

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Batch control – **iTeh STANDARD PREVIEW**
Part 3: General and site recipe models and representation
(standards.iteh.ai)

Contrôle-commande des processus de fabrication par lots –
Partie 3: Modèles et représentation des recettes générales et des recettes de site

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

BATCH CONTROL –

**Part 3: General and site recipe models
and representation**

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International Standard IEC 61512-3 has been prepared by subcommittee 65A: System aspects, of IEC technical committee 65: Industrial-process measurement, control and automation.

This first edition cancels and replaces IEC/PAS 61512-3, published in 2004.

This part of IEC 61512 is to be used in conjunction with IEC 61512-1 and IEC 61512-2.

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

CDV	Report on voting
65A/496/CDV	65A/503/RVC

Full information on the voting for the approval of this standard 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.

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

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

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- withdrawn,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

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INTRODUCTION

IEC 61512-1 provides models and terminology applicable to batch control, IEC 61512-2 addresses data structures and guidelines for languages. This part of IEC 61512 defines additional information on general and site recipes. Clause 4 of this part of IEC 61512 contains definitions of general and site recipes in greater detail than in IEC 61512-1. Clause 5 defines detailed description of the contents of general and site recipes. Clause 6 defines a data model that identifies objects and relationships that were addressed in Clauses 4 and 5. Clause 7 defines a method for depiction of general and site recipes that can be used for both simple and complex processing requirements, using both a tabular and a graphical notation. Clause 8 describes some aspects of general or site to master recipe transformation. The annexes provide complementary information.

Although this part of IEC 61512 is intended primarily for batch processes, it may have considerable value for other types of processes as well.

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BATCH CONTROL –

Part 3: General and site recipe models and representation

1 Scope

This part of IEC 61512 on Batch Control defines a model for general and site recipes; the activities that describe the use of general and site recipes within a company and across companies; a representation of general and site recipes; and a data model of general and site recipes.

2 Normative references

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

IEC 60050-351:2006, *International Electrotechnical Vocabulary – Part 351: Control technology*

IEC 61512-1:1997, *Batch Control – Part 1: Models and terminology*

IEC 61512-2: 2001, *Batch Control – Part 2: Data structures and guidelines for languages*
[https://standards.iteh.ai/catalog/standards/sist/4e11dcb4-3b60-4fcb-af4d-](https://standards.iteh.ai/catalog/standards/sist/4e11dcb4-3b60-4fcb-af4d-a071409a87a6/iec-61512-3-2008)

IEC 62264-1: 2003, *Enterprise-control system integration – Part 1: Models and terminology*

IEC 62264-2: 2004, *Enterprise-control system integration – Part 2: Object model attributes*

ISO/IEC 19501, *Information technology - Open Distributed Processing - Unified Modeling Language (UML) Version 1.4.2*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61512-1, IEC 61512-2 and IEC 60050-351, as well as the following, apply.

3.1.1

equipment-independent recipe

recipe type that defines general requirements for equipment but is not specifically tailored for a precise class or size of equipment.

3.1.2

master recipe transform component

part of a master recipe that is used in the transformation of an equipment-independent recipe into a complete master recipe.

3.1.3

process procedure chart

a graphical representation of equipment-independent recipes that is defined in this part of IEC 61512.

3.1.4

product family

a set of produced materials that are related by manufacturing process or business policy.

3.1.5

product grades

collections of similarly produced materials with variations in properties.

3.2 Abbreviation

PPC - Process Procedure Chart

4 Recipe description

4.1 Recipe types

As defined in the recipe model of IEC 61512-1, a recipe is an entity that contains the minimum set of information that uniquely defines the manufacturing requirements for a specific product. Recipes provide a way to describe products and how those products are produced.

Four types of recipes are defined in IEC 61512-1: general recipe, site recipe, master recipe, and control recipe. There are substantial differences between general/site and master/control recipes. General/site recipes describe the equipment-independent processing requirements to make a specific product. Master/control recipes describe the specific actions required with specific equipment to make a batch of product.

Additional information on the four recipe types is defined in IEC 61512-1.

4.2 General and site recipe description

4.2.1 Manufacturing information

General and site recipes are sources of information for the development of process cell-specific master recipes. Their purpose is to describe manufacturing information without regard to specific manufacturing equipment. They describe, in manufacturing terms, the materials, equipment requirements, chemical transformations, and physical transformations required to manufacture a product.

4.2.2 Multiple site definitions

General and site recipes are intended to define processing requirements that can be carried out in differently constructed process cells and that can be valid in multiple areas and multiple sites, as shown in Figure 1. In some circumstances, general recipes can even be used to convey product-manufacturing information across multiple enterprises.

other areas of the enterprise, such as research and development (R&D), but the concepts can be beneficial in other areas.

In the examples, the recipes are identified as general recipes, but they can be any type of equipment-independent recipe.

Development of equipment-independent recipes is typically iterative so there will be feedback loops throughout the development cycle. For simplicity, the multiple feedback loops have not been shown in Figures 2 and 3.

4.3.3 Input to trial or pilot production

Figure 2 illustrates the activities associated with the generation and use of equipment-independent recipes as an input to trial or pilot plant production.

In this usage scenario, a company generates equipment-independent recipes that are the definitions given to the trial or pilot plant operation. The equipment-independent recipes are converted to master recipes that match the pilot plant equipment layout and the process is scaled up and validated.

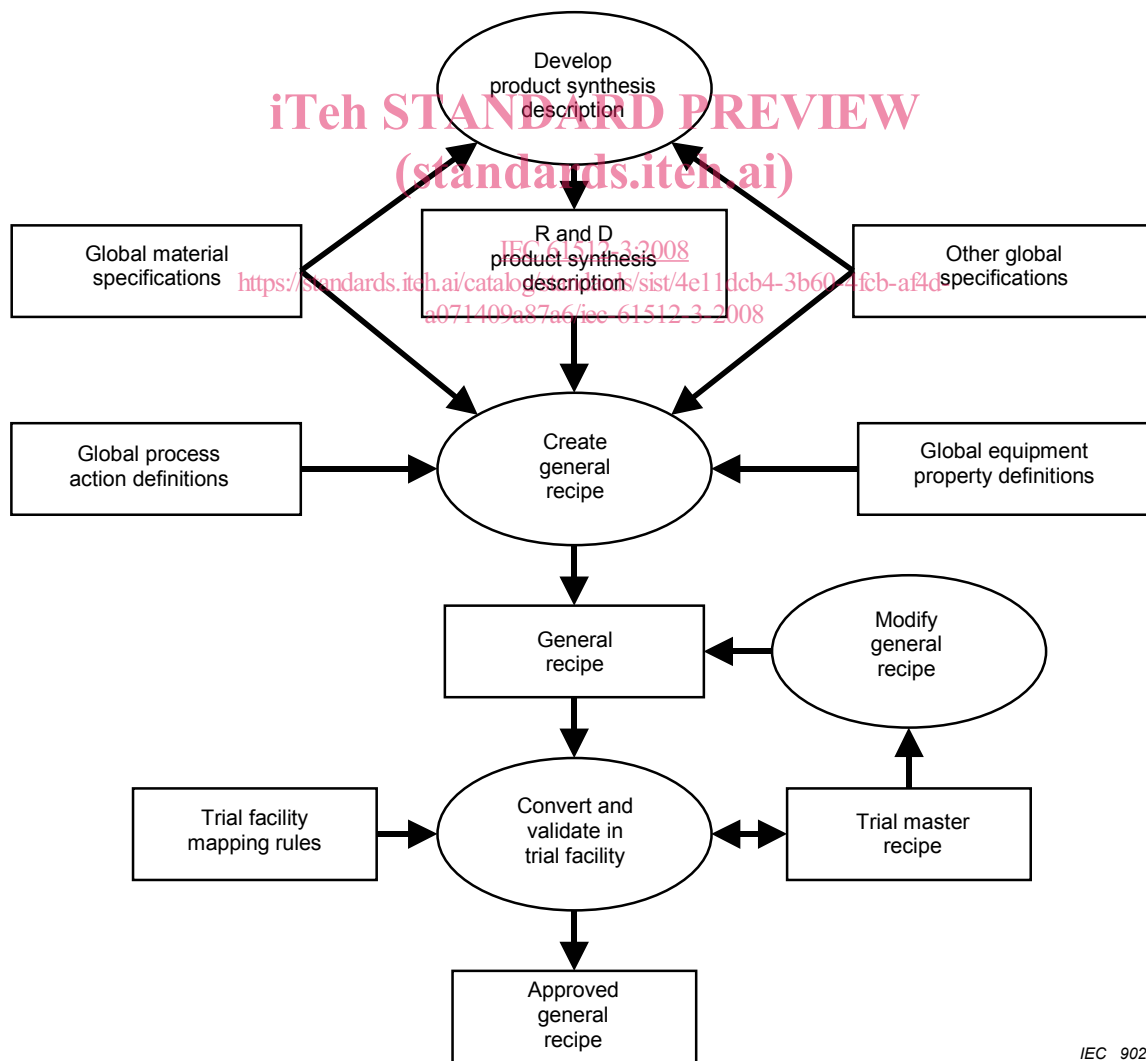


Figure 2 – Pilot plant creation of equipment-independent recipe

4.3.4 Output from trial or pilot production

An alternate method for equipment-independent recipes development is the creation of an equipment-independent recipe after the scale-up and verification of the process in a trial or pilot facility, as shown in Figure 3. In this model, a final equipment-independent recipe is generated after the scale up and verification of the process in a trial or pilot facility. This equipment-independent recipe is usually constructed using the final trial master recipe as the process description.

Note that because of clarity of the process description inherent in formal equipment-independent recipes, it can be advantageous in some circumstances to use the same structure as an input to the pilot plant, even if it is not identified as a recipe.

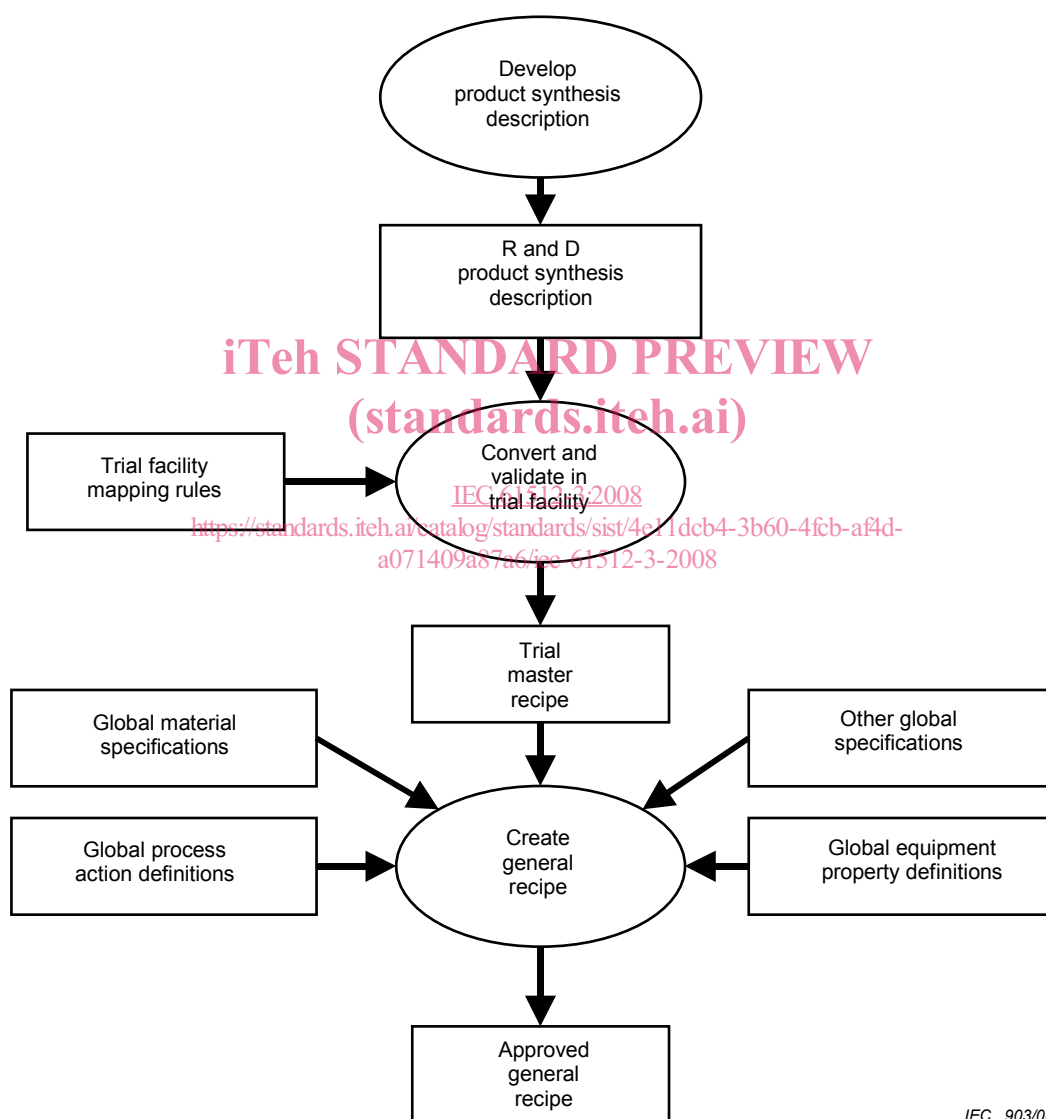


Figure 3 – Equipment-independent recipe from pilot plant development

4.3.5 Control of equipment-independent recipes

Equipment-independent recipes are usually tightly controlled because they represent the valuable, proprietary, and unique intellectual capital of a company. It is important that equipment-independent recipes be managed with formal procedures and adequate safeguards for change control.