

90%

HiCAD Plant Engineering

Version 2018

Creating new parts and variants

Date of issue: 14/09/2018



TOC

Creating New Parts and Variants (PE).	5
Using Connection Type Attributes (PE)	7
General information	7
Connection type ID with priority information.	8
Connection type ID - List of part standards.	8
List of Part Type IDs (PE)	9
Creating Individual Parts: Procedure (PE).	11
Rules for the Creation of User-Defined Parts (PE)	13
Part Type: Branch (PE)	14
Part Type: Valve (PE).	17
Part Type: Blank Flange (PE)	20
Part Type: Double Knee (PE).	22
Part Type: 3-Way Valve (PE)	24
Part Type: Corner Valve (PE).	27
Part Type: Flange (PE).	30
Part Type: Straight Pipe (PE)	32
Part Type: Y-Piece (PE)	35
Part Type: Cap (PE).	38
Part Type: Knee (PE)	40
Part Type: Cross (PE)	42
Part Type: Gauge part (PE)	45
Part Type: Reducer, Concentric (PE)	47
Part Type: Reducer, Excentric (PE)	49
Part Type: Elbow (PE)	51
Part Type: Pipe Clamp (PE)	53
Part Type: Vessels, Pumps, Other components (PE).	55
Part Type: Nozzle (PE)	56
Part Type: Other Pipe Part (PE)	58
Part Type: T-Piece (PE)	61
Part Type: 4-Way Valve (PE)	63
Part Type: Seal (PE).	66
Pressure ranges.	67
Part Type: Fastener (PE)	68
Part Type: Saddle Connection / Elbolet (PE).	70

Rules for the Creation of User-Defined Feature Variants (PE).	73
Variant for Part Type: Branch (PE)	74
Variant for Part Type: Valve (PE).	77
Variant for Part Type: Blank Flange (PE).	80
Variant for Part Type: Double Knee (PE).	82
Variant for Part Type: 3-Way Valve (PE).	85
Variant for Part Type: Corner Valve (PE)	88
Variant for Part Type: Flange (PE).	91
Variant for Part Type: Straight Pipe (PE).	94
Pipe-dependent placing of loose flanges.	97
Variant for Part Type: Y-Piece (PE).	99
Variant for Part Type: Cap (PE)	102
Variant for Part Type: Knee (PE).	105
Variant for Part Type: Cross (PE)	108
Variant for Part Type: Gauge part (PE).	112
Variant for Part Type: Reducer, Excentric (PE).	116
Variant for Part Type: Reducer, Concentric (PE).	119
Variant for Part Type: Elbow (PE)	122
Variant for Part Type: Pipe Clamp (PE)	125
Variant for Part Type: Vessels, Pumps, Other Components (PE)	127
Variant for Part Type: Nozzle (PE).	129
Variant for Part Type: Other Pipe Parts (PE).	132
Variant for Part Type: T-Piece (PE).	137
Variant for Part Type: 4-Way Valve (PE).	140
Variant for Part Type: Seal (PE)	143
Pressure ranges.	144
Variant for Part Type: Fastener (PE)	146
Variant fpr Part Type: Saddle Connection / Elbolet (PE).	148
Rules for the Creation of Symbolic Representations (PE).	151

Creating New Parts and Variants (PE)

Besides using the part and variants which have been predefined by the ISD you can also create,

- new Plant Engineering parts and
- new Feature Variants for Plant Engineering parts.

Please note that for the creation of new parts and new variants certain rules, depending on the particular part type, need to be respected.

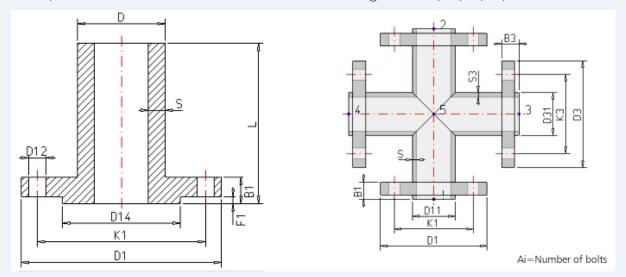
IMPORTANT - Please note the following when working with user-defined variants for flanges or parts with flanges:

You can use the **Flange connection, bolted** functions of the Plant Engineering module to place boltings on flange connections. To ensure that the boltings match the flanges, the functions will evaluate the variables of the part variant to which the flange belongs. This also needs to be considered if construct your own parts/variants with flange connections, because otherwise, problems will occur during their processing with the flange connection functions.

The following table shows the lists of variables. The <u>second</u> place of the variable's designation must match the connection number. The list here refers to the example of the first connection of a part.

- B1 Thickness of flange plate (B1 = C1 + F1)
- C1 Thickness of flange plate (without collar)
- F1 Thickness of collar
- A1 Number of bolts
- **K1** Diameter of bore circle
- D12 Bore diameter
- L Part length (not connection-specific)

Hence, the variables of the second connection will have the designations B2, C2, F2, A2, D22.



HiCAD Plant Engineering 5 / 154

Additional, part-specific rules apply during evaluation:

- 1. If the variables C1 and F1 are defined in a loose flange, the grip length of the bolting will be determined via the value C1+F1 istead of using B1.
- 2. For blank flanges the variable L instead of B1 will be used for grip length determination provided that L has been defined.

The value of the variables NI (capital "N", capital "i", NO "1"!) is used as an additional attribute during creation or querying of an article master in HELiOS. It represents the nominal diameter in Inches

Using Connection Type Attributes (PE)

General information

In the data records of parts, the attributes

- Anschlussart (=Connection type),
- Anschlussart2 and
- Anschlussart3

enable a determination of the type of connection and of any required accessories. If a part to which particular connecting parts have been assigned via connection attributes is placed onto a guideline, the accessories will be automatically attached to connections 1 and 2 of the part.

If no own attribute entry exists for a connection, the entry with the next lower connection number will be used.

Example:

If we assume that entries only exist for **Anschlussart** (Connection type) and **Anschlussart3** (Connection type 3) respectively, then the attribute for **Anschluss** (Connection) also applies to connection 2.

The attribute entry is composed of an ID number (connection type ID) and a supplement.

ID	Meaning	ID	Meaning
1000x	welded	3200x	screwed, f
2000x	flange	4100x	plugged, m
2100x	flange with notch	4200x	plugged, f
2200x	flange with groove	5100x	butt-welded, m
3100x	screwed, m	5200x	butt-welded, f

The last digit (x) of the identification number provides additional information on the supplement:

- 0 no supplement
- 2 The supplement is composed of the connection number, part type ID and part standard of the part to be attached.

Example:

20002 1 5100010 DIN 2633

This means: "Attach flange according to DIN 2633 with Connection 1."

The wildcard character ('?') is not allowed for the part type ID (in this case 5100010).

The 4th digit of the ID is interpreted as a priority indicator. This digit is important in cases where two parts coincide on one connection which both specify additional parts to be inserted via their connection type (often Fasteners). If one part is connected to another part, on the connecting points of which fasteners are already located, the prioritization will be evaluated.

The meaning of the 3rd digit has not been defined yet.

HiCAD Plant Engineering 7 / 154



Please note:

- Parts with only one "genuine" connection still require two named isolated points (Designation: ! and 2) to enable them to be auto-aligned correctly. To prevent Point 2 from being falsely interpreted as a connection in the isometry, the attribute ANSCHLUSSART2 needs to be set to the value 0.
- If no entry concerning the "Anschlussart" ("Connection type") attribute exists for a part, HiCAD assumes 10000 (= welded, without supplement).

Connection type ID with priority information

In practice it can happen that two parts coincide which both specify additional parts to be inserted via their connection type (often Fasteners). In such cases, the last but one digit of the connection will be interpreted as a priority indicator. If one part is connected to another part, on the connecting points of which fasteners are already located, the prioritization will be evaluated. If the part to be connected has a higher priority, the fasteners that already exist on the connection will be removed and replaced with the part to be connected.

If the connection type of the part to be connected has a lower priority, its fasteners will not be inserted.

In cases of equal priority new fasteners will only be inserted if no fasteners exist on the connection yet.

The priority information will also be evaluated if a part does not supply any further elements. Even in such cases, existing fasteners will be removed if the part to be connected has a connection type with a higher priority than that of the existing connection. This means that a part can remove all fasteners because it acts as a fastener itself.

Connection type ID - List of part standards

Instead of specifying a standard in the supplement, it is also possible to specify a list of standards separated by commas, e.g.

41002 1 5971010 Standard_A, Standard_B, Standard_C

During part search in the catalogue or in the HELiOS database the standards will be combined by means of an OR condition. This means that not several parts are specified here, but the range of allowed parts will be extended here.



Important:

In the part standards list, spaces will be interpreted as allowed characters of a standard designation. Therefore, no additional spaces must be entered to the right and to the left of the separating commas. Since the standards are separated by commas, they must not contain any commas themselves.

List of Part Type IDs (PE)

In the data record of a part you can, with the help of the so-called connection type attributes, specify the connection types and the fasternes that may be required for this. If a part to which particular fasteners are assigned via connection attributes will be places on a guideline, these will be automatically placed onto the Connections 1 and 2 of the part.

For this the part type ID will be required:

ID	Part type	ID	Part type
1000010	Straight pipe	5810010	Pipe clamp
1010011	Nozzle	5900010	Other pipe part
2100010	Elbow	5910011	Double knee
2200010	Knee	5920010	Gauge part
3110010	T-piece	5970010	Fastener, symmetric
3210011	Y-piece	5971010	Fastener, unsymmetric
3230010	Branch	5990011	Seal
3300010	Cross	6110010	Saddle connection
4100010	Valve	6111010	Elbolet
4200010	Corner valve	9100001	Vessel
4300010	3-way valve	9110001	Pump
4400010	4-way valve	5902021	Other parts
5100010	Flange	5980010	Seal
5210010	Сар	9700001	Component
5310010	Reducer, concentric	9800001	Gauge
5320011	Reducer, excentric	9970001	Insulation
5710010	Blank flange		

HiCAD Plant Engineering 9 / 154

Creating Individual Parts: Procedure (PE)

Besides Plant Engineering parts which are based on a variant and are generated via this variant, you can also create new, individual parts with fixed dimensions. If you want to construct a new, <u>non</u>- parameterised (fixed) Plant Engineering part for the available representation types, proceed as follows:

Please observe the Rules for the creation of the respective part type, as well as the Rules for the creation of symbolic representations.

With the HELiOS Database as part data source: (3 representation types are possible)

- 1. Construct a hollow body in HiCAD 3-D.
- 2. Save part as KRA file (without referencing, without part master and document master) to PlantParts\Parts2.
- 3. Check part with the Check part, Geometry Figure function.
- 4. Construct a solid body in HiCAD 3-D.
- 5. Save part as KRA file (without referencing, without part master and document master) to *PlantParts\Parts3*, with the same name as the hollow body representation.
- 6. Check part with the Check part, Geometry Part function.
- 7. Load the new KRA file from *PlantParts\Parts3* with the **PAA-Editor** and modify it as desired (enter attribute values). Save the part, i.e. create a PAA file.
- 8. Activate the **Part data synchronisation** function to perform the part data synchronisation with the database.
- 9. Check the attribute data with the Check parts, Attributes * function.
- 10. Create the symbolic representation with the **Symbol Editor** and add it to the new PAA file.

With the HiCAD Catalogue as part data source: (2 representation types are possible)

- 1. Construct a hollow body in HiCAD 3-D.
- 2. Save part as KRA file ("Save as part", without referencing) to PlantParts\Parts2.
- 3. Check part with the **Check part, Geometry** function.
- Construct a solid body in HiCAD 3-D.
- 5. Save part as KRA file ("Save as part", without referencing) to *PlantParts\Parts3*, with the same name as the hollow body representation.
- 6. Check part with the **Check part, Geometry** function.
- 7. Load the new KRA file from *PlantParts\Parts3* with the **PAA-Editor** and modify it as desired (enter attribute values). Save the part, i.e. create a PAA file.

HiCAD Plant Engineering 11 / 154

8. Activate the **Part data synchronisation** function to perform the part data synchronisation (this function calls the **VarToCat** tool).

If you want to initially create only one representation type for a Plant Engineering part in order to check whether the part functions in the way you expect it, you can omit three steps in the procedures described above:

- If you initially only require the solid body representation, omit the steps 1 3.
- If you initially only require the hollow body representation, omit the steps 4 6. Continue with step 7 to load the KRA file from *PlantParts\Parts2*.

If you want to add another representation type later (here: hollow body), the following steps are required:

- 1. Construct a hollow body in HiCAD 3-D.
- 2. Save part as KRA file ("Save as part", without referencing) to *PlantParts\Parts2* with a different name than the other representation type.
- 3. Check part with the Check part, Geometry 🎉 function
- 4. Load the new KRA file from *PlantParts\Parts2* with the **PAA-Editor**. Do not modify it, but save it immediately, i.e. create a PAA file. (If you have created the solid body representation instead of the hollow body representation, load the new KRA file from *PlantParts\Parts3*).
- 5. Now load the PAA file of the representation type that you have first created and tested (here: Solid body) from *PlantParts* with the **PAA Editor**. Use the **Edit archive** option to add the second representation type (here: Hollow body) from the corresponding PAA file. In the PAA Editor, save the still open PAA file of the first representation type, whereupon it will contain both representation types. The PAA file of the second representation type is now no longer needed.

Another part data synchronisation will not be required if you have only added the second representation type.

Rules for the Creation of User-Defined Parts (PE)

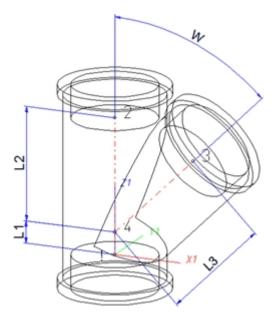
Besides Plant Engineering parts which are based on and created via a variant, you can also create new, individual parts with fixed dimensions. These parts are .PAA files. For their creation certain rules, depending on the particular part type, need to be respected.

When using your own variants for flanges or parts with flanges, please read the notes on bolted flange connections!

- Part type: Branch
- Part type: Valve
- Part type: Blank flange
- Part type: Double knee
- Part type: 3-way valve
- Part type: Corner valve
- Part type: Flange
- Part type: Straight pipe
- Part type: Y-piece
- Part type: Cap
- Part type: Knee
- Part type: Cross
- Part type: Gauge part
- Part type: Reducer, concentric
- Part type: Reducer, excentric
- Part type: Elbow
- Part type: Pipe clamp
- Part type: Vessels, Pumps, Other components
- Part type: Nozzles
- Part type: Other pipe part
- Part type: T-piece
- Part type: 4-way valve
- Part type: Seal
- Part type: Fasteners
- Part type: Saddle connection / Elbolet

HiCAD Plant Engineering 13 / 154

Part Type: Branch (PE)



Position of connecting poin	Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0
4	Auxiliary point	Branching point of centre line	X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.
WINKEL	Angle (see angle in drawing)
NENNWEITE	Nominal diameter, Connection"!"
NENNWEITE2	Nominal diameter, Connection "2"
NENNWEITE3	Nominal diameter, Connection "3"
Additionally (only if the corresponding	g standard uses nominal diameters in inches):
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection "!"
NPS2_INCH	Nominal diameter (inches), Connection "2"
NPS3_INCH	Nominal diameter (inches), Connection "3"
These parameters are to be consident necting sockets they refer to the pipe	ered for all connection types except for flange connections. For control to be inserted:
D_AUSSEN	Outer diameter, Connection "!"
D2_AUSSEN	Outer diameter, Connection "2"
D3_AUSSEN	Outer diameter, Connection "3"
WANDDICKE	Wall thickness, Connection "!"
WANDDICKE2	Wall thickness, Connection "2"
WANDDICKE3	Wall thickness, Connection "3"
ANSCHLUSSART	Connection type , Connection "!"
ANSCHLUSSART2	Connection type, Connection "2"
ANSCHLUSSART3	Connection type, Connection "3"
Possible values of the attribute ANSCH	HLUSSART (CONNECTION TYPE):

HiCAD Plant Engineering 15 / 154

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

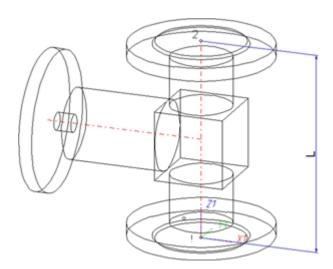
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Part Type: Valve (PE)



The centre axis of the actuator should be located in the plane X < 0, Y = 0, Z > 0!

Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.
	An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 17 / 154

Attribute			Description		
NENNWE	EITE		Nominal diameter, Connection "!" and "2"		
Additiona	ally (only if the corresponding	g standard	uses nominal diameters in inches):		
NPS_INC	H		Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!" and "2"		
-	rameters are to be considere ockets they refer to the pipe		onnection types except for flange connections. For con- rted:		
D_AUSSE	N		Outer diameter, Connection "!" and "2"		
WANDDIG	CKE		Wall thickness, Connection "!" and "2"		
ANSCHLU	JSSART		Connection type		
Possible v	values of the attribute ANSCH	LUSSART	(CONNECTION_TYPE):		
1000x	Butt-welded	Provide auxiliary part when fitting part			
2000x	Flange connection	a connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of		
2100x	Flange with groove connection				
2200x	Flange with notch connection		the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40		
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own part master attached to this connection.	EN 1092-	1/11/A/PN 40 is the standard designation with which the flange is to be o the database.		
3100x	Screwed, nipple				
3200x	Screwed, socket				
4100x	Plugged, nipple				
4200x	Plugged, socket				
5100x	Socket-welded, nipple				
5200x	Socket-welded, socket				

The last character (x) provides information about the meaning of the supplement:

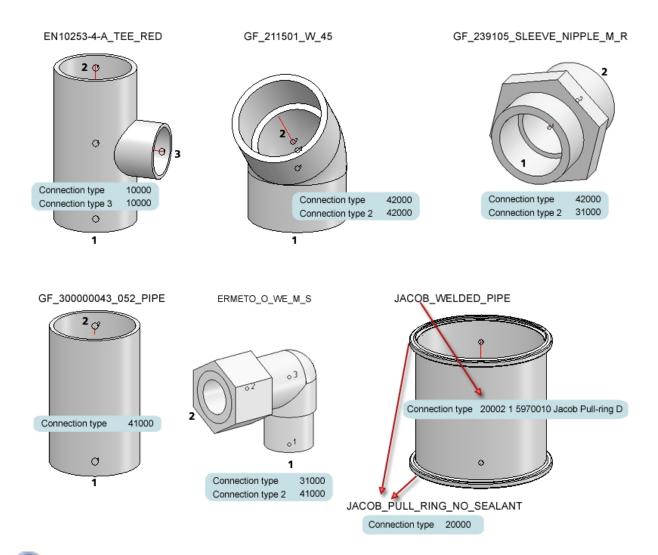
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

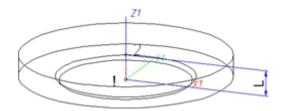
Connection types: Examples



Parts with socket-welded connections (51000 / 52000) are currently not contained in the HiCAD part inventory.

HiCAD Plant Engineering 19 / 154

Part Type: Blank Flange (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connection "!"	
Additionally (only if the corresponding star	ndard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection "!"	
ANSCHLUSSART	Connection type for Connection "!" (always flange connection)	
Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):		

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the
2100x	Flange with groove connection	part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange
2200x	Flange with notch connection	connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART
3100x	Screwed, nipple	(CONNECTION_TYPE) attribute could look as follows:
3200x	Screwed, socket	20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation
4100x	Plugged, nipple	with which the flange is to be entered into the database.
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

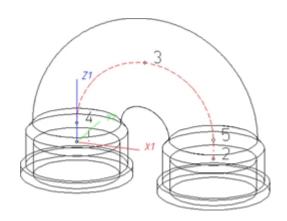
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 21 / 154

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Part Type: Double Knee (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (X1=0,Y1=0,Z1=0)
2	Connecting point		X2 > 0, Y2 = 0, Z2 = 0
3	Auxiliary point		X3 = X2/2, Y3 = 0, Z3 > Z4
4	Auxiliary point		X4 = 0, Y4 = 0, Z4 > 0
5	Auxiliary point		X5 = X2, Y5 = 0, Z5 = Z4

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connection "!" and "2"	
Additionally (only if the corresponding sta	ndard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!" and "2"	
These parameters are to be considered fo necting sockets they refer to the pipe to be	or all connection types except for flange connections. For cone inserted:	
D AUSSEN	Outer diameter, Connection "!" and "2"	

Attribute	Description	
WANDDICKE	Wall thickness, Connection "!" and "2"	
ANSCHLUSSART	Connection type, Connection "!"	
ANSCHLUSSART2	Connection type, Connection "2"	
D. W		

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):.

Possible va	nues of the attribute ANSCHL	USSART (CONNECTION
1000x	Butt-welded	Provide auxiliary part when fit
2000x	Flange connection	If appropriately preset in the a a connection, the part will pro
2100x	Flange with groove connection	cified in the attribute for the c a flange connection and the c
2200x	Flange with notch connection	the ANSCHLUSSART (CONN 20002 1 5100010 EN 1092-
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	to magning of the cumplement.

itting part

ANSCHLUSSART (CONNECTION_TYPE) attribute for ovide and connect an auxiliary part of the standard speconnection when being fitted. For example, if the part has corresponding counter-flange is required, the content of INECTION_TYPE) attribute could look as follows:

-1/11/A/PN 40

the standard designation with which the flange is to be

The last character (x) provides information about the meaning of the supplement:

0=No supplement

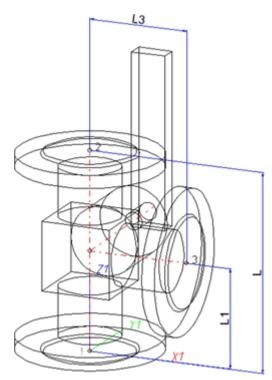
2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 23 / 154

Part Type: 3-Way Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

ttribute		Description	
ENENN	UNG	Designation of part	
NORMBEZEICHNUNG		Standard designation of the part.	
		An entry is mandatory, even if the part corresponds to no standard.	
NENNWE	UTC	Nominal diameter, Connection "!" and "2"	
NENNWE		Nominal diameter, Connection "3"	
INLININVVL	IILO	Norminal diameter, Connection 3	
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC	Н	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!" and "2"	
NPS3_IN	CH	Nominal diameter (inches), Connection "3"	
-	ockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted: Outer diameter, Connection "!" and "2"	
D3_AUSS		Outer diameter, Connection "3"	
WANDDI(Wall thickness, Connection "!" und "2"	
WANDDI	-	Wall thickness, Connection"3"	
ANSCHLU	JSSART	Connection type, Connection "!", "2" and "3"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
5100x	Socket-welded, nipple		

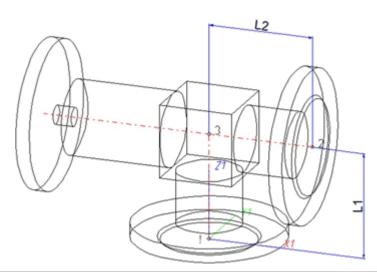
HiCAD Plant Engineering 25 / 154

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Attribute Description

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Part Type: Corner Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Corner point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 27 / 154

Attribute		Description	
NENNWE	TITE	Nominal diameter, Connection "!"	
NENNWE		Nominal diameter, Connection "2"	
INLININVVL	-11 LZ	Normal dameter, connection 2	
Additiona	ally (only if the corresponding	standard uses nominal diameters in inches):	
NPS_INC	CH .	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection"!"	
NPS2_IN	CH	Nominal diameter (inches), Connection "2"	
-	ockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted: Outer diameter, Connection "!"	
D2 AUSS		Outer diameter, Connection "2"	
WANDDI		Wall thickness, Connection "!"	
WANDDI		Wall thickness, Connection "2"	
**/ ((1 1 1 1 1 1 1 1 1	OI \LL	wan unowness, connection 2	
ANSCHL	JSSART	Connection type, Connection "!" and "2"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):.	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has	
2100x	Flange with groove connection	a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4100X			
4200x	Plugged, socket		
	Plugged, socket Socket-welded, nipple		

The last character (x) provides information about the meaning of the supplement:

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

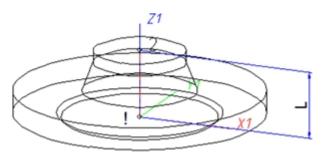
 $[\]mathbf{2}$ = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

When using the HELiOS database, please make sure that you use the correct Classification matching the part type!

HiCAD Plant Engineering 29 / 154

Part Type: Flange (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part.	
	An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connection "!" and "2"	
Additionally (only if the corresponding standard uses nominal diameters in inches):		
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection"!" and "2"	

Attribute	Description
D_AUSSEN	Outer diameter, Connection "2"
WANDDICKE	Wall thickness, Connection "2"
ANSCHLUSSART	Connection type, Connection"!" (always flange connection)
ANSCHLUSSART2	Connection type, Connection"2"
D 311 1 (11 11 11 1	ANICOLULIUS ART (CONNIFOTIONI TYPE)

Possible values of the attribute ANSCHLUSSART (CONNECTION TYPE):

Possible v	alues of the attribu	THE ANSCHLUSSART (CONNECTION_TYPE):
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the
2100x	Flange with groove connection	connection when being fitted. For example, if the part has a flange connection and the cor- responding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_ TYPE) attribute could look as follows:
2200x	Flange with notch connection	20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
2010x	Flange connection of a loose flange	
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket- welded, nipple	
5200x	Socket- welded, socket	
The last ober	actor (v) provides inform	nation about the magning of the cumplement.

The last character (x) provides information about the meaning of the supplement:

0=No supplement

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

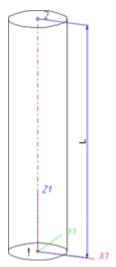
 $The prefixed connection \ number \ indicates \ the \ connection \ with \ which \ the \ auxiliary \ part \ is \ to \ be \ attached \ to \ the \ current \ connection.$

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Loose flanges are assigned to the part type Flange. The attribute ANSCHLUSSART (=CONNECTION_TYPE), however, must have the value 20100!

HiCAD Plant Engineering 31 / 154

Part Type: Straight Pipe (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Designation
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.
BELIEBIG_TEILBAR	Indicates whether a cutting to length of the pipe is permissible

Attribute	Designation	
LIEFERLAENGE	Supplied length in m (!)	
NENNWEITE	Nominal diameter, Connection "!" and "2"	
Additionally (only if the	e corresponding standard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection"!" and "2"	
	to be considered for all connection types except for flange connections. For conefer to the pipe to be inserted:	
D_AUSSEN	Outer diameter, Connection"!" and "2"	
WANDDICKE	Wall thickness, Connection"!" and "2"	
ANSCHLUSSART	Connection type , Connection"!" (and "2")	
ANSCHLUSSART2	If you want both pipe ends to have the same connection type it will suffice to specify a value for the ANSCHLUSSART attribute.	
	If you want the two pipe ends to have different connection types, the connection type for Connection 1 must be specified for the ANSCHLUSSART attribute, and the connection type for Connection 2 for the ANSCHLUSSART2 attribute.	
	If you want to create a new feature variant of a straight pipe with different connection types, the part must be constructed in such a way that the value of the attribute ANSCHLUSSART is smaller than the value of the attribute ANSCHLUSSART2.	
	Example:	
	Let us assume that you require a pipe that can be butt-welded at one end, and ha a screwed socket at the other end.	
	The connection type for butt-welded connections is 10000, the one for screwers sockets is 32000. This means that Connection 1 (Point designation "!") is require for the welded connection (ANSCHLUSSART = 10000) and Connection 2 (point designation).	

HiCAD Plant Engineering 33 / 154

Attribute	Designation	
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 FN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

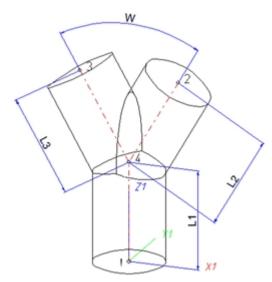
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Part Type: Y-Piece (PE)



Position of connecting points and determination of insertion lengths for various connection types					
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection		
a 2	a	a 2	a 2		
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)		

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Connecting point		X < 0, Y = 0, Z > 0
4	Auxiliary point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.

HiCAD Plant Engineering 35 / 154

Attribute		Description	
		An entry is mandatory, even if the part corresponds to no standard.	
NI TNINI\A/T	TITE	Naminal diameter Connection "I"	
NENNWE		Nominal diameter, Connection "!"	
NENNWE	:ITEZ	Nominal diameter, Connection"2" and "3"	
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INCH		Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection"!"	
NPS2_INCH		Nominal diameter (inches), Connection"2" and "3"	
	nrameters are to be considere sockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted:	
D_AUSSEN		Outer diameter, Connection"!"	
D2_AUSS	SEN	Outer diameter, Connection"2" and "3"	
WANDDI	CKE	Wall thickness, Connection"!"	
WANDDICKE2		Wall thickness, Connection"2" and "3"	
ANSCHL	USSART	Connection type, Connection"!"	
ANSCHLUSSART2		Connection type, Connection "2" and "3"	
Possible \	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
2100x	Flange with groove connection		
2200x	Flange with notch connection		
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.		
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
	Plugged, socket Socket-welded, nipple		

 $[\]mathbf{0} = No supplement$

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

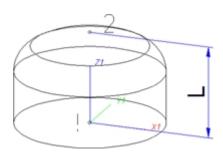
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Attribute Description

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 37 / 154

Part Type: Cap (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part.	
	An entry is mandatory, even if the part corresponds to no standard	
NENNWEITE	Nominal diameter, Connection "!"	
D_AUSSEN	Outer diameter, Connection "!"	
WANDDICKE	Wall thickness, Connection "!"	
Additionally (only if the corresponding standard uses nominal diameters in inches):		
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "	

Attribute		Description
		characters), Connection "!"
ANSCHLUSSART		Connection type, Connection "!"
Possible v	values of the attribute Al	NSCHLUSSART (CONNECTION_TYPE):.
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-

2000x Flange connection
2100x Flange with groove connection
2200x Flange with notch connection
2040x Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.

3100x Screwed, nipple
3200x Screwed, socket

Plugged, nipple

Plugged, socket

Socket-welded, nipple

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

 $\hbox{EN 1092-1/11/A/PN 40}$ is the standard designation with which the flange is to be entered into the database.

5200x Socket-welded, socket

The last character (x) provides information about the meaning of the supplement:

0=No supplement

4100x

4200x

5100x

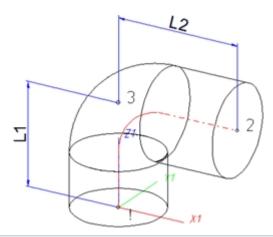
2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 39 / 154

Part Type: Knee (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Corner point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.

Attribute		Description	
NENNWEITE		Nominal diameter, Connection "!"	
NENNWE	ITE2	Nominal diameter, Connection "2"	
WINKEL		Angle between the distances "3" -> "!" and "3" -> "2"	
Additiona	lly (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC	Н	Nominal diameter (inches) (e.g. 1 1/2", the " consists o two " characters) , Connection "!"	
NPS2_INC	CH	Nominal diameter (inches), Connection "2"	
necting so	ockets they refer to the pipe		
D_AUSSEI	N	Outer diameter, Connection "!"	
D2_AUSSI	EN	Outer diameter, Connection "2"	
WANDDICKE		Wall thickness, Connection "!"	
WANDDICKE2		Wall thickness, Connection "2"	
ANSCHLU	JSSART	Connection type, Connection "!"	
ANSCHLU	JSSART2	Connection type, Connection "2"	
Possible va	alues of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
2200x	Flange with notch connection		
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as		

3100x Screwed, nipple

nection.

icle master attached to this con-

3200x Screwed, socket

4100x Plugged, nipple

4200x Plugged, socket

5100x Socket-welded, nipple

5200x Socket-welded, socket

The last character (x) provides information about the meaning of the supplement:

 ${\bf 2} = {\sf The \ supplement \ consists \ of \ connection \ number, \ part \ type, \ ID, \ and \ standard \ of \ the \ part \ to \ be \ connected}$

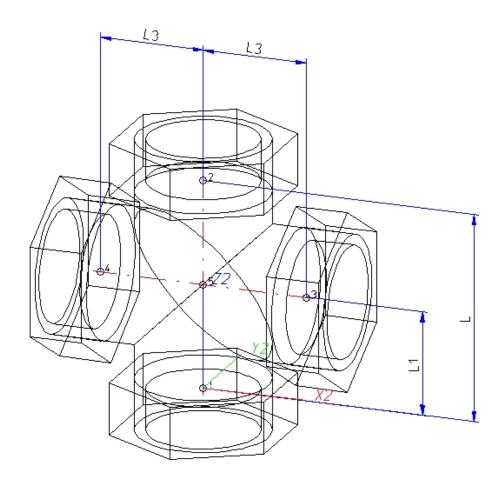
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 41 / 154

⁰=No supplement

Part Type: Cross (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Corner point	on branch	X > 0, Y = 0, Z > 0
4	Corner point	on branch	X < 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.
	An entry is mandatory, even if the part corresponds to no standard.
NENNWEITE	Nominal diameter, Connection "!" and "2"
NENNWEITE3	Nominal diameter, Connection "3" and "4"
Additionally (only if the correspo	nding standard uses nominal diameters in inches):
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the " consists of two " characters), Connection "!" and "2"
NPS3_INCH	Nominal diameter (inches), Connection "3" and "4"
These parameters are to be cons	idered for all connection types except for flange connections. For conpipe to be inserted:
D_AUSSEN	Outer diameter, Connection "!" and "2"
D3_AUSSEN	Outer diameter, Connection "3" and "4"
WANDDICKE	Wall thickness, Connection "!" and "2"
WANDDICKE3	Wall thickness, Connection "3" and "4"
ANSCHLUSSART	Connection type, Connection "!", "2", "3" and "4"

HiCAD Plant Engineering 43 / 154

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for
2000x	Flange connection	a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Part Type: Gauge part (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point or Connecting point	-	X > 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 45 / 154

Attribute		Description	
NENNWE	ITE	Nominal diameter, Connection "!"	
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC		Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!"	
-	rameters are to be considere ockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted:	
D_AUSSE	N	Outer diameter, Connection "!"	
WANDDI	CKE	Wall thickness, Connection "!"	
ANSCHL	JSSART	Connection type, Connection "!"	
ANSCHLUSSART2		Connection type, Connection "2" (="0", if only one connection exists)	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):.	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
5100x	Socket-welded, nipple		

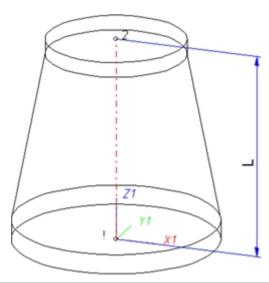
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Part Type: Reducer, Concentric (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 47 / 154

onnection "!" onnection "2" s in inches):
onnection "2" in inches):
in inches):
1 1/0/1 11 11 11 11
ches) (e.g. 1 1/2", the "consists of nnection "!"
ches), Connection "2"
or flange connections. For con-
or flange connections. For con- mection "!"
nection "!"
nection "!" nection "2"
nection "!" nection "2" ection "!"
nection "!" nection "2" ection "!"
ches), Con

1000x	Butt-weided
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

4200x

5100x

5200x

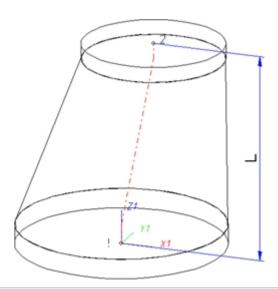
2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰⁼No supplement

Part Type: Reducer, Excentric (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 49 / 154

Attribute	Description
NENNWEITE	Nominal diameter, Connection "!"
NENNWEITE2	Nominal diameter, Connection "2"
Additionally (only if the correspond	ing standard uses nominal diameters in inches):
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection "!"
	N
NPS2_INCH	Nominal diameter (inches), Connection "2"
NPS2_INCH	Nominal diameter (inches), Connection "2"
	ered for all connection types except for flange connections. For con-
These parameters are to be consider	ered for all connection types except for flange connections. For con-
These parameters are to be consid- necting sockets they refer to the pipe	ered for all connection types except for flange connections. For conpe to be inserted:
These parameters are to be considented necting sockets they refer to the pipe D_AUSSEN	ered for all connection types except for flange connections. For conpe to be inserted: Outer diameter, Connection "!"
These parameters are to be considented necting sockets they refer to the pipe D_AUSSEN D2_AUSSEN	ered for all connection types except for flange connections. For conpe to be inserted: Outer diameter, Connection "!" Outer diameter, Connection "2"
These parameters are to be considented necting sockets they refer to the pipe D_AUSSEN D2_AUSSEN WANDDICKE	ered for all connection types except for flange connections. For conpe to be inserted: Outer diameter, Connection "!" Outer diameter, Connection "2" Wall thickness, Connection "!"
These parameters are to be considented necting sockets they refer to the pipe D_AUSSEN D2_AUSSEN WANDDICKE	ered for all connection types except for flange connections. For conpe to be inserted: Outer diameter, Connection "!" Outer diameter, Connection "2" Wall thickness, Connection "!"

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part hat a loose flange that is modelled at a sub-part and has no own art icle master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple
4200x	Plugged, socket
5100x	Socket-welded, nipple

Socket-welded, socket

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

5200x

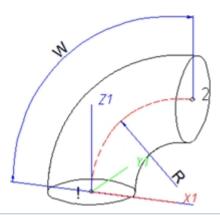
2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰⁼No supplement

Part Type: Elbow (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin(0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.
BELIEBIG_TEILBAR	Indicates whether a cutting to length of the elbow is permissible.

HiCAD Plant Engineering 51 / 154

Attribute		Description	
NENNWEITE		Nominal diameter, Connection "!" and "2"	
WINKEL KRUEMMUNG		Angle	
		Bend radius	
Additiona	ılly (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC	Н	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!" and "2"	
	rameters are to be considere ockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted:	
D_AUSSE	N (Outer diameter, Connection "!" and "2"	
WANDDIG	CKE	Wall thickness, Connection "!" and "2"	
ANSCHLUSSART		Connection type, Connection "!" and "2" The connection types on both ends must be identical.	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):.	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to lentered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
5100x	Socket-welded, nipple		

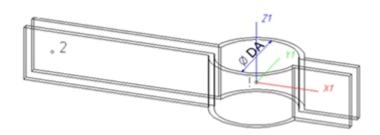
2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

Part Type: Pipe Clamp (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Fitting point	Reference point placed on the centre line of a pipe during fitting	in origin (0,0,0)
2	Auxiliary point		X < 0, Y = 0, Z = 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered at least for the attributes shown below:

Possibility 1:

Attribute	Description		
BENENNUNG	Designation of part		
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.		
NENNWEITE	Nominal diameter		
D_AUSSEN	Outer diameter of pipe (see DA in drawing)		
Additionally (only if the corresponding standard uses nominal diameters in inches):			
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters)		

Possibility 2:

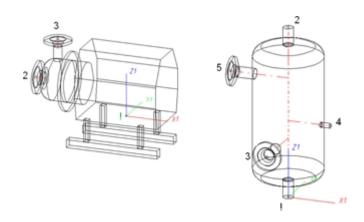
Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.
D_AUSSEN	Largest possible outer diameter of pipe that is still suitable for pipe clamp

HiCAD Plant Engineering 53 / 154

Attribute	Description	
D2_AUSSEN	Smallest possible outer diameter of pipe that is still suitable for pipe clamp	
NENNWEITE	Nominal diameter matching D_AUSSEN	
Additionally (only if the corresponding standard uses nominal diameters in inches):		
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters)	

For the insertion of a pipe clamp having these two outer diameter attributes the Also use Outer diameter 2 as search criterion for pipe clamps checkbox on the Part search tab of the Plant Engineering Settings dialogue must be active.

Part Type: Vessels, Pumps, Other components (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point or Auxiliary point	Fitting point	in origin (0,0,0)
2, 3, 4 etc., unambiguous within the part	Connecting points or Auxiliary points		arbitrary

Connecting points should preferably be created via the **Component connection** function or by the insertion of nozzles.

Each component connection (and the fitting point, if it is an auxiliary point) needs to be located in a plane belonging to the part. It needs however not be located within the surface boundary.

Example



If the connecting point is located in the plane of the ring surface, the surface condition is fulfilled.

Caution: It would also be fulfilled if the point would be located in the same plane, but outside of the ring.

To assign an unambiguous orientation to a connection, a connecting point must not fulfil the surface condition for several surfaces at once.

Required attributes for entries into database or catalogue

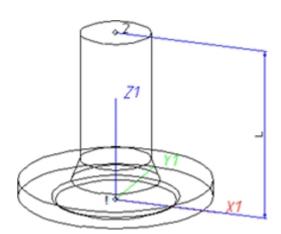
The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.
	An entry is mandatory, even if the part corresponds to no standard.

HiCAD Plant Engineering 55 / 154

Part Type: Nozzle (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.
	An entry is mandatory, even if the part corresponds to no standard.
NENNWEITE	Nominal diameter, Connection "!" and "2"
D_AUSSEN	Outer diameter, Connection ["!" and] "2"

Attribute		Description		
WANDDICKE		Wall thickness, Connection ["!" and] "2"		
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):		
NPS_INC	CH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connections "!" and "2"		
ANSCHL	USSART	Connection type, Connection "!"		
ANSCHL	USSART2	Connection type, Connection "2" (value always 10000)		
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):.		
1000x	Butt-welded	Provide auxiliary part when fitting part		
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-		
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of		
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40		
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.		
3100x	Screwed, nipple			
3200x	Screwed, socket			
4100x	Plugged, nipple			
4200x	Plugged, socket			
5100x	Socket-welded, nipple			
5200x	Socket-welded, socket			

0=No supplement

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

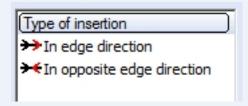
HiCAD Plant Engineering 57 / 154

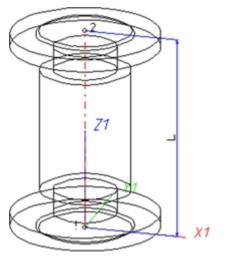
^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Part Type: Other Pipe Part (PE)

Up to 4 connections are possible for this part type.

The connections "!" and "2" need to be located on the Z-axis. The position of further connections is arbitrary. However, connections "3" and "4" cannot process guidelines during part insertion. The creation of guidelines starting from connections "3" and "4" can only be performed subsequently. Therefore, you will only have the following fitting options:





Example: Compensator with flanges

Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	optional	arbitrary
4	Connecting point	optional	arbitrary

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

For a part with two connections, values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part.

Attribute		Description	
		An entry is mandatory, even if the part corresponds to no standard.	
NENNWE	EITE	Nominal diameter, Connection "!" and "2"	
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INCH		Nominal diameter (inches) (e.g. 1 1/2", the "consists of two" characters), Connection "!" and "2"	
-	rameters are to be considere ockets they refer to the pipe	ed for all connection types except for flange connections. For conto be inserted:	
D_AUSSE	EN	Outer diameter, Connection "!" and "2"	
WANDDI	CKE	Wall thickness, Connection "!" and "2"	
ANSCHLUSSART		Connection type, Connection"!" and "2"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
5100x	Socket-welded, nipple		
5200x	Socket-welded, socket		
The last chai	racter (x) provides information about t	he meaning of the supplement:	

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

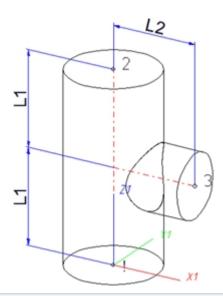
As mentioned above, the part can have up to 4 connections. If a connection "4" exists, it needs to have the same properties (nominal diameter, outer diameter, wall thickness, connection type) as connection "3". For three connections, different properties can be preset:

HiCAD Plant Engineering 59 / 154

⁰⁼No supplement

	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part.	
	An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connection "!"	
NENNWEITE2	Nominal diameter, Connection "2"	
NENNWEITE3	Nominal diameter, Connection "3" [and "4"]	
Additionally (only if the corresponding s	standard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection "!" and "2"	
NPS2_INCH	Nominal diameter (inches), Connection "2"	
NPS3_INCH	Nominal diameter (inches), Connection "3" [and "4"]	
These parameters are to be considered necting sockets they refer to the pipe to	for all connection types except for flange connections. For con-	
	be inserted:	
D_AUSSEN	Outer diameter, Connection "!"	
D_AUSSEN D2_AUSSEN		
_	Outer diameter, Connection "!"	
D2_AUSSEN	Outer diameter, Connection "!" Outer diameter, Connection "2"	
D2_AUSSEN D3_AUSSEN	Outer diameter, Connection "!" Outer diameter, Connection "2" Outer diameter, Connection "3" [and "4"]	
D2_AUSSEN D3_AUSSEN WANDDICKE	Outer diameter, Connection "!" Outer diameter, Connection "2" Outer diameter, Connection "3" [and "4"] Wall thickness, Connection "!"	
D2_AUSSEN D3_AUSSEN WANDDICKE WANDDICKE2	Outer diameter, Connection "!" Outer diameter, Connection "2" Outer diameter, Connection "3" [and "4"] Wall thickness, Connection "!" Wall thickness, Connection "2"	
D2_AUSSEN D3_AUSSEN WANDDICKE WANDDICKE2 WANDDICKE3	Outer diameter, Connection "!" Outer diameter, Connection "2" Outer diameter, Connection "3" [and "4"] Wall thickness, Connection "!" Wall thickness, Connection "2" Wall thickness, Connection "3" [and "4"]	

Part Type: T-Piece (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no

HiCAD Plant Engineering 61 / 154

Attribute		Description	
		standard.	
NENNWE	TITE	Nominal diameter, Connection "!" and "2"	
NENNWE		Nominal diameter, Connection "3"	
INCININAAC	:ITE3	inonlinal diameter, Connection 5	
Additiona	ally (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC	Н	Nominal diameter (inches) (e.g. 1 1/2", the " consists two " characters), Connection "!" and "2"	
NPS3_IN	CH	Nominal diameter (inches), Connection "3"	
ANSCHL	JSSART	Connection type, Connection "!" and "2"	
ANSCHL	JSSART3	Connection type, Connection "3"	
-	ockets they refer to the pipe	red for all connection types except for flange connections. For co to be inserted: Outer diameter, Connection "!" and "2"	
D3_AUSS		Outer diameter, Connection "3"	
WANDDI(Wall thickness, Connection "!"	
WANDDICKE3		Wall thickness, Connection "3"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for	
2000x	Flange connection	a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
5100x	Socket-welded, nipple		
F000			

Socket-welded, socket

5200x

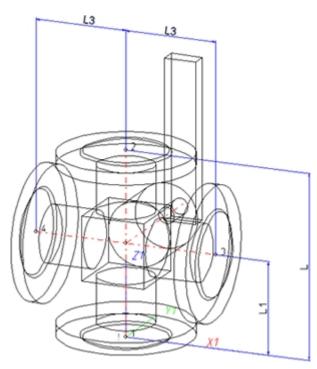
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

⁰=No supplement

 $[\]mathbf{2}$ = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Part Type: 4-Way Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinates system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0
4	Connecting point	on branch	X < 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

HiCAD Plant Engineering 63 / 154

Attribute		Description	
BENENN	UNG	Designation of part	
IORMBE	ZEICHNUNG	Standard designation of the part (identical for all sub-types	
		An entry is mandatory, even if the part corresponds to no standard.	
VENNWE	TTF	Nominal diameter, Connection "!" and "2"	
NENNWE	···	Nominal diameter, Connection 3" and "4"	
1121111111		Trommardameter, connection 5 and 4	
Additiona	ılly (only if the corresponding	g standard uses nominal diameters in inches):	
NPS_INC	Н	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection"!" and "2"	
NPS3_IN	CH	Nominal diameter (inches), Connection "3" and "4"	
-	rameters are to be considere	ed for all connection types except for flange connections. For conto be inserted:	
D_AUSSE		Outer diameter, Connection"!" and "2"	
 D3_AUSS		Outer diameter, Connection"3" and "4"	
WANDDICKE		Wall thickness, Connection"!" and "2"	
WANDDIC	CKE3	Wall thickness, Connection"3" and "4"	
ANSCHLU		Connection type for Connection"!", "2", "3" and "4"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):	
1000x	Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for	
2000x	Flange connection	a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of	
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		
3200x	Screwed, socket		
4100x	Plugged, nipple		
4200x	Plugged, socket		
F100	Socket-welded, nipple		
5100x			

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

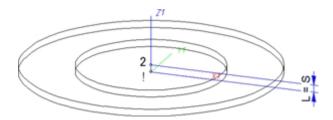
The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Attribute Description

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 65 / 154

Part Type: Seal (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Designation	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part.	
	An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connections "!" and "2"	
DICKE	Seal thickness	
Additionally (only if the correspor	nding standard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connections "!" and "2"	
ANSCHLUSSART	Connection types for Connections "!" and "2" (value = 20000 for flange connection)	
Possible values of the attribute AN	SCHLUSSART (CONNECTION_TYPE):	

Attribute	Des	ignation
2000x 2100x	Flange connection Flange with groove connection	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_ TYPE) attribute for a connection, the part will provide and connect an
2200x	Flange with notch connection	auxiliary part of the standard specified in the attribute for the con- nection when being fitted. For example, if the part has a flange con-
2050x	Flange connection of a seal that is exclusive intended for the pushed in end of a pushpipe. The effect of this value is that a loc flange, together with the push-in pipe, will connected to the seal. The pushed in of the push-in pipe must have the connection to 10xxx. Flange connection.	content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation with which the

0=No supplement

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Pressure ranges

In previous versions the nominal pressure was of no significance for the search of matching sealing gaskets. To take pressures ranges into account, the attribute **DRUCK_MIN** (Minimum pressure) is now available.

When you now search a sealing gasket for a flange, the following, additional search condition will be generated from the nominal pressure **PN** of the flange:

(MIN_DRUCK ist unbelegt oder MIN_DRUCK <= PN) und (DRUCK ist unbelegt oder DRUCK >= PN) (Minimum pressure not specified or Minimum pressure <=PN) and (Minimum pressure not specified or Minimum pressure >=PN)

Sealing gaskets without pressure specifications will thus be handled as if they were suitable for any nominal pressure.

The standard parts that are by default supplied with HiCAD do not include sealing gaskets with a defined pressure range. Therefore, this new feature is currently only relevant for gaskets that have been created by the user. Accordingly, the attribute DRUCK_MIN (Min. pressure) will not be available in the search masks that are by default supplied with HELiOS. If desired, you can add this attribute with the HELiOS Mask Editor.

If you prepare the database for Plant Engineering by clicking the corresponding button in DBPlantDataImport.exe, the attribute **DRUCK_MIN** will be entered, with the designation **Minimum pressure**, into the database.

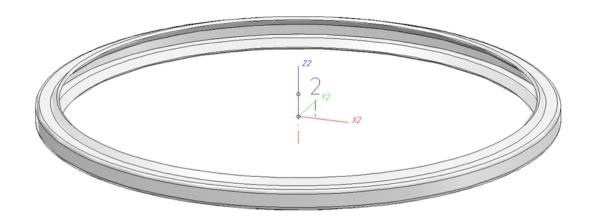
An example from practice:

If you do not want gaskets with an own article number for each pressure level to be created, you can avoid this by means of the **DRUCK_MIN** attribute.

Furthermore, you have now the option to narrow search results for sealing gaskets by specifying a value for the attribute **DRUCK** (Pressure), e.g. by including only gaskets with a defined pressure in your pipe class.

HiCAD Plant Engineering 67 / 154

Part Type: Fastener (PE)



Named isolated points

Designation	Function	Comment	Position in coordinate system
!	Connecting point	Fitting point	In origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

The part has no insertion length. When the part is inserted, it will be placed with its fitting point onto a connection of the target part. Connecting point 2 will only be used for a correct alignment.

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

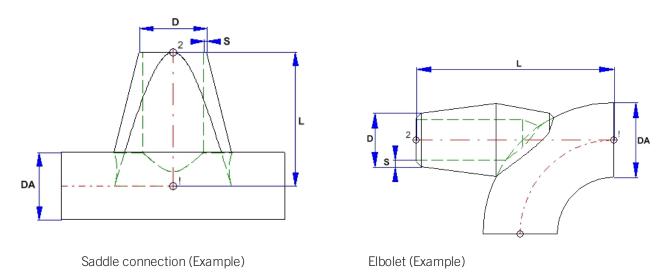
Attribute	Description		
BENENNUNG	Designation of the part		
NORMBEZEICHNUNG	Standard designation of the part		
	An entry will even be required if the part corresponds to no standard.		
ANSCHLUSSART	Connection type for which the fastener is intended.		
NENNWEITE	Nominal diameter intended for the fastener.		
Additionally (only if the corresponding standard uses nominal diameters in inches):			
NPS_INCH	Nominal diameter in inches (e.g. 1 1/2", the "consist of 2 'characters)		
These additional values make sense if the above attributes should not be sufficient as search criteria:			
D_AUSSEN	Outer diameter for which the fastener is intended		
WANDDICKE	Wall thickness for which the fastener is intended		
Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):			

Attribute		Description
20000	Flange connection	Please note:
2040x	Flange connection of a part that is not a flange its The part has a loose flange that is modelled as a s part and has no own article master attached to this nection.	ub- the part (if the corresponding option has been set) is not avail-
42000	Plugged, socket	
51000	Socket-welded, nipple	
52000	Socket-welded, socket	
_		

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

HiCAD Plant Engineering 69 / 154

Part Type: Saddle Connection / Elbolet (PE)



D=Outer diameter of the nozzle, DA=Outer diameter of the part to which the connection is made, L=Length, S=Wall thickness

Please note that the variable DA (Outer diameter) will be modified upon insertion. It will be applied to the outer diameter of the pipe to which the connection is made. This allows the calculation of the part geometry to match the respective fitting situation. Please check whether the geometry of the constructed saddle connection correctly adjust itself to a modified DA value.

Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Required attributes for entries into database or catalogue

The entering of attribute values and the part type selection should be performed using the PAA Editor.

Values need to be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
NORMBEZEICHNUNG	Standard designation of the part.	
	An entry is mandatory, even if the part corresponds to no standard.	
NENNWEITE	Nominal diameter, Connection "!" and "2"	
Additionally (only if the c	orresponding standard uses nominal diameters in inches):	
NPS_INCH	Nominal diameter (inches) (e.g. 1 1/2", the "consists of two "characters), Connection"!" and "2"	
These sizes are to be conthey refer to the pipe to b	nsidered for all connection types except for the flange connection. For sockets be inserted: Outer diameter of the part to which the connection is made. This allows a suitable	
	adjustment of the nozzle.	
D2_AUSSEN	Outer diameter of the nozzle, Connection "!" and "2"	
WANDDICKE	Wall thickness, Connection "2"	
ANSCHLUSSART		
ANSCHLUSSART2	If the same connection type is required at both part ends it will suffice to assign a value to the attribute ANSCHLUSSART. If different connection types are required at the part ends you need to assign the	
	value of the connection type for Connection 1 to the attribute ANSCHLUSSART, and the connection type for Connection 2 to the attribute ANSCHLUSSART2.	
Possible values of th (CONNECTION_TYPE2):	e attributes ANSCHLUSSART (CONNECTION_ TYPE) and ANSCHLUSSART2	

HiCAD Plant Engineering 71 / 154

Attribute	Description	
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Creating Individual Parts: Procedure (PE)

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Rules for the Creation of User-Defined Feature Variants (PE)

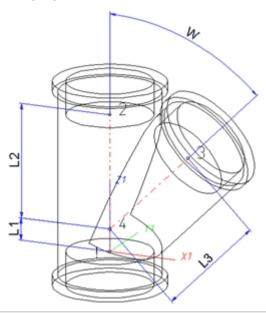
When creating new, user-defined Feature Variants for Plant Engineering Parts, certain rules, depending on the particular part type, need to be respected.

When using your own variants for flanges or parts with flanges, please read the notes on bolted flange connections!

- Variant for Part Type: Branch
- Variant for Part Type: Valve
- Variant for Part Type: Blank flange
- Variant for Part Type: Double knee
- Variant for Part Type: Three-way valve
- Variant for Part Type: Corner valve
- Variant for Part Type: Flange
- Variant for Part Type: Straight pipe
- Variant for Part Type: Y-piece
- Variant for Part Type: Cap
- Variant for Part Type: Knee
- Variant for Part Type: Cross
- Variant for Part Type: Gauge part
- Variant for Part Type: Reducer, concentric
- Variant for Part Type: Reducer, excentric
- Variant for Part Type: Elbow
- Variant for Part Type: Pipe clamp
- Variant for Part Type: Vessels, Pumps, Other Components
- Variant for Part Type: Nozzles
- Variant for Part Type: Other pipe parts
- Variant for Part Type: T-piece
- Variant for Part Type:4-way valve
- Variant for Part Type: Seal
- Variant for Part: Fastener
- Variant for Part: Saddle connection / Elbolet

HiCAD Plant Engineering 73 / 154

Variant for Part Type: Branch (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0
4	Auxiliary point	Branching point of centre line	X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L1	Length of distance between points "!" und "4"	LAENGE1
L2	Length of distance between points "2" und "4"	LAENGE2
L3	Length of distance between points "3" und "4"	LAENGE3

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2"	N2	NENNWEITE2
Nominal diameter, Connection "3"	N3	NENNWEITE3
Angle	W	WINKEL
Additionally (only if the correspond	ding standard uses nominal diameter	s in inches):
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameter (inches), Connection "2"	NI2	N2_INCH
Nominal diameter (inches), Connection "3"	NI3	N3_INCH
The nominal diameters in inches ne	ed to be entered as decimal values as	well (e.g. 1.5 for 1 1/2").
These parameters are to be considered necting sockets they refer to the p	lered for all connection types except ipe to be inserted:	for flange connections. For con-
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2"	D2	D2_AUSSEN
Outer diameter, Connection "3"	D3	D3_AUSSEN
Wall thickness, Connection "!"	S	WANDDICKE
Wall thickness, Connection "2"	S2	WANDDICKE2
Wall thickness, Connection "3"	S3	WANDDICKE3

If required, the attributes LAENGE1, LAENGE2 and LAENGE3 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

HiCAD Plant Engineering 75 / 154

Attribute	Description
BENENNUNG	Part designation
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!)
	An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for Connection "!"
ANSCHLUSSART2	Connection type for Connection "2"
ANSCHLUSSART3	Connection type for Connection "3"
Possible values of the attribute ANS	SCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

0 = No supplement

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

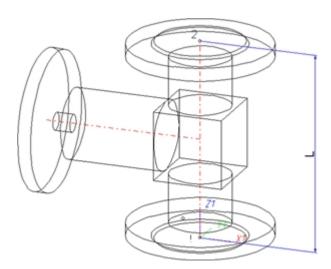
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH , $N2_INCH$ and $N3_I$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH..

Variant for Part Type: Valve (PE)



The centre axis of the actuator should be located in the plane X < 0, Y = 0, Z > 0.

Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between point"!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

HiCAD Plant Engineering 77 / 154

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE
Additionally (only if the correspond	ing standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameters in inches need to	be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be consid necting sockets they refer to the pi	ered for all connection types except f pe to be inserted:	or flange connections. For con-
Outer diameter, Connection "!" and "2"	D	D_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE

If required, the attribute LAENGE need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!" and "2"
Possible values of the attribute ANSCHLUSS	ART (CONNECTION_TYPE):.

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

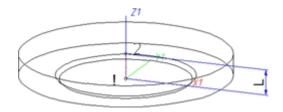
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 79 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Blank Flange (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between points "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA files

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute		
Nominal diameter, Connection "!"	N	NENNWEITE		
Additionally (only if the corresponding standard uses nominal diameters in inches):				
Nominal diameter (inches), Connection "!"	NI	N_INCH		
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").				

If required, the attribute LAENGE need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only

Attribute	Description	
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.	
ANSCHLUSSART	Connection type for connection "!" (always flange connection)	
ANSCHLUSSART2	Connection type for connection "2" (always 0)	

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the
2100x	Flange with groove connection	part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange
2200x	Flange with notch connection	connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART
3100x	Screwed, nipple	(CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
3200x	Screwed, socket	EN 1092-1/11/A/PN 40 is the standard designation
4100x	Plugged, nipple	with which the flange is to be entered into the database.
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

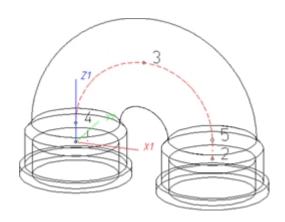
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 81 / 154

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Double Knee (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (X1=0,Y1=0,Z1=0)
2	Connecting point		X2 > 0, $Y2 = 0$, $Z2 = 0$
3	Auxiliary point		X3 = X2/2, Y3 = 0, Z3 > Z4
4	Auxiliary point		X4 = 0, Y4 = 0, Z4 > 0
5	Auxiliary point		X5 = X2, Y5 = 0, Z5 = Z4

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

and that the predefined attribute assignment is entered:				
Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute		
Nominal diameter, Connection "!" and "2"	N	NENNWEITE		
Additionally (only if the correspond	ling standard uses nominal diameters	s in inches):		
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH		
Nominal diameters in inches need to	be entered as decimal values as well	(e.g. 1.5 for 1 1/2").		
These parameters are to be considered for all connection types except for flange connections. For connecting sockets they refer to the pipe to be inserted:				
Outer diameter, Connection "!" and "2"	D	D_AUSSEN		

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Wall thickness, Connection "!" and "2"	S	WANDDICKE

If required, the attributes LAENGE1 and LAENGE2 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!"
ANSCHLUSSART2	Connection type for connection "2"

1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	

The last character (x) provides information about the meaning of the supplement:

0=No supplement

3200x

4100x

4200x

5100x

5200x

Screwed, socket

Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

HiCAD Plant Engineering 83 / 154

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Attribute

Description



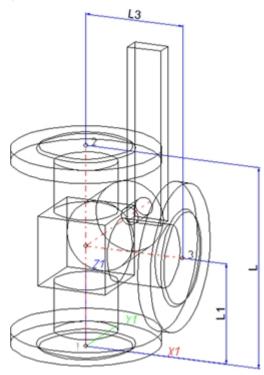
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_ INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

Variant for Part Type: 3-Way Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types					
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection		
a 2	a	a 2	a 2		
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)		

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0

HiCAD Plant Engineering 85 / 154

Variables names

Name	Description	Attribute (optional)
L	Length of distance between points "!" and "2"	LAENGE
L1	Length of distance between point "!" and branching point of centre line	LAENGE1
L3	Distance of point "3" from the line through "!" and "2"	LAENGE3

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.

and that the predefined attribute assignment	Silinoit is critored.	
Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" und "2"	N	NENNWEITE
Nominal diameter, Connection "3"	N3	NENNWEITE3
Additionally (only if the correspon	ding standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameter (inches), Connection "3"	NI3	N3_INCH
Nominal diameters in inches need	to be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be consinecting sockets they refer to the p	dered for all connection types except to be inserted:	for flange connections. For con-
Outer diameter, Connection "!" and "2"	D	D_AUSSEN
Outer diameter, Connection "3"	D3	D3_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE
Wall thickness, Connection "3"	S3	WANDDICKE3

If required, the attributes LAENGE, LAENGE1 and LAENGE3 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for Connection "!", "2" und "3"

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):.

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple
4200x	Plugged, socket
5100x	Socket-welded, nipple

Socket-welded, socket

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN~1092--1/11/A/PN~40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

5200x

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

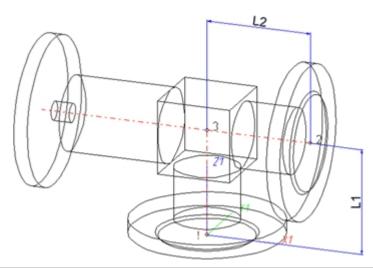
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 87 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Corner Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Corner point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L1	Distance between point "!" and "3"	LAENGE1
L2	Distance between point "3" and "2"	LAENGE2

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2"	N2	NENNWEITE2
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameter (inches), Connection "2"	NI2	N2_INCH
Nominal diameters in inches need t	o be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be considered necting sockets they refer to the p	dered for all connection types except ipe to be inserted:	for flange connections. For con-
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2"	D2	D2_AUSSEN
Wall thickness, Connection "!"	S	WANDDICKE
Wall thickness, Connection "2"	S2	WANDDICKE2

If required, the attributes LAENGE1 and LAENGE2 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description		
BENENNUNG	Designation of the part		
COMPONENT_TYPE	Part type (always = Semi-finished products * Plant Engineering) for HELiOS database only		
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!)		
	An entry is mandatory, even if the part corresponds to no standard.		
ANSCHLUSSART	Connection type for connection "!" and "2"		
Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):.			

HiCAD Plant Engineering 89 / 154

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



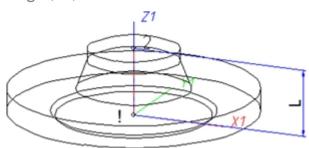
Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Flange (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Designation	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column...

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE

HiCAD Plant Engineering 91 / 154

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Additionally (only if the corresponding standard	uses nominal diameters in inc	nes):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameters in inches need to be entered as	s decimal values as well (e.g. 1.	5 for 1 1/2").
For connecting sockets these parameters refer t	o the pipe to be inserted:	
Outer diameter, Connection "2"	D	D_AUSSEN
Wall thickness, Connection "2"	S	WANDDICKE

If required, the attribute LAENGE needs to be assigned to the length variables (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!" (always flange connection)
ANSCHLUSSART2	Connection type for connection "2"
Possible values of the attribute ANSCHLUSS	ART (CONNECTION_TYPE):.

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the
2100x	Flange with groove connection	connection when being fitted. For example, if the part has a flange connection and the cor- responding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_ TYPE) attribute could look as follows:
2200x	Flange with notch connection	20002 1 5100010 EN 1092-1/11/A/PN 40 EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
2010x	Flange connection of a loose flange	
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket- welded, nipple	
5200x	Socket- welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Loose flanges are assigned to the part type **Flange**. The attribute ANSCHLUSSART (=CONNECTION_TYPE), however, must have the value 20100!



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 93 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Straight Pipe (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	In origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal width, Connection "!" and "2"	N	NENNWEITE
Length (if a cutting to length of the pipe is permissible, the value is arbitrary. The length needs however to be smaller than the supplied length.)	L	LAENGE
Additionally (only if the corresponding standard uses nomin	nal diameters in inches):	
Nominal diameter (inches) , Connection "!" and "2" NI N_INCH		N_INCH
Nominal diameters in inches need to be entered as decimal v	alues as well (e.g. 1.5 for 1	1 1/2").
These parameters are to be considered for all connection to necting sockets they refer to the pipe to be inserted:	ypes except for flange co	nnections. For con-
Outer diameter, Connection "!" and "2"	D	D_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE

If required, the attribute LAENGE needs to be assigned to the length variables (see Variables names above).

HiCAD Plant Engineering 95 / 154

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of the part	
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) <u>for HELiOS database only</u>	
NORMBEZEICHNUNG Standard designation of the part (identical for all sub-types!)		
	An entry is mandatory, even if the part corresponds to no standard.	
BELIEBIG_TEILBAR	Indicates whether the cutting to length of the pipe, is permissible.	
LIEFERLAENGE	Supplied length in m (!)	
ANSCHLUSSART	Connection type for connection "!" and "2"	
ANSCHLUSSART2	If you want both pipe ends to have the same connection type it will suffice to specify a value for the ANSCHLUSSART attribute.	
	If you want the two pipe ends to have different connection types, the connection type for Connection 1 must be specified for the ANSCHLUSSART attribute, and the connection type for Connection 2 for the ANSCHLUSSART2 attribute.	
	If you want to create a new feature variant of a straight pipe with different cornection types, the part must be constructed in such a way that the value of the attribute ANSCHLUSSART is smaller than the value of the attribut ANSCHLUSSART2.	
	Example:	
	Let us assume that you require a pipe that can be butt-welded at one end, and ha a screwed socket at the other end.	
	The connection type for butt-welded connections is 10000, the one for screwe sockets is 32000. This means that Connection 1 (Point designation "!") is require for the welded connection (ANSCHLUSSART = 10000) and Connection 2 (point de ignation "2") is required for the screwed connection (ANSCHLUSSART2 = 32000).	

Attribute	Description	
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 FN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

0=No supplement

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Important:

- When working with the **HELiOS database**, please pay attention to the correct classification matching the part type.
- During variant synchronization the **Nominal diameters in inches** will initially only be taken over into the attribute N_INCH in the form of decimal numbers. The usual character strings for the specification of the nominal diameter in inches (e.g. 1 1/2" instead of 1.5) can be subsequently generated in the HELiOS database for the attribute NPS_INCH. For this purpose the HiCAD macro ANLDB_ZOLLATTRIGEN.MAC in the \HICAD\MAKROANL folder is used.
- Please also read the information about pipe-dependent placing of loose flanges given below!

Pipe-dependent placing of loose flanges

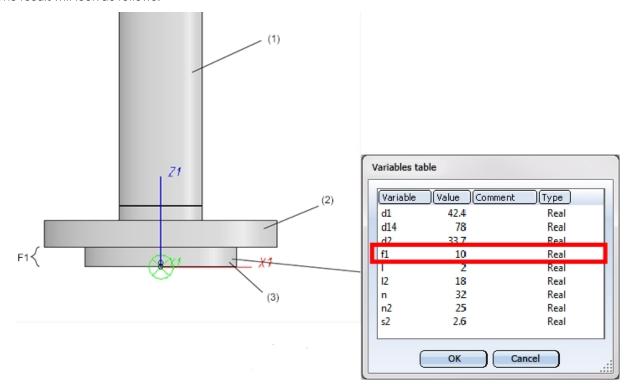
Loose flanges can be placed manually or automatically on the connecting point of straight pipes. In the process, the first connecting point of the loose flange will be placed on the connecting point of the straight pipe. Sometimes, however, it is desirable to move the representation of the loose flange slightly away from the connecting point, e.g. in cases where the straight pipe ends with a flanged edge which is not to be overlapped by the geometry of the loose flange.

HiCAD Plant Engineering 97 / 154

To achieve this, you can define a suitable distance in the feature variables of the straight pipe. This distance must be stored in the Variable F1 for the first connecting point, and in the Variable F2 for the second connecting point.

Even if the end of the pipe is a flanged end, the required connection type will be 10000 (welded connection).

The result will look as follows:

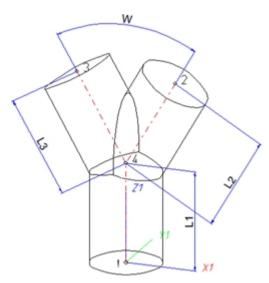


(1) Straight pipe, (2) Loose flange, (3) Collar piece, modelled as straight pipe defining a distance of the loose flange via F1 for the first connecting point.

After insertion of the loose flange, its first connecting point will still be located at the end of the straight pipe, but the part geometry and the second connecting point have been moved away from the connection by the value F1.

During manual placing of loose flanges, please bear in mind that the Guideline mode must be switched off, and that **Connection 1 on target connection** must have been selected during insertion.

Variant for Part Type: Y-Piece (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Connecting point		X < 0, Y = 0, Z > 0
4	Auxiliary point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L1	Distance between point "!" and "4"	LAENGE1
L2	Distance between point "2" and "4"	LAENGE2
L3	Distance between point "3" and "4"	LAENGE3

HiCAD Plant Engineering 99 / 154

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2" and "3"	N2	NENNWEITE2
Angle	W	WINKEL
Additionally (only if the correspond	ling standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameter (inches), Connection "2" and "3"	NI2	N2_INCH
As only decimal values are saved to entered as decimal values as well (e	the VAA file as parameter values, nome.g. 1.5 for 1 1/2").	inal diameters in inches need to be
These parameters are to be considered necting sockets they refer to the parameters are to the parameters are to be considered as a second nection of the parameters are to be considered as a second nection of the parameters are to be considered as a second nection of the parameters are to be considered as a second nection of the parameters are to be considered nection of the parameters are to be con	lered for all connection types except to be inserted:	for flange connections. For con-
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2" und "3"	D2	D2_AUSSEN
Wall diameter, Connection "!"	S	WANDDICKE
Wall diameter, Connection "2" and "3"	S2	WANDDICKE2

If required, the attributes LAENGE1, LAENGE2 and LAENGE3 need to be assigned to the length variables (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!"
ANSCHLUSSART2	Connection type for connection "2" and "3"
Possible values of the attri	bute ANSCHLUSSART (CONNECTION_TYPE):
1000x Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHILISSART (CONNECTION TYPE) attribute for

1000x	Butt-welded	Provide aux
2000x	Flange connection	a connection
2100x	Flange with groove connection	cified in the a flange con
2200x	Flange with notch connection	the ANSCH 20002 1 51
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1 entered into
3100x	Screwed, nipple	
3200x	Screwed, socket	

Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

4100x

4200x

5100x

5200x

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

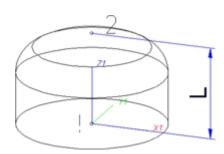
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_{NCH} , $N2_{NCH}$ and $N3_{NCH}$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_{NCH} , NPS_{NCH} und $NPS3_{NCH}$.

HiCAD Plant Engineering 101 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Cap (PE)



Position of connecting points and determination of insertion lengths for various connection types		
Connection for butt welding	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

Variables names

Name	Designation	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Outer diameter, Connection "!"	D	D_AUSSEN

Parameter	Variable	Assigned attribute
All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	(suggestion)	
Wall thickness, Connection "!"	S	WANDDICKE
Additionally (only if the corresponding standard uses nominal diameters in inches):		
Nominal diameter (inches), Connection "!" NI N_INCH		N_INCH
Nominal diameters in inches need to be entered as decimal values as well (e.g. $1.5\mathrm{for}11/2$ ").		

If required, the attribute LAENGE needs to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute		Description	
BENENNUNG		Designation of part	
COMPON	ENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only	
NORMBE	ZEICHNUNG	Standard designation of the part (identical for all sub-types!)	
		An entry is mandatory, even if the part corresponds to no standard.	
ANSCHL	JSSART	Connection type for connection "!"	
Possible v	values of the attribute ANSCH	LUSSART (CONNECTION_TYPE):.	
1000x	Butt-welded	Provide auxiliary part when fitting part	
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-	
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40	
2200x	Flange with notch connection		
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.	
3100x	Screwed, nipple		

3200x Screwed, socket

4100x Plugged, nipple4200x Plugged, socket

5100x Socket-welded, nipple

5200x Socket-welded, socket

The last character (x) provides information about the meaning of the supplement:

HiCAD Plant Engineering 103 / 154

⁰=No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Attribute

Description



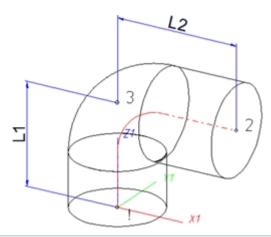
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_ INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

Variant for Part Type: Knee (PE)



Position of connecting poin	Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0
3	Corner point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L1	Distance between point "!" and "3"	LAENGE1
L2	Distance between point "3" and "2"	LAENGE2

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

HiCAD Plant Engineering 105 / 154

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute	
Nominal diameter, Connection "!"	N	NENNWEITE	
Nominal diameter, Connection "2"	N2	NENNWEITE2	
Angles between the distances "3" - > "!" and "3" -> "2"	W	WINKEL	
Additionally (only if the correspondir	ng standard uses nominal diameters	in inches):	
Nominal diameter (inches), Connection "!"	NI	N_INCH	
Nominal diameter (inches), Connection "2"	NI2	N2_INCH	
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").			
These parameters are to be considered for all connection types except for flange connections. For connecting sockets they refer to the pipe to be inserted:			
Outer diameter, Connection "!"	D	D_AUSSEN	
Outer diameter, Connection "2"	D2	D2_AUSSEN	
Wall thickness, Connection "!"	S	WANDDICKE	
Wall thickness, Connection "2"	S2	WANDDICKE2	

If required, the attributes LAENGE1 and LAENGE2 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description			
BENENNUNG	Designation of part			
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only			
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!)			
	An entry is mandatory, even if the part corresponds to no standard.			
ANSCHLUSSART	Connection type for Connection "!"			
ANSCHLUSSART2	Connection type for Connection "2"			
Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):				
1000x Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for			

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple

Screwed, socket

Plugged, nipple

Plugged, socket

Socket-welded, nipple

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN~1092--1/11/A/PN~40 is the standard designation with which the flange is to be entered into the database.

5200x Socket-welded, socket

The last character (x) provides information about the meaning of the supplement:

0=No supplement

3200x

4100x

4200x

5100x

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

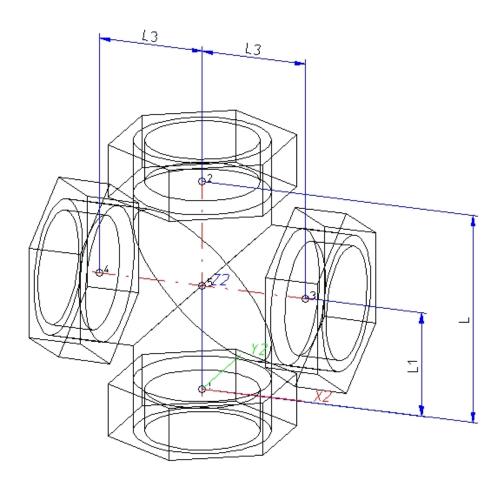


Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_{NCH} , $N2_{NCH}$ and $N3_{NCH}$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_{NCH} , NPS_{NCH} und $NPS3_{NCH}$.

HiCAD Plant Engineering 107 / 154

Variant for Part Type: Cross (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0
4	Connecting point	on branch	$X \le 0, Y = 0, Z > 0$

Variables names

Name	Description	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE
L1	Distance between point "!" and the intersection point of the centre lines	LAENGE1
L3	Distance between point "3" and "4"	LAENGE3

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.:

The that the predefined attribute assignment	5 iiiioiit is critorea	
Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE
Nominal diameter, Connection "3" and "4"	N3	NENNWEITE3
Additionally (only if the correspon	ding standard uses nominal diameter	s in inches):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameter (inches), Connection "3" and "4"	NI3	N3_INCH
Nominal diameters in inches need	to be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be consinecting sockets they refer to the p	dered for all connection types except pipe to be inserted:	for flange connections. For con-
Outer diameter , Connection "!" and "2"	D	D_AUSSEN
Outer diameter, Connection "3" and "4"	D3	D3_AUSSEN
Wall thickness, Connection "!"	S	WANDDICKE

HiCAD Plant Engineering 109 / 154

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
and "2"		
Wall thickness, Connection "3" and "4"	\$3	WANDDICKE3

If required, the attributes LAENGE, LAENGE1 and LAENGE3 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for Connection "!", "2", "3" and "4"

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

 $\hbox{EN 1092-1/11/A/PN 40}$ is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

0=No supplement

4200x

5100x

5200x

 $\mathbf{2}$ = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_{INCH} , $N2_{INCH}$ and $N3_{INCH}$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 111 / 154

Variant for Part Type: Gauge part (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Auxiliary point or Connecting point		X > 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches).
Additionally (only if the correspond	This standard uses nonlinar diameters	
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").		
These parameters are to be considered necting sockets they refer to the p	dered for all connection types except to be inserted:	for flange connections. For con-
Outer diameter , Connection "!" and "2"	D	D_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE

If required, the attribute LAENGE needs to be assigned to the length variables. (see Variables names above).

HiCAD Plant Engineering 113 / 154

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of part	
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only	
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.	
ANSCHLUSSART	Connection type for Connection "!"	
ANSCHLUSSART2	Connection type for Connection "2" (="0", if only one connection exists)	

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN~1092--1/11/A/PN~40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

0=No supplement

4200x

5100x

5200x

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

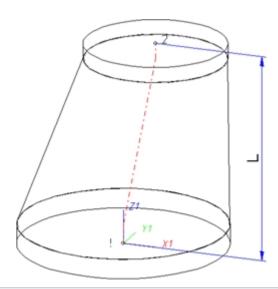


Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 115 / 154

Variant for Part Type: Reducer, Excentric (PE)



Position of connecting poin	Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance of the connecting surfaces from "!" to "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column..

VAA file:

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2"	N2	NENNWEITE2
Additionally (only if the correspond	ling standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameter (inches), Con- nection "2"	NI2	N2_INCH
Nominal diameters in inches need to	be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be considered necting sockets they refer to the pi	ered for all connection types except to be inserted:	for flange connections. For con-
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2"	D2	D2_AUSSEN
Wall thickness, Connection "!"	S	WANDDICKE
Wall thickness, Connection "2"	S2	WANDDICKE2

If required, the attributes LAENGE needs to be assigned to the length variables. (see Variables names above)

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!"
ANSCHLUSSART2	Connection type for connection "2"
Possible values of the attribute ANSCHLUSS	SART (CONNECTION_TYPE):

HiCAD Plant Engineering 117 / 154

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for
2000x	Flange connection	a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



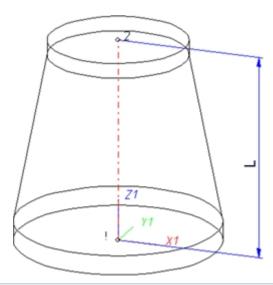
Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Reducer, Concentric (PE)



Position of connecting poin	Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file:

Use the Variant Editor to enter the suitable part type into the VAA file.

HiCAD Plant Engineering 119 / 154

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2"	N2	NENNWEITE2
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!"	NI	N_INCH
Nominal diameter (inches), Connection "2"	NI2	N2_INCH
Nominal diameters in inches need t	o be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be considered necting sockets they refer to the p	dered for all connection types except in the connection type in the	for flange connections. For con-
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2"	D2	D2_AUSSEN
Wall thickness, Connection "!"	S	WANDDICKE
Wall thickness, Connection "2"	S2	WANDDICKE2

If required, the attributes LAENGE needs to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!"
ANSCHLUSSART2 Possible values of the attribute ANSCHLUSS	Connection type for connection "2" ART (CONNECTION_TYPE):

ttribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for
2000x	Flange connection	a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

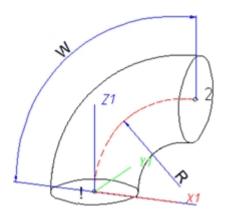
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 121 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Elbow (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X > 0, Y = 0, Z > 0

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute	
Nominal diameter, Connection "!" and "2"	N	NENNWEITE	
Angle	W	WINKEL	
Bend radius	R	KRUEMMUNG	
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):	
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH	
Nominal diameters in inches need t	o be entered as decimal values as well	(e.g. 1.5 for 1 1/2").	
These parameters are to be considered necting sockets they refer to the p	dered for all connection types except fipe to be inserted:	or flange connections. For con-	
Outer diameter, Connection"!" and "2"	D	D_AUSSEN	
Wall thickness, Connection "!" and "2"	S	WANDDICKE	

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
BELIEBIG_TEILBAR	Indicates whether a cutting to length of the elbow is permissible.
ANSCHLUSSART	Connection type for connections "!" and "2" The connection types on both ends must be identical.
Possible values of the attribute ANSCHLUSS	ART (CONNECTION_TYPE):

HiCAD Plant Engineering 123 / 154

Attribute		Description
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



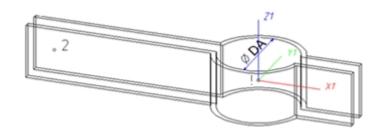
Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Pipe Clamp (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Fitting point	Reference point placed on the centre line of a pipe during fitting	in origin (0,0,0)
2	Auxiliary point		X < 0, Y = 0, Z = 0

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes shown below, and that the predefined attribute assignment is entered.

Possibility 1:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
These parameters apply to pipes which	ch fit into the clamps	
Nominal diameter	N	NENNWEITE
Outer diameter	DA	D_AUSSEN
Additionally (only if the corresponding	g standard uses nominal diamet	ers in inches):
Nominal diameter (inches)	NI	N_INCH
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").		

Possibility 2:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
These parameters apply to pipes which fit into the clamps		
Outer diameter of pipe that is still suitable for pipe clamp	DA	D_AUSSEN

HiCAD Plant Engineering 125 / 154

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Outer diameter 2 Smallest possible outer diameter of pipe that is still suitable for pipe clamp	D2	D2_AUSSEN
Nominal diameter	N	NENNWEITE
Additionally (only if the corresponding standard uses nor	inal diameters in inches):	
Nominal diameter (inches)	NI	N_INCH
Nominal diameters in inches need to be entered as decimal values as well (e.g. $1.5\mathrm{for}11/2$ ").		

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG (DESIGNATION)	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) <u>for</u> <u>HELiOS database only</u>
NORMBEZEICHNUNG (STANDARD_ DESIGNATION	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.

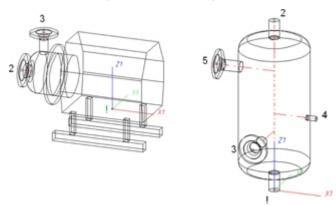


Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

For the insertion of a pipe clamp having these two outer diameter attributes the Also use Outer diameter 2 as search criterion for pipe clamps checkbox on the Part search tab of the Plant Engineering Settings dialogue must be active.

Variant for Part Type: Vessels, Pumps, Other Components (PE)



Named isolated points

Designation	Purpose	Description	Position in coordinate system
!	Connecting point or auxiliary point	Fitting point	in origin (0,0,0)
2, 3, 4 etc., unambiguous within the part	Connecting points or auxiliary points		arbitrary

Connecting points should preferably be created via the Component connection function, or (for various components) by the insertion of nozzles.

Each component connection (and the fitting point, if it is an auxiliary point) needs to be located in a plane belonging to the part. It needs however not be located within the surface boundary.

Example:



If the connecting point is located in the plane of the ring surface, the surface condition is fulfilled.

Caution: It would also be fulfilled if the point would be located in the same plane, but outside of the ring.

To assign an unambiguous orientation to a connection, a connecting point must not fulfil the surface condition for several surfaces at once.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that appropriate attributes such as HOEHE (HEIGHT), BREITE (WIDTH), LAENGE (LENGTH) etc.are assigned to the individual variables, enabling a distinguishing between various sub-types during part selection.

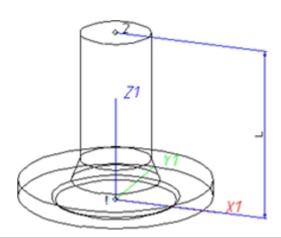
For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

HiCAD Plant Engineering 127 / 154

Values must be entered for at least the following attributes:

AttributE	Description
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material+Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!)
	An entry is mandatory, even if the part corresponds to no standard.

Variant for Part Type: Nozzle (PE)



Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Length of distance between points "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

HiCAD Plant Engineering 129 / 154

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE
Nominal diameter, Connection "3" and "4"	N3	NENNWEITE3
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameter (inches), Connection "3" and "4"	NI3	N3_INCH
Nominal diameters in inches need t	o be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
These parameters are to be considered necting sockets they refer to the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to be considered as a second of the parameters are to the parameters are to be considered as a second of the parameters are	lered for all connection types except find to be inserted:	or flange connections. For con-
Outer diameter, Connection "!" and "2"	D	D_AUSSEN
Outer diameter, Connection "3" and "4"	D3	D3_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE
Wall thickness, Connection "3" and "4"	S3	WANDDICKE3

If required, the attribute LAENGE need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!"
ANSCHLUSSART2	Connection type for connection "2" (value always 10000)
Possible values of the attribute ANS	SCHLUSSART (CONNECTION TYPE):.

i ussibie vi	alues of the attribute ANSON	LOSSANT (CONNECTION_TITLE)
1000x	Butt-welded	Provide auxiliary part when fitting part
2000x	Flange connection	If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard spe-
2100x	Flange with groove connection	cified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of
2200x	Flange with notch connection	the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows: 20002 1 5100010 EN 1092-1/11/A/PN 40
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 40 is the standard designation with which the flange is to be entered into the database.
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	
5200x	Socket-welded, socket	

The last character (x) provides information about the meaning of the supplement:

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_ INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 131 / 154

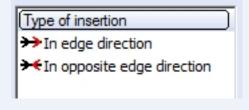
⁰=No supplement

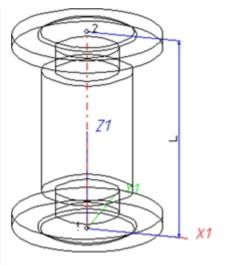
^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: Other Pipe Parts (PE)

Up to 4 connections are possible for this part type.

The connections "!" and "2" need to be located on the Z-axis. The position of further connections is arbitrary. However, connections "3" and "4" cannot process guidelines during part insertion. The creation of guidelines starting from connections "3" and "4" can only be performed subsequently. Therefore, you will only have the following fitting options:





Example: Compensator with flanges

Position of connecting points and determination of insertion lengths for various connection types			
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection
a 2	a	a 2	a 2
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	optional	arbitrary
4	Fiting point	optional	arbitrary

Variables names

Name	Description	Attribut (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered.

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute	
Nominal diameter, Connection "!" and "2"	N	NENNWEITE	
Additionally (only if the correspond	ing standard uses nominal diameters	s in inches):	
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH	
Nominal diameters in inches need to	be entered as decimal values as well	(e.g. 1.5 for 1 1/2").	
These parameters are to be consid necting sockets they refer to the pi	ered for all connection types except f	or flange connections. For con-	
Outer diameter, Connection "!" and "2"	D	D_AUSSEN	
Wall thickness, Connection "!" and "2"	S	WANDDICKE	

If required, the attributes LAENGE needs to be assigned to the length variables. (see Variables names above).

HiCAD Plant Engineering 133 / 154

As mentioned above, the part may have up to 4 connections. If a connection "4" exists, it needs to have the same properties (Nominal diameter, Outer diameter, Wall thickness, Connection type) as connection "3". For three connections, various properties can be preset:

Parameter	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!"	N	NENNWEITE
Nominal diameter, Connection "2"	N2	NENNWEITE2
Nominal diameter, Connection "3" [and "4"]	N3	NENNWEITE3
Nominal diameter (inches) , Connection "!"	NI	N_INCH
Nominal diameter (inches), Connection "2"	NI2	N2_INCH
Nominal diameter (inches), Connection "3" [and "4"]	NI3	N3_INCH
Outer diameter, Connection "!"	D	D_AUSSEN
Outer diameter, Connection "2"	D2	D2_AUSSEN
Outer diameter, Connection "3" [and "4"]	D3	D3_AUSSEN
Wall thickness, Connection"!"	S	WANDDICKE
Wall thickness, Connection "2"	S2	WANDDICKE2
Wall thickness, Connection "3" [and "4"]	S3	WANDDICKE3

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Part type designation
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for all connections
ANSCHLUSSART2	Connection type for connection "2", if different from that for connection "1"
ANSCHLUSSART3	Connection type for connection "3" [and "4"], if different from

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded	Provide auxiliary part wh
2000x	Flange connection	If appropriately preset in a connection, the part w
2100x	Flange with groove connection	cified in the attribute for a flange connection and
2200x	Flange with notch connection	the ANSCHLUSSART (0 20002 1 5100010 EN 1
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.	EN 1092-1/11/A/PN 4 entered into the databas
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, socket	
5100x	Socket-welded, nipple	

hen fitting part

in the ANSCHLUSSART (CONNECTION_TYPE) attribute for will provide and connect an auxiliary part of the standard sper the connection when being fitted. For example, if the part has d the corresponding counter-flange is required, the content of (CONNECTION_TYPE) attribute could look as follows:

1092-1/11/A/PN 40

40 is the standard designation with which the flange is to be ise.

The last character (x) provides information about the meaning of the supplement:

Socket-welded, socket

0=No supplement

5200x

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

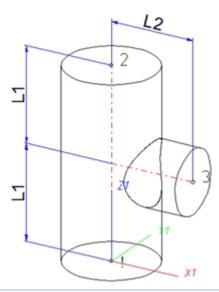
Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

HiCAD Plant Engineering 135 / 154 During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

Variant for Part Type: T-Piece (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt welding	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L1	Half the length of the distance between points "!" and "2"	LAENGE1
L2	Distance of point "3" from straight line through "!" and "2"	LAENGE3

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

HiCAD Plant Engineering 137 / 154

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute
Nominal diameter, Connection "!" and "2"	N	NENNWEITE
Nominal diameter, Connection "3"	N3	NENNWEITE3
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH
Nominal diameter (inches), Connection "3"	NI3	N3_INCH
Nominal diameters in inches need t	o be entered as decimal values as well	(e.g. 1.5 for 1 1/2").
necting sockets they refer to the p		-
Outer diameter, Connection"!" and "2"	D	D_AUSSEN
Outer diameter, Connection "3"	D3	D3_AUSSEN
Wall thickness, Connection "!" and "2"	S	WANDDICKE
Wall thickness, Connection "3"	S3	WANDDICKE3

If required, the attributes LAENGE1 and LAENGE3 need to be assigned to the length variables. (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description	
BENENNUNG	Designation of the part	
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only	
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!)	
	An entry is mandatory, even if the part corresponds to no standard.	
ANSCHLUSSART	Connection type for connections "!" and "2"	
ANSCHLUSSART3	Connection type for connection "3"	
Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):		
1000x Butt-welded Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for		

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple

Screwed, socket

Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

EN~1092--1/11/A/PN~40 is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

3200x

4100x

4200x

5100x

5200x

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Handling of nominal diameters in inches in the HELiOS database:

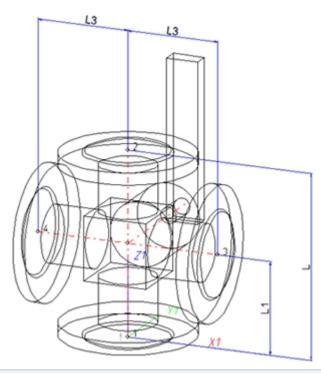
During part data synchronization, nominal diameters in inches will be taken over to the attributes N_{NCH} , $N2_{NCH}$ and $N3_{NCH}$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_{NCH} , NPS_{NCH} und $NPS3_{NCH}$.

HiCAD Plant Engineering 139 / 154

⁰⁼No supplement

^{2 =} The supplement consists of connection number, part type, ID, and standard of the part to be connected

Variant for Part Type: 4-Way Valve (PE)



Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0
3	Connecting point	on branch	X > 0, Y = 0, Z > 0
4	Connecting point	on branch	X < 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Length of distance between points "!" and "2"	LAENGE
L1	Length of distance between points "!" and the intersection point of centre lines	LAENGE1
L3	Half the length of the distance between points "3" und "4"	LAENGE3

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

nd that the predefined attribute assig	illitetit is efficied.			
Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute		
Nominal diameter, Connection "!" and "2"	N	NENNWEITE		
Nominal diameter, Connection "3" and "4"	N3	NENNWEITE3		
Additionally (only if the correspond	ding standard uses nominal diameters	s in inches):		
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH		
Nominal diameter (inches), Connection "3" and "4"	NI3	N3_INCH		
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").				
These parameters are to be considered necting sockets they refer to the p	dered for all connection types except fipe to be inserted:	or flange connections. For con-		
Outer diameter, Connection "!" and "2"	D	D_AUSSEN		
Outer diameter, Connection "3" and "4"	D3	D3_AUSSEN		
Wall thickness, Connection "!" and "2"	S	WANDDICKE		
Wall thickness, Connection "3" and "4"	\$3	WANDDICKE3		

If required, the attributes LAENGE, LAENGE1 and LAENGE3 need to be assigned to the length variables (see Variables names above).

HiCAD Plant Engineering 141 / 154

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description
BENENNUNG	Designation of part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART (CONNECTION_TYPE)	Connection type for Connection "!", "2", "3" and "4"

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):.

1000x	Butt-welded
2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a sub-part and has no own article master attached to this connection.
3100x	Screwed, nipple
3200x	Screwed, socket
4100x	Plugged, nipple

Plugged, socket

Socket-welded, nipple

Socket-welded, socket

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

 $EN\ 1092\text{--}1/11\text{/A/PN}\ 40$ is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

4200x

5100x 5200x

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



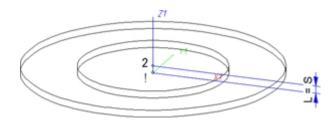
Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_INCH, N2_INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

⁰⁼No supplement

 $^{{\}bf 2} = {\sf The \ supplement \ consists \ of \ connection \ number, \ part \ type, \ ID, \ and \ standard \ of \ the \ part \ to \ be \ connected}$

Variant for Part Type: Seal (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Description	Attribute (optional)
L	Distance between point "!" and "2"	LAENGE

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute		
Nominal diameter, Connection "!" and "2"	N	NENNWEITE		
Seal thickness (values same as for Variable L)	S	DICKE		
Additionally (only if the corresponding standard uses nominal diameters in inches):				
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH		
Nominal diameters in inches need to be entered as decimal values as well (e.g. 1.5 for 1 1/2").				

If required, the attribute LAENGE (LENGTH) needs to be assigned to the length variables (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

HiCAD Plant Engineering 143 / 154

Attribute	Designation
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) for HELiOS database only
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry is mandatory, even if the part corresponds to no standard.
ANSCHLUSSART	Connection type for connection "!" and "2" (Value= 20000 for Flange connection)

Possible values of the attribute ANSCHLUSSART (CONNECTION TYPE):

2000x	Flange connection
2100x	Flange with groove connection
2200x	Flange with notch connection
2050x	Flange connection of a seal that is exclusively intended for the pushed in end of a push-in pipe. The effect of this value is that a loose flange, together with the push-in pipe, will be connected to the seal. The pushed in of the push-in pipe must have the connection type $10xxx$. Flange connection.

Provide auxiliary part when fitting part

If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of the ANSCHLUSSART (CONNECTION_TYPE) attribute could look as follows:

20002 1 5100010 EN 1092-1/11/A/PN 40

 ${\bf EN~1092\text{-}1/11/A/PN~40}$ is the standard designation with which the flange is to be entered into the database.

The last character (x) provides information about the meaning of the supplement:

0 = No supplement

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.

Pressure ranges

In previous versions the nominal pressure was of no significance for the search of matching sealing gaskets. To take pressures ranges into account, the attribute **DRUCK_MIN** (Minimum pressure) is now available.

When you now search a sealing gasket for a flange, the following, additional search condition will be generated from the nominal pressure **PN** of the flange:

(MIN_DRUCK ist unbelegt oder MIN_DRUCK <= PN) und (DRUCK ist unbelegt oder DRUCK >= PN) (Minimum pressure not specified or Minimum pressure <=PN) and (Minimum pressure not specified or Minimum pressure >=PN)

Sealing gaskets without pressure specifications will thus be handled as if they were suitable for any nominal pressure.

The standard parts that are by default supplied with HiCAD do not include sealing gaskets with a defined pressure range. Therefore, this new feature is currently only relevant for gaskets that have been created by the user. Accordingly, the attribute DRUCK_MIN (Min. pressure) will not be available in the search masks that are by default supplied with HELiOS. If desired, you can add this attribute with the HELiOS Mask Editor.

If you prepare the database for Plant Engineering by clicking the corresponding button in DBPlantDataImport.exe, the attribute **DRUCK_MIN** will be entered, with the designation **Minimum pressure**, into the database.

An example from practice:

If you do not want gaskets with an own article number for each pressure level to be created, you can avoid this by means of the **DRUCK_MIN** attribute.

Furthermore, you have now the option to narrow search results for sealing gaskets by specifying a value for the attribute **DRUCK** (Pressure), e.g. by including only gaskets with a defined pressure in your pipe class.

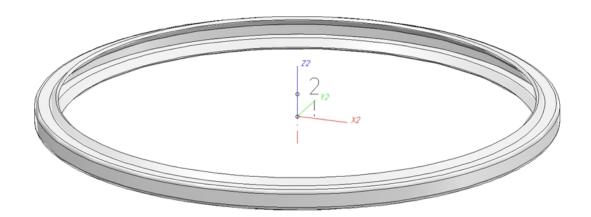


Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N_{INCH} , $N2_{INCH}$ and $N3_{INCH}$. The usual character strings for indication of the diameter in inches (e.g. $1\ 1/2$ " instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 145 / 154

Variant for Part Type: Fastener (PE)



Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	In origin (0,0,0)
2	Auxiliary point		X = 0, Y = 0, Z > 0

The part has no insertion length. When the part is inserted, it will be placed with its fitting point onto a connection of the target part. Connecting point 2 will only be used for a correct alignment.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter	Variable	Assigned attribute
All dimensions must be specified in millimetre Exception: Nominal diameters in inches	es; (suggestion)	
Nominal diameter for which the fastener is intended	N	NENNWEITE
Additionally (only if the corresponding standard uses n	ominal diameters in ir	nches):
Nominal diameter in inches (as decimal number) for which the fastener is intended	h NI	N_INCH
Nominal diameter in inches needs to be entered as a dec	imal number as well (e	.g. 1.5 for 1 1/2").
These additional values make sense if the above attribu	utes should not be suf	ficient as search criteria:
Outer diameter for which the fastener is intended	D	D_AUSSEN
Wall thickness for which the fasteners is intended	S	WANDDICKE

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Designation
BENENNUNG	Designation of the part
COMPONENT_TYPE	Part type (always= Semi-finished product+Plant Engineering) only if HELiOS database is used
NORMBEZEICHNUNG	Standard designation of the part (identical for all sub-types!) An entry will even be required if the part corresponds to no standard.
ANSCHLUSSART	Connection type for which the fastener is intended

Possible values of the attribute ANSCHLUSSART (CONNECTION_TYPE):

1000x	Butt-welded	Please no
2000x	Flange connection	The optic
2100x	Flange with groove connection	the part (able here
2200x	Flange with notch connection	
2040x	Flange connection of a part that is not a flange itself. The part has a loose flange that is modelled as a subpart and has no own article master attached to this connection.	
3100x	Screwed, nipple	
3200x	Screwed, socket	
4100x	Plugged, nipple	
4200x	Plugged, sleeve	
5100x	Sleeve-welded, nipple	

ion to specify, via the attribute ANSCHLUSSART, a ed part that will automatically be inserted together with (if the corresponding option has been set) is not avail-

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



5200x

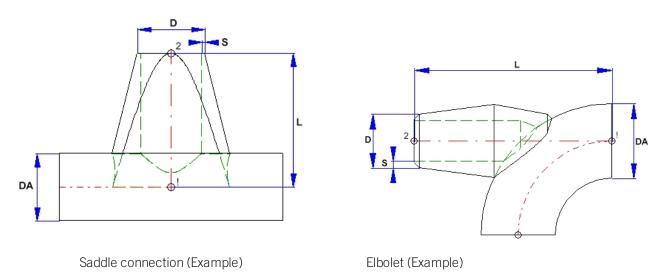
Sleeve-welded, sleeve

Handling of nominal diameters in inches in the HELiOS database:

During part data synchronization, nominal diameters in inches will be taken over to the attributes N INCH, N2 INCH and N3_. The usual character strings for indication of the diameter in inches (e.g. 1 1/2" instead of 1.5) will be auto-generated in the database for the attributes NPS_INCH, NPS2_INCH und NPS3_INCH.

HiCAD Plant Engineering 147 / 154

Variant fpr Part Type: Saddle Connection / Elbolet (PE)



D=Outer diameter of the nozzle, DA=Outer diameter of the part to which the connection is made, L=Length, S=Wall thickness

Please note that the variable DA (Outer diameter) will be modified upon insertion. It will be applied to the outer diameter of the pipe to which the connection is made. This allows the calculation of the part geometry to match the respective fitting situation. Please check whether the geometry of the constructed saddle connection correctly adjust itself to a modified DA value.

Position of connecting points and determination of insertion lengths for various connection types				
Connection for butt weld- ing	Flange connection	Connecting nipple for screwed, plugged or socket-welded connection	Connecting socket for screwed, plugged or socket-welded connection	
a 2	a	a 2	a 2	
a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	a = Insertion length dimension (e.g. L, L1 etc.)	

Named isolated points

Designation	Purpose	Comment	Position in coordinate system
!	Connecting point	Fitting point	in origin (0,0,0)
2	Connecting point		X = 0, Y = 0, Z > 0

Variables names

Name	Designation	Attribute (optional)	
L	Distance between point "!" and "2"	LAENGE	

If the variables names given in the **Name** column are used, you do not need to assign any attributes to them via the Variant Editor. If different variables are required, you need to assign the attributes given in the **Attribute** column.

VAA file

Use the Variant Editor to enter the suitable part type into the VAA file.

Then, use the Variant Editor to expand the VAA file in such a way that it contains values for the sizes specified here, and that the predefined attribute assignment is entered:

Parameter All dimensions must be specified in millimetres; Exception: Nominal diameters in inches	Variable (suggestion)	Assigned attribute	
Nominal diameter, Connection "!"and "2"	N	NENNWEITE	
Length	L	LAENGE	
Additionally (only if the corresponding standard uses	nominal diameters in inche	s):	
Nominal diameter (inches), Connection "!" and "2"	NI	N_INCH	
As only decimal values are saved to the VAA file as pare entered as decimal values as well (e.g. 1.5 for 1 1/2").	ameter values, nominal diame	eters in inches need to be	
entered as decimal values as well (e.g. 1.5 for 1 1/2"). These parameters are to be considered for all conne			
entered as decimal values as well (e.g. 1.5 for 1 1/2"). These parameters are to be considered for all connencting sockets they refer to the pipe to be inserted: Outer diameter of the part to which the connection is made. This allows a suitable adjustment of the	ction types except for flange	connections. For con-	

If required, the attribute LAENGE needs to be assigned to the length variables (see Variables names above).

For variant synchronization you also need to enter the values for the attributes which are to apply to all sub-types of the variant.

Values must be entered for at least the following attributes:

Attribute	Description		
BENENNUNG	Designation of part		
COMPONENT_TYPE	Part type (always = Semi-finished material + Plant Engineering) <u>for HELiOS database only</u>		
NORMBEZEICHNUNG	Standard designation of the part. An entry is mandatory, even if the part corresponds to no standard.		
ANSCHLUSSART	Connection type for Connection "!"(and "2") If the same connection type is required at both part ends it will suffice to assign a		

HiCAD Plant Engineering 149 / 154

Attribute		Description	1			
ANSCHLUSSART2		value to the attribute ANSCHLUSSART.				
		If different connection types are required at the part ends you need to assign the value of the connection type for Connection 1 to the attribute ANSCHLUSSART, and the connection type for Connection 2 to the attribute ANSCHLUSSART2.				
Possible values of the attributes ANSCHLUSSART (CONNECTION_TYPE) and ANSCHLUSSART2 (CONNECTION_TYPE2):						
1000x	Butt-welded		Provide auxiliary part when fitting part If appropriately preset in the ANSCHLUSSART (CONNECTION_TYPE) attribute for a connection, the part will provide and connect an auxiliary part of the standard specified in the attribute for the connection when being fitted. For example, if the part has a flange connection and the corresponding counter-flange is required, the content of			
2000x	Flange connection					
2100x	Flange with groove	connection				
2200x	Flange with notch of	connection	entered into the database.			
2040x	Flange connection is not a flange itself a loose flange that i a sub-part and ha icle master attache nection	. The part has s modelled as s no own art-				
3100x	Screwed, nipple					
3200x	Screwed, socket					
4100x	Plugged, nipple					
4200x	Plugged, socket					
5100x	100x Socket-welded, nipple					
5200x The last chara	5200x Socket-welded, socket The last character (x) provides information about the meaning of the supplement:					

The last character (x) provides information about the meaning of the supplement:

2 = The supplement consists of connection number, part type, ID, and standard of the part to be connected

The prefixed connection number indicates the connection with which the auxiliary part is to be attached to the current connection.

Please also read the information given in the paragraphs Connection type ID with priority information and Connection type ID - List of part standards.



Important:

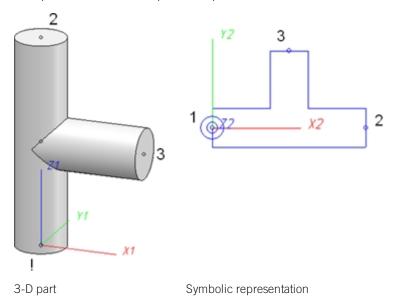
- When working with the HELiOS database, please pay attention to the correct classification matching the part type.
- During variant synchronization the **Nominal diameters in inches** will initially only be taken over into the attribute N_INCH in the form of decimal numbers. The usual character strings for the specification of the nominal diameter in inches (e.g. 1 1/2" instead of 1.5) can be subsequently generated in the HELiOS database for the attribute NPS_INCH. For this purpose the HiCAD macro ANLDB_ZOLLATTRIGEN.MAC in the \HICAD\MAKROANL folder is used.

⁰=No supplement

Rules for the Creation of Symbolic Representations (PE)

Symbolic representations are required for parts or part variants that are used for pipelines of which you want to generate isometries. You use the **Symbol Editor** to draw such symbolic representations.

Below please find the example of a T-piece:



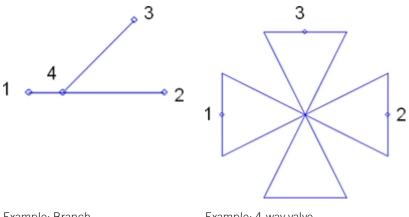
1. Position in the coordinate system

The symbolic representation is drawn in the **Symbol Editor** as a 2-D part in the XY-plane. The Z-axis in the 3-D part corresponds to the X-axis in the symbolic 2-D representation. The 3-D X-axis corresponds to the 2-D Y-axis.

2. Named isolated points:

The symbolic representation needs to contain (just as the 3-D part) named isolated points indicating the positions of connections or auxiliary points. The point "1" in the symbolic representation is located in the origin of the coordinate system and corresponds to the point "!" in the 3-D part. Points "2" and "3" correspond to the same-named points in the 3-D part.

There are only two parts that require a point "4" in their symbolic representations, namely Branch and Y-piece (the 4-way valve contains no point "4").



Example: Branch Example: 4-way valve

HiCAD Plant Engineering 151 / 154

Rechtliche Hinweise:

© 2018 ISD ® Software und Systeme GmbH alle Rechte vorbehalten

Dieses Handbuch sowie die darin beschriebene Software werden unter Lizenz zur Verfügung gestellt und dürfen nur in Überein-stimmung mit den Lizenzbedingungen verwendet oder kopiert werden. Der Inhalt dieses Handbuches dient ausschließlich zur Information, kann ohne Vorankündigung verändert werden und ist nicht als Verpflichtung von ISD Software und Systeme GmbH anzusehen. Die ISD Software und Systeme GmbH gibt keine Gewähr oder Garantie hinsichtlich der Richtigkeit oder Genauigkeit der Angaben in dieser Dokumentation. Kein Teil dieser Dokumentation darf, außer durch das Lizenzabkommen ausdrücklich erlaubt, ohne vorherige, schriftliche Genehmigung von ISD Software und Systeme GmbH reproduziert, in Datenbanken gespei-chert oder in irgendeiner Form übertragen werden.

Alle erwähnten Produkte sind Warenzeichen oder eingetragene Warenzeichen ihrer jeweiligen Hersteller.

Legal notes

 $\hbox{@ 2018 ISD } \hbox{@ Software und Systeme GmbH. All rights reserved.}$

This User Guide and the software described herein are provided in conjunction with a license and may only be used or copied in accordance with the terms of the license. The contents of this User Guide solely serve the purpose of information; it may be modified without prior notice and may not be regarded as binding for the ISD Software und Systeme GmbH. The ISD Software und Systeme GmbH does not assume any responsibility for the correctness or accuracy of the information provided in this document. No part of this document may be reproduced, saved to databases or transferred in any other form without prior written permission by the ISD Software und Systeme GmbH, unless expressly allowed by virtue of the license agreement.

All mentioned products are trademarks or registered trademarks of their respective manufacturers and producers.

HiCAD Plant Engineering 153 / 154





ISD Software und Systeme GmbH

Hauert 4 44227 Dortmund Germany Tel. +49 (0)231 9793-0 Fax +49 (0)231 9793-101 info@isdgroup.de

ISD Berlin

Paradiesstraße 208a 12526 Berlin Germany Tel. +49 (0)30 634178-0 Fax +49 (0)30 634178-10 berlin@isdgroup.de

ISD Hamburg

Strawinskystraße 2 25337 Elmshorn Germany Tel. +49 (0)4121 740980 Fax +49 (0)4121 4613261 hamburg@isdgroup.de

ISD Hannover

Hamburger Allee 24 30161 Hanover Germany Tel. +49 (0)511 616803-40 Fax +49 (0)511 616803-41 hannover@isdgroup.de

ISD Nürnberg Nordostpark 7

90411 Nuremberg Germany Tel. +49 (0)911 95173-0 Fax +49 (0)911 95173-10 nuernberg@isdgroup.de

ISD Ulm

Wilhelmstraße 25 89073 Ulm Germany Tel. +49 (0)731 96855-0 Fax +49 (0)731 96855-10 ulm@isdgroup.de

ISD Austria GmbH

Hafenstraße 47-51 4020 Linz Austria Tel. +43 (0)732 21 04 22-0 Fax +43 (0)732 21 04 22-29 info@isdgroup.at

ISD Benelux b.v.

Het Zuiderkruis 33 5215 MV 's-Hertogenbosch The Netherlands Tel. +31 (0)73 6153-888 Fax +31 (0)73 6153-899 info@isdgroup.nl

ISD Benelux b.v.

Grote Voort 293A 8041 BL Zwolle The Netherlands Tel. +31 (0)73 6153-888 Fax +31 (0)73 6153-899 info@isdgroup.nl

ISD Schweiz AG

Rosenweg 2 4500 Solothurn Switzerland Tel. +41 (0)32 624 13-40 Fax +41 (0)32 624 13-42 info@isdgroup.ch

www.isdgroup.com