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Light and lighting — Building information modelling properties for lighting — Lighting systems

Lumière et éclairage — Propriétés de modélisation des informations de la construction pour l'éclairage — Systèmes d'éclairage

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Foreword

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This document was prepared by Technical Committee ISO/TC 274, *Light and Lighting*.

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

Building information modelling (BIM) is a concurrent process that gives engineering and construction professionals the tools to more efficiently plan, construct, and manage buildings and infrastructure.

Within standardisation committees much work is being performed to define the fundamental principles of BIM that will allow this to happen in an effective and consistent manner.

For lighting applications, it is essential that this work is monitored and where required input is made to ensure that the requirements for lighting applications are considered.

Light and lighting — Building information modelling properties for lighting — Lighting systems

1 Scope

This technical specification identifies and clarifies lighting properties for digital building design and maintenance.

This document provides all the needed properties to design and to describe lighting systems. These properties are intended to be used for mapping between data providers and requesters. The mapping of the identifiers enables the exchange of luminaire and sensing device data within different databases.

The unambiguous mapping and description of properties improves the data quality, reduces misinterpretations and the processing time in digital environments. Therefore, the properties listed in this document establish the essential description of lighting systems in BIM systems and databases.

The listed properties in this document are used to structure the product data sheet which is complemented with real product information.

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 23386:2020, *Building information modelling and other digital processes used in construction — Methodology to describe, author and maintain properties in interconnected data dictionaries*

CIE S 017:2020, *ILV: International Lighting Vocabulary*

ISO 80000-7, *Quantities and units — Part 7: Light*

3 Terms and definitions

For the purposes of this document, the following terms and definitions given in CIE S 017, ISO 80000-7 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
building information modelling
BIM
use of a shared digital representation of a built object (including buildings, bridges, roads, process plants, etc.) to facilitate design, construction and operation processes to form a reliable basis for decisions

Note 1 to entry: The acronym BIM also stands for the shared digital representation of the physical and functional characteristics of any construction works.

[SOURCE: ISO 29481-1:2016, 3.2]

3.2
data dictionary
database that contains metadata

[SOURCE: ISO/IEC 2382:2015, 2121501]

3.3
attribute
data element for the computer-sensible description of a property, group of properties, etc.

Note 1 to entry: An attribute describes only one single detail of a property or a group of properties.

EXAMPLE The GUID of a property, the name of a property, the definition of a group of properties.

[SOURCE: ISO 23386:2020, 3.4, modified – Example extended]

3.4
property
inherent or acquired feature of an item

EXAMPLE Thermal efficiency, heat flow, sound reduction index, sound power level, colour.

[SOURCE: ISO 23386:2020, 3.17]

4 Principal structure

4.1 General

A lighting system (for example a luminaire or a sensing device) is described by specific properties, providing the possibility to communicate about it in an application or specification.

The properties for lighting systems have been organized in tables listed in Clause 5 according to different disciplines. This sub-division is indicative only and not to be taken as exclusive:

— Mechanical properties – ID 01 (Table 1);

— Electrical properties – ID 02 (Table 2);

— Emergency lighting properties – ID 03 (Table 3);

— Photometric properties – ID 04 (Table 4);

— Sensing device properties – ID 05 (Table 5);

— Mounting & Accessory properties – ID 06 (Table 6);

— Marketing properties – ID 07 (Table 7);

— Operations & Maintenance properties – ID 08 (Table 8);

— Environmental properties – ID 09 (Table 9).

4.2 Detailed description of set of attributes

4.2.1 General

The structure of the attributes is according to ISO 23386:2020 and enhanced by the property ID.

The properties have no mandatory or optional aspect. All properties are equal in importance and hierarchy. The use case and the application provide a structure and are mandatory to the properties.

4.2.2 GUID

In ISO 23386:2020, PA001 named "Globally unique identifier".

Identifier given to a product that guarantees its uniqueness throughout its entire life (defined in ISO 6707-2:2017, 3.2.46).

This attribute identifies the property unambiguously. A Globally Unique identifier GUID is generated using an algorithm. This machine-readable code will allow matching across databases, lists and data template.

In ISO 16739-1 (IFC) and ISO 12006-3 the compressed version of GUID is used. It can be uncompressed to the standard GUID with open tools.

4.2.3 ID

This attribute identifies the property unambiguously. It is human-readable and corresponds to the GUID.

Note The ID always starts with the table number from 4.1 followed by a dash and an individual serial number with four digits.

4.2.4 Name

In ISO 23386:2020, PA016 named "Names in language en-EN".

The name of the property.

4.2.5 Description

In ISO 23386:2020, PA018 named "Descriptions in language en-EN".

This attribute is used to provide a plain language description of the property.

For some descriptions the name is enough. To avoid the repeating of the name, just "*identical with name.*" is entered.

4.2.6 Symbol

In ISO 23386:2020, PA022 named "Symbols of the property in a given property group".

Symbols for quantities are given in the ISO 80000 and IEC 80000 series. The symbols for quantities are written in italics. A given symbol can indicate different quantities. (ISO 80000-1:2022).

4.2.7 Format, Unit

In ISO 23386:2020, PA037 named "Digital format".

Precision is the maximum number of significant digits that can be represented in a format, or the number of digits that a result is rounded to [ISO/IEC 60559:2020].

In ISO 23386:2020, PA033 named "Units".

Concept type representing a scale that enables a value to be measured. Properties that do not have a unit are to be designated as not applicable (n.a.).

4.2.8 Value set

In ISO 23386:2020, PA039 named "List of possible values in language en-EN".

Collection of acceptable values for a property. Values outside the value set are not permitted. Multiple values may be possible for some properties.

4.2.9 Examples

In ISO 23386:2020, PA019 named “Examples in language en-EN”.

Samples for a value of the specific property.

4.3 Further IT-related attributes

Where potential attributes are not specified in 4.2, they may be defined separately within a data dictionary. These attributes can be found in ISO 23386:2020:

— **Definitions in language en-EN (PA017):** A description of the attribute in order to define it unambiguously;

— **Method of measurement (PA029):** Evaluation of construction products to ensure their suitability according to requirements in harmonised technical specifications;

— **Name of the defining values (PA034):** In a table of values, this attribute provides the name of the column headers;

— **Data type (PA030):** Format for expressing the value of the property. This can be understood as the storage type from a software perspective. (ISO/IEC 11404:2007, 8.1) Examples: String, Float, Integer;

— **Status (PA002):** Status of the property during its life cycle. Example: Active;

— **Date of creation (PA003):** Date of validation of the property creation request. All dates in accordance with ISO 8601. Format=YYYY-MM-DDThh:mm:ssTZD. Example: 2014-04-30T10:39:53Z;

— **Date of activation (PA004):** Date after when the property can be used;

— **Date of last change (PA005):** Date of validation of the last change request;

— **Date of revision (PA006)**;

— **Date of version (PA007)**;

— **Date of deactivation (PA008):** Date when property becomes obsolete. The property is maintained in the dictionary;

— **Version number (PA009):** Enables tracking of major changes;

— **Revision number (PA010):** Enables tracking of minor changes. If the version number changes, the revision number starts again at 1. Examples: new translation, changes of typos;

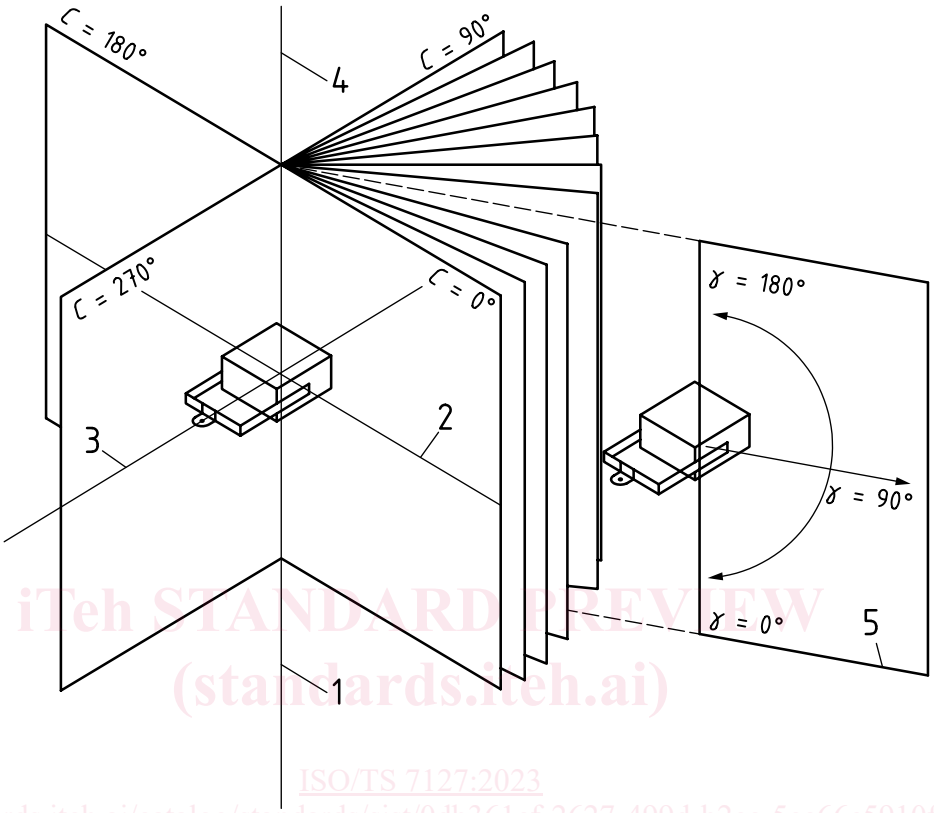
— **List of replaced properties (PA011):** Identifier of the replaced property (or properties). List of GUIDs;

— **List of replacing properties (PA012):** Identifier of the replacing property (or properties). List of GUIDs;

— **Deprecation explanation (PA013):** Reason of deprecation. Deprecated may indicate the property will be removed in the future. This explanation shall be written in international English (EN).

5 Properties for lighting systems

In Table 1 the mechanical properties of a lighting system are described. Figure 1 shows the orientation of a luminaire in the (C, γ) coordinate system according to CIE 121:1996 to clarify the location relationship.



Key

1 first axis of luminaire
2 second axis of luminaire
3 third axis of luminaire
4 polar axis of photometer
5 C half plane

Figure 1 — Orientation of a luminaire in the (C, γ) coordinate system according to CIE 121:1996; first axis of luminaire (γ) is in the IES LM-63-19, the vertical or the z-axis; second axis of luminaire (C0-C180) is in the IES LM-63-19, the 0° horizontal or the x-axis; third axis of luminaire (C90-C270) is in the IES LM-63-19, the 90° horizontal or the y-axis

Table 1 — Mechanical properties

GUID	ID	Name	Description	Symbol	Format, Unit	Value set	Examples
2GZ1YB8enFVhD-HOKgLc$BU	01-0001	overall diameter	Overall diameter of the housing of the round lighting system.		1E0, mm	n.a.	200
2F38RxmOf3ow-0715JRf5OO	01-0053	overall radius	Overall radius of the housing of the lighting system. Suitable for circular luminaires or sensing devices or segment geometry. Not suitable for ellipsoid forms.		1E0, mm	n.a.	100
19Z9XKYDT-4p8HR0ZbD$wO_	01-0002	overall height	Height of the housing of the lighting system. Measured over γ (Vertical). See Figure 1 – first axis of luminaire.		1E0, mm	n.a.	100
1uJglYpRnFpQ4tSt-HaR2Pf	01-0003	overall length	Length of the housing of the lighting system. Measured in the C90-C270 plane (90° Horizontal,). See Figure 1– third axis of luminaire.		1E0, mm	n.a.	1 500
1dPvrZN3vEIB0n-0vwYvDcX	01-0004	overall width	Width of the housing of the lighting system. Measured in the C0-C180 plane (0° Horizontal). See Figure 1– second axis of luminaire.		1E0, mm	n.a.	200
1RPyGAgMf4hRTZ-0DogLFnU	01-0005	mass	Mass of the lighting system. Commonly used as “weight”.		1E-2, kg	n.a.	1,40
2A6xVlUTj9QP-1G$qb4FiWv	01-0006	cut-out diameter	Diameter of the cut-out hole (for recessed or flush mount).		1E0, mm	n.a.	180
1RIsLltoX1whNaYk-aCoHXJ	01-0007	recessed required depth	Required minimum installation depth, height of the invisible/ hidden mounting part of the luminaire (for recessed or flush mount).		1E0, mm	n.a.	130
2VEYAfd7j4FQt-JgAb_riA5	01-0008	cutting out length	Length of the cut-out hole (for recessed or flush mount).		1E0, mm	n.a.	1 380
2pFfNBOuv1Tf_RTQpYktGL	01-0009	cutting out width	Width of the cut-out hole (for recessed or flush mount).		1E0, mm	n.a.	175

Table 1 *(continued)*

GUID	ID	Name	Description	Symbol	Format, Unit	Value set	Examples
1zs4Cj96j3d8TWAeeix-Jga	01-0010	luminaire housing shape 3D	Three-dimensional simplified shape of the lighting system.		n.a.	Cylinder, Cuboid, Cube, Cone, Pyramid, Sphere, Half-Sphere, User Defined	Cube
1Zek8UyXfE6gToN8_RDHFg	01-0011	shipping weight	Weight of the shipping package of the lighting system.		1E-2, kg	n.a.	2,40
1i_XY2Awj5RRadN-mgPS3yQ	01-0012	shipping height	Height of the packed lighting system as it is shipped.		1E0, mm	n.a.	150
10UDC$GOvEHex-mf_I8j9xG	01-0013	shipping length	Length of the packed lighting system as it is shipped.		1E0, mm	n.a.	1 650
1ybyhd8TbACg99Ox-pWMoOg	01-0014	shipping width	Width of the packed lighting system as it is shipped.		1E0, mm	n.a.	260
0yvFhm4xvDggZv-Lzgzhiyq	01-0015	type of packaging	Type of packaging. Available types of packaging to be specified by the manufacturers.		n.a.	Carton, Pallet, Container, Without, Other	Pallet

Table 1 *(continued)*

GUID	ID	Name	Description	Symbol	Format, Unit	Value set	Examples
16XdmXw8T3HOIi-0TOcc8LH	01-0016	impact protection rating IK	Degree of protection provided by enclosures for electrical equipment against external mechanical impacts according to IEC 62262:2002 and IEC 60068-2-75:2014.		n.a.	IK00, IK01, IK02, IK03, IK04, IK05, IK06, IK07, IK08, IK09, IK10	IK 10
1LrBLaYtnCARK-perF_2Ykh	01-0017	glow wire resistance	The glow wire test for fire hazard according to IEC 60695-2:2014 to test electrical products, assemblies, or individual components.		1E0, °C	550 °C, 650 °C, 750 °C, 850 °C, 960 °C	750
1284Zyx8D4uR55X-2cRsWzu	01-0018	needle flame test	Method for testing and assessment of the fire hazard of plastic material using a needle flame according to IEC 60695-11-5:2017. “Yes” for the product has passed the test.		n.a.	Yes No	
1PMNxHS2z4tRu-wiQxyzRfs	01-0019	number of light outputs	Number of surfaces with light output. Equals the number of positions for light distribution curves of the luminaire.		1E0, n.a.	n.a.	1
1mHV_4yHLEFux-OaIDlNmNn	01-0020	diameter of the luminous area	*Identical with name.*		1E0, mm	n.a.	190
0WXZRI6CD2KfL4x-C1uuLBF	01-0021	height of the luminous area	Height measured over z-axis. See Figure 1 – first axis of luminaire.		1E0, mm	n.a.	4
1auIwSthrFvRTJgX-6NfO9Z	01-0022	length of the luminous area	Length measured aligned with the y-axis, in the C90-C270 plane. See Figure 1– third axis of luminaire.		1E0, mm	n.a.	1 430

Table 1 *(continued)*

GUID	ID	Name	Description	Symbol	Format, Unit	Value set	Examples
2SqBhDZKD1hBjG-WsV4q_GQ	01-0023	width of the luminous area	Width measured aligned with the x-axis, in the C0-C180 plane. See Figure 1– second axis of luminaire.		1E0, mm	n.a.	192
2gBflnlCfCgwR3hT_QVGtQ	01-0024	cable length	Cable for power supply. Zero means no cable supplied.		1E0, mm	n.a.	2 400
1oCak0l6v9Bew_SHOfRFnw	01-0025	Pliable	The luminaire body is flexible.		n.a.	Yes No	
3CckyLFxX8KxZV-vgilS7Jt	01-0026	ground recessed accessibility class	Specific application class for ground recessed luminaires according to temperature limits, dimensions, and static load resistance in kN according to IEC 60598-2-13.		n.a.	n.a.	In restricted accessible areas
3AgJzo7ND4zB4c3y-sHuewK	01-0054	ground recessed luminaire static load	Static load of ground recessed luminaire according to IEC 60598-2-13.		1E0, kN	n.a.	20
0f2af0EifB1Qi6x-alTs1Xn	01-0029	sealing material	Material of the sealing of a luminaire.		n.a.	n.a.	
0iACWRZ2HAFfY7UB-nCGjHq	01-0057	reflector material	Material of the reflector of a luminaire.		n.a.	n.a.	Aluminium
3jAmXEFTn9oPlBD_oO4BfE	01-0030	silicone-free	States whether the luminaire is silicon-free.		n.a.	Yes No	
2DJLgonKH2zvtUylG-DtoL3	01-0031	halogen-free	States whether the product is halogen-free according to IEC 61249-2-21:2004.		n.a.	Yes No	
3IPpBFdz17PB0W-0suiESss	01-0032	temperature on light aperture	Average temperature of light emitting surface of a luminaire.		1E0, °C	n.a.	
30M$RN1TX7$g-z0O8$bv0j4	01-0033	operating temperature	Range defined by the minimum and maximum operating temperatures at which the luminaire operates normally as specified by the supplier or manufacturer.		1E0, °C	n.a.	-40 25
0jRoUrk2nF5QFen-mXXlBTS	01-0034	minimum distance	Describes the minimum required distance of the luminaire housing to other objects.		1E0, mm	n.a.	50