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Technical product documentation (TPD) — Unique integral feature identification (UIFI)

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Documentation technique de produits (DTP) — Identification unique des éléments intégraux

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Contents

Foreword

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This document was prepared by Technical Committee ISO/TC 10, *Technical product documentation*, Subcommittee SC 1, *Basic conventions*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/SS F01, *Technical drawings*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document is a technical product documentation (TPD) standard and is a complementary standard.

Modern computer-aided design (CAD) systems already provide built-in systems for the unambiguous identification of each integral feature of a model. This identifier will often vary between CAD systems, but typically comprises a long and complex code, which is normally difficult to read by humans and is therefore impractical.

A datum feature identifier indicated in a datum feature indicator on an integral feature of a part specified in a TPD in accordance with ISO 5459 is a unique integral feature identifier, a name which can be used to reference that specific integral feature. However, all integral features of a part will not be indicated with a datum feature identifier, which complicates the identification of other integral features than datum features.

Drawings are used in a variety of situations, e.g. design, manufacturing and verification (see ISO/TS 21619). In many cases, it can be difficult to unambiguously communicate a reference to a specific integral feature, either orally or in writing, in different documents when the part is not described in full detail in the drawing.

Depictions of the part are not always the most efficient way to communicate. Using a written identification that unambiguously identifies each integral feature on the part can be useful for the following purposes (the list is non-exhaustive):

— Ease verbal communication between stakeholders, e.g. between a customer and a supplier, or between a designer and a manufacturer or a metrologist~~.~~;

— Simplify the preparation of a nomenclature drawing of the part (human-readable naming of the integral features~~).~~);

— Ease the kinematic description of the part by stating what function an integral feature will have in different product or part states, e.g. if it is a clearance or an interface surface~~.~~;

— Referencing surfaces in documents, e.g. standard operating procedures (SOPs), measurement descriptions, measurement reports, nonconformities, customer complaint descriptions, failure investigations, risk analyses, failure modes and effects analyses (FMEA), tolerance stack-up calculations, change requests.

Furthermore, unique integral feature identifiers can be used to simplify a TPD, e.g. when a special requirement or subsequent machining, finishing or treatment ~~shall apply~~applies to a group of different integral features.

Human-readable identifiers for integral features are needed to ease the communication between stakeholders and to clarify to which integral feature a specification applies, i.e. establish human-understandable traceability, and to provide traceability between the drawing and other TPD. CAD vendors are encouraged to implement a harmonized system of unique integral feature identifiers to support the implementation of the benefits described in this Introduction and in this document.

Technical product documentation (TPD) — Unique integral feature identification (UIFI)

1 Scope

This document specifies how to uniquely identify the integral features of a part by an integral feature indicator with a unique alpha-numerical label and how indication in technical product documentation (TPD) is done, where needed to improve human readability.

The proportions and dimensions of graphical symbols for a simplified indication of repeated features are also specified.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 5459, *Geometrical product specifications (GPS) — Geometrical tolerancing — Datums and datum systems*

ISO 81714-1, *Design of graphical symbols for use in the technical documentation of products — Part 1: Basic rules*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5459 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
integral feature
geometrical feature belonging to the real surface of the workpiece or to a surface model

Note 1 to entry: An integral feature is intrinsically defined, e.g. skin of the workpiece.

Note 2 to entry: For the statement of specifications, geometrical features obtained from partition of the surface model or of real surface of workpiece shall be defined. These features, called "integral features", are models of the different physical parts of the workpiece that have specific functions, especially those in contact with adjacent workpieces.

Note 3 to entry: An integral feature can be identified, for example, by

— a partition of the surface model,

— a partition of another integral feature, or

— a collection of other integral features.

[SOURCE: ISO 17450-1:2011, 3.3.5]

4   Graphical symbols

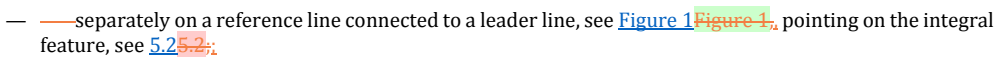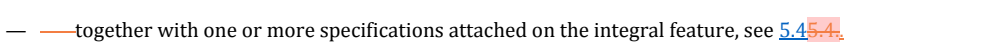### 4.1   Graphical symbol for unique integral feature indication

The unique integral feature indication consists of an integral feature indicator pointing to an integral feature.

The integral feature indicator consists of an integral feature indicator symbol and an alpha-numerical label.

The integral feature indicator symbol is defined by a leader line connected to a reference line.

The alpha-numerical label ~~display~~displays the name of the integral feature and is called integral feature identifier.

The alpha-numerical label shall be indicated:

— separately on a reference line connected to a leader line, see Figure 1~~Figure 1~~, pointing on the integral feature, see 5.2~~5.2~~;

— together with one or more specifications attached on the integral feature, see 5.4~~5.4~~.

a) With leader lines terminating at outlines   b) With leader line terminating onto surfaces
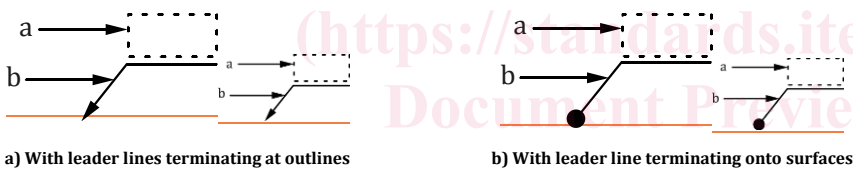
Key
a   alpha-numerical label
b   integral feature indicator symbol

Figure 1 — Integral feature indicator

4.2   Graphical symbol for enumeration direction of repeated features

There are two basic complementary symbols for indication of the enumeration directions for simplified indication of repeated features, see Figure 2 and 5.5.2. The symbols shall be in accordance with Annex A.

~~indication of repeated features, see Figure 2 and 5.5.2. The symbols shall be in accordance with Annex A.~~

2

a) Circular direction

b) Multilinear (matrix) direction

Figure 2 — Graphical symbol for the indication of enumeration directions for repeated features

The enumeration direction symbols can be flipped horizontally or rotated, or both, according to the appropriate indication. For details of the symbol, see Figures A.1Figures A.1 to A.10A.10.

5 Identification of integral features

5.1 General

If needed, the necessary single integral features on a part shall have their own alpha-numerical label, displaying the unique name of the feature called a "feature identifier".

The user may choose only to identify those integral features of a part needed with a feature identifier. However, it can be useful to identify all integral features of the entire part in order to take full advantage of the identification.

When the design is changed, the consequence with respect to the naming of the integral features should be considered. If the function of the integral feature is changed, it is often good practice to change the feature identifier in order to make the design change obvious.

5.2 Alpha-numerical label for integral features

5.2.1 General

The integral feature identifier:

— shall be unique;

— may be chosen according to the user's own requirements and rules;

— can also be used as a datum feature identifier, see 5.35.3.

5.2.2 Single or repeated capital letter

It is recommended that the label for the integral feature identifier consists of a single or a repeated capital letter.

In order to avoid confusion, the letters I, O, Q, X, Y and Z should not be used due to the following reasons:

— I: can be mistaken for the number one (1);

— O and Q: can be mistaken for zero (0);

— X: can be mistaken for number of repetitions ($n\times$);

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— ——X, Y and Z can be mistaken for the naming of the coordinate axis in a Cartesian coordinate system.

If all the letters of the alphabet have been used for the single capital letter feature identifier, it is recommended to repeat the same capital letter uninterruptedly, e.g. BB, CCC.

Using a combination of different letters should be avoided, in order to prevent misinterpretations, e.g. HMNF can easily be mistaken for HNMF.

If a combination of letters is used, special care should be taken to ensure that no combination of letters ~~are~~is used that can be confused with other GPS modifiers, e.g. like UF. The use of the letter R with a postfixed enumeration should be avoided in order to avoid it being mistaken as a Radius specification.
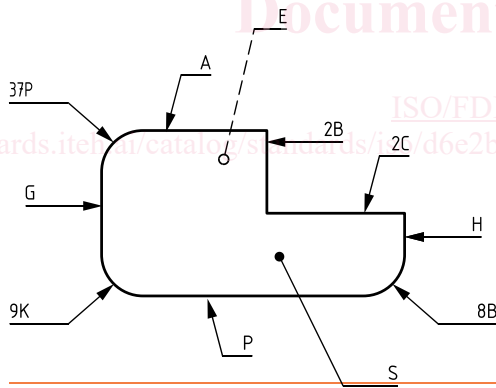
5.2.3   Prefixed capital letter

To ease the readability of the feature identifier, a prefixed capital letter identifier should be used in preference to a repeated capital letter identifier with a long list of repeated letters. A prefixed capital letter consists of a preceding number and a letter, e.g. 2B, 2C, see Figure 3~~Figure 3~~ .

NOTE 1   ISO 5459:2011 does not allow the use of prefixed capital letters as datum identifiers.

NOTE 2   A number of repeated letters and a prefixed letter with the same preceded number as the number of repeated letters and of the same letter, e.g. "AAA" (triple A) and "3A" (three A), are two unique independent feature identifiers.

The use of a prefixed capital letter rather than a repeated capital letter ~~will   make~~makes the search functionality in an electronical document more efficient, e.g. the number of hits using the feature identifier "1A" is usually fewer than using the feature identifier "A".
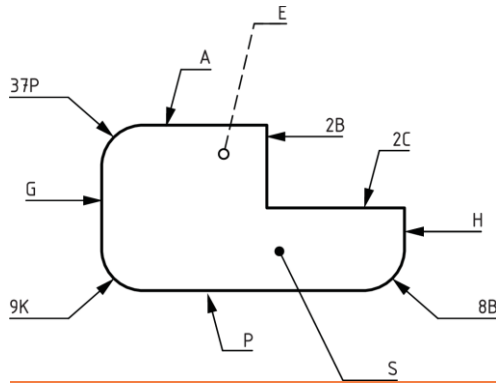
Figure 3 — Example of a drawing with unique identification of integral features using integral feature identifiers

5.2.4 Postfixed enumerated capital letter

Any of the three types of feature identifiers (single capital letter, repeated capital letter or prefixed capital letter) may additionally be expanded to have an index, i.e. a postfixed enumeration equivalent to the enumeration of datum targets (see ISO 5459), e.g. 2A1, 2A2, 2A3 (see 5.55.5).).

The feature identifier shall be unique, i.e. the name shall not be used for any other integral feature.

A different writing style may be used to establish unique integral feature identifiers, if necessary, see Figure 4Figure 4. The following alpha-numerical labels are considered to be different from each other and therefore regarded to be unique: A, A1, 1A, 1A1, AA, AA1, 2A, 2A1, 2A2, etc. However, the use of postfixed feature identifiershouldidentifier should be restricted for:

— ⸻repeated features, see 5.55.5;;

— ⸻restricted areas that are related to each other, see 5.65.6;;

— ⸻compound features, see 5.75.7.

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