconfirmed,

265 • withdrawn,

266 • replaced by a revised edition, or

267 • amended.

268

269 | The National Committees are requested to note that for this publication the stability date is ….

270 | THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED
271 | AT THE PUBLICATION STAGE.

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273 # INTRODUCTION

274 The IEC 61512 batch control standard has several parts. This part of IEC 61512 describes an
275 overarching framework of models and definitions for batch manufacturing. Other parts of the
276 series describe in more detail particular focus areas within this framework.

277 This part of IEC 61512 is structured to follow the IEC (International Electrotechnical
278 Commission) guidelines. Therefore, Clauses 1 through 3 discuss the Scope of this part of IEC
279 61512, Normative References, and Definitions, in that order.

280 The models and terminology in IEC 61512 are highly interdependent, making many of the
281 definitions in Clause 3 incomplete and circular. Note that while Clause 3 provides definitions,
282 the entire document constitutes the models and terminology of batch control. The user should
283 consider Clause 3 as a short glossary of terms with brief descriptions and not rely on Clause 3
284 for a full understanding of the concepts.

285 Clauses 4 through 8 incrementally complete these definitions by starting at a very high level,
286 progressively detailing a set of conceptual models, and describing how they collectively interact
287 to control batch production. The models are presumed to be complete as indicated. However,
288 they may be collapsed and expanded as described in the explanation of each model.

289 Clause 4, *Batch processes and equipment,* is normative. The intent of this clause is to provide
290 models and terminology that describe *batch processes* and the equipment used to perform
291 them.

292 Clause 5, *Structure for batch control,* is normative. The intent is to describe three types of
293 control used in *batch processing* and their relationships to the previously defined process and
294 equipment models.

295 Clause 6, *Recipes and procedural elements,* is normative. The intent is to describe the roles
296 and contents of four types of recipes used in batch manufacturing, their use of the previously
297 defined *process* and procedural control models, and their connection to equipment control.

298 Clause 7, *Batch control considerations,* is normative. The intent is to describe additional
299 considerations related to iterative design, exception handling, modes and states, production
300 plans and schedules, and production information.

301 Clause 8, *Activities and functions in batch control,* is normative. The intent is to describe the
302 control activities that are needed to address the diverse control requirements of batch
303 manufacturing.

304 Clause 9, *Completeness, compliance, and conformance,* is normative. The intent is to define
305 compliance and conformance relative to the normative models and terminology in this part of
306 IEC 61512.

307 Annex A is informative. It provides guidance towards understanding the model types used in
308 this part of IEC 61512.

309 Annex B is informative. It provides a more expansive procedural state reference model. The
310 model found in subclause 7.5 may be considered a collapsed version of this more general
311 model.

312 Annex C is informative. It provides answers to typical questions that may arise in applying this
313 part of IEC 61512.

314 Annex D is informative. It provides further explanation of the software entities listed in clause
315 4.4.2.1.

316 Annex E is informative. It provides a summary of the changes made in this update as compared
317 with IEC 61512-1 Ed1.0:1997.

318 The bibliography is informative, giving references for further investigation concerning safety
319 and other relevant Standards.

320 This part of IEC 61512 is intended for those who are

321 • involved in the design, operation, or both of batch manufacturing plants,

322 • responsible for specifying controls and the associated application programs for batch
323 manufacturing plants, or

324 • involved in the design and marketing of products in the area of batch control.

325 This part of IEC 61512 defines standard models and terminology for specifying the control
326 requirements for batch manufacturing plants. The models and terminology

327 • emphasise good practices for the design and operation of batch manufacturing plants,

328 • can be used to improve control of batch manufacturing plants, and

329 • can be applied regardless of the degree of automation.

330 This part of IEC 61512 provides standard terminology and a consistent set of concepts and
331 models for batch manufacturing plants and batch control that are intended to

332 • improve communications between all parties involved,

333 • reduce the user's time to reach full production levels for new products,

334 • enable vendors to supply appropriate tools for implementing batch control,

335 • enable users to better identify their needs,

336 • make recipe development straightforward enough to be accomplished without the services
337 of a control systems engineer,

338 • reduce the cost of automating batch processes, and

339 • reduce life-cycle engineering efforts.

340 It is not the intent of IEC 61512 to

341 • suggest that there is only one way to implement or apply batch control,

342 • force users to abandon their current way of dealing with their batch processes, or

343 • restrict development in the area of batch control.

344 The key concepts defined in this part of IEC 61512 are:

345 • description of recipes, procedures, their contents, and their structure;

346 • definition of levels of recipes and procedures;

347 • recognition of product specific recipes and procedures that are separate from process-
348 oriented equipment and its direct control;