

Custom properties

Version 1.0

Version history:

Version	Author	Date	Description
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Preface

This document is related to BEC project's quantity lists created using Tekla Structures Organizer tool.

Certain information cannot be directly asked from Tekla Structures, but it is possible to program Custom property plug-ins (compiled into dll files) that can be added to Tekla Structures folder structure.

This document contains descriptions of the implemented Custom properties and their pre conditions and limitations.

The custom property dll files were published like presented in the document for the first time in version Tekla Structures 21.0 Service Release 7.

1 BeamCustomProperties.dll

1.1 CUSTOM.WEB_THICKNESS

Modeling requirements

Cast unit prefix must begin with

- K (normally reinforced concrete beam)
- JK (prestressed, pretensioned concrete beam)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: Web thickness
- Text: empty string

Supported profiles

- RCL, RCDL, RCXX, RCDX, RCX
- JKMP (Parma middle beam), JKSIDE (Parma edge beam)
- PRMB (Luja middle beam), LBL (Luja edge beam)
- BMK (Betonimestarit middle beam), BMR (Betonimestarit edge beam)

1.2 CUSTOM.RIB_WIDTH

Modeling requirements

Cast unit prefix must begin with

- TT (Traditional TT-slab)
- TEK (Parma's light weight TT-slab)
- SUPERTT (Luja's light weight TT-slab)
- RIB (Shallow rib slab)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: Rib width
- Text: empty string

Supported profiles

See modelling requirements

1.3 CUSTOM.BOTTOM_FLANGE_THICKNESS_1

Modeling requirements

Cast unit prefix must begin with

- K (normally reinforced concrete beam)
- JK (prestressed, pretensioned concrete beam)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: Flange thickness 1
- Text: empty string

Supported profiles

- RCL, RCDL, RCXX, RCDX, RCX
- JKMP (Parma middle beam), JKSIDE (Parma edge beam)
- PRMB (Luja middle beam), LBL (Luja edge beam)
- BMK (Betonimestarit middle beam), BMR (Betonimestarit edge beam)

1.4 CUSTOM.BOTTOM_FLANGE_THICKNESS_2

Modeling requirements

Cast unit prefix must begin with

- K (normally reinforced concrete beam)
- JK (prestressed, pretensioned concrete beam)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: Flange thickness 2
- Text: empty string

Supported profiles

- RCDL, RCXX, RCDX, RCX
- JKMP (Parma middle beam)
- PRMB (Luja middle beam)
- BMK (Betonimestarit middle beam)

2 ElementCustomProperties.dll

2.1 CUSTOM.ELEMENT_POS

Modeling requirements

No special requirements

Usage

- Organizer quantity lists
- Model view part label (shows value only for main part)

Row and value type

Works for PART and CAST_UNIT template rows

- PART rows: return value only for cast unit main part

Return value:

- Number: 0
- Number with decimals: 0.0
- Text:
 - o Value is formed by Finland environment's project UDA
P_ELEMENT_POS_TYPE
 - [01 CAST_UNIT_POS |
02 CAST_UNIT_PREFIX + ACN]
 - o For Hollow core (prefix starts with O) and plank slabs (prefix starts with KL) returns CUSTOM.SLAB_CAST_UNIT_POS value

Supported cast units

- Only precast (not cast-in-place)

2.2 CUSTOM.ELEMENT_MARK

Modeling requirements

No special requirements

Usage

- Organizer quantity lists
- GA drawing part mark

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0

- Number with decimals: 0.0
- Text:
 - o Value is formed by Finland environment's project UDA
P_ELEMENT_POS_TYPE
 - [01 CAST_UNIT_POS |
02 CAST_UNIT_PREFIX + ACN]
 - o For Hollow core (prefix starts with O) and plank slabs (prefix starts with KL) returns CUSTOM.SLAB_CAST_UNIT_MARK value

Supported cast units

- Only precast (not cast-in-place)

2.3 CUSTOM.SIMILAR_ELEMENT_POS_LIST

Requirements

Useful only if Finland environment's project UDA
P_ELEMENT_POS_TYPE has value "02 CAST_UNIT_PREFIX + ACN".
This is used for example by precast element manufacturer Lujabetoni.

Usage

- For naming plot files (e.g. pdf files)
- Can be used as part of environment variable
XS_DRAWING_PLOT_FILE_NAME_C value.
For example:
XS_DRAWING_PLOT_FILE_NAME_C=%TPL:CUSTOM.SIMILAR_ELEMENT_POS_LIST%%_1_1%%DRAWING_REVISION?#%%REVISION_MARK%

Return value

- Return value is of text type:
- o Algorithm searches all cast units that are represented by the same drawing (having same CAST_UNIT_POS). Then it is concatenating the CUSTOM.ELEMENT_POS values of all of those cast units.
 - o Example:
Drawing represents ELEMENT_POS values P1, P2, P3, P4, P5, P8 and P11.
The value of CUSTOM.SIMILAR_ELEMENT_POS_LIST is then "P1;;P5;P8;P11". Note that "P1;;P5" represents values P1, P2, P3, P4 and P5. This syntax has been defined by Lujabetoni to name pdf files for their manufacturing system.

Supported cast units

- Only precast (not cast-in-place)

2.4 CUSTOM.ACN

Requirements

ACN value exist on cast unit

Usage

- Add CUSTOM.ACN on Model view's Part label. The value is drawn into view only for cast unit main part, which makes the view easier to read.

Return value

If not set, returns empty string for model view.
Otherwise the integer value is converted into string.

2.5 CUSTOM.CAST_UNIT_NAME

Requirements

No requirements.

Usage

- Add CUSTOM.CAST_UNIT_NAME on Model view's Part label. The value is drawn into view only for cast unit main part, which makes the view easier to read.

Return value

Shows cast unit's name or main parts name if cast unit name has no value.

3 LocationCustomProperties.dll

3.1 CUSTOM.FLOOR

Requirements

The user has produced floor information to one of these locations:

- By using Organizer tool (which saves the floor information that can be asked by LOCATION_BREAKDOWN_STRUCTURE.LBS_FLOOR
- User defined attribute BLD_FLOOR (Finland Environment UDA)
- User defined attribute IFC_BUILDING_STOREY

Usage

- For getting floor information of precast concrete elements into lists created by Organizer's Object browser.
- Finland Environments project's user defined attribute P_LOCATION_SOURCE defines where the floor value is read
[01 IFC building and storey |
02 Organizer section and floor |
03 Finland environment section and floor]

Return value

Return value is of text type.

Value is asked from assembly.

If asked from a part, the return value is the value asked from part's assembly.

Supported cast units

- Both precast and cast-in-place assemblies

3.2 CUSTOM.SECTION

Requirements

The user has produced section information to one of these locations:

- By using Organizer tool (which saves the floor information that can be asked by LOCATION_BREAKDOWN_STRUCTURE.LBS_SECTION
- User defined attribute BLD_SECTION (Finland Environment UDA)
- User defined attribute IFC_BUILDING

Usage

- For getting section information of precast concrete elements into lists created by Organizer's Object browser.
- Finland Environments project's user defined attribute P_LOCATION_SOURCE defines where the floor value is read
[01 IFC building and storey |

02 Organizer section and floor |
03 Finland environment section and floor]

Return value

Return value is of text type.

Value is asked from assembly.

If asked from a part, the return value is the value asked from part's assembly.

Supported cast units

- Both precast and cast-in-place assemblies

4 SlabCustomProperties.dll

4.1 CUSTOM.SLAB_INSULATION_MATERIAL

Modeling requirements

Only works for such cast units which prefix starts with

- O (hollow core slabs)
- KL (plank slabs)
- EL (insulated massive slab)
- L (massive slab)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

- PART rows: return value only for cast unit main part

Return value:

- Number: 0
- Number with decimals: 0.0
- Text:
 - o Searches cast unit parts that have MATERIAL_TYPE = MISCELLANEOUS
 - o Return the MATERIAL value of the part that is biggest by volume

Supported cast units

- See Modeling requirements

4.2 CUSTOM.SLAB_INSULATION_THICKNESS

Modeling requirements

Only works for such cast units which prefix starts with

- O (hollow core slabs)
- KL (plank slabs)
- EL (insulated massive slab)
- L (massive slab)

Usage

- Organizer quantity lists

Row and value type

Works for PART and CAST_UNIT template rows

- PART rows: return value only for cast unit main part

Return value:

- Number: converted double value into integer
- Number with decimals:
 - o Searches cast unit parts that have MATERIAL_TYPE = MISCELLANEOUS
 - o Returns the thickness of the part that is biggest by volume
- Text: string where double value is formatted into number with zero decimals

Supported cast units

- See Modeling requirements

4.3 CUSTOM.SLAB_CAST_UNIT_POS

Modeling requirements

Only works for such cast units which prefix starts with

- O (hollow core slabs)
- KL (plank slabs)

Usage

- Organizer quantity lists
- Model view part label (shows value only for main part)

Row and value type

Works for PART and CAST_UNIT template rows

- PART rows: return value only for cast unit main part

Return value:

- Number: 0
- Number with decimals: 0.0
- Text:
 - o PROFILE + “-“ + CAST_UNIT_SERIAL_NUMBER
 - o if the cast unit has not been numbered
PROFILE + “-(?)”

Supported cast units

- Only precast (not cast-in-place)

4.4 CUSTOM.SLAB_CAST_UNIT_MARK

Modeling requirements

Only works for such cast units which prefix starts with

- O (hollow core slabs)
- KL (plank slabs)

Usage

- GA-drawing part marks

Row and value type

Works for PART and CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: 0.0
- Text:
 - o If strand info has been given in user defined attribute STRAND_INFO
PROFILE + “- “ + STRAND_INFO + “-“ +
CAST_UNIT_SERIAL_NUMBER
 - o Otherwise
PROFILE + “- -“ + CAST_UNIT_SERIAL_NUMBER
 - o If the cast unit has not been numbered,
CAST_UNIT_SERIAL_NUMBER is replaced with “(?)”

4.5 CUSTOM.IS_DETAILED_SLAB

Modeling requirements

Only works for such cast units which prefix starts with

- O (hollow core slabs)
- KL (plank slabs)

Usage

- Template editor reports
- The idea is to “raise a flag” if the factory production line must do something else that cut the slab with perpendicular sawing

Row and value type

Works for PART and CAST_UNIT template rows, only gives value for assembly or main part.

Return value:

- Number: 0

- Number with decimals: 0.0
- Text: {"TRUE" | "FALSE"}

Checks:

- Is the assembly a cast unit? AND
- Does main part contain rebars? OR
- Does main part contain part cuts? OR
- Does main part contain non-perpendicular plane cuts or fittings? OR
- Does main part contain steel embeds? OR
- Does cast unit contain more than one concrete part?

5 CustomWallProperties.dll

5.1 CUSTOM.INNER_PANEL_MATERIAL

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- SK (load bearing inner shell)
- RK (not load bearing inner shell)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: 0.0
- Text: MATERIAL of the biggest concrete part which name contains substring "INNER" or "SISÄ"

Supported cast units

- See Modeling requirements

5.2 CUSTOM.INNER_PANEL_THICKNESS

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- SK (load bearing inner shell)
- RK (not load bearing inner shell)
- S (load bearing sandwich)
- R (not load bearing sandwich)

- NK (load bearing strip element)
- N (not load bearing strip element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: double value rounded to integer
- Number with decimals: thickness of the inner panel
Value asked from concrete part biggest by volume and recognized as inner panel by name
- Text: double value formatted to text with zero decimals

Supported cast units

- See Modeling requirements

5.3 CUSTOM.INNER_PANEL_VOLUME

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- SK (load bearing inner shell)
- RK (not load bearing inner shell)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: thickness of the inner panel
Sum of concrete part volumes recognized as inner panel by name
- Text: empty string

Supported cast units

- See Modeling requirements

5.4 CUSTOM.INSULATION_MATERIAL

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- SK (load bearing inner shell)
- RK (not load bearing inner shell)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: 0.0
- Text: MATERIAL of the biggest miscellaneous material type part which name contains substring "INSULATION" or "ERISTE" or class is 104

Supported cast units

- See Modeling requirements

5.5 CUSTOM.INSULATION_THICKNESS

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- SK (load bearing inner shell)
- RK (not load bearing inner shell)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: double value rounded to integer
- Number with decimals: thickness of the insulation part
Value asked from miscellaneous material type part biggest by volume and recognized as insulation by name or class
- Text: double value formatted to text with zero decimals

Supported cast units

- See Modeling requirements

5.6 CUSTOM.OUTER_PANEL_MATERIAL

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- KE (outer shell element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: 0.0
- Text: MATERIAL of the biggest concrete part which name contains substring "OUTER" or "ULKO"

Supported cast units

- See Modeling requirements

5.7 CUSTOM.OUTER_PANEL_THICKNESS

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- KE (outer shell element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: double value rounded to integer
- Number with decimals: thickness of the inner panel
Value asked from concrete part biggest by volume and recognized as outer panel by name
- Text: double value formatted to text with zero decimals

Supported cast units

- See Modeling requirements

5.8 CUSTOM.OUTER_PANEL_VOLUME

Modeling requirements

Only works for such cast units which prefix starts with

- SKR (load bearing plastered sandwich)
- RKR (not load bearing plastered sandwich)
- S (load bearing sandwich)
- R (not load bearing sandwich)
- NK (load bearing strip element)
- N (not load bearing strip element)
- KE (outer shell element)
- AS (load bearing socle element)
- AN (not load bearing socle element)
- AR (ground pressure socle element)

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: thickness of the inner panel
Sum of concrete part volumes recognized as outer panel by name
- Text: empty string

Supported cast units

- See Modeling requirements

5.9 CUSTOM.SURFACE_TREATMENT_NAME_1

5.10 CUSTOM.SURFACE_TREATMENT_NAME_2

5.11 CUSTOM.SURFACE_TREATMENT_NAME_3

Modeling requirements

Surface treatments have been modelled to cast unit as surface treatment objects

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: 0.0
- Text: NAME or surface treatment which area is biggest / second biggest / third biggest

Supported cast units

- See Modeling requirements

5.12 CUSTOM.SURFACE_TREATMENT_AREA_1

5.13 CUSTOM.SURFACE_TREATMENT_AREA_2

5.14 CUSTOM.SURFACE_TREATMENT_AREA_3

Modeling requirements

Surface treatments have been modelled to cast unit as surface treatment objects

Usage

- Organizer quantity lists

Row and value type

Works for CAST_UNIT template rows

Return value:

- Number: 0
- Number with decimals: sums areas of surface treatment objects. Sorted by area and reported by biggest / second biggest / third biggest area.
- Text: empty string

Supported cast units

- See Modeling requirements

6 ElementWeight.dll

6.1 CUSTOM.ELEMENT_WEIGHT

Loops through cast unit parts and sums their weight.

Ignores subassemblies which are made from steel as their weight is already included in a slightly higher density value of concrete parts.