

BSH NX Method - Core Architecture User Guide

BSH Engineering Design Process / BSH NX M-CAD / NX10 / Method / Responsible Party - BSH GST Product Master Data

Preface

Siemens PLM NX is the corporate key system for all CAx applications at BSH. The major areas of use are the R&D and Tooling departments of all various product divisions at BSH throughout the world. Due to the fact that many of the developments of BSH will be engineered and manufactured in a distributed way, it is essential for all international users of the NX system to follow a certain set of rules and methodologies when creating models and drawings.

This document is an abstract of the "BSH NX Core Architecture" documentation. It contains the main definitions for the BSH NX end user and BSH supplier participating at the BSH NX supplier program. In order to make this abstract as compact as possible, all setups and definitions "behind the scenes" have been left off. For further information please refer to the core architecture documentation mentioned above.

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1 General Design Standards

1.1 Modeling Units

All parts will be modeled and dimensioned in metric units.

1.2 Language in CAD Documents

Language should be English **and** local language. If drawing is distributed to other factories (countries) English is mandatory.

1.3 Dates

All dates will be formatted according to ISO 8601: **CCYY-MM-DD**

Key	Meaning	Type
CC	Century	2-digit number
YY	Year	2-digit number
MM	Month	2-digit number
DD	Day	2-digit number

Example: 2015-05-01 equals May 1, 2015.

1.4 Coordinate Systems

All parts should be modeled near the origin of the absolute coordinate system.

1.5 Datum Objects

1st Datum CSYS only at the absolute coordinate origin (X0Y0Z0). All other datum planes / axis / csys have to be placed relative to existing geometry (referenced items).

1.6 BSH Layer Standard

The BSH layer standard is absolutely mandatory.

Number	Contents	Category
1	Solid body, final version	BODY
2 - 10	Solids bodies, other parts and bodies	BODY
11 - 40	Sketches, datums, auxiliary geometry	CONSTRUCTION
41	Fixed Datums / CSYS	ABSOLUTE_DATUM
42 - 80	Sketches, datums, auxiliary geometry	CONSTRUCTION
81 - 85	3D dimensions, text, annotations	ANNOTATION
86	Sheet metal, unfolded part, final version	FLATPATTERN
87 - 90	Sheet metal, other parts	FLATPATTERN
91 - 100	Wave geometry	WAVE
101 - 120	Electric components, data	ELECTRIC
121 - 130	NC auxiliary geometry	CAM
131 - 140	Finite elements, kinematics and other CAE data	CAE

141 - 149	CODIM (Coordinate Dimensioning System)	CODIM
150	Drawing frame and title block, pattern	DRAWING
151 - 152	2D annotations (dimensions, notes, etc)	DRAWING
153	BOM balloons	EXPLOSION
154 - 155	BCT Raster elements	BCT_RASTER
156 - 157	BCT Raster construction elements	BCT_RASTER_CONSTRUCTION
158	BCT-Inspector-Balloon visible	BCT_INSPECTOR
159	BCT-Inspector-Balloon invisible	BCT_INSPECTOR_CONSTRUCTION
160	Electronic components (EPAK)	BOARD_OUTLINE_LAYER
161	Electronic components (EPAK)	OTHER_OUTLINE_LAYER
162	Electronic components (EPAK)	ROUTE_OUTLINE_LAYER
163	Electronic components (EPAK)	PLACE_OUTLINE_LAYER
164	Electronic components (EPAK)	ROUTE_KEEPOUT_LAYER
165	Electronic components (EPAK)	VIA_KEEPOUT_LAYER
166	Electronic components (EPAK)	PLACE_KEEPOUT_LAYER
167	Electronic components (EPAK)	PGA_LAYER
168	Electronic components (EPAK)	TOPCOMP_LAYER
169	Electronic components (EPAK)	BOTCOMP_LAYER
170 - 175	Manufacturing annotations	CAM_RESOURCE
176 - 180	not in use	
181 - 199	Standard and catalogue parts	CATALOGUE
200	Customer service annotations, German	LNG_DE

201	Customer service annotations, English	LNG_EN
202	Customer service annotations, Spanish	LNG_ES
203	Customer service annotations, French	LNG_FR
204	Customer service annotations, Turkey	LNG_TR
205	Customer service annotations, Portuguese	LNG_PT
206	Customer service annotations, Greek	LNG_EL
207	Customer service annotations, Chinese	LNG_ZH
208 - 215	Auxilliary for Drawing	AUXILARY_FOR_DRW
216 - 219	not in use	
220	Alignment points of solid	MEASURING_ALIGNMENT
221	Support points of solid	MEASURING_SUPPORT
222	Special measure points	MEASURING_POINTS
223 - 247	not in use	
248	Wiring auxiliary geometry	WIRING
249	Wiring Qualification	WIRING
250	Sheet metal, unfolded part, final 3D version	FLATSOLID
251 - 255	Reserved for future NX modules	
256	Temporary geometry (like interference), scratch	

1.7 Line Fonts

Number	Graphical Representation	Name
1	—————	Solid
2	- - - - -	Dashed
3	· - - - - ·	Centerline
4	· · - - - · ·	2-point
5	· · · - - · · ·	3-point
6	· · · · - · · · ·	4-point
7	· · · · ·	Dotted

1.8 Color Definition Files

Standard directory for color definition is %UGII_BASE_DIR%\bsh\cdf\ . Standard color definition file is standard.cdf (for modeling black background and for drafting black background). There are optional color definition files available for:

- Grey background (grey.cdf)
- White background (white.cdf)
- Black/white color set (bw.cdf)
- White/black color set (wb.cdf)

Select the color palette icon from the BSH Modeling menu:



The BSH Color Palette window shows up on the screen providing a list of choices. Select one of the options as described above and press Apply to preview the changes, or OK to make the changes permanent. Repeat the procedure as often as needed. STANDARD is the basic BSH setup.



1.9 Text Fonts and Character Sets

Name	Purpose
bsh_latin	Text with Latin characters
bsh_greek	Text with Greek characters
chinesef	Text with Chinese characters for Customer Service documents
uni_latinext_a	Text with Latin characters for Customer Service documents
uni_greek_a	Text with Greek characters for Customer Service documents

1.10 Reference Sets

The following reference sets are NX standard:

Name	Contents	Purpose
Entire Part	all	default
Empty	nothing	for parts that need not to be seen

The following reference set is an additional reference set defined for BSH:

Name	Contents	Purpose
BODY	Final solid	Display fully detailed solid part

The reference set "BODY" is automatically created during the save of the part.

1.11 Mass Property Calculation Setup

The predefined material for mass property calculation within NX is steel. The default values for mass property calculation are as following:

Item	Value
Calculation accuracy	0,01 units

Calculation units	g/cm ³
Density	1000,0

For all components the density of the specific part need to be defined by assigning according material information.

Note: The value of 1000 is intended to identify components without "valid" density settings.

1.12 Seed Part

Seed Part	File Name
BSH Master Model Seed Part	UGII_BASE_DIR\bsh\seed_part\bsh_metric_nx10.prt
BSH Drawing Seed Part	UGII_BASE_DIR\bsh\seed_part\bsh_metric_dwg_nx10.prt
DXF/DWG Translator Metric	UGII_BASE_DIR\DXFDWG\dwgnullnx10_mm.prt
IGES Translator Metric	UGII_BASE_DIR\IGES\igesnullnx10_mm.prt
STEP AP203 Metric	UGII_BASE_DIR\STEP203UG\step203ugnullnx10_mm.prt
STEP AP214 Metric	UGII_BASE_DIR\STEP214UG\step214ugnullnx10_mm.prt
VDA-FS Metric	VDAFS\null.prt

Seed parts contain:

1. Setup of Customer defaults
2. Standard Datum CSYS
3. Standard Reference Sets
4. Line Font Definition
5. Layer Categories
6. Color Definition
7. Part Attributes
8. Standard Part Expressions
9. RPI Tolerance 0.03

When using NX/Managed mode, the correct seed part will be referenced automatically. Certain NX Applications (e. g. Schematics, Simulation, NC-CAM, etc.) will provide additional seed parts containing further settings needed for these applications.

2 Naming Conventions

2.1 File Naming Conventions for Parts and Assemblies

The maximum length for file names is 26 digits plus 4 digits for ".prt".

File naming convention:

Master parts: **SSSSNNNNNNNNNN**.prt

Other parts (associated to master part): **SSSSNNNNNNNNNN_TTCC**.prt

Key	Meaning	Length	Remark
SSSS	Site ID	4 digits	Number generator ID according to BSH standard
NNNNNNNNNN	Document Number	10 digits	
TT	Document Type	2 characters	See table below
CC	Counter	01-99	

Key	Mnemonic	Meaning
TT	dr	Drawing
	nc	NC part file
	ar	Altrep part file
	sc	Scenario part file

Example: 56001234567890_dr01.prt

2.2 Component Designation

Maximum designation length: 40 characters.

Component names must be in English language only. Use BSH Dictionary.

2.3 Drawing Sheet Names

Only one drawing sheet per drawing part is allowed.

The name of this sheet is always **SHT1**.

The insertion of only one (1) drawing frame per drawing sheet is allowed. If a component does not fit onto a single drawing sheet due to the size or the amount of detail or section views, a new part must be derived from the master model containing the next sheet and drawing frame.

2.4 View Names

Users should just use NX standard functionality; no additional naming conventions have to be observed.

3 Model Creation

3.1 Part Structure

All parts must be created in accordance to the **Master Model Concept** of NX.

Only one geometrical representation might be created within a single NX part file.

3.2 Rules for variants

Variant Cause	Preferred Variant Method
Different shape for drawing and assembly:	BSH NX Part Family, WAVE link and BSH NX Altrep / Deformable parts
Same geometry, same tool set, different SAP material codes:	Same part / table on drawing
Mirrored geometry:	BSH NX Part Family (preferred!) or WAVE BSH NX Assembly
All other differences:	Different parts

3.3 Modeling Accuracy

Tolerance	Value
Maximum allowed deviation between CAD model geometry and nominal dimension of a physical part or drawing:	0.001 mm
Maximum gap between the end points of two wire frame elements:	0.001 mm

Setup to support this:

Variable	Value
System tolerance set up for solid bodies and sheet bodies:	0.001 mm
Angle tolerance set up:	0.5

4 Drawing Generation

4.1 Drawing Origin

The origin of a drawing is at the lower left corner, which represents the origin (X0Y0) of the drawing's coordinate system. When inserting the drawing frame, this standard will be automatically maintained without any attention of the user.

4.2 View Projection Method

ISO-Method E is BSH standard (first angle projection method).

ISO-Method A is only allowed for documents from suppliers or existing documents.

The projection method used to create a drawing must be represented in the title block of the drawing frame. Projection method and site logo will be loaded automatically.

4.3 Dimension Parts

All dimensions must match the actual model size within a precision of two decimal digits. Trailing zeroes, however, may not be displayed.

5 Pattern

5.1 General Purpose

A pattern library is available to support drawing generation with elements like drawing frame, title block, and reusable components. Please refer to "BSH NX Pattern Library" documentation for more details.

A user interface is provided to automate the process; please refer to according chapters of "BSH NX Drawing Generation" documentation for further information, how to insert, modify and delete pattern and how to fill in text (where needed).

5.2 Layer Standard for Pattern

The layer to insert a pattern is always 150.

5.3 Drawing Sheet Sizes and Pattern Names


















Pattern	Size in mm	R&D pattern name	Tooling pattern name
A4 portrait	210 x 297	GGFRA_A4-PORT	GTFRA_A4-PORT
A4 landscape	297 x 210	GGFRA_A4-LAND	GTFRA_A4-LAND
A3	420 x 297	GGFRA_A3	GTFRA_A3
A2	594 x 420	GGFRA_A2	GTFRA_A2
A1	841 x 594	GGFRA_A1	GTFRA_A1
A0	1189 x 841	GGFRA_A0	GTFRA_A0
A0-1250	1250 x 841	GGFRA_A0-1250	GTFRA_A0-1250
A0-1500	1500 x 841	GGFRA_A0-1500	GTFRA_A0-1500
A0-1750	1750 x 841	GGFRA_A0-1750	GTFRA_A0-1750
A0-2000	2000 x 841	GGFRA_A0-2000	GTFRA_A0-2000
A0-2250	2250 x 841	GGFRA_A0-2250	GTFRA_A0-2250
A0-2500	2500 x 841	GGFRA_A0-2500	GTFRA_A0-2500
A4	297 x 210	GWFRA_A4	
A3	420 x 297	GWFRA_A3	

A2	594 x 420	GWFR_A2	
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6 BSH Tools

BSH currently has different customized toolbars: Modeling, Freeze/Unfreeze Wave, BSH Standard Checker, Drafting, Tooling, Codim, Schematics, E/Pak and Harness-Design.

BSH Modeling







- Change Color Palette ▶
-  Blank All Datums
-  Unblank All Datums
-  Open Specification Part
-  Edit Attribute Dialog
-  Analyze Body
-  Create a gearwheel
-  Move text into lines
-  Section Component NO\YES
-  Save JT Files Only
-  UG -> VDAFS
-  VDAFS -> UG
-  Export FLATPATTERN Curves to DXF
-  Export FLATPATTERN Curves to IGES
-  Export Solids on Layer 1 (Final Body) to STL
-  Export Faces to VDA
-  Calculate Weight
-  Execute Current Tests

BSH Freeze-Unfreeze Wave

-  Freeze Wave Part
-  Freeze All Wave Part
-  Freeze Wave Assembly
-  Display Freeze/Unfreeze Wave Message YES\NO
-  Unfreeze Wave Part
-  Unfreeze All Wave Part
-  Unfreeze Wave Assembly





















For more details please refer to "BSH NX Parametric Modeling" documentation.

BSH Standard Checker

-  Execute Current Tests
-  Check Family Members YES\NO
-  Save Results if Passed Always YES\NO\Unset
-  Set Up Tests
-  View Check-Mate Results
-  Set Old Data Bypass












For more details please refer to "BSH Standard Checker User Guide" documentation.

BSH Drafting






-  Insert Pattern
-  Edit Pattern
-  Move Pattern
-  Delete Pattern
-  Refresh Pattern
-  Position Material Number On Drawing
-  Edit Attribute Dialog
-  Insert Check\SPC Dimension
-  Delete Check\SPC Dimension
-  Sort Dimensions
-  Insert Change Marker
-  Edge Definition DIN_ISO_13715
-  Load reference dimension table
-  Delete reference dimension table
-  Text onto curve
-  Phantom delete
-  Gearwheel table
-  Tolerance table
-  Netlines
-  Execute Current Tests

For more details please refer to "BSH NX Drawing Generation" documentation.

BSH Tooling





-  Create Equipment ID
-  Set Partlist Position Attribute
-  Create Partlist
-  Create Position Number
-  Create Weld Bead
-  Delete Weld Bead
-  Apply Names To Faceproperties
-  Reset all feeds speeds
-  Remove empty NC Folder
-  Make Sketch Constraints Fully Fixed
-  Create PDF Datasets from Assembly

BSH Codim

-  Setup Counter
-  Insert 2D Feature
-  Insert 3D Feature
-  Create ASCII File
-  Create Tabular Note
-  Shift Hole Number


For more details please refer to "BSH NX Tool Design Methods" documentation.

BSH-Schematics

-  Create new Master and Specification Part for Schematics
-  Place generic BOM f. Schematics WID A3
-  Place generic BOM f. Schematics WID A2
- DE** DE German
- EN** EN English
- ES** ES Spanish
- FR** FR French
- TR** TR Turkey
- PT** PT Portuguese
- EL** EL Greek
- ZH** ZH Chinese
- All** ALL
-  Grid ON
-  Grid OFF
-  Blank All Points
-  Unblank All Points
-  Wire Text ON
-  Wire Text OFF
-  Connection Signal Definition
-  Connection Signal List
-  Coding List
-  Custom Board Creation






For more details please refer to "BSH NX Schematics" documentation.

BSH-EPAK

 BSH E/Pak

For more details please refer to "BSH NX E/Pak" documentation.

BSH Harness Design

-  Create Harness Design
-  Move Harness Node
-  Rotate Harness Node
-  Check Harness Node
-  Print Harness Design

At the moment only used in TRT; for more details please refer to "FTH Harness Design"

Other toolbars might be added by 3rd party tools like BCT Inspector, BCT Raster etc.