Acknowledgments

NBS would like to express special thanks to the following individuals for their support in the recent updates to the NBS BIM Object Standard:

John Dickinson, Advanced BIM Solutions
Rafael Lucero, Alberta Infrastructure
Steven Mahaney, Alberta Infrastructure
Bill Moore, Associated Engineering
John Hale, Department of National Defence
Keith Robinson, Dialog
David Watson, Digicon Information Inc.
Drew Wiggett, NBS
Lee Jones, NBS
Bruce McCallum, Next Architecture
Meagan Beange, Public Service and Procurement Canada
Justin James, Reach Consulting
Adam James, Ryder Architecture
Susan Keenliside, S8 Inc.

We would also like to thank the following organizations: Autodesk®, Bentley®, BuildingSMART, Nemetschek® and GraphiSoft® for their support in the formation of the NBS BIM Object Standard.
The NBS BIM Object Standard

At NBS, we recognized that the lack of an industry-wide standard for BIM objects was a barrier to the successful adoption of BIM. Therefore, by defining what constitutes a high-quality BIM object and providing consistency in the content and structure of these objects, the NBS BIM Object Standard will play a major role in assisting organizations to standardize their BIM approach.

The construction industry needs access to BIM objects that can be relied upon. Product data is also required at the right levels of information with the appropriate geometry.

The BIM landscape is rapidly evolving, and NBS is at the forefront of this evolution. We understand that the market needs good quality BIM objects, and the introduction of the NBS BIM Object Standard means that manufacturers or designers creating their own objects for practice and project-specific purposes can now do so to a common standard, enabling greater collaboration, efficiency and more meaningful information exchange.

Client groups, as well as project managers, will feel the benefit as they can be confident in the quality of the BIM objects used within their project models.

This is an important step: not just for NBS, but for all those who author BIM objects, as we can now build objects using a common approach. BIM objects that meet the requirements of the NBS BIM Object Standard will help to realize the true benefits of digital construction – resulting in better value across the whole life of the built asset.

The introduction of this standard in 2014 and subsequent updates is yet another indication of how NBS is demonstrating its knowledge and expertise throughout the entire digital plan of work.

The NBS BIM Object Standard will transform the future of BIM in the global construction market.
# Contents

The NBS BIM Object Standard ........................................................................................................ 3  
Standardizing BIM Objects ........................................................................................................... 5  
Scope and Purpose .......................................................................................................................... 7  
About NBS ....................................................................................................................................... 8  
Section 1: General Requirements ................................................................................................ 9  
Section 2: Information Requirements .......................................................................................... 10  
Section 3: Geometry Requirements ............................................................................................. 22  
Section 4: Functional Requirements ............................................................................................ 25  
Section 5: Metadata Requirements ............................................................................................... 26  
References ..................................................................................................................................... 30  
Terms and Definitions ................................................................................................................... 30
Standardizing BIM Objects

There are many definitions of building information modelling (BIM). Put simply, it is a means by which everyone can understand a building through the use of a digital model. Modelling an asset in digital form enables those who interact with the building to optimize their actions, resulting in a greater whole-life value for the asset.

More and more assets are being ‘built with BIM’, and that provides a fantastic opportunity to revolutionize the way in which users interact with the information contained in models of those assets.

In order to enable users from different companies, disciplines or geographical areas to effectively use model information, the digital building blocks that are used to create virtual assets need to be standardized. These building blocks are commonly known as BIM objects.

Since all physical assets require products, the availability of manufacturers’ BIM objects is an important factor in achieving success with BIM. The construction industry needs access to manufacturer BIM objects and BIM data.

These objects need to be of the right quality, and they need to be compatible with generic objects that are chosen before a product is selected. Associated data such as technical specifications need to connect with the BIM objects to support work processes. NBS has been achieving standardization between generic and proprietary information for over 45 years, and our entire product range is geared towards supporting the work processes of every construction professional involved in a project.

This standard recommends compatibility with the Construction Operations Building information exchange (COBie) standard, which identifies the information necessary for management of the facility after it is constructed. One of the advantages of COBie is that information collected at various milestone dates can be compared in various ways. With COBie, construction data can be compared across project stages; has the cost changed, and has the delivery time improved or reduced? These are typical stage-to-stage questions.

On a broader scale, being able to compare construction data across numerous built assets will help to assess greater whole-life value. By comparing projects, data optimization becomes possible: lessons can be learned from what has worked well, and this knowledge can influence future projects, refurbishment works and maintenance activities.

A BIM object is a combination of many things:

- Information content that defines the product.
- Model geometry representing the product’s physical characteristics.
- Behavioural data such as detection, maintenance and clearance zones that enable the BIM object to be positioned in (or function in the same manner as) the product itself.

For each of these BIM object essentials, it is important that a standardized approach is taken, as creating digital assets using a consistent kit of parts will yield all of the benefits that standardization brings.

BIM data should be efficient to use, easily comparable and interoperable.

The NBS National BIM Library in the UK sets an industry standard for quality, efficient generic and manufacturers’ objects. We expanded the standard that we used for our own library to form this BIM Object Standard (BOS). The BIM Object Standard establishes every object with a core property set that:

- adopts a consistent approach to classification;
• applies a standard naming convention for ease of use; and
• standardizes approaches to the level of information and object presentation.

This supports efficient workflows and enables the creation of high-quality digital building assets.

Note: For a consistent approach to classification, the new International Standard ISO 19650 requires a classification system that aligns to the ISO 12006-2 framework. Uniclass 2015 is the leading worldwide example of a classification system based on this framework.

By standardizing the information recorded within objects, we can compare them and make an appropriate selection for the project. Common approaches to the modelling of the physical characteristics of products make the BIM objects simple to use, affording the designer a reliable, consistent and intuitive experience. The hard work is in the detail. BIM objects in Industry Foundation Class (IFC) format, for example: these IFC files are manipulated so that they have their information properties consistently grouped and organized. This makes their use in various BIM platforms straightforward and consistent. Another example is the use of standardized properties. The benefits of this become obvious when using objects from more than one manufacturer in the same project. When creating schedules that span products from many manufacturers, the use of a standardized property set enables information relating to each of these products to be displayed in a single column.

With each BIM platform vendor having their own approach to information handling, the importance of setting minimum requirements for information transfer is vital to achieving collaboration and interoperability.
Scope and Purpose

Scope

This standard defines the information, geometry, behaviour and presentation of BIM objects to maximize consistency, efficiency and interoperability across the construction industry. Words in bold (and others) are explained in the Terms and Definitions section of this document.

Purpose

This standard is intended to assist construction professionals, manufacturers and other BIM content developers in creating BIM objects that operate in a Common Data Environment (CDE). It is a quality standard for BIM objects, and a benchmark by which objects can be consistently assessed. The standard is not intended to specify how to create BIM objects in specific software platforms (it is assumed that readers of the standard will have the requisite knowledge to operate their software of choice). Through the use of a common standard, the integration of building information and its effective use becomes possible.
About NBS

NBS is a technology platform for the construction industry. Thousands of users interact daily with our tools to create specifications, find products and develop their digital models.

Our platform is used by organizations of all sizes, from small architecture and engineering firms to the very largest global construction companies. We enable our customers to work safer and reduce their risk by providing expert content at their fingertips, and to work smarter through an intelligent set of connected tools which help them develop and manage their project information faster and more accurately.

For building product manufacturers, we give unrivalled exposure to decision makers that no other marketing channel or product library can match. We do this by placing their products in our platform at the very point of specification and product selection.

Our roots lie in the National Building Specification, which for over 40 years has been helping the construction industry to build better, with lower risk. Our future lies in cloud-based technologies and connected data, as we fast become an information marketplace for the construction industry.

NBS is backed by the Royal Institute of British Architects (RIBA), who are a significant shareholder and industry advocate for us. Through our relationship with the RIBA, we have unique knowledge of and access to the architecture and design communities. We also play an active role in many cross-industry bodies and groups, representing other construction disciplines, including engineering.

The NBS National BIM Library website enables construction professionals to locate, download and use thousands of high-quality, data-rich generic and manufacturers’ BIM objects, all of which have been authored to the trusted NBS format.

NBS BIM objects have direct connectivity to the key BIM 3D design tools and can be directly integrated into NBS Chorus software, which places NBS in a unique position – not just in the UK but worldwide. NBS is at the very forefront of BIM development, and its experts hold key positions in groups and organizations that are shaping the BIM landscape and starting to attract interest on a global stage.

NBS is represented in key industry groups such as the BSI B/555 BIM standards committee, CEN 442, CP1c, ICIS and BuildingSMART. NBS is the organization responsible for authoring the Uniclass 2015 classification system, as recommended by ISO 19650. It also publishes the internationally respected NBS National BIM Report.

A wealth of free BIM information can be found on theNBS.com/bim
Section 1: General Requirements

This section describes the general requirements for BIM objects.

The scope of this section includes general requirements such as object categorization, IFC element type and predefined type requirements.

1.1 General

1.1.1 Terms
The word ‘shall’ is used to express requirements of this standard.
The word ‘should’ is used to express recommendations.
The word ‘may’ is used in the text to express permissibility, e.g. as an alternative to the primary recommendation of the clause.
The word ‘can’ is used to express possibility, e.g. a consequence of an action or an event.
Terms in bold are defined in the Terms and Definitions section.

1.1.2 Object designation
The BIM object shall be created as:
a) A generic or manufacturer object.
b) A component or layered object.

1.1.3 Assembly
The BIM object may, where relevant, be part of a larger collection of objects that forms an assembly, including an assembly which represents the context in which an object is used.

1.2 Object Type

1.2.1 Identification
The BIM object type shall be identifiable within the associated BIM authoring system, and assigned using the appropriate IfcElementType and PredefinedType from the BuildingSMART International IFC4 (Add2) schema (ISO 16739).

If an appropriate type does not exist, the following shall be used:
a) IfcBuildingElementProxyType for the IfcElementType.
b) ‘USERDEFINED’, in upper case, for the PredefinedType.

1.2.2 IFC Exchange
The BIM object should include all necessary IFC properties to allow complete export to IFC from the BIM platform.
Section 2: Information Requirements

This section defines the requirements for the information contained within a BIM object. The scope of this section includes general requirements such as property sets, properties and values, as well as COBie and IFC properties.

2.1 General

2.1.1 Property assignment
The BIM object shall contain properties that are appropriately assigned as type or component. Common properties shall be assigned to type and not to component.

2.1.2 Data properties
The BIM object shall use information properties to represent aspects of construction products that are not modelled geometrically.

2.1.3 Completed values
The BIM object shall have completed values where they are known, and shall not include unset or undefined values. This is to avoid any doubt of error if a value is unable to be completed within the set parameter. Where the information is unknown, not applicable or not available, a default value ‘n/a’ shall be used and NOT left blank. If the data type restricts the use of an alphanumeric value, the appropriate value to that property shall be used, e.g. ‘0’ for numeric fields and ‘1900-12-31T23:59:59’ for date fields.

2.1.4 Units of measurement
The BIM object shall use units of measurements that are appropriate to its type, intended use and specific domain. The BIM object:

a) Shall use the Système international d'unités (SI) protocols for dimensions and units generally.

b) Should use base unit symbols to BS ISO 80000-1.

NOTE: The only exceptions are where the construction industry has (without dispute) retained an alternative unit of measurement, e.g. bar as a unit of pressure, or where a specific unit has been required by an information schema such as COBie or IFC.

2.1.5 Implied units
Information shall be provided for characteristic functional measures and quantities of service life planning to ISO 15686-4. If no measure is given then a unit should be implied by the property value type. In the case of materials and layered constructions, a unit volume or area should be assumed, e.g. m³.

2.1.6 Hard-coded properties
The BIM object shall retain hard-coded properties within the specific BIM platform, which allow for tasks such as performance analysis and calculations of specific functionality. Each property should be completed with a value if known.

2.1.7 Dimensional properties
The BIM object shall contain properties providing dimensional information limited to that necessary to define unambiguously the nominal model geometry of the construction product.

2.2 Values

2.2.1 General
The BIM object property value shall be controlled so that completion of the value facilitates information accuracy. The BIM object shall include, where appropriate, pre-determined sizes, multiple sizes and configurations that are accurately represented and easily available for selection within the BIM platform.

2.2.2 Product variants
The BIM object can represent product variants, using a property with a value comprising an alphanumeric or numerical single value, list value, range value, enumerated value and reference value or bounded value.

a) The BIM object property can be assigned a single value where a value has a single selection. The value shall be predetermined and completed where the value is available and known.

b) The BIM object property can be assigned a list value where several unique values of the same type are given in an ordered list, the order of which is significant, e.g. 200, 400, 600, 800.

c) The BIM object property can be assigned a range value where a value has an upper and lower limit (bound). The lowest bound shall be presented first, followed by the highest bound. Where the range uses positive and negative signs, the numbers are separated using ‘to’; for all other situations, use a hyphen. If the value is not given, it indicates an open bound, e.g. OverallWidth 0.9–1.25 m.

d) The BIM object property can be assigned an enumerated value where a value has a choice of fixed values, selected from a defined list of enumerators. Individual items shall be separated from each other using a comma and a single space, e.g. a, b, c, d.

<table>
<thead>
<tr>
<th>Name</th>
<th>UpperBound Value</th>
<th>LowerBoundValue</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>OverallHeight</td>
<td>1930</td>
<td>2300</td>
<td>m</td>
</tr>
<tr>
<td>OverallWidth</td>
<td>0.9</td>
<td>1.25</td>
<td>m</td>
</tr>
<tr>
<td>MaxHeight</td>
<td>20.0</td>
<td>&lt;nil&gt;</td>
<td>m</td>
</tr>
<tr>
<td>MinWeight</td>
<td>&lt;nil&gt;</td>
<td>20</td>
<td>kg</td>
</tr>
</tbody>
</table>

d) The BIM object property can be assigned an enumerated value where a value has a choice of fixed values, selected from a defined list of enumerators. Individual items shall be separated from each other using a comma and a single space, e.g. a, b, c, d.

2.2.3 Property values
Unless otherwise restricted by property type, the BIM object property value shall:

a) Be assigned an alphanumeric data type to allow both numbers and characters to be entered.

b) Be separated from units by a space where the unit is expressed within the value, with the exception of degree Celsius, percentage and angular degree.

c) Include values that are consistently capitalized using sentence case without text formatting. Conjunctions, acronyms, model numbers and units of measurement shall adopt common practice.

d) Not end in a full stop.
2.2.4 Dependence
The BIM object property value can be expressed as a formula where the value is dependent upon other properties.

2.3 Property groups and usage

2.3.1 Property set presentation
The BIM object shall include properties that are organized so that they are easily viewed and retrieved, and consistently located within the BIM platform where possible.

Properties shall be grouped as follows:

<table>
<thead>
<tr>
<th>Property Group</th>
<th>Autodesk® Revit®</th>
<th>IFC, ArchiCAD, Vectorworks &amp; AECOsim</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFC</td>
<td>IFC Parameters</td>
<td>Pset_</td>
</tr>
<tr>
<td>COBie</td>
<td>Other</td>
<td>COBie</td>
</tr>
<tr>
<td>BOS_General</td>
<td>General</td>
<td>BOS_General</td>
</tr>
<tr>
<td>&lt;SpecificationSource&gt;_Data</td>
<td>Data</td>
<td>&lt;SpecificationSource&gt;_Data</td>
</tr>
</tbody>
</table>

Note 1: When included, replace <SpecificationSource> with the name of the source of additional data properties. There can be multiple specification sources.

2.3.2 Occurrence
The BIM object shall include only one occurrence of a property.

2.3.3 Order of priority
The BIM object shall include a single property occurrence based upon the following order of selection where a property exists in multiple sources.

<table>
<thead>
<tr>
<th>Selection Order</th>
<th>Property Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hard-coded</td>
</tr>
<tr>
<td>2</td>
<td>IFC</td>
</tr>
<tr>
<td>3</td>
<td>COBie</td>
</tr>
<tr>
<td>4</td>
<td>BOS_General</td>
</tr>
<tr>
<td>5</td>
<td>&lt;SpecificationSource&gt;_Data</td>
</tr>
<tr>
<td>6</td>
<td>USERDEFINED</td>
</tr>
</tbody>
</table>

2.3.4 Identical property information
Where properties have different names but the same definition and value requirement, their use shall be based upon the order of selection in clause 2.3.3. Only one property shall be included to avoid duplication of values.
2.3.5 **Precedence**

The BIM object type property shall take precedence where a property exists with the same name at type and component level.

2.4 **Property naming**

2.4.1 **General**

Property names shall be entered as PascalCase, and where a parent-child relationship occurs, the child shall be prefixed with the corresponding parent property so that they are sorted logically.

2.4.2 **Boolean properties**

Properties with values having Boolean (Yes/ No) data types shall be given a name which clearly implies that they require a Yes/ No value, e.g. HasHandle.

2.4.3 **Units**

Property names shall not include units.

2.5 **IFC**

2.5.1 **IFC4 Common property sets**

The BIM object may include IFC4 common property sets (Pset_xxxxCommon) that are relevant to the construction product and associated IfcElementType, where available.

2.5.2 **Proxy**

The BIM object may include Pset_BuildingElementProxyCommon if no IFC common property set (Pset_xxxxCommon) exists for that object in IFC4.

2.5.3 **IFC2x3**

The BIM object can include additional information from Ifc2x3 (ISO/PAS 16739) in addition to IFC4 Add2.

2.6 **Facilities management properties**

2.6.1 **Facilities management properties**

The BIM object shall have properties to support the exchange of life cycle information about the rooms and equipment in a building, and to assist with the management of the asset. These facilities management properties shall be provided by the COBie Model View Definition (MVD) properties derived from Chapter 4.2 of the United States National Building Information Model Standard (NBIMS-US) V3, or by the IFC4 Facilities Management-related property sets derived from BuildingSMART International IFC4 (Add2).

Properties shall be consistently selected from the chosen source.

2.6.2 **COBie properties**
The BIM object may have the COBie Type and Component properties detailed in Tables 3 and 4 available for use, provided with the object either as an accompanying set of available properties or embedded in the object. The property shall be completed with the detailed property requirement.

**NOTE 1:** Where the recording of COBie data is a requirement, it is only necessary to include COBie data for managed assets.

### Table 3 - COBie Type Properties

<table>
<thead>
<tr>
<th>Property name</th>
<th>Property requirements</th>
<th>Data type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AccessibilityPerformance</td>
<td>An alphanumeric value representing the accessibility issue(s) which the product satisfies.</td>
<td>Alphanumeric</td>
<td>Automatic</td>
</tr>
<tr>
<td>AssetType</td>
<td>An alphanumeric default value of: 'Fixed' to indicate fixed equipment and products attached and integral to the function, e.g. heating, plumbing, elevators. 'Movable' to indicate standalone equipment and products, e.g. a chair, table, lamp.</td>
<td>Alphanumeric</td>
<td>Fixed</td>
</tr>
<tr>
<td>Category</td>
<td>A classification code, e.g. Uniclass2015. Complete the value with a single text string with the classification number, a colon and the classification name.</td>
<td>Alphanumeric</td>
<td>Pr_40_70_62_37: Hand driers</td>
</tr>
<tr>
<td>CodePerformance</td>
<td>An alphanumeric value representing the code compliance requirement(s) which the product satisfies.</td>
<td>Alphanumeric</td>
<td>Fully earthed</td>
</tr>
<tr>
<td>Color</td>
<td>An alphanumeric value representing the primary colour of the product.</td>
<td>Alphanumeric</td>
<td>White</td>
</tr>
<tr>
<td>Constituents</td>
<td>An alphanumeric value with details of the various parts of the product.</td>
<td>Alphanumeric</td>
<td>Electric motor</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
<td>Type</td>
<td>Value</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>Description</td>
<td>An alphanumeric value giving a concise description of the <em>product</em> represented by the BIM object. <em>Manufacturer objects</em> shall include factual information only and may include the manufacturer’s trade and catalogue name.</td>
<td>Alphanumeric</td>
<td>Lightweight hand dryer</td>
</tr>
<tr>
<td>DurationUnit</td>
<td>The units used to record durations; typically, this is 'year'.</td>
<td>Alphanumeric</td>
<td>year</td>
</tr>
<tr>
<td>ExpectedLife</td>
<td>A numerical value representing the expected serviceable life of the product. The units are recorded by DurationUnit.</td>
<td>Numeric</td>
<td>10</td>
</tr>
<tr>
<td>Features</td>
<td>An alphanumeric value representing the primary features or other important characteristics relevant to the product <em>specification</em>.</td>
<td>Alphanumeric</td>
<td>Quiet operation, tamper-resistant locking screws</td>
</tr>
<tr>
<td>Finish</td>
<td>An alphanumeric value representing the characteristic primary finish of the product.</td>
<td>Alphanumeric</td>
<td>Matt</td>
</tr>
<tr>
<td>Grade</td>
<td>An alphanumeric value representing the standard grading(s) to which the product corresponds.</td>
<td>Alphanumeric</td>
<td>Class 1 appliance</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>A valid email address for the organization responsible for supplying or manufacturing the <em>product</em>.</td>
<td>Alphanumeric</td>
<td><a href="mailto:company@email.com">company@email.com</a></td>
</tr>
<tr>
<td>Material</td>
<td>An alphanumeric value representing the characteristic or primary material of the product.</td>
<td>Alphanumeric</td>
<td>Die-cast aluminium</td>
</tr>
<tr>
<td>ModelNumber</td>
<td>An alphanumeric value representing the <em>product</em>, item or unit number assigned by the manufacturer of the <em>product</em>. This could be a part number,</td>
<td>Alphanumeric</td>
<td>553</td>
</tr>
<tr>
<td>Field</td>
<td>Description</td>
<td>Type</td>
<td>Value</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------</td>
<td>------------------------</td>
</tr>
<tr>
<td>SKU, catalogue number or equivalent.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ModelReference</td>
<td>An alphanumeric value for the name of the manufactured item as used by the manufacturer.</td>
<td>Alphanumeric</td>
<td>Excel hand dryer</td>
</tr>
<tr>
<td>Name</td>
<td>A unique human-readable alphanumeric name that begins with the product type.</td>
<td>Alphanumeric</td>
<td>Hand dryer</td>
</tr>
<tr>
<td>NominalHeight</td>
<td>A numerical value of the nominal height (typically the vertical characteristic dimension of the product) in millimetres.</td>
<td>Numeric</td>
<td>240</td>
</tr>
<tr>
<td>NominalLength</td>
<td>A numerical value of the nominal length (typically the primary or larger of the two perpendicular horizontal dimensions of the product) in millimetres.</td>
<td>Numeric</td>
<td>310</td>
</tr>
<tr>
<td>NominalWidth</td>
<td>A numerical value of the nominal width (typically the secondary or smaller of the two perpendicular horizontal dimensions of the product) in millimetres.</td>
<td>Numeric</td>
<td>180</td>
</tr>
<tr>
<td>ReplacementCost</td>
<td>A numerical value representing the cost to replace the product in the project currency. If the project currency is not known, provide in local currency.</td>
<td>Numeric</td>
<td>300</td>
</tr>
<tr>
<td>Shape</td>
<td>An alphanumeric value representing the characteristic shape of the product.</td>
<td>Alphanumeric</td>
<td>Rectangular</td>
</tr>
<tr>
<td>Size</td>
<td>An alphanumeric value representing the characteristic size of the product, e.g. 50 litres.</td>
<td>Alphanumeric</td>
<td>310 x 240 x 180 mm</td>
</tr>
</tbody>
</table>
### Table 4 - COBie Component Properties (for use in the project only - not by the manufacturer)

<table>
<thead>
<tr>
<th>Property name</th>
<th>Property requirements</th>
<th>Data type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AssetIdentifier</td>
<td>An alphanumeric default value, 'n/a'.</td>
<td>Alphanumeric</td>
<td>n/a</td>
</tr>
<tr>
<td>Barcode</td>
<td>An alphanumeric default value, 'n/a'.</td>
<td>Alphanumeric</td>
<td>n/a</td>
</tr>
<tr>
<td>InstallationDate</td>
<td>The default value '1900-12-31T23:59:59'.</td>
<td>Alphanumeric</td>
<td>1900-12-31T23:59:59</td>
</tr>
<tr>
<td>SerialNumber</td>
<td>An alphanumeric default value, 'n/a'.</td>
<td>Alphanumeric</td>
<td>n/a</td>
</tr>
</tbody>
</table>
### 2.6.3 IFC4 Facility management properties

The BIM object may have the IFC4 facility management properties available for use, provided either with the object as an accompanying set of available properties or embedded in the object. The property shall be completed with the detailed property requirement.

The properties shall be selected from the following IFC4 property sets:

a)  Pset_ManufacturerTypeInformation.

b)  Pset_ManufacturerOccurrence.

c)  Pset_Warranty.

### 2.7 BOS_General

The BIM object shall include properties from the BOS_General property group to ensure a minimum level of information sufficient to identify a construction product and its use.

There may be multiple classification and specification properties where required.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Property requirements</th>
<th>Data type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>The name of the person, organization or library provider that authored the object.</td>
<td>Alphanumeric</td>
<td>Company</td>
</tr>
<tr>
<td>ManufacturerName</td>
<td>The name of the manufacturer of the product. Property may be omitted for generic objects.</td>
<td>Alphanumeric</td>
<td>Company</td>
</tr>
<tr>
<td>ManufacturerURL</td>
<td>A valid URL hyperlink to the manufacturer’s website. Property may be omitted for generic objects.</td>
<td>Alphanumeric</td>
<td><a href="http://www.company">www.company</a>.</td>
</tr>
<tr>
<td>&lt;Specification&gt;Description</td>
<td>The appropriate specification system clause title may be included. When included, replace &lt;Specification&gt; with name of specification</td>
<td>Alphanumeric</td>
<td>Hand Dryer</td>
</tr>
</tbody>
</table>
system, for example NBSDescription. Reference to multiple specification systems can be included.

| **<Specification>Reference** | The appropriate specification system clause reference may be included. When included, replace `<Specification>` with name of specification system, for example NBSReference. Reference to multiple specification systems can be included. | Alphanumeric | 54896 |

| **ProductInformation** | A valid URL hyperlink to further product information, such as technical documentation, installation guides, certificates, product catalogues or literature, and an alphanumeric value of a description of the location where the document can be found. Property may be omitted for generic objects. | Alphanumeric | www.company.com/HandDryer |

| **Revision** | For completion within the project environment. | Alphanumeric | n/a |

| **<Classification>Code** | The appropriate classification code. Replace `<Classification>` with name of classification system, for example Uniclass2015Code. Reference to multiple classifications systems can be included. | Alphanumeric | Pr_40_70_62_37 |

| **<Classification>Title** | The appropriate classification title. Replace `<Classification>` with name of classification system, for example Uniclass2015Title. Reference to multiple classifications systems can be included. | Alphanumeric | Hand driers |
2.8 BOS_Certification

The BIM object may include properties from the BOS_Certification property group. Multiple certification properties may be included.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Property requirements</th>
<th>Data type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;CertificationScheme&gt;Code</td>
<td>The appropriate certification scheme may be included. When included, replace</td>
<td>Alphanumeric</td>
<td>01/0234</td>
</tr>
<tr>
<td></td>
<td>&lt;CertificationScheme&gt; with name of the Certification Scheme, for example BBA.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;CertificationScheme&gt;Title</td>
<td>The appropriate certification scheme may be included. When included, replace</td>
<td>Alphanumeric</td>
<td>Roofing</td>
</tr>
<tr>
<td></td>
<td>&lt;CertificationScheme&gt; with name of the Certification Scheme, for example BBA.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.9 BOS_Environmental

The BIM object may include properties from the BOS_Environmental property group. Multiple environmental properties may be included.

<table>
<thead>
<tr>
<th>Property name</th>
<th>Property requirements</th>
<th>Data type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;EnvironmentalScheme&gt;Code</td>
<td>The appropriate environmental scheme may be included. When included, replace &lt;EnvironmentalScheme &gt; with name of the Environmental Scheme, for example BRE Green Guide.</td>
<td>Alphanumeric</td>
<td>01/0234</td>
</tr>
<tr>
<td>&lt;EnvironmentalScheme&gt;Title</td>
<td>The appropriate certification scheme may be included. When included, replace &lt;EnvironmentalScheme &gt; with name of the Environmental Scheme, for example BRE Green Guide.</td>
<td>Alphanumeric</td>
<td>Roofing</td>
</tr>
</tbody>
</table>

2.10 Supplementary properties

2.10.1 Additional property sources

The BIM object may include supplementary properties from other sources, including:

- Characteristic selection and performance properties to BS ISO 15686-4.
- IFC property sets relevant to the PredefinedType, where applicable.
- Properties derived from the relevant specification system clause and completed with the appropriate property name and value.
- Properties derived from the construction product manufacturer.
- User-defined properties. Properties that do not fall under the groupings outlined in clause 2.3 shall be clearly named to aid understanding (see section 5, Metadata requirements).
- Properties to assess economic and environmental impacts of a product.
Section 3: Geometry requirements

This section defines the minimum geometry requirements of the BIM object to describe the physical form of the construction product.

A number of factors affect how detailed the geometry is, such as the type of object and how it is intended to be used, together with the practicalities of working with contemporary BIM platforms.

The scope of this section includes general requirements, such as level of geometric detail. In addition, this section defines dimensional and measurement requirements.

Geometric information is divided into:

- General geometry data.
- Shape data.
- Symbolic data.
- Space data.
- Surface/material data.
- Connection data.

3.1 General

3.1.1 Modelling scale
The BIM object shall have geometry produced at the scale 1:1.

3.1.2 Insertion point
The BIM object shall include an insertion point that is suitable for its intended use.

3.1.3 Parametric function
The BIM object may, where supported by the BIM platform and where appropriate:

a) Have parametric geometry that is locked and aligned to appropriate reference elements such as planes, lines, levels and points.

b) Include dimensions and labels that are constrained to reference planes.

3.1.4 Modelling units
The BIM object shall use metric geometry with units of millimetres, unless the local construction industry has (without dispute) retained an alternative unit of measurement.

3.1.5 Actual thickness
Layered BIM objects shall represent the actual thickness of a layer unless unsupported by the BIM platform, in which case the minimum thickness supported by the BIM platform shall be used.

3.2 Geometrical detail

3.2.1 Geometrical extent
The geometrical detail of an object shall be appropriate for its intended use and informational purpose. The geometrical detail of an object shall represent the extent of the object and its connectivity. Objects can be represented by a 3D bounding box to show
3.2.2 Dimensions
Generic objects shall include nominal or expected dimensions where actual dimensions are unknown. Manufacturer objects shall include accurate overall dimensions and any further dimensions necessary for the object to fulfil its intended purpose.

3.3 Shape data

3.3.1 Essential geometry
The BIM object shall include:

a) Geometric representation of the space defined by the construction product’s external boundary.

b) Geometry with a defined purpose.

c) Essential openings and geometric details, from which meaningful information can be gained.

3.3.2 Fixed geometry
The BIM object shall have fixed geometry where the construction product is not intended to be modifiable, has a fixed form or is available in one size and shape only.

3.4 Symbolic data

3.4.1 Displaying objects
To allow coherent viewing of BIM objects, the following shall be included:

a) A means of displaying a geometrical convention (a representation, a simplified representation or a symbol) at scales 1:20, 1:50 and 1:100. Use an appropriate geometrical convention for the product and scale.

b) Default lines, line types, hatching and fill patterns, as appropriate to the BIM authoring system and conforming to local industry practice, to distinguish between geometric features such as depth and product parts.

3.4.2 Supplementary symbolic data
The BIM object may include the following:

a) Information devices or supplementary geometry to show abstract items and convey geometric information that would not otherwise be modelled, such as directional arrows and opening directions.

b) 2D lines, where required, to convey relevant geometric details that are not otherwise modelled in 3D.

3.5 Space data

3.5.1 Operation and maintenance zones
The BIM object may include 2D and 3D space data such as:

a) Minimum operation space.

b) Access space.

c) Placement and transportation space.
3.6 Surface and material data

3.6.1 Material appearance
The BIM object may include colours, hatching, fill patterns or texture image file to an appropriate scale to reflect the construction product material and appearance in the relevant geometrical view, e.g. elevation, section, isometric and animation views.

3.6.2 Generic object colour
Generic objects may use representative colours for the construction product, or white if it exists in a variety of colours.

3.6.3 Control and selection
The BIM object shall provide individual control and selection of textures and colours for a material's constituent parts where functionally possible within the BIM platform.

3.6.4 Default materials
The BIM object may include default materials provided by the BIM platform.
Section 4: Functional requirements

This section describes the functional requirements that can be embedded within the BIM object to represent behavioural characteristics, constraints and connectivity.

4.1 General

4.1.1 Object behaviour
The BIM object shall behave in an appropriate manner that reflects its relationship with associated objects within the BIM platform.

4.1.2 Performance
The BIM object functional behaviour shall not compromise the performance of the project model in which it is placed.

4.1.3 Reliance
The BIM object shall be configured so that its use is not reliant upon a host object, unless placement on a host is a specific requirement of the construction product.

4.1.4 Ease of use
The BIM object shall be modelled so that its behaviour is easily controlled.

4.1.5 Constraints
The BIM object may include constraints that limit selection criteria to those variations or accessories that are available in the construction product. Constraints shall not have a detrimental effect or confuse or limit the object’s use.

4.1.6 Associated objects
The BIM object shall be modelled so that it can be associated and connected with other objects where the association is appropriate to the project model and its analysis.
Section 5: Metadata requirements

This section defines metadata requirements for BIM objects. The scope of this section includes naming conventions for files, objects, properties, materials, values and images.

5.1 Naming conventions

5.1.1 Spelling

The BIM object shall use spellings that respect the approach taken by the parent resource, e.g. NBS uses the Oxford English Dictionary (OED) as the default spelling guide, whereas COBie and IFC use North American English.

5.1.2 Composition

Names shall be composed of alphanumeric characters without text formatting (e.g. a-z, A-Z, 0-9) and limited to a maximum of 75 characters. The naming fields shall use the underscore character (_) as a delimiter and the dash character (-) within phrases. Information within each field is to be PascalCase (capitalized first letters for words and no spaces).

No spaces or other punctuation shall be used.

5.1.3 Consistent naming

The BIM object shall include properties and values that are consistently and uniquely named.

5.1.4 Abbreviations

Where the BIM platform has filename character limitations, the values within the fields can be abbreviated. An abbreviation can be created using no more than seven characters, and uppercase lettering without full stops and spaces. The same abbreviation shall be used for its singular or plural contexts.

5.1.5 Naming fields

BIM objects, materials and associated images shall be composed of the naming fields defined in Table 6. See clauses 5.2.1, 5.4.1 and 5.5.1 for the composition of each name type.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originator</td>
<td>Used to convey the object provider by a 3–6 character code. Where an object is provided through an object library but developed by another party, include a code to convey the library provider.</td>
<td>NSWPH</td>
</tr>
<tr>
<td>Source</td>
<td>Used to identify the library object manufacturer. The manufacturer name shall not be abbreviated. For a generic object, this field may be omitted.</td>
<td>BettaWindows</td>
</tr>
<tr>
<td>Type</td>
<td>Used to identify the object type.</td>
<td>Window</td>
</tr>
<tr>
<td>Material</td>
<td>Used to identify the material type.</td>
<td>Plastic</td>
</tr>
<tr>
<td>Subtype/Product</td>
<td>Used to convey additional information to further define the construction product, such as the product range. The manufacturer product range shall not be abbreviated. This field can also be used to identify the predefined (Sub) type.</td>
<td>Skylight</td>
</tr>
<tr>
<td>Differentiator</td>
<td>Used to convey additional information required to adequately identify the object, or not otherwise captured in the attribute data.</td>
<td>600x900mm</td>
</tr>
</tbody>
</table>
5.2 **Files and BIM object naming**

5.2.1 **Files and object name composition**

The file and BIM object names shall be composed of the fields defined in Table 6, in the following arrangement:

\(<\text{Originator}>_<\text{Source}>_<\text{Type}>_<\text{Subtype/Product code}>_<\text{Differentiator}>\)

**NOTE 1:** The differentiator field is optional and may be included as needed.

5.3 **Naming of individual layers within a multi-layered object**

5.3.1 **Layer naming**

A multi-layered BIM object shall include individual layers that are named to the requirements of clause 5.2.

5.4 **Naming of materials within the BIM platform**

5.4.1 **Name composition**

The material name shall be composed of the fields defined in Table 6, in the following arrangement:

\(<\text{Originator}>_<\text{Source}>_<\text{Material}>_<\text{Subtype}>_<\text{Differentiator}>\)

**NOTE 1:** The subtype and differentiator fields are optional and may be included as needed.

5.4.2 **Suffix**

Objects in Autodesk® Revit® format shall include properties for material objects that are named with the suffix '_mtrl'.

5.5 **Naming of image files for materials**

5.5.1 **Name composition**

The following naming convention shall be composed of the fields defined in Table 6, in the following arrangement:

\(<\text{Originator}>_<\text{Source}>_<\text{Material}>_<\text{SubType}>_<\text{Differentiator}>_<\text{ImageType}>\)

**NOTE 1:** The subtype and differentiator fields are optional and may be included as needed.

5.5.2 **Image file format**

The material image files shall be in bitmap (bmp) or jpeg (jpg) format.

5.6 **Image tiling**

5.6.1 **Image shape**

Where the material image file is to be repeated, it shall either be square or rectangular in shape to allow the image to be repeated and tiled with no overlaps or gaps.
5.6.2 Image quality

The material image file shall meet the minimum requirements:

a) \(512 \times 512\) pixels for square images.

b) \(512\) pixels on its longest side for rectangular images.

c) 150 dpi.
References

The following documents have influenced the development of this standard.


BS 8541-2:2011: Library objects for architecture, engineering and construction. Recommended 2D symbols of building elements for use in building information modelling.

BS 8541-3:2012: Library objects for architecture, engineering and construction. Shape and measurement. Code of practice.


BS ISO 16739:2013: Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries.


Building Information Management

## Terms and definitions

Terms and definitions used throughout the NBS BIM Object Standard are generally as defined in BS EN ISO19650-2 and PAS 1192-3. In addition, the following apply:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly</td>
<td>A collection of objects that forms a system.</td>
</tr>
<tr>
<td>BIM platform</td>
<td>Application that is usually used in design for generating data for multiple uses. Examples include Autodesk® Revit®, Bentley AECOsim, Graphisoft ArchiCAD, Nemetscheck Vectorworks and Tekla Structures.</td>
</tr>
<tr>
<td>COBie (Construction Operation Building information exchange)</td>
<td>A subset of BS ISO 16739, IFC-documented as a BuildingSMART model view definition (MVD), which includes operational information. The definition of COBie is maintained by BuildingSMART Alliance and BuildingSMART UKI. See also FM Basic Handover Model View Definition (MVD).</td>
</tr>
</tbody>
</table>
| Component object                                 | An individual object that has unique geometry and does not rely on any other objects to be understood. It carries information about its identity, appearance, performance and usage. Can also carry behavioural information. The object has unique geometry ranging from simple to highly complex. A component may contain a number of variants in its parameters; however, any variation to the geometry of a component constitutes a new object. For example, a door, chair or light fitting. Note: A component object:
  - Can be aggregated together with construction material objects to form an assembly, e.g. a room.
  - Is an individual building element that can be reused. For example, doors, stair cores, furniture and internal room layouts, facade panels. Component objects are typically inserted and moved/rotated into the required position. The term ‘component’ is sometimes replaced with ‘instance’, ‘occurrence’ or ‘element’. |
| Components                                        | Specific instances of each type that may require management such as inspection, maintenance, service or replacement during ‘in-use’ phase. |
| Constraint                                        | Can be:
  - A ‘geometric constraint’ whereby geometric properties are limited and controlled, e.g. a dimension can be constrained by fixed length or by range, or two lines can be constrained to be parallel.
  - An ‘information constraint’ whereby non-geometrical properties are limited, e.g. product value can only be ‘blue’. IFC: Restriction for a specified reason. |
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction entity (ISO 12006-2)</td>
<td>Consists of elements defined by technical function, form and/or position such as walls and roofs, ventilation and electrical power supply. Construction entities are the basic units of the built environment and together form, e.g. buildings, landscape, roads and dams. See also Object.</td>
</tr>
<tr>
<td>Construction information (ISO 12006-2)</td>
<td>Information resource of interest in a construction process. Includes general reference information as well as project information, e.g. BIM, scale models, drawings, diagrams, calculations, specifications.</td>
</tr>
<tr>
<td>Construction object (ISO 12006-2)</td>
<td>Object of interest in the context of a construction process. See also Object.</td>
</tr>
<tr>
<td>Construction product</td>
<td>ISO 12006-2: A product intended to be used as a construction resource. IFC defines a product as a physical object (manufactured, supplied or created) for incorporating into a project. It may be physically existing or tangible. A product may be defined by shape representations and have a location in the coordinate space.</td>
</tr>
<tr>
<td>Construction resource (ISO 12006-2)</td>
<td>A construction object used in a construction process to achieve a construction result.</td>
</tr>
<tr>
<td>Container file</td>
<td>Repository used to compile assemblies and components for specific purposes, including export and publication.</td>
</tr>
<tr>
<td>Convention (BS 8541-2)</td>
<td>Accepted way of drawing an item which may have the nature of a representation, a simplified representation or a symbol.</td>
</tr>
<tr>
<td>Datatypes (defined, enumeration and select) BS ISO 29481-1</td>
<td>Named types of data that may be used, including labels, text descriptions, identifiers, enumerated ranges of possible values from which a selection should be made for alternative routing through a schema.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Documentation View</td>
<td>'Documentation View’ includes, tabular, schedules, cost estimations, thermal calculations, performance reports’. See also view type.</td>
</tr>
<tr>
<td>Digital Plan of Works</td>
<td>Digital Plan of Works (dPoW) Schedule of phases, roles, responsibilities, assets and attributes, made available in a computable form. See also RIBA Plan of Works 2013.</td>
</tr>
<tr>
<td>Enumeration (IFC)</td>
<td>Construction that allows an attribute value to be one of multiple predefined values identified by name.</td>
</tr>
<tr>
<td>External reference (IFC)</td>
<td>Link to information outside the data set, with direct relevance to the specific information the link originates from inside the data set.</td>
</tr>
<tr>
<td>Field (BS 1192)</td>
<td>Part of a container name reserved for metadata.</td>
</tr>
<tr>
<td>FM Basic Handover Model View Definition (MVD)</td>
<td>An IFC View Definition, or FM Handover Model View Definition, MVD, defines a subset of the IFC schema, that is needed to satisfy one or many Exchange Requirements of the AEC industry. The basic FM hand overview definition developed by BuildingSMART exchanges facility management information among building models. The COBie spreadsheet is a mapping of the FM Handover Model View Definition (MVD) of the current IFC 2x3 scheme as documented in the COBie responsibility matrix. <a href="http://projects.BuildingSMARTalliance.org/files/?artifact_id=4093">http://projects.BuildingSMARTalliance.org/files/?artifact_id=4093</a></td>
</tr>
<tr>
<td><strong>Generic object</strong></td>
<td>BS 8541-1: Type object intended for use in stages of design when the object is not resolved in a product. Or Object type intended for use in stages of design when the finalised solution has not yet been completely resolved. Example: Generic – Hand-Drier 285x200x250 (electric device).</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Geometric representation</strong></td>
<td>Geometric representation of the space defined by a products external boundaries. Also referred to as product shape or shape representation in other documentation.</td>
</tr>
<tr>
<td><strong>Geometrical view</strong></td>
<td>Includes elevation, plan, section, front, side, isometric and animation views. See also View type.</td>
</tr>
<tr>
<td><strong>Hard coded</strong></td>
<td>Fixed data or property in a BIM platform that cannot be altered.</td>
</tr>
<tr>
<td><strong>Identification (ISO 16739)</strong></td>
<td>Capability to find, retrieve, report, change, or delete specific instances without ambiguity.</td>
</tr>
<tr>
<td><strong>IfcBuildingElementProxyType</strong></td>
<td>This defines a list of commonly shared property set definitions of a building element proxy and an optional set of product representations. It is used to define an element specification (i.e. the specific product information that is common to all occurrences of that product type).</td>
</tr>
<tr>
<td><strong>IfcPredefinedType</strong></td>
<td>Defines the particular type.</td>
</tr>
<tr>
<td><strong>IfcTypeObject</strong></td>
<td>The object type defines the specific information about a type, that is common and shared by multiple object occurrences. The object type is represented by a set of property set definitions. Similar to class, template and type.</td>
</tr>
<tr>
<td><strong>Industry Foundation Class (IFC)</strong></td>
<td>Open vendor-independent neutral file format that defines an extendable set of consistent data representing building information for exchange and interoperability between AEC software applications. The IFC specification is developed and maintained by BuildingSMART International as its “Data standard”. It is registered with ISO as ISO16739.</td>
</tr>
<tr>
<td><strong>Information device (BS 8541-2)</strong></td>
<td>Convention indicating an abstract item.</td>
</tr>
</tbody>
</table>
| **Instance** | BS 1192: An occurrence of an entity at a particular location and orientation within a model.  
Synonym for occurrence.  
Similar to the term instance of a class in object oriented programming. See also component. |
| **Layered object** | A composite layered object with simple to medium geometry and a range of parameters.  
A layered object may consist of one layer, e.g. waterproof membrane, insulation, metal decking or consist of a number of layers combined to form a multi layered object.  
A multi layered object is often used where it is more practical to model multiple layers together rather than model each separate layer individually. |
| **Level of detail (BS 8541-3)** | Completeness and accuracy of a virtual shape representation compared to the physical and functional characteristics of the actual object. |
| **Level of measurement (BS 8541-3)** | Completeness and accuracy of a virtual measurement compared to the physical and function characteristics of the actual object. |
| **Line (ISO 128)** | Geometrical object, the length of which is more than half of the line width and which connects an origin with an end in any way, e.g. straight or curved, and without interruptions.  

The term line width is also synonymous with line weight or pen weight. |
|---|---|
| **Line types** | A collection of lines.  

Synonym for line pattern. |
| **Manufacturer object** | Type object intended to represent an obtainable product, either as a requirement or exemplar or as-built, as defined by BS 8541-1.  

Note: The term manufacturer object is also synonymous with proprietary object or product object. |
| **Material (object)** | May carry information regarding identity, performance and appearance. Material may be assigned a specific colour, surface pattern or designated render appearance and specific line work for 2D representation to control the outward appearance of the construction product or geometrical representation in geometrical views.  

Materials can be used on their own as finishes and coatings, as building products within an object, or to represent an option within an object.  

The term material is often synonymous with building material, construction material and surface. |
| **Metadata** | Data used for the description and management of documents and other containers.  

Note: Each item of meta-data resides in a field. Codes are the values allowed for fields. |
| **Object** | ISO 12006-2: Any perceivable or conceivable word.  

Or  

PAS 1192: Item having state, behaviour and unique identity – for example, a wall object.  

The term object is also synonymous with entity, construction entity and construction element as defined by ISO 12006-2. |
| **Occurrence object (BS 8541)** | Representation of an actual occurrence (instance) of an object in a building.  

See also component. |
<table>
<thead>
<tr>
<th>Parameter</th>
<th>See property.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parametric geometry</td>
<td>Geometry is that is defined and controlled by its parameters.</td>
</tr>
<tr>
<td>Placeholder</td>
<td>A simplified or generic representation of a 3D object</td>
</tr>
<tr>
<td>Presentation (BS EN ISO 13567-2)</td>
<td>Information which may relate to particular elements or to the model or drawing, and which may need to be switched on or off. Note: Presentation in formation is related primarily to the geometrical appearance on screen and paper, as opposed to element information which is related to the physical structure.</td>
</tr>
<tr>
<td>Product object (BS 8541)</td>
<td>See Manufacturer object.</td>
</tr>
<tr>
<td>Property</td>
<td>The generalisation of all characteristics (either types or partial type, i.e. property sets that may be assigned to objects. Shared among object instances, it reflects the specific information of an object type, but it may also represent the occurrence information of the actual object in the project context, if it is assigned only to a single object instance. Properties are used to represent technical data and functions for designing, calculating and simulating the product. They can be: ISO 16739: Unit of information that is dynamically defined as a particular entity instance. ISO 12006-2: Construction objects have construction properties. Properties are represented as attributes in construction information. Note: The term parameter is often used by BIM platforms to describe the property information type that has been used to define a BIM object.</td>
</tr>
<tr>
<td><strong>Term</strong></td>
<td><strong>Definition</strong></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td><strong>Property set</strong></td>
<td>Collection of characteristics associated with an object and grouped together that can comprise of parameters and attributes.</td>
</tr>
<tr>
<td><strong>Representation (BS 8541-2:2011)</strong></td>
<td>Scale view of an object. Note: a) Representation is often also referred to as visibility or display. b) The terms ‘Low/ symbolic/ simple/ Course, Medium, High/ detailed/ fine/ realistic’ are often used to as a substitute for 1:20, 1:50 and 1:100.</td>
</tr>
<tr>
<td><strong>RIBA Plan of Work 2013</strong></td>
<td>The RIBA Plan of Work 2013 comprises eight work stages, each with clear boundaries and details the tasks and outputs required at each stage. Further information can be viewed at <a href="http://www.ribaplanofwork.com">http://www.ribaplanofwork.com</a></td>
</tr>
<tr>
<td><strong>Schema</strong></td>
<td>Data model in a formal machine-readable notation. The IFC specification consists of such a schema and associated informal human-readable semantic definitions. The schema describes a set of data types and their possible relationships.</td>
</tr>
<tr>
<td><strong>Section (ISO 10209-1:1992)</strong></td>
<td>A representation showing only the outlines of an object lying in one or more cutting planes. Synonym for cut.</td>
</tr>
<tr>
<td><strong>Selection property (BS ISO 16757:1)</strong></td>
<td>Used to select a single product from a catalogue which often contains more than a million products of a similar kind.</td>
</tr>
<tr>
<td><strong>Simplified representation (BS 8541-2)</strong></td>
<td>Scale view incorporating only the essential shape, size or features of an object.</td>
</tr>
<tr>
<td><strong>Specification</strong></td>
<td>Description of the quality of, and requirements of, the construction product.</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Supplementary geometry (BS ISO 16792)</strong></td>
<td>Geometric elements included in product definition data to commutate design requirements but not intended to represent a portion of the manufactured product.</td>
</tr>
</tbody>
</table>
| **Symbol (BS 8541-2)** | Geometrical device without scale used:  
a) on a drawing to indicate the occurrence and/or location of an item  
b) in an annotation to indicate one or more of the attributes of that item. |
| **System** | Systems consist of products defined by technical function, form and/or material such as masonry, insulation and blockwork.  
IFC: organised combinations of related parts, composed for a common purpose or function or to provide a service. System is essentially a functionally related aggregation of products. |
| **Système international d'unités (SI) (International System of Units) (BS EN ISO 80000-1)** | System of units, based on the International System of Quantities and adopted by the General Conference on Weights and Measures (CGPM). Comprises names and symbols, including a series of prefixes, with rules for their use. |
| **Type** | Common characteristics shared by multiple object occurrences.  
The named specification for equipment, products and materials.  
Similar to object class, template, style, category, subcategory, functional type, library part, or subtype in other publications. |
| **Value(s)** | Information given against a property.  
Example: Text, Boolean, Length, Look up table, Real, Units, Volume. |
<table>
<thead>
<tr>
<th>Variations/Variants</th>
<th>A form or version that differs in some respect from other forms of the same things or from a standard.</th>
</tr>
</thead>
<tbody>
<tr>
<td>View types</td>
<td>Collective term used for and including geometrical view and document view.</td>
</tr>
<tr>
<td>Visibility</td>
<td>See representation.</td>
</tr>
</tbody>
</table>
Get the exposure that no other marketing channel can match.

NBS is the only provider to get you direct exposure to decision makers in all these places

**RIBA CPD**

Get face to face with decision makers to educate them about technologies and innovations related to your products.

**NBS National BIM Library**

The most trusted BIM object library in the UK, with over half a million product downloads last year.

**RIBA Product Selector**

Used by 90,000 specifiers every month to find the right products for their projects.

**NBS Plus**

Your products added directly to the project specification, minimising substitution. Used by over 3,000 UK practices.
Contact

NBS welcomes feedback and encourages all parties from the construction industry to comment on the NBS BIM Object Standard, and help shape future editions.

Send your feedback to:
Email: info@theNBS.com
Telephone: 0345 456 9594, option 1
Telephone overseas: +44 191 232 9594
NBS telephone lines are open Monday to Friday from 9 am to 5 pm

Please note: calls may be recorded for quality and training purposes, and to ensure that we deliver the best possible experience for our customers.

Support

NBS provides free tools, templates and guides to help create objects to this standard. For more information, please visit: https://www.nationalbimlibrary.com/en/bim-tools-and-guides/

The NBS National BIM Library hosts over 700 generic template objects and thousands of manufacturer-specific objects all authored to this standard. Users may download these objects for free and use these on their construction projects. For more information, please visit: https://www.nationalbimlibrary.com

Revision History:
1.0 First Edition
1.1 Non-technical amendments for enhanced downloadable pdf document
1.2 Further acknowledgements added. Typographical correction to clause 2.6.1.22 made. Hyperlinks added to references section for enhanced downloadable pdf version.
1.3 Section 2 updated to remove the Uniclass 2 property and properties added relating to Uniclass 2015.
2.0 Document structure revised to allow multiple classification and specification systems. Document style revised to tabulate requirements for easier reading.
2.1 Document revised following the introduction of the new ISO19650 International Standards series and for general modernization updates.