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Technical product documentation – A life cycle model and allocation of documents to phases and activities

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Teknisk dokumentation – En livs- cykelmodell och dokumentets tillhö- righet till faser och aktiviteter

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 15226 was prepared by Technical Committee ISO/TC 10, *Technical drawings, product definition and related documentation*, Subcommittee SC 1, *Basic conventions*.

Annexes A, B and C of this International Standard are for information only.

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Introduction

Technical product documentation (TPD) is becoming more and more extensive, and in order to give protection against claims related to product liability it is necessary to store technical documents for a long period of time. Growing knowledge in all technical disciplines is reflected by increasing documentation. As companies transfer parts of production to sub-suppliers, the exchange of documentation among companies increases accordingly. The necessity to interchange larger amounts of technical information more frequently increases the importance of product documentation management and justifies standardization in this area, if only for economic reasons.

The method described in this International Standard meets the principal requirements of product documentation management:

- documentation as easy to understand as possible so that, for example, every user of a document knows who has prepared the document and which other documents have been used in its preparation;
- simultaneous or concurrent engineering consisting of parallel activities during the product life cycle;
- implementation of project management techniques with the registration of the document flow in the company;
- registration and proof of existing documents in a documentation overview;
- control and coordination of paper documentation and electronic documentation;
- clear delineation of responsibilities, processes, results and persons responsible for preparing documents.

This International Standard results from the obvious need to establish common principles for dealing with technical documentation in a company.

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Technical product documentation — Life cycle model and allocation of documents

1 Scope

This International Standard gives a method of establishing a flexible life cycle model and gives guidance on efficient and easy-to-understand handling technical documents during the product life cycle. The product life cycle takes different company-specific requirements into account, in accordance with project management techniques. For general use in connection with non-company-specific requirements, procedures, processes and products, it may be necessary to establish a standardized life-cycle model with defined phases.

This International Standard is intended for use in companies, bodies of authority and other organizations who deal with manufactured products, with the compilation and use of technical documents during the product life cycle. It is not applicable either to services or software.

This International Standard is intended to be an aid in controlling and coordinating documents, in accordance with ISO 9001, ISO 9002, and ISO 9003.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5127-1:1983, *Documentation and information — Vocabulary — Part 1: Basic concepts*.

ISO 9001:1994, *Quality systems — Model for quality assurance in design, development, production, installation and servicing*.

ISO 9002:1994, *Quality systems — Model for quality assurance in production, installation and servicing*.

ISO 9003:1994, *Quality systems — Model for quality assurance in final inspection and test*.

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*.

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 activity

processes, procedures or parts of them, usually related to established organization units

NOTE The terms "process" and "procedure" are defined in ISO 8402. A detailed explanation of processes within companies is given in ISO 9000-1.

**3.2
activity matrix**

matrix allocating activities to phases of the product life cycle and to a fixed organization unit

**3.3
document**

recorded information which can be treated as a unit in a documentation process

[ISO 5127-1:1983]

**3.4
documentation**

set of documents collected for a specific purpose

[ISO 5127-1:1983]

**3.5
product**

thing or substance produced by a natural or artificial process

[ISO 10303-1:1994]

NOTE For the purposes of this International Standard a product is usable or saleable and is documented.

**3.6
organization unit**

part of an organization, with a fixed function

EXAMPLES Departments, project teams.

**3.7
product life cycle**

period of time from the first idea to the ultimate disposal of a product

NOTE The product life cycle is divided into defined periods called phases in which activities that belong together are grouped, e.g. product concept, design, production etc. The beginning and ending of phases require definite decisions (e.g. releases).

**3.8
concurrent engineering**

coordination of parallel activities in the product life cycle, especially in the phases up to market introduction

4 Determining a product life cycle

4.1 General

Because requirements are different and depend on the branch of industry, the product, and the internal structure of a company involved, a standard general life cycle for all technical products would hardly be relevant. Moreover, a general standard would restrict the freedom of companies to manage their own organizational structure. Every company must therefore develop one or more of its own product life cycles, depending on specific product requirements. Subclauses 4.2 and 4.3 present a general method for defining and describing a product life cycle.

NOTES

- 1 The tables shown in annex B are examples intended to assist in the development of life cycle models. The phases described may have to be edited, extended, deleted, etc. to suit individual company-specific life cycles.
- 2 The descriptions of phases in the design process are given in ISO 11442-3.

Table 1 — General life cycle

	Phases			
	Phase 1	Phase 2	...	Phase <i>n</i>
	Name of phase	Name of phase	...	Name of phase
Conditions, beginning and end of phase	Conditions — beginning — end	Conditions — beginning — end	...	Conditions — beginning — end
Activities	Activity 1.1	Activity 2.1	...	Activity <i>n</i> .1
	Activity 1.2	Activity 2.2	...	Activity <i>n</i> .2

	Activity 1. <i>m</i>	Activity 2. <i>m</i>	...	Activity <i>n</i> . <i>m</i>

NOTE — The variables *n* and *m* denote that the number of phases and activities is not restricted. They are not designations.

4.2 General model of a product life cycle

As a first step in developing a life cycle model the phases necessary for the life cycle of a specific product must be listed. Phases are delineated by activities and conditions which mark their beginning and their end. The result is an overview; see table 1.

The beginning and end of a phase have fixed times which are determined by documentation and by company and product-specific requirements. Such requirements are often called "release", "development valuation", or "milestones" and must be given in the row "Conditions, beginning and end of a phase" for each phase. The activities associated with a phase must take the product from phase beginning to phase end. Activities are processes, procedures or parts thereof. Generally, an activity is allocated to a fixed organization unit so that it becomes clearly delineated on the activity matrix.

The defined method can also be represented by the flow of documents in concurrent engineering. To gain quick access to the market it is often not feasible to wait until all type-related activities in one phase are completed before beginning the next phase. Figure 1 shows an example of part of a product life cycle. The curves illustrate the work intensity for the different kinds of activities.

The temporal aspects of phases must be determined in a way which ensures that most type-related activities become part of one phase. All activities in the phase must then reach a state that enables the next phase to begin. In principle, resources devoted to activities must be used during the phase in which the particular activities occur.

The product life cycle, the activity matrix (see clause 5) and the allocation of documents to activities (see clause 6) should be independently documented within the company. Authorized members of the staff must have access to such documentation. Documentation may be in the form of printed matter or computer-based information.

4.3 Procedure for defining a specific product life cycle

The definition of a product life cycle is divided into four steps described in 4.3.1 to 4.3.4.

4.3.1 Specifying relevant product life cycle

Different products in the company can have different life cycles. The development of specific life cycles will depend on whether the products concerned are the subject of single or series production, or whether complex systems or simple consumer products are manufactured.

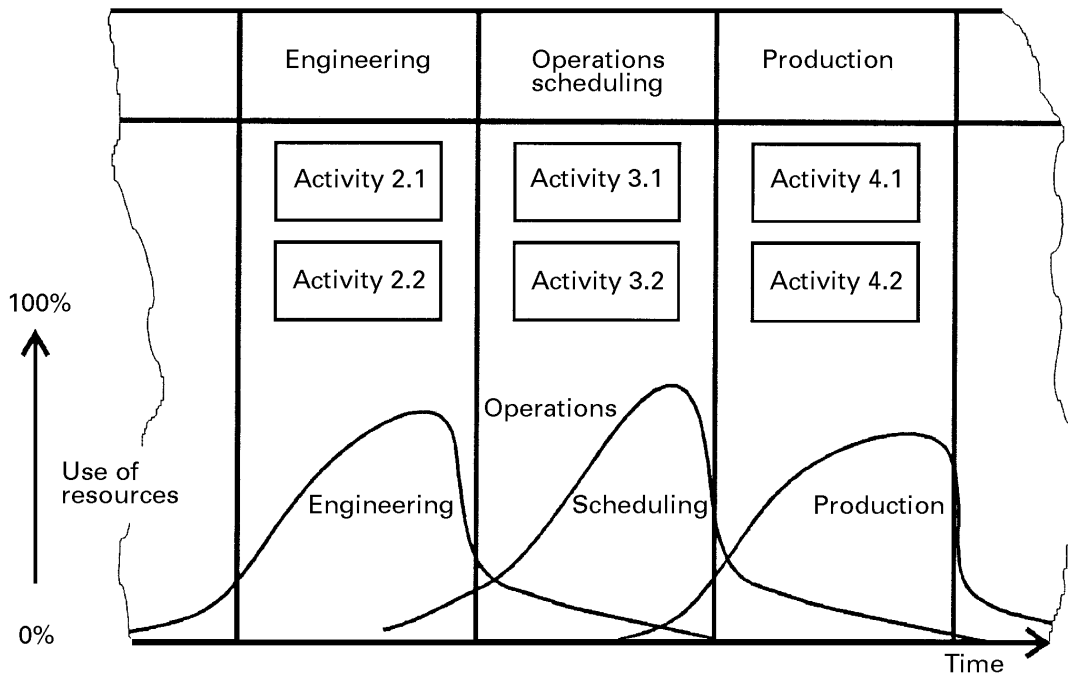


Figure 1 — Allocation of activities in terms of time and content

The decision on whether two or more products/product groups should have the same life cycle is a question of optimization: optimum adaptation of the product life cycle to the single product, or the rationalization/unification of administrative work. The more similar the handling of the products in the company becomes, the greater is the possibility of using common life cycles.

4.3.2 Elaborating product life cycle phases

After determining the relationship between a product or product group, the company-relevant phases of the product life cycle have to be determined. Such decisions have to be made on the basis of the company functions and organization units concerned with the product in question. In these functions and units similar activities are often grouped. Additional information can be found in procedural and organizational rules, and in quality management documents.

4.3.3 Listing activities and allocating them to phases

The allocation of activities to different organization units has to be systematic. If activities are part of project management they are usually adequately defined. If this is not the case, activities must be described in a separate list. Such a list should give an identification number for each activity so that an activity matrix can be drawn up (see 5.3). In addition to describing activities, the list should also contain designations referring to the organization units responsible for carrying them out.

Each activity must also be clearly allocated to a phase in the product life cycle. Therefore, it may be necessary to divide one activity into several individual activities which can be clearly allocated.

In many companies such activities are already listed in organizational documents and quality management documents. Decisions are also activities. When collecting and defining activities, all employees concerned should be included in the process in order to stimulate the acceptance of changes.

4.3.4 Specifying conditions for beginning and end of phases

Phases begin and end with decisions, e.g. releases. They are described in organizational and quality-management documents. Usually the conditions for ending a phase simultaneously present the conditions for beginning the next