

Dutch Building Hardware Association
VHS



VHS building hardware (BIM) standard

version 1.0

Part 1 - Articles



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1 Terminology

FixedPart	De name of an article as geometry definition in the BMH XML protocol.
BIM	Building Information Model: a technique for a conclusive and parametric building model. This technique is used in e.g. Revit and Tekla.
BMH protocol	An XML format defined by 'Bos Machine Handel' for the description of a 3D frame model for production. This protocol also contains the definitions for articles and operations, and is usable in a BIM environment
WHS protocol	A by 'DeltaPi Systems' defined XML format, based on the BMH protocol, for the definitions of articles and recipes in a BIM environment
XML format	A text format suitable for structured data.
Door/window frame	(In Dutch: kozijn) A frame with doors and/or windows and/or glass and/or panels
Geometry	The 3D shapes of an article and the applicable operations (pockets and drillholes)
Article	A hardware article that can be priced, ordered and applied in a frame
Placeholder	A temporary substitute for an end result. In this case the placeholder acts as a means to present options to the user to make a choice.
Options	Properties on an article which, while applying this article enables the user to make a choice. These properties can affect the shape or price
Recipe	A list of conditions on which an article is placed on a specific spot in a frame.
Cluster	A coherent combination of files for a specific hardware series
FixedPartArticle	The name of an article in the VHS XML standard: it is an addition to the BMH XML definition with data needed for ordering, applying and calculation.
Header	The head of an XML file, contains general data and properties
Alignment	The position and rotation of an article in a door/window frame in relation to a specific point. This is explained in part 2 - recipes.

2 Introduction

This document is about the article in the VHS building hardware (BIM) standard.

3 Model representation

An important basic starting point in this standard is the compactness of the 3D information. There are 2 reasons for this:

- The purpose of this standard is information for window frame production (price calculations, ordering, modelling, manufacturing). Exact 3D information is not relevant.
- Detailed 3D elements are only wanted in a BIM model when it is functional. Otherwise they are too much of a burden, slow down the model and will therefor not be used.

So geometrical information in large BIM models should remain limited to the needed info:

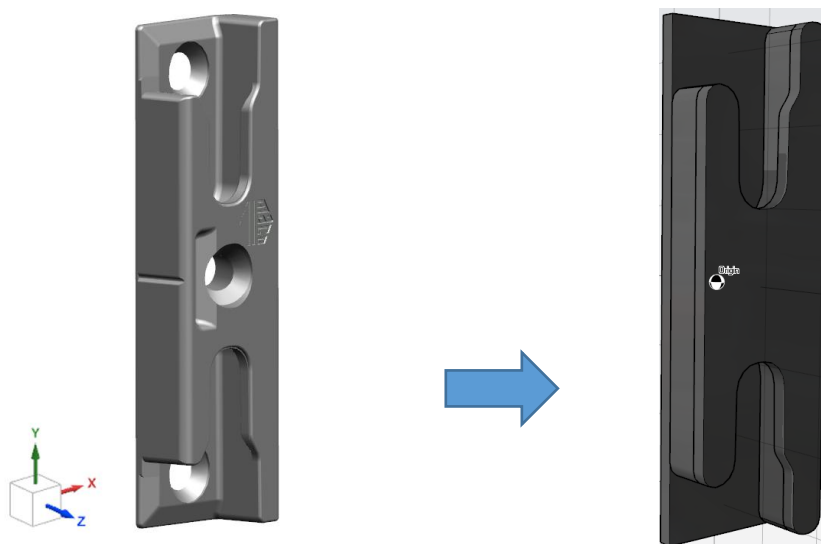


Figure 1

Example of a detailed closing plate as used by the hardware manufacturer schematized as VHS XML-definition

4 Article structure

An article XML consists of:

- A part for the alphanumeric properties (the header)
- A part for the geometries.

An article is a separate XML file.

An article XML file has the extension '.article'.

5 Article header

The header contains the properties (parameters) of the article (*see the appendix for a complete description*):

General:

- Product ID (normally the article id of the manufacturer)
- Name
- Description, short and long
- ETIM version
- Date
- Document data
- Measure unit
- Currency
- Building hardware type (general, handle hole, hinge)
- Language

Data from the supplier:

- Supplier product ID, ordering number
- Product description
- Name of the supplier (not needed if this is provided in the recipe)

- GLN code of the supplier (not needed if this is provided in the recipe)
- Delivery time
- Package unit
- Prices
 - Price
 - Discount

Data from the manufacturer:

- Manufacturer product ID
- Product description, short and long
- Name of the manufacturer (not needed if this is provided in the recipe)
- GLN code of the manufacturer (not needed if this is provided in the recipe)
- Product properties (when relevant):
 - Color
 - Length, width, depth
 - Diameter
 - Material
 - Surface treatment

5.1 XML Header example

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<HEADER>
```

```
  <TYPE type="ARTIKEL" />
  <PID>96779</PID>
  <NAME>Top guide - hinge-side, silver </ NAME >
  <ETIM.VERSION type="ETIM-BMEcat-4.0.2"></ETIM.VERSION>
  <DATETIME type="TIMESTAMP"></DATETIME>
  <DOCUMENTDATE>2023-09-14</DOCUMENTDATE>
  <UNITOFMEASUREMENT>MM</UNITOFMEASUREMENT>
  <CURRENCY>EUR</CURRENCY>
  <WEIGHT>KG</WEIGHT>
  <LANGUAGE default="true">eng</LANGUAGE>
  <LANGUAGE>dut</LANGUAGE>
```

```
<SUPPLIER>
```

```
  <SUPPLIER_PID>96779</SUPPLIER_PID>
  <SUPPLIER_NAME>Test supplier</SUPPLIER_NAME>
  <SUPPLIER_ID type="gln">8714161999999</SUPPLIER_ID>
  <SUPPLIER_ID type="duns">123456789</SUPPLIER_ID>
```

```
<PRODUCT_PRICING>
```

```
  <PRICE_AMOUNT>23.12</PRICE_AMOUNT>
  <TAX>21%</TAX>
  <LOWER_BOUND>21%</LOWER_BOUND>
  <DISCOUNT>10%</DISCOUNT>
```

```
</PRODUCT_PRICING>
```

```
</SUPPLIER>
```

```
<MANUFACTURER>
```

```
<PRODUCT_DETAILS>
```

```
  <MANUFACTURER_NAME>MACO Beschläge BV</MANUFACTURER_NAME>
```

```

<MANUFACTURER_ID type="gln">9501101020016</MANUFACTURER_ID>
<ARTIKEL_ID type="PID">96779</ARTIKEL_ID>
<ARTIKEL_ID type="EAN">9009615242325</ARTIKEL_ID>
<DESCRIPTION_SHORT>Striker plates i.S., silver</DESCRIPTION_SHORT>
<DESCRIPTION_SHORT lang="dut">Sluitplaten i.S., zilver</DESCRIPTION_SHORT>
<DESCRIPTION_LONG>Striker plates i.S. 12 mm air gap 20 mm Euro-rebate silver</DESCRIPTION_LONG>
<DESCRIPTION_LONG lang="dut">Sluitplaten i.S. 12 L eurogroef FT 20 mm zilver</DESCRIPTION_LONG>
<REMARKS>test remark</REMARKS>
<REMARKS lang="dut">test opmerking</REMARKS>
</PRODUCT_DETAILS>
<PRODUCT_PROPERTIES>
  <PRODUCT itemtype="Top guide"></PRODUCT>
  <PRODUCT_CLOUR>"Zilver"</PRODUCT_CLOUR>
  <PRODUCT_MATERIAL>Steel</PRODUCT_MATERIAL>
  <PRODUCT_SURFACE>Galvanized</PRODUCT_SURFACE>
  <PRODUCT_WEIGHT>0.140</PRODUCT_WEIGHT>
  <PRODUCT_LENGTH>68.0</PRODUCT_LENGTH>
  <PRODUCT_WIDTH>20.0</PRODUCT_WIDTH>
  <PRODUCT_DEPTH>9.0</PRODUCT_DEPTH>
  <PRODUCT_DIAMETER>22</PRODUCT_DIAMETER>
  <PRODUCT_SCREW_NUMBER>1</PRODUCT_SCREW_NUMBER>
</PRODUCT_PROPERTIES>
</MANUFACTURER>

```

5.2 Split article

An article can be split in 2 files: an XML with product data (properties, data) and ordering data (ordering number, price, discount etc.).

The first file is supplier-independent and can be generated by the building hardware manufacturer. The second file can be added by the supplier as extra XML. The combination of the 2 files will then be the article definition.

Generated and supplied by the manufacturer:

- Header with general data (so in the example above all except the <Supplier> part)
- The geometric data.

Generated and supplied by the supplier:

Header with the ordering data and PID (so in the example above the <Supplier> part including the general PID number)

6 Article geometry

The geometry of an article consist of 3 parts, called Operations. Operations are extruded forms.

- Pocket: a (possibly tapered) extruded free form recess, needed to place the article in the frame.
- Shape: a (possibly tapered) extruded free form to give the article a recognizable 3D shape
- Drillhole: a (possibly tapered) round drillhole needed to place the article in the frame.

The 'pocket' and 'drillhole' are defined in the BMH XML protocol. The 'shape' is added to give the article a visible and recognizable shape. The 'shape' has the same structure as the 'pocket', but it is not sent to the milling machines for the frame production.

An article has 0 or more operation. The number of operations in an article is not limited.

An article can have 0 operations: it then has no physical shape or millings, but it still can have a price or ordering information.

The geometry of an article can be kept simple. The shapes only have to represent the basic form, and the millings needed for assembly are always simple. An article gets a visible form by the combination of shapes.

This makes it possible to show the articles in a BIM model in an informatize but schematized and very light way:

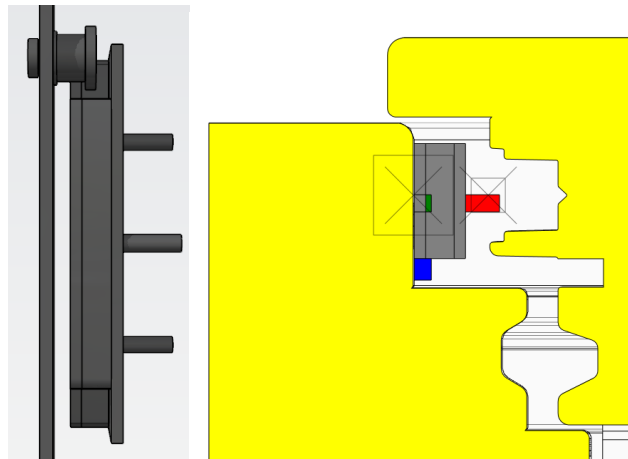


Figure 2

It is possible to include a reference to an OBJ or STL in the geometry part of an article and hence give it a detailed 3D shape. This can be meaningful for e.g. a door handle, but one should be very restricted with this. There is a lot of building hardware in a building and modellers won't like heavy building hardware data due to the impact on the performance.

The acceptance by other building participants relies on the compactness of information in as-built models.

6.1 Shape (also see the BMH XML protocol)

The base structure of the <Shape> consists of:

- The name of the shape, unique in the building hardware combination (recipe)
- A closed series of contour points in one plane
- The rotation of this plane relative to the origin
- The curve definition between the points: a straight line (radius = 0) or an arc (radius=#value#)
- The depth and offset of the contour extrusion, and a possible taps angle

6.2 Pocket

The base structure of the <Pocket> is identical to the <Shape>.

6.3 Drillhole

The base structure of the <DrillHole> consists of:

- The name of the drillhole, unique in the hardware combination (recipe)
- The displacement of the centre of the drillhole relative to the origin
- The rotation of the plane with this centre point relative to the origin
- The diameter
- The depth and offset relative to the centre point

6.4 2D- Contours

The 2D contour lines, the schematic representation of the article parts, or the pockets forms, are a combination of lines and arcs, and are always closed.

They are defined on a flat surface and then moved and rotated relative to the origin of the article.

7 XML geometry examples

Also see the BMH XML protocol.

Each article has a 'Name' field

An optional STL or OBJ file can be referenced by 'StlPathToModel' and placed with an offset, rotation and scale.

```
<?xml version="1.0" encoding="utf-8"?>
<FixedPartArticle XmlVersion="27" Name="Quader" StlPathToModel="XXX">
  <StlOffset X="0.00" Y="0.00" Z="0.00"/>
  <StlRotation X="0.00" Y="0.00" Z="0.00"/>
  <StlScale X="1.00" Y="1.00" Z="1.00"/>
  <Operations>
    <Operation>
      <BaseOffset X="0.00" Y="0.00" Z="0.00"/>
      <Shape Name="Vorm_01" Rotation="0" Depth="20" DirectionAngleX="0" DirectionAngleY="0" Offset="0">
        <OuterContour>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="0.00"/>
          </PathEntry>
          ...
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="0.00"/>
          </PathEntry>
        </OuterContour>
      </Shape>
    </Operation>
  </Operations>
</FixedPartArticle>
```

7.1 Shape

An example of the XML definition of a FixedPartArticle with an Operation of the type "Shape" as a cube with the dimensions: L * W * H = X * Y * Z = 20 * 10 * 20:

```
<?xml version="1.0" encoding="utf-8"?>
<FixedPartArticle XmlVersion="27" Name="Quader">
  <Operations>
    <Operation>
      <BaseOffset X="0.00" Y="0.00" Z="0.00"/>
      <Shape Name="Vorm_01" Rotation="0" Depth="20" DirectionAngleX="0" DirectionAngleY="0" Offset="0">
        <OuterContour>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="0.00"/>
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="10.00"/>
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="20.00" Y="10.00"/>
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="20.00" Y="0.00"/>
          </PathEntry>
        </OuterContour>
      </Shape>
    </Operation>
  </Operations>
</FixedPartArticle>
```

```

</PathEntry>
<PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
  <Point X="0.00" Y="0.00"/>
</PathEntry>
</OuterContour>
</Shape>
</Operation>
</Operations>
</FixedPartArticle>

```

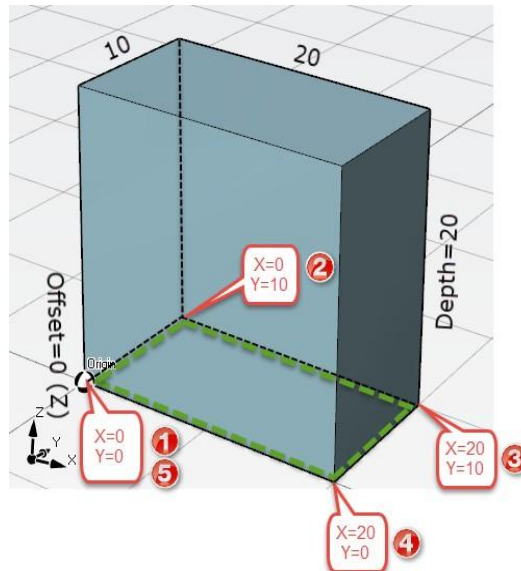


Figure 3

This definition describes (clockwise) a cube that starts at the coordinate origin 0,0 with length X=20 and width Y=10. The height of the cube is Z=20 and starts on the definition plane X-Y. The 5th contour point (<PathEntry>) corresponds with the 1st contour point and thus closes the contour.

7.2 Pocket

An example of the XML-definition of a FixedPartArticle with an Operation of the type 'Pocket' with a filleted corner point. The structure is identical to the "Shape" type.

```

<?xml version="1.0" encoding="utf-8"?>
<FixedPartArticle XmlVersion="27" Name="Bewerking">
  <Operations>
    <Operation>
      <BaseOffset X="0.00" Y="0.00" Z="0.00" />
      <Pocket Name="Pocket" Rotation="0" Depth="20" DirectionAngleX="0" DirectionAngleY="0" Offset="0">
        <OuterContour>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="0.00" />
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="0.00" Y="10.00" />
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
            <Point X="15.00" Y="10.00" />
          </PathEntry>
          <PathEntry Fillet="false" Radius="5" RadiusCCW="false" IsLargeArc="false">
            <Point X="20.00" Y="5.00" />
          </PathEntry>
          <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">

```

```

    <Point X="20.00" Y="0.00" />
  </PathEntry>
  <PathEntry Fillet="false" Radius="0" RadiusCCW="false" IsLargeArc="false">
    <Point X="0.00" Y="0.00" />
  </PathEntry>
</OuterContour>
</Pocket>
</Operation>
</Operations>
</FixedPartArticle>

```

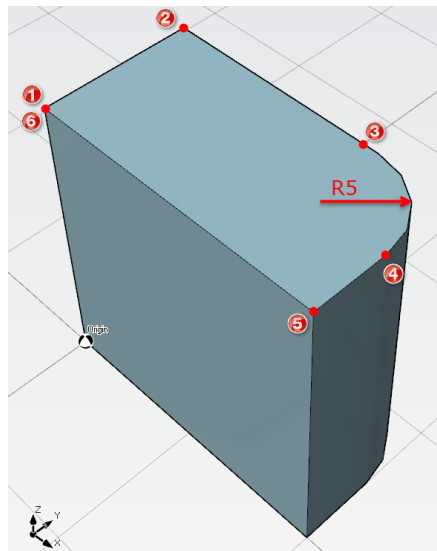


Figure 4

In this example the connection between point 3 and 4 is defined as an arc by the value Radius="5" in the PathEntry tag of contour point 4.

7.3 Drillhole

An example of the XML-definition of a FixedPartArticle with an Operation of the type 'DrillHole'. It has a Diameter and Depth, it is not rotated and therefore perpendicular to the X-Y plane, it is not tapered and not drilled through, and it has a BaseOffset relative to the origin of the article.

```

<?xml version="1.0" encoding="utf-8"?>
<FixedPartArticle XmlVersion="27" Name="Boring">
  <Operations>
    <Operation>
      <BaseOffset X="10.00" Y="0.00" Z="0.00" />
      <DrillHole Name="Vorm_3" Diameter="5" Depth="50" Tapered="false" TaperAngle="0"
        ThroughHole="false" DirectionAngleX="0" DirectionAngleY="0" Offset="0" />
    </Operation>
  </Operations>
</FixedPartArticle>

```

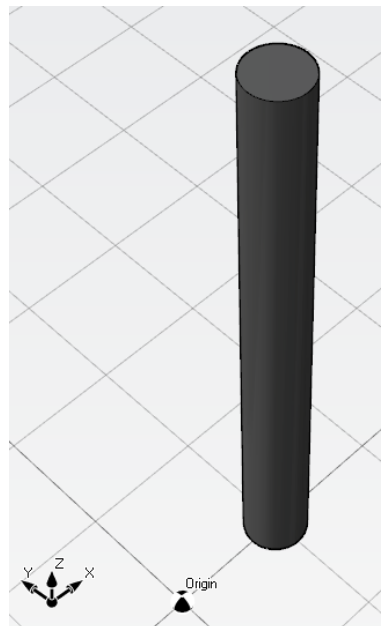


Figure 5

8 Coordinates and rotations

All contours (the drawn outlines of the operations) in an article are defined in the X-Y plane. The Offset and Depth define the elevation and height in the Z-direction.

The contours can be rotated around the X- and Y-axis by means of the DirectionAngleX and DirectionAngleY.

8.1 Hinge example

This example shows that the parts of the hinge are drawn flat in the X-Y-plane, given an offset and depth, and then rotated.

In the dialog below (figure 6) this is visible and can easily be checked.

Name	Atlas INSIDE Renovatie 4.0/89X89 tek: 20150025.1042R_L
Description	Atlas Inside RENO gelagerd SKG**® compleet
Hardware article type	Hinge
Manufacturer	BUVA
Manufacturer article ID	1342166V
Only on current frame	<input type="checkbox"/>
Is exclusive	<input type="checkbox"/>

Operations	
------------	--

Type	Description	Usage	Offset	Depth	Diameter	Taper	AngleX	AngleY
Shape	Shape	General	0,00	-102,00			-90,00	0,00
Shape	Shape	General	-6,50	-89,00			-90,00	0,00
Shape	Shape	General	-6,50	-89,00			-90,00	0,00
Pocket	Pocket	General	2,60	3,00			0,00	-90,00
Pocket	Pocket	General	0,00	-3,00			0,00	-90,00
Drillhole	Drillhole	General	-3,00	-5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	-3,00	-5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	5,60	5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	5,60	5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	5,60	5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	-3,00	-5,00	2,50		0,00	-90,00
Drillhole	Drillhole	General	-3,00	-5,00	2,50		0,00	-90,00

Technical drawing of a hinge assembly. The top part shows a side view of a door with a hinge. The bottom part shows a top view of the hinge plate, which is a rectangular plate with four mounting holes and a central slot.

3D rendering of a hinge assembly. The top part shows a side view of a door with a hinge. The bottom part shows a top view of the hinge plate, which is a rectangular plate with four mounting holes and a central slot.

Figure 6

Visible are the hinge blades, the pockets for the recesses in the frame and door, and the small holes to aim the screws.

9 Article placement

Articles are placed in the frame by means of a recipe (see the document about recipes): the article is placed and rotated to have it placed on the exact correct spot and given the correct rotation in the 3D frame model.

The operations (recesses in the frame) are a result of this placement and therefore always correct.

If the hinge is in the 3D model, the operations are included in the production model of the frame manufacturer.

The orientations and origin of the article are linked to the recipes by which they are placed. When the origin of the hinge is not on the top but in the middle, the recipe should take that into account. That is why articles and recipes are always parts of the same cluster.

10 Appendix

10.1 InterfaceExport 3D EN - Mapping XML

No	Element/Attribute Element Path	Element/Attribute explanation Data type / Possibilities	Explanation	Mandatory/ Optional	Data type
1	<XML Version>	The version="1.0" is the version of the XML currently used String	Version number of the XML.	Mandatory	dtSTRING
2	<HEADER>	Begin element, Import BIM hardware information -	Begin element, Import BIM hardware information.	Mandatory	
3	<ETIM.VERSION>	Version of ETIM international classification standard for technical products String	Version of ETIM international classification standard for technical products	Mandatory	dtSTRING
4	version="ETIM-BMEcat-4.0.2" ETIM.VERSION/	Version of ETIM international String	Version = "ETIM-BMEcat-4.0.2", catalog document corresponds.	Optional	dtSTRING
5	<DATETIME>	DATETIME type="generation_date" -	Date for the start of the period of validity. Used value: <Date> yyyy-mm-dd	Mandatory	
6	type="TIMESTAMP" DATETIME/	Type of Date DATETIME type="generation_date" String	The TIMESTAMP data type is used for values that contain both date and time parts.	Mandatory	dtSTRING
7	<DOCUMENTDATE> DOCUMENTDATE/	Date of version from XML-scheme Date	Time stamp, when the catalog document is generated. Used value: <DOCUMENTDATE> yyyy-mm-dd Example: 2021-08-07	Mandatory	dtDATE
8	<TYPE ARTIKEL>	Feature of the xml TYPE type="ARTIKEL"	Feature of the xml	Mandatory	dtSTRING
9	<UNITOFMEASUREMENT> UNITOFMEASUREMENT/	Units are used for measuring sizes and positions -	Units are used for measuring sizes and positions	Mandatory	
10	"MM" UNITOFMEASUREMENT/	Units are used for measuring Millimeters String	This data type is used to represent units of measurement such as <MM> (Millimeter)	Mandatory	dtSTRING
11	<CURRENCY> CURRENCY/	Unit code are used for currency -	Provides the currency that is default for all price information in the XML.	Mandatory	
12	"EUR" CURRENCY/	Units are used for currency Euro String	Currency of the price. Used value: <CURRENCY> EUR:	Mandatory	dtCURRENCIES
13	<WEIGHT> WEIGHT/	Unit code are used for weight -	Gross weight of the packing unit in kilo-gram (kg)	Optional	
14	"KG" WEIGHT/	Units are used for weight KG String	This data type is used to represent units of measurement such as KG. Example: KG (Kilo-gram)	Optional	dtNUMBER

15	<LANGUAGE> default/true=	Unit code are used for language String	This element determines the default language of all lan-guage-dependent information in the document.	Mandatory	dtBOOLEAN
16	"eng" default/true=	Units are used for language English -	Language codes to indicate the language used in texts or pictures. Example: eng (English)	Mandatory	dtLANG
17	<LANGUAGE> -	Unit code are for language -	This element determines the default language of all lan-guage-dependent information in the document.	Mandatory	dtBOOLEAN
18	"dut" -	Units are used for used for language Dutch String	Language codes to indicate the language used in texts. Example: dut (Dutch)	Mandatory	dtLANG
19	<SUPPLIER> SUPPLIER/	Supplier of the article -		Mandatory	
20	SUPPLIER_PID="227606" SUPPLIER/SUPPLIER_PID/	Article code of the supplier String	Contains the product number issued by the supplier. It is determining for ordering the product; it identifies the product in the supplier catalog.	Mandatory	dtSTRING
21	SUPPLIER_NAME="Test supplier" SUPPLIER/SUPPLIER_NAME/	Supplier name String	Name of the supplier	Mandatory	dtSTRING
22	SUPPLIER_ID type="gln" SUPPLIER/SUPPLIER_ID/	Supplier Global Location Number String	GLN- Global Location Number of the supplier (formerly known as ILN - International-Location-Number)	Mandatory	dtSTRING
23	SUPPLIER_ID type="duns" SUPPLIER/SUPPLIER_ID/	Supplier identification number String	The D-U-N-S® number (Data Universal Numbering System - https://www.dnb.com) is a 9-digit numeric code to uniformly identify companies all over the world. It was developed and introduced by Dun & Brad-street in 1962. The number has to be delivered without formatting.	Mandatory	dtSTRING
24	<MANUFACTURER> MANUFACTURER/	Manufacturer of the article -		Mandatory	
25	<PRODUCT_DETAILS> MANUFACTURER/PRODUCT_DETAILS/	Manufacturing Product Information -		Mandatory	
26	MANUFACTURER_NAME="MACO Beschläge BV" MANUFACTURER/PRODUCT_DETAILS/MANUFACTURER_NAME/	Manufacturing name String		Mandatory	

27	MANUFACTURER_ID type="gln" >000020536542< MANUFACTURER/PRODUCT_DETAILS/MANUFACTURER_ID/	Manufacturing Global Location Number String		Mandatory	
28	ARTIKEL_ID type="PID" >96779< MANUFACTURER/PRODUCT_DETAILS/ARTIKEL_ID/	Manufacturing unique identification code String		Mandatory	
29	ARTIKEL_ID type="EAN" >9009615242325< MANUFACTURER/PRODUCT_DETAILS/ARTIKEL_ID/	Manufacturing European item Number String		Mandatory	
30	DESCRIPTION_SHORT = "Striker plates i.S., silver" MANUFACTURER/PRODUCT_DETAILS/DESCRIPTION_SHORT/	Short description of item String		Mandatory	
31	DESCRIPTION_SHORT lang="dut" = "Sluitplaten i.S., zilver." MANUFACTURER/PRODUCT_DETAILS/DESCRIPTION_SHORT lang/	Short description of item Languages Dutch String		Mandatory	
32	DESCRIPTION_LONG = "Striker plates i.S. 12 mm air gap 20 mm Euro-rebate silver " MANUFACTURER/PRODUCT_DETAILS/DESCRIPTION_LONG/	Long description of item String		Mandatory	
33	DESCRIPTION_LONG lang="dut" = "Sluitplaten i.S. 12 L eurogroef FT 20 mm zilver " MANUFACTURER/PRODUCT_DETAILS/DESCRIPTION_LONG lang/	Long description of item Languages Dutch String		Mandatory	
34	REMARKS = "test remark" MANUFACTURER/PRODUCT_DETAILS/REMARKS/	Comments on the item String		Mandatory	
35	REMARKS lang="dut" = "test opmerking" MANUFACTURER/PRODUCT_DETAILS/REMARKS lang/	Comments on the item Languages Dutch String		Mandatory	
36	<PRODUCT_PROPERTIES> MANUFACTURER/PRODUCT_PROPERTIES/	Product Properties -		Mandatory	
37	PRODUCT itemtype ="Striker plates" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT itemtype	Product type String		Mandatory	

38	PRODUCT_MATERIAL ="Steel" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_MATERIAL	Product material type String		Mandatory	
39	PRODUCT_CLOUR ="Zilver" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_CLOUR	Product material colour String		Mandatory	
40	PRODUCT_SURFACE ="Galvanized" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_SURFACE	Product surface String		Mandatory	
41	PRODUCT_WEIGHT ="0.140" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_WEIGHT	Product weight String		Mandatory	
42	PRODUCT_LENGTH ="68.0" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_LENGTH	Product length String		Mandatory	
43	PRODUCT_WIDTH ="20.0" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_WIDTH	Product width String		Mandatory	
44	PRODUCT_DEPTH ="9.0" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_DEPTH	Product depth String		Mandatory	
45	PRODUCT_DIAMETER ="0" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_DIAMETER	Product diameter String		Mandatory	
46	PRODUCT_SCREW_NUMBER ="3" MANUFACTURER/PRODUCT_PROPERTIES/PRODUCT_SCREW_NUMBER	Quantity of screw Double		Mandatory	
47	<PRODUCT_PRICING> -	Product Pricing of the article -	Attribute, which specifies the type of price, e.g.	Mandatory	
48	<PRICE_AMOUNT> PRODUCT_PRICING/PRICE_AMOUNT	Supplier Pricing of the article String	Amount of the price (0.00 is no valid price, except for products without list price, see explanation 5e)	Mandatory	
49	<TAX> PRODUCT_PRICING/TAX	Value Added Tax of the article String	Factor for tax applicable to this price »0.19« (is »19%«)	Mandatory	
50	<LOWER_BOUND> PRODUCT_PRICING/LOWER_BOUND	Supplier Pricing discount of the article String	Lower quantity limit for graduated prices. The unit for the graduated price limit is the order unit (ORDER_UNIT), default value = 1.	Mandatory	
51	<PRODUCT_OPTIONS> -	Product Options of the article -		Mandatory	
52	type ="CLOUR_OUTSIDE" PRODUCT_OPTIONS/CLOUR_OUTSIDE	Units are used colour outside String		Mandatory	

53	type ="CLOUR_INSIDE" PRODUCT_OPTIONS/CLOUR_INSIDE	Units are used colour inside String		Mandatory	
54	type ="CLOUR" PRODUCT_OPTIONS/CLOUR_INSIDE	Units are used colour inside String		Mandatory	
55					
56	<ArticleDrawings> ArticleDrawings/	Part items (shapes) of items -		Mandatory	
57	<LevelOfDevelopment> -	Level Of Development 500 -		Optional	
58	type ="LOD500" ArticleDrawings/LevelOfDevelopment/	Product Level Of Development (LOD) 500 in BIM, It is the as-built stage of LOD. String		Optional	
59	<StlOffset> ArticleDrawings/StlOffset	Offset dimensions of part item (shape) -		Optional	
60	X="0" ArticleDrawings/StlOffset	Offset dimension in X direction Double		Optional	
61	Y="0" ArticleDrawings/StlOffset	Offset dimension in Y direction Double		Optional	
62	Z="0" ArticleDrawings/StlOffset	Offset dimension in Z direction Double		Optional	
63	<StlRotation> ArticleDrawings/StlRotation	Rotation of part item (shape) -		Optional	
64	X="0" ArticleDrawings/StlRotation	Rotation angle over X axis Double		Optional	
65	Y="0" ArticleDrawings/StlRotation	Rotation angle over Y axis Double		Optional	
66	Z="0" ArticleDrawings/StlRotation	Rotation angle over Z axis Double		Optional	
67	<StlScale> ArticleDrawings/StlScale	Scale factor of part item (shape) -		Mandatory	
68	X="0" ArticleDrawings/StlScale	Scale factor in X direction Double		Mandatory	
69	Y="0" ArticleDrawings/StlScale	Scale factor in Y direction Double		Mandatory	
70	Z="0" ArticleDrawings/StlScale	Scale factor in Z direction Double		Mandatory	
71	<Operations> ArticleDrawings/Operations	Operations of part item (shape) -		Optional	
72	<Operation> ArticleDrawings/Operations	Operation in operations of part item (shape) -		Optional	

73	<BaseOffset> ArticleDrawings/Operations/Operations/Operation/BaseOffset	Offset of operation of part item (shape) -		Optional	
74	X="0" ArticleDrawings/Operations/Operations/Operation/BaseOffset	Offset of Operation in X direction Double		Optional	
75	Y="0" ArticleDrawings/Operations/Operations/Operation/BaseOffset	Offset of Operation in Y direction Double		Optional	
76	Z="0" ArticleDrawings/Operations/Operations/Operation/BaseOffset	Offset of Operation in Z direction Double		Optional	
77	<Shape> ArticleDrawings/Shape/	Drill hole of Operation -		Mandatory	
78	ID="227606" ArticleDrawings/Shape/	Name of shape String		Mandatory	
79	Name="Shape" ArticleDrawings/Shape/	Name of shape String		Mandatory	
80	Rotation="0" ArticleDrawings/Shape/	Rotation of shape Double		Mandatory	
81	DirectionAngleX="0" ArticleDrawings/Shape/	Rotation over X axis of shape Integer		Mandatory	
82	DirectionAngleY="0" ArticleDrawings/Shape/	Rotation over Y axis of shape Integer		Mandatory	
83	DirectionAngleZ="0" ArticleDrawings/Shape/	Rotation over Z axis of shape Integer		Mandatory	
84	Offset="0" ArticleDrawings/Shape/	Offset of start from shape Boolean		Mandatory	
85	<OuterContour> ArticleDrawings/Shape/OuterContour	Contour of shape -		Mandatory	
86	<PathEntry> ArticleDrawings/Shape/OuterContour/PathEntry	Path entry of contour -		Mandatory	
87	Element/Attribute Element Path	Element/Attribute explanation Data type / Possibilities		Mandatory	
88	Fillet="false" ArticleDrawings/Shape/OuterContour/PathEntry	Is path entry fillet from pocket contour		Mandatory	
89	Radius="0" ArticleDrawings/Shape/OuterContour/PathEntry	Radius of path entry from pocket contour Double		Mandatory	
90	RadiusCCW="false" ArticleDrawings/Shape/OuterContour/PathEntry	Is radius of path entry from pocket shape CCW? True/false (CCW = CounterClockWise) Boolean		Mandatory	

91	IsLargeArc="false" ArticleDrawings/Shape/OuterContour/PathEntry	Is radius of path entry from shape contour a large arc type? True/false Boolean		Mandatory	
92	<Point> ArticleDrawings/Shape/OuterContour/PathEntry/Point	Point of path entry from shape contour -		Mandatory	
93	X="0.0" ArticleDrawings/Shape/OuterContour/PathEntry/Point	X-coordinate from point of path entry from shapet contour Double		Mandatory	
94	Y="0.0" ArticleDrawings/Shape/OuterContour/PathEntry/Point	Y-coordinate from point of path entry from shape contour Double		Mandatory	
95	Z="0" ArticleDrawings/Shape/OuterContour/PathEntry/Point	Z-coordinate from point of path entry from shape contour Double		Mandatory	