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Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS) —

Part 102: Grammar of symbols for metrological characteristics and their specifications

Spécification géométrique des produits (GPS) — Essais de réception et de vérification périodique des systèmes à mesurer tridimensionnels (SMT) —

Partie 102: Syntaxe des symboles pour les caractéristiques métrologiques et leurs spécifications

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 213, *Dimensional and geometrical product specifications and verification*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 290, *Dimensional and geometrical product specification and verification,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all parts in the ISO 10360 series can be found on the ISO website.

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.

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Introduction

This document is a geometrical product specification (GPS) standard and is to be regarded as a general GPS standard (see ISO 14638). It influences chain links A to C of the chains of standards on datums.

The ISO GPS matrix model given in ISO 14638 gives an overview of the ISO GPS system of which this document is a part. The fundamental rules of ISO GPS given in ISO 8015 apply to this document and the default decision rules given in ISO 14253-1 apply to the specifications made in accordance with this document, unless otherwise indicated.

For more detailed information on the relationship of this document to other standards and the GPS matrix model, see Annex C.

The ISO 10360 series is widely used in industry for the acceptance and the reverification testing of coordinate measuring systems (CMSs). It includes several documents addressing different CMS technologies. These documents are designed to ensure the highest possible degree of internal consistency in spite of their diversity.

This document and other parts of the ISO 10360 series with part numbers over 100 (e.g. ISO 10360-102) describe the commonalities of the ISO 10360 series. The purpose is to provide a reference for the development of future ISO 10360 documents and the revision of existing ISO 10360 documents as well as to disclose the commonalities to the public and to improve awareness and understanding overall.

The ISO 10360 series specifies metrological characteristics – typically error parameters – and their specifications [maximum permissible errors (MPEs) or maximum permissible limits (MPLs)] of CMSs. Symbols are associated to them for convenience and ease of reference. The association of symbols to corresponding metrological characteristics and their specifications is conventional and any is valid in principle when it is unambiguous (i.e. the correspondence is one-to-one) and conforms to ISO 80000-1. The systematic rules in this document for assigning and interpreting metrological characteristics and their specifications are intended to maintain clarity in the symbols used in the increasing number of ISO 10360 documents.

The symbols in the ISO 10360 series of documents follow an underlying grammar named G3, to create valid and consistent symbols. Annex B describes the evolution of the symbols of the ISO 10360 series and the underlying grammar generations. Understanding such grammar is important in order to avoid confusion (symbols are sometimes long and complex) and to be able to read, interpret and compare them.

Annex A provides a complete set of grammar rules for the G3 symbols and is intended mainly for standard makers for defining new symbols of metrological characteristics and their specifications in the ISO 10360 series.

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Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring systems (CMS) —

Part 102: Grammar of symbols for metrological characteristics and their specifications

1 Scope

This document specifies the grammar of symbols used in ISO 10360 series in order to identify metrological characteristics of coordinate measuring systems (CMSs) and their specifications.

This document does not provide the meaning of these symbols, neither of whole symbols nor of their components. These meanings are specified in the ISO 10360 documents introducing them.

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 10360-1, *Geometrical product specifications (GPS) — Acceptance and reverification tests for coordinate measuring machines (CMM) — Part 1: Vocabulary*

ISO 14978, *Geometrical product specifications (GPS) — General concepts and requirements for GPS measuring equipment*

ISO 80000-1, *Quantities and units — Part 1: General*

ISO/IEC Guide 99, *International vocabulary of metrology — Basic and general concepts and associated terms (VIM)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10360-1, ISO 14978, ISO/IEC Guide 99 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
grammar of symbols
G3
set of rules applicable to the spelling and meaning of the symbols associated with the metrological characteristics of CMSs and their specifications as specified in ISO 10360 series

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3.2
G3 symbol
symbol conforming to the grammar of symbols (G3)

3.3
symbol component
component
portion of a G3 symbol that captures all necessary information about an aspect of the metrological characteristic or specification

Note 1 to entry: Symbol components are separated by punctuation.

Note 2 to entry: G3 symbols of metrological characteristics and their specifications are made of an ordered sequence of symbol components.

3.4
characteristic symbol component
characteristic component
symbol component that identifies the geometrical characteristic measured in the test of a CMS capturing the metrological characteristic or specification

3.5
procedure symbol component
procedure component
symbol component that identifies the procedural details of the measurement of the metrological characteristic or specification

3.6
technology symbol component
technology component
symbol component that identifies the CMS type (or technology)

3.7
specification symbol component
specification component
symbol component that identifies a specification

Note 1 to entry: G3 symbols of metrological characteristics do not have a specification symbol component.

Note 2 to entry: The specification symbol component is added to the G3 symbol of a metrological characteristic to indicate the specification assigned to that metrological characteristic.

3.8
symbol component word
word
<of a G3 symbol component> smallest portion of a symbol component that carries a unit of meaning

Note 1 to entry: A symbol component may contain one or more symbol component words or may be void.

4 Objectives

G3 is subject to ISO 80000-1 and has the following objectives:

— to maintain consistency of symbols throughout the ISO 10360 series, and underpin one-to-one correspondence between metrological characteristics and their specifications, and G3 symbols;

— to allow performance comparison of CMSs of a same or of different technologies, e.g. a laser tracker vs. a (large) tactile CMM;

— to help users of standards in remembering definitions, or at least meanings, by looking at G3 symbols, or even in guessing meanings before reading definitions;

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