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Technical product documentation (TPD) — General requirements of digital mock-up for mechanical products

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The UK participation in its preparation was entrusted to Technical Committee TDW/4, Technical Product Realization.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Documentation technique de produits (TPD) — Exigences générales de Digital mock-up pour les produits mécaniques

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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 documents 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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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary information.

The committee responsible for this document is ISO/TC 10, *Technical product documentation*, Subcommittee SC 6, *Mechanical engineering documentation*.

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INTERNATIONAL STANDARD ISO 17599:2015(E)

Technical product documentation (TPD) — General requirements of digital mock-up for mechanical products

1 Scope

This International Standard specifies the requirements for the classification, composition, modelling, review, application, and management of digital mock-up.

This International Standard for mechanical products is applicable to the building, management, review, and application of digital mock-up.

2 Normative references

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

ISO 10007:2003, *Quality management systems — Guidelines for configuration management*

ISO 11442, *Technical product documentation — Document management*

ISO 16792:2006, *Technical product documentation — Digital product definition data practices*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
digital mock-up (DMU)
digital specification given to a complete mechanical product or sub-system with an independent function, not only of the geometric properties, but also of its function and/or performance in a particular field

Note 1 to entry: The digital mock-up of the product is built at a design stage and is applicable to the whole life cycle of the product, including design, manufacture, marketing, and aftermarket. The digital mock-up could realize interference check, motion analysis, simulation of performance and manufacturing, technical training, advertising, maintenance planning, etc.

3.2
complete digital mock-up
digital specification given to all the information of a complete mechanical product or its systems

Note 1 to entry: The complete description pertains to mechanical components, system devices, function components, accessories, etc.

3.3
sub-system digital mock-up
digital specification of all the information of sub-systems based on the different functional divisions of mechanical products

EXAMPLE DMU of power, transmission, and control systems

3.4
scheme digital mock-up
part of the complete DMU, which includes the digital specification of product plan design

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3.5
detailed digital mock-up
part of the complete DMU, which includes the digital specification of elaborate product design

3.6
manufacturing digital mock-up
part of the complete DMU, which includes the digital specification of product machining and assembling

3.7
geometry digital mock-up
subset of the complete DMU, providing digital information specification, geometrically emphasized, extracted from officially released DMU

3.8
function digital mock-up
subset of the complete DMU, providing a digital information specification, functionally emphasized, extracted from officially released DMU

3.9
performance digital mock-up
subset of the complete DMU, providing a digital information specification, based on performance, extracted from officially released DMU

3.10
special-purpose digital mock-up
description extracted or simplified from a complete product model of a digital mock-up for special purposes, such as simulation, technical training, and marketing

3.11
retrofit digital mock-up
DMU of a new product, built on the basis of an existing one

3.12
simplification
method which allows some features built without modelling or some parts (or components) without assembling during the modelling process

Note 1 to entry: Through simplification, the geometric detailed representation can be simplified and the model loading efficiency can be improved provided that the simplification does not incur ambiguous understanding or bring about inconvenience to the use of a model.

3.13
lightweight
method to extract patches from the product geometry model

Note 1 to entry: It reduces resource expenditure in model loading, and it is suitable for large assembly, assembly simulation, advertising, technical training, etc.

3.14
annotation
dimension(s), tolerance(s), note(s), text, or symbol(s) visible without any manual or external manipulation

[SOURCE: ISO 16792:2006, 3.1]

3.15
configuration
interrelated functional and physical characteristics of a product defined in product configuration information

[SOURCE: ISO 10007:2003, 3.3]

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3.16
product configuration information
requirements for product design, realization, verification, operation, and support

[SOURCE: ISO 10007:2003, 3.9]

3.17
configuration management
coordinated activities to direct and control configuration

[SOURCE: ISO 10007:2003, 3.6]

4 Abbreviations

BOM	bill of materials
CAD	computer-aided design
CAE	computer-aided engineering
CAM	computer-aided manufacturing
CAPP	computer-aided process planning
DMU	digital mock-up
EBOM	engineering bill of materials
FMEA	failure mode and effects analysis
MBOM	manufacturing bill of materials
PBOM	process bill of materials
PDM	product data management
QC	quality control
TED	theoretically exact dimension

5 Classification of digital mock-up

5.1 Development stage

According to the development or life cycle stage, digital mock-up is generally divided into scheme digital mock-up, detailed digital mock-up, manufacturing digital mock-up, etc.

5.2 Purposes

Digital mock-up can be established according to various special purposes, such as simulation, manufacture, technical training, marketing, and advertising. This classification is done in line with purposes.

5.3 Data format

Digital mock-up can be classified according to the software type or data format.

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