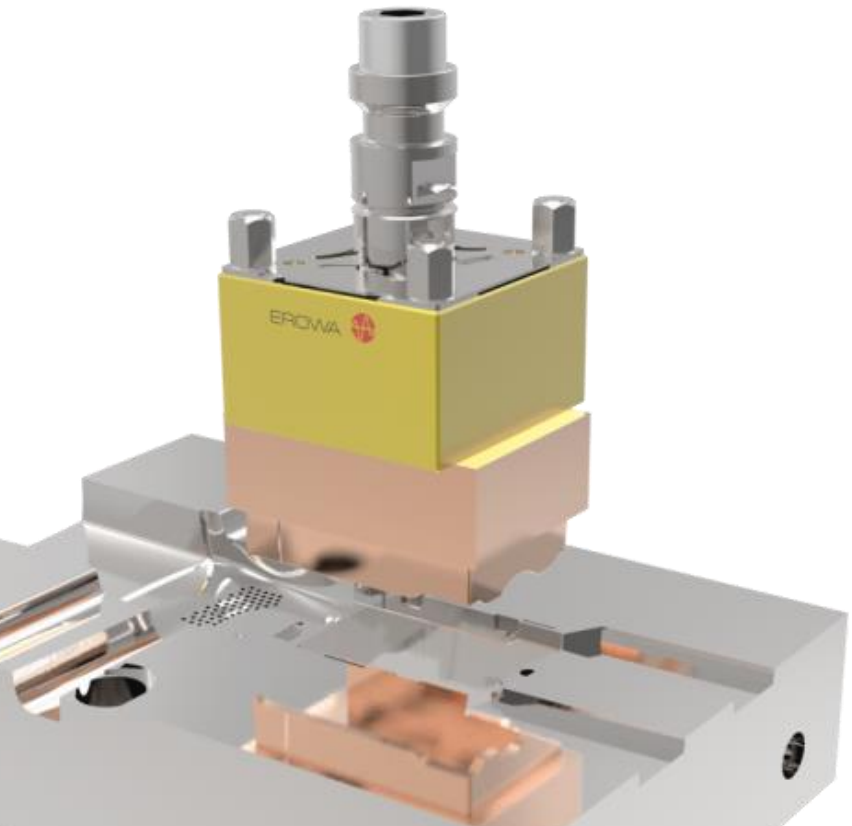
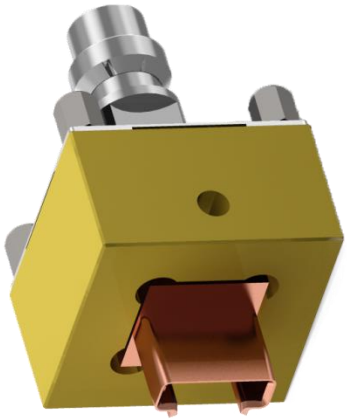


SMARTElectrode

Training

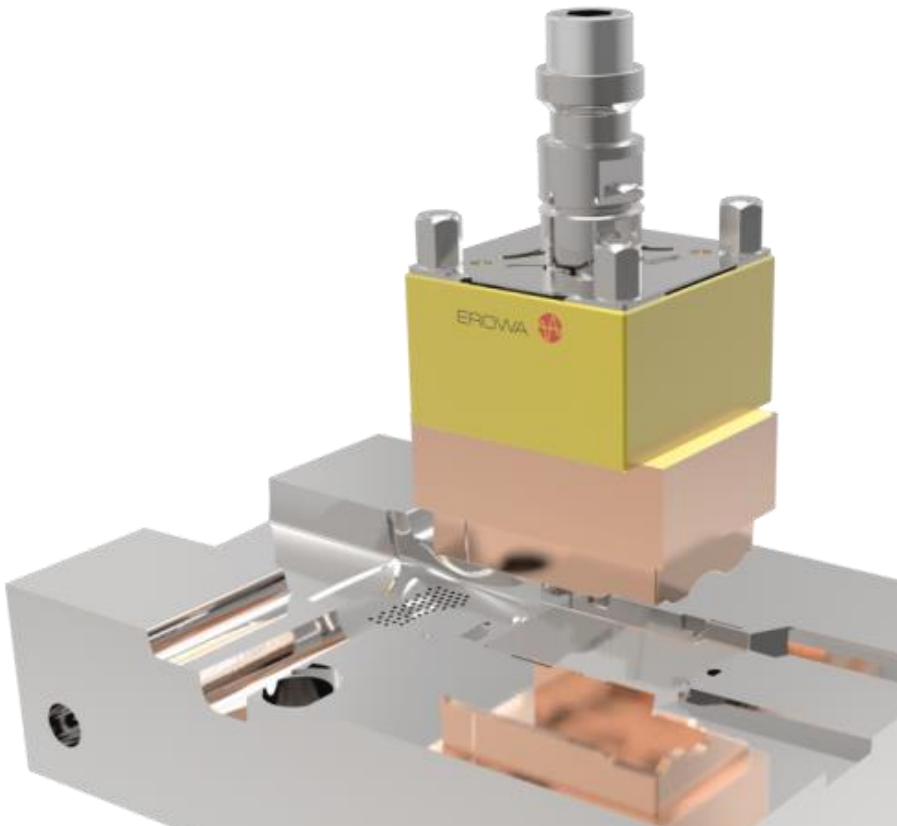
B&W Products and Solutions



SMARTElectrode 8.0
is an auxiliary application for PTC Creo Parametric that automates the design of sinking electrodes

Agenda

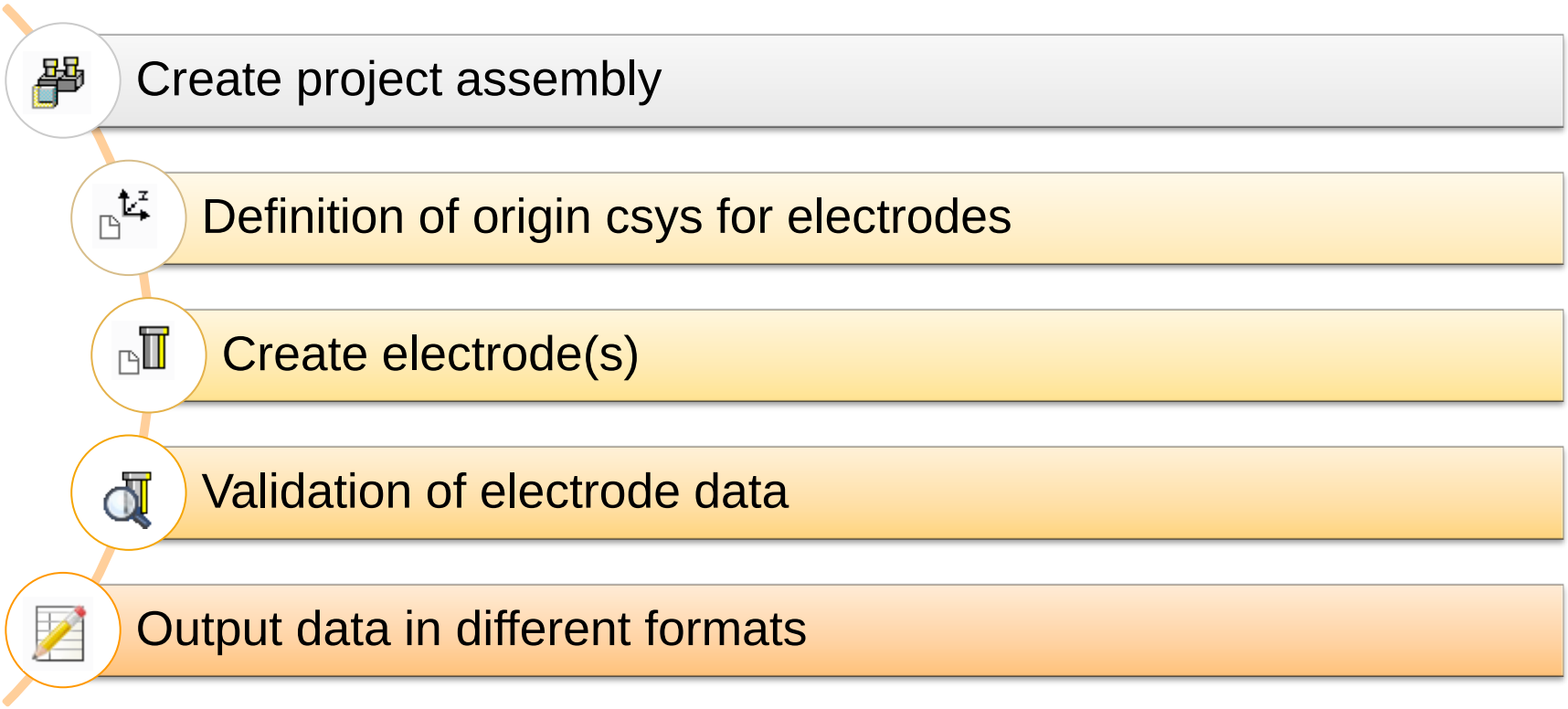
- **Concept**
- **Workflow**
  1. Create Project Assembly
  2. Preparation *[optional]*
  3. Set Operation Origin
  4. Add New Electrode
  5. Detail Solid
  6. Add Base Feature
  7. Set Properties
  8. Check Electrode
  9. Create Drawings
  10. Create Output
- **Tutorial**



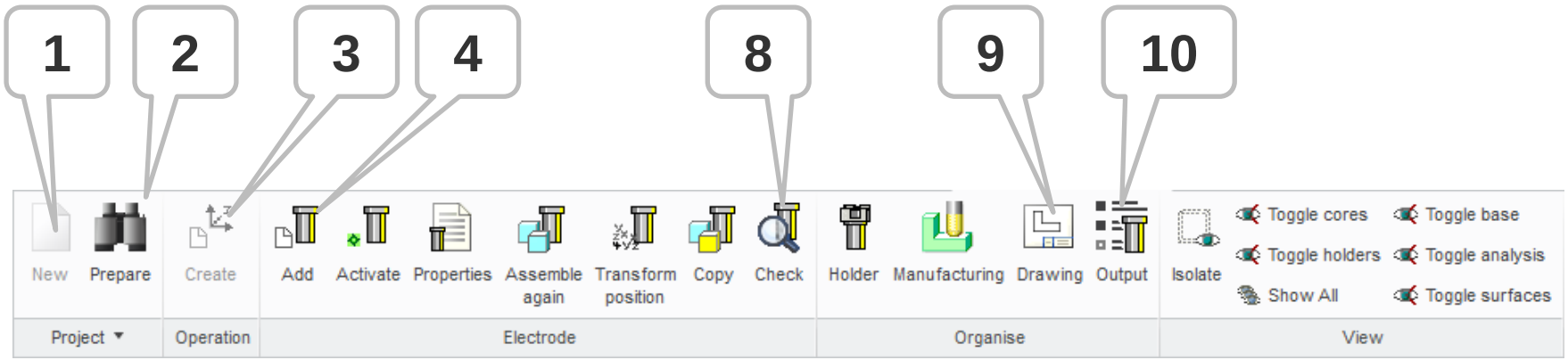
Concept SME 8.0

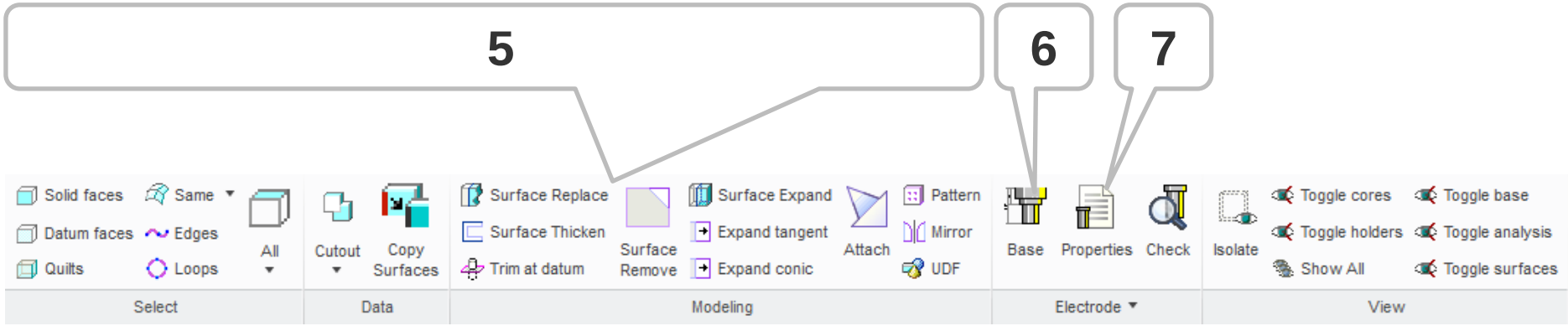
- **SME 8.0**
  - Is especially designed for new customers using PTC Creo Parametric 3.0!
- **SME 8.0 separates designer tasks into easy steps!**
  - Creation of geometry
  - Attach all necessary data as parameters
  - Output geometric and additional information in different formats

Workflow I


Create project assembly
Definition of origin csys for electrodes
Create electrode(s)
Validation of electrode data
Output data in different formats

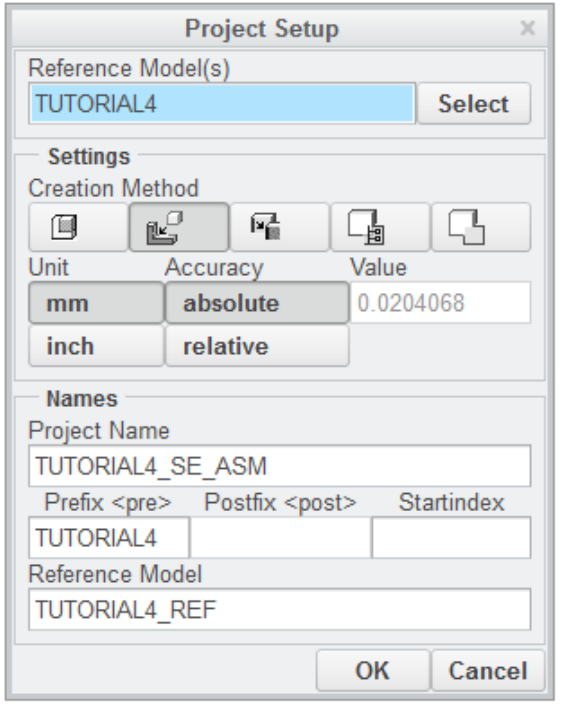
Workflow II


1
2
3
4
8
9
10
New
Prepare
Create
Add
Activate
Properties
Assemble again
Transform position
Copy
Check
Holder
Manufacturing
Drawing
Output
Isolate
Toggle cores
Toggle base
Toggle holders
Toggle analysis
Show All
Toggle surfaces
Project
Operation
Electrode
Organise
View


5
6
7
Solid faces
Same
Datum faces
Edges
Quilts
Loops
All
Cutout
Copy Surfaces
Surface Replace
Surface Thicken
Trim at datum
Surface Remove
Surface Expand
Expand tangent
Expand conic
Attach
Pattern
Mirror
UDF
Base
Properties
Check
Isolate
Toggle cores
Toggle base
Toggle holders
Toggle analysis
Show All
Toggle surfaces
Select
Data
Modeling
Electrode
View

1/10 – Create project assembly

- **The Project-assembly is the compilation of workpieces, a zero point and electrodes**
- **Assemble workpieces**
  - As original part
  - As reference part (copy of original)
- **Inheritance for native models**
- **Start from part or assembly**
- **Use of surface or solid models**

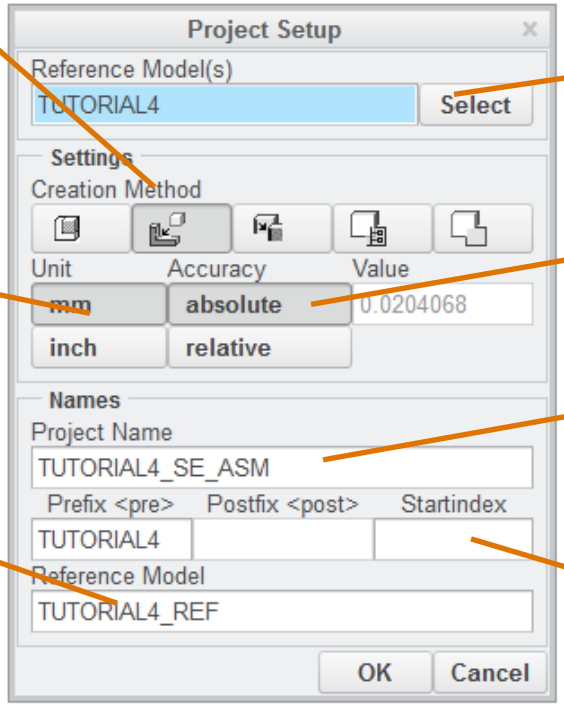


1/10 – Create project assembly

Method
Original,
Merge, Inherit, CopyGeom
Current Model (Only for assemblies)

Units
workpiece/assembly
mm/mm, mm/inch, inch/inch, inch/mm

Name of **Ref.-Assembly**
Only needed for ref-models



Workpieces (cores)
Current model or selected

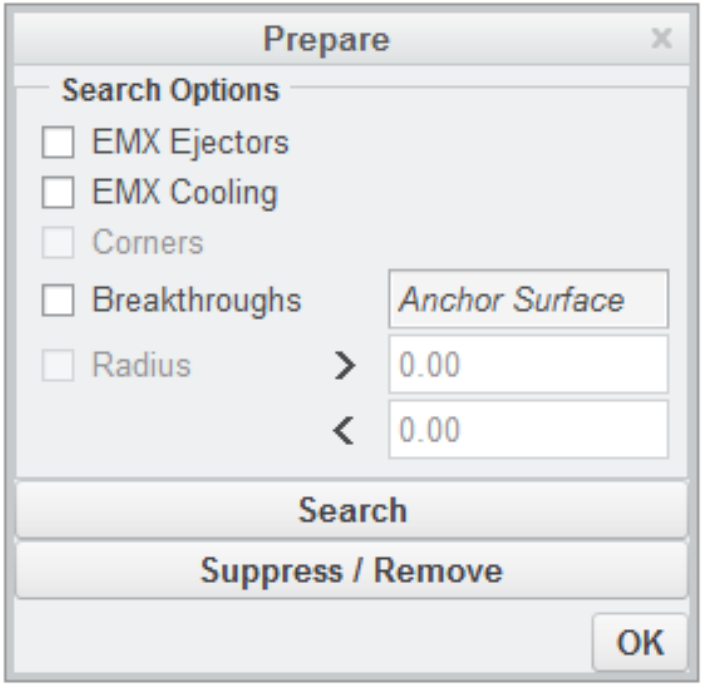
Accuracy type and value
Use consistent accuracy throughout the whole assembly!

Project name
From naming format

Startindex

2/10 – Preparation

- **Prepare geometry in core or reference model by suppressing or removing:**
  - EMX Ejectors
  - EMX Cooling
  - Breakthroughs
  - Rounds within min or max radius



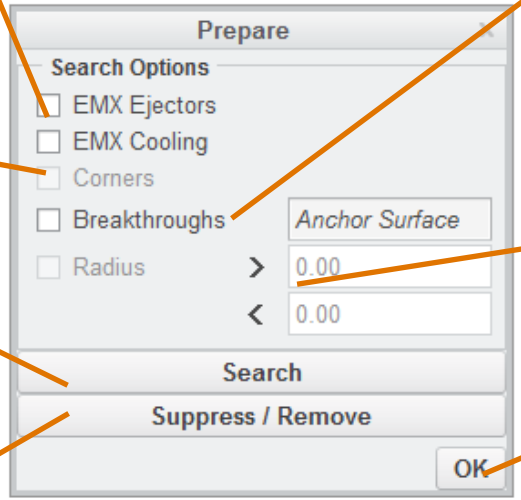
2/10 – Preparation

EMX
Search EMX-ejectors and cooling groups
Use in ref.-parts with inheritance

Corners
Search by sharp transitions

Search
Start Search

Suppress / Remove
Confirm and select action
Also RMB (right mouse button)



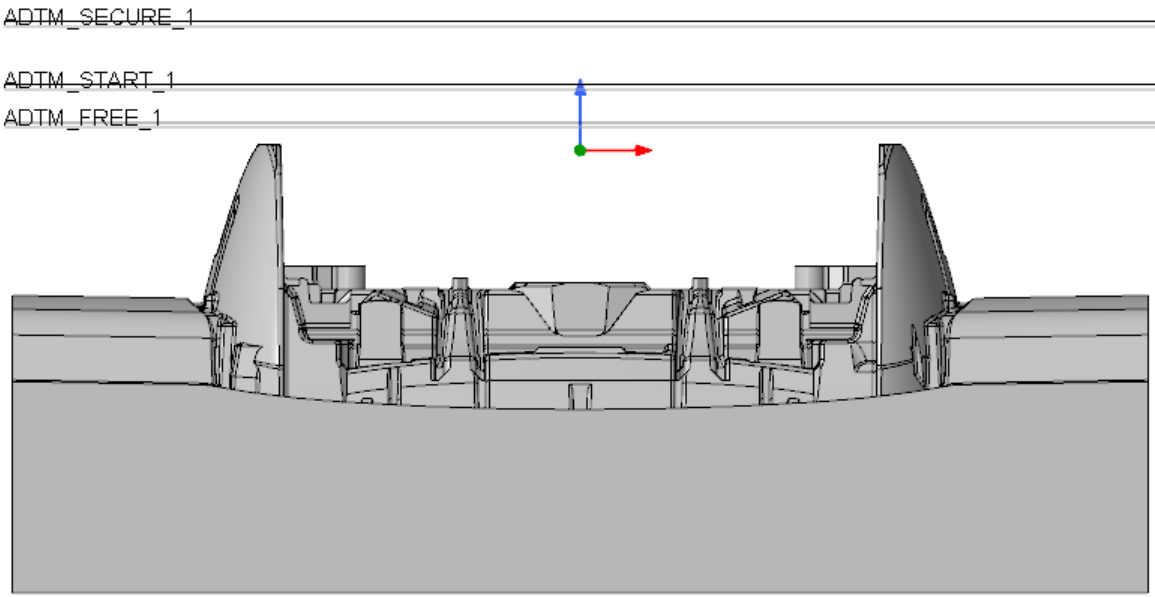
Breakthroughs
Search ejector holes in imports
Choice of anchor surface necessary

Radius
Search for min and max radii

OK
Close dialog

3/10 – Operation Csys

- **Defines origin for electrodes**
- **One origin in one project assembly**
- **Is a group of features in project assembly**
  - Operation CSYS
  - Csys on default position with orientation of operation CSYS
  - FREE_FACE
    datum for electrode
    base feature with
    offset from origin
  - START
    default start position
    for electrode
  - SECURE
    default retreat plane



3/10 – Operation Csys

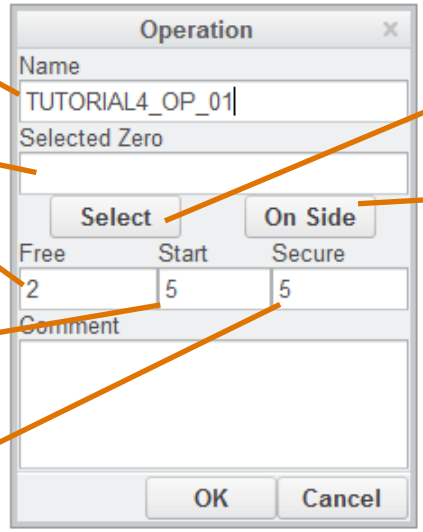
Name
From naming format

Selected CSYS

FREE_FACE
Distance above zero plane

Start
Default for start plane

Secure
Default for retreat plane



Select CSYS
Or create on-the-fly

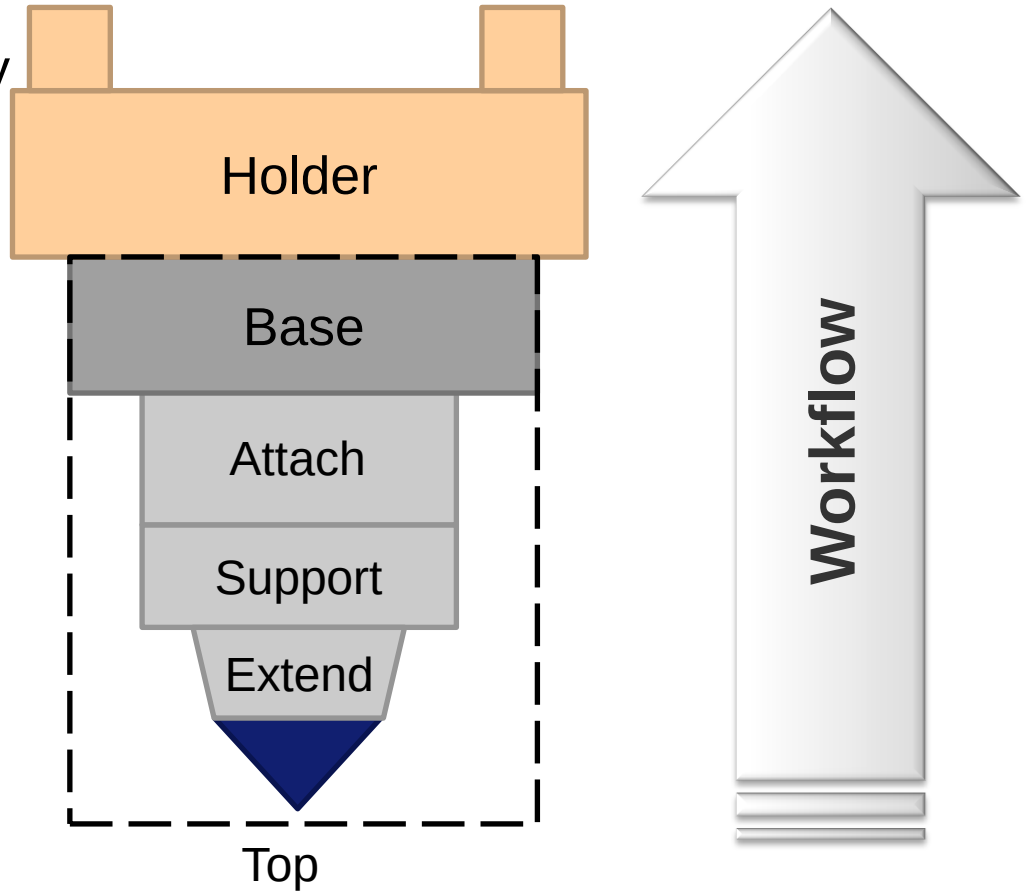
Create CSYS
On side of model

4/10 – New Electrode

- **A new electrode is…**
  - An empty part from default template
  - Assembled on default position in assembly
  - Named by naming format
    (the counter will be updated automatically; gaps will be closed)
- **Activate component in assembly to start detailing mode!**

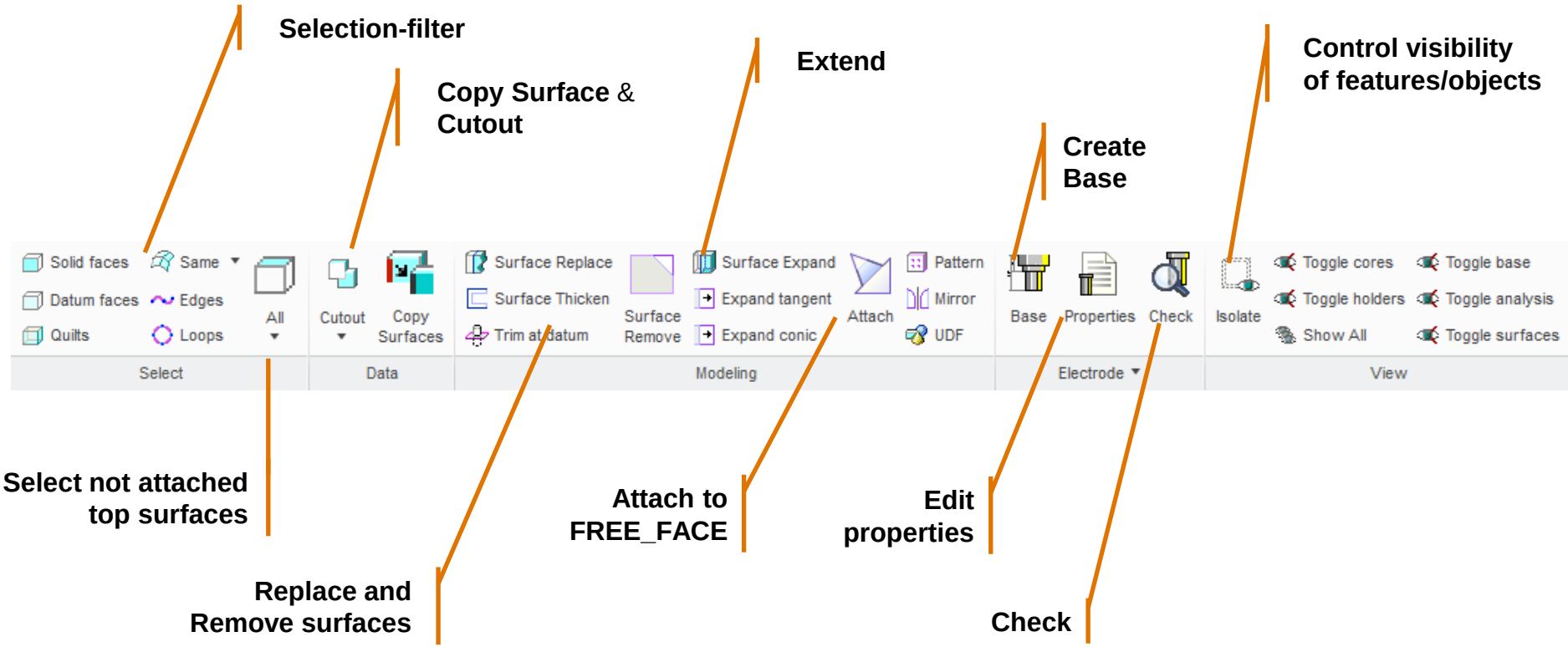
5/10 – Detailing

- **Activate component in assembly to start detailing mode**
  - Create burn geometry
  - Extend geometry
  - Create support geometry
  - Attach solid or surfaces to FREE_FACE
  - Add base group



5/10 – Detailing

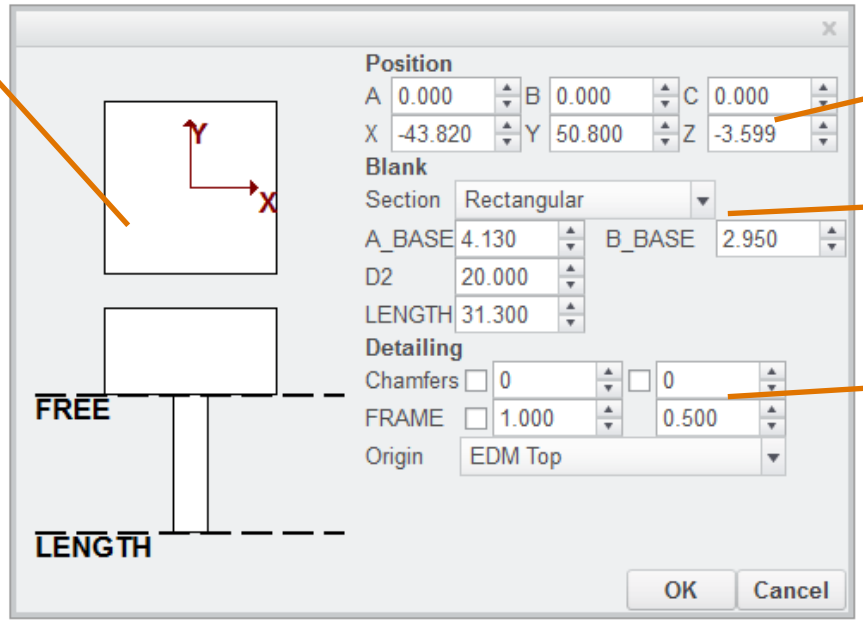
- Activate component to show detailing Ribbon
- Switch between electrodes whenever necessary
- Use visibility commands to focus on electrode



6/10 – Add Base

- **Add base feature**

Preview
Preview of template with dimensions



Position

Template
Section and dimensions

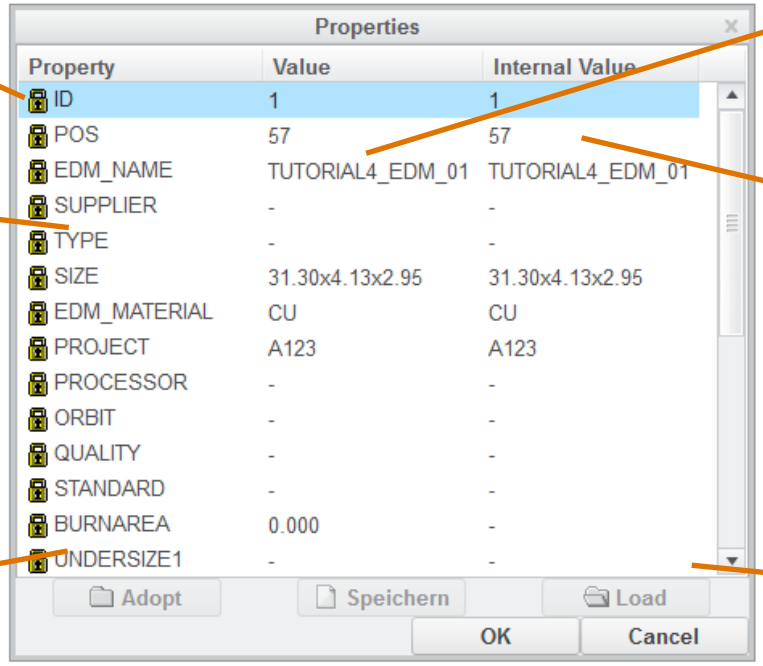
Detailing
Position of origin
Frame and chamfers

7/10 – Set Properties

- **Set Properties of**
  - Project
  - Workpieces
  - Operation
  - Electrodes

Lock state
Is value editable
Or driven by

Parametername
From configuration



Current value

Internal value
From software or options

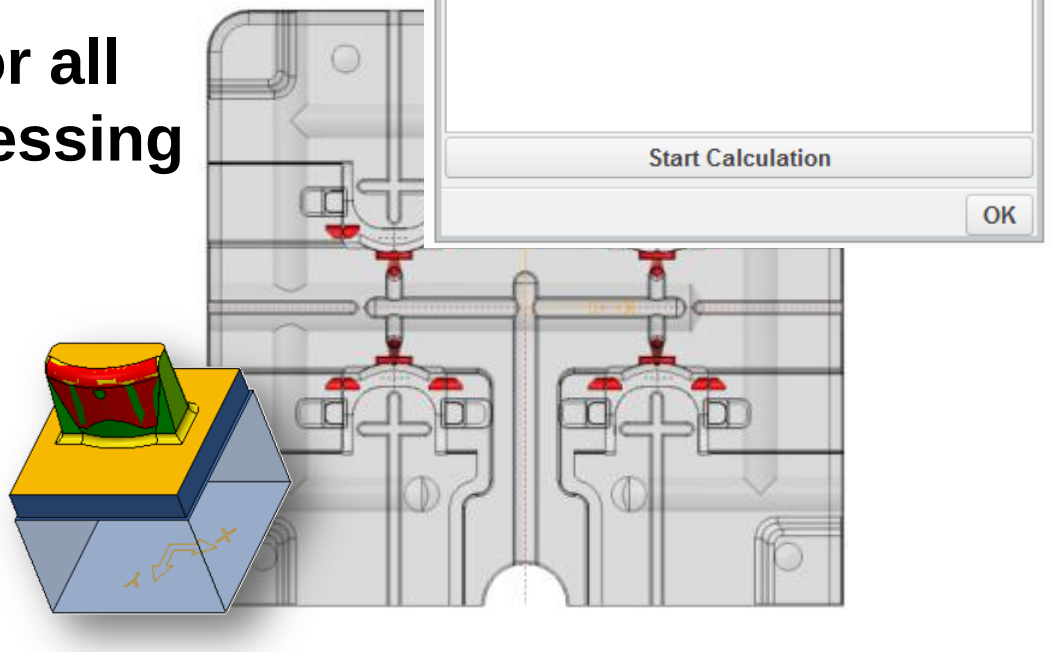
Adopt
Copy values from another electrode model

Save/Load
Userdefined template and data

8/10 – Check

- **Check electrodes to…**
  - get interferences
  - assignment a prepared color format
  - get touching surfaces (analysis not available in normal Creo)
  - calculate burn-area projection

- **Select single, active or all components for processing**



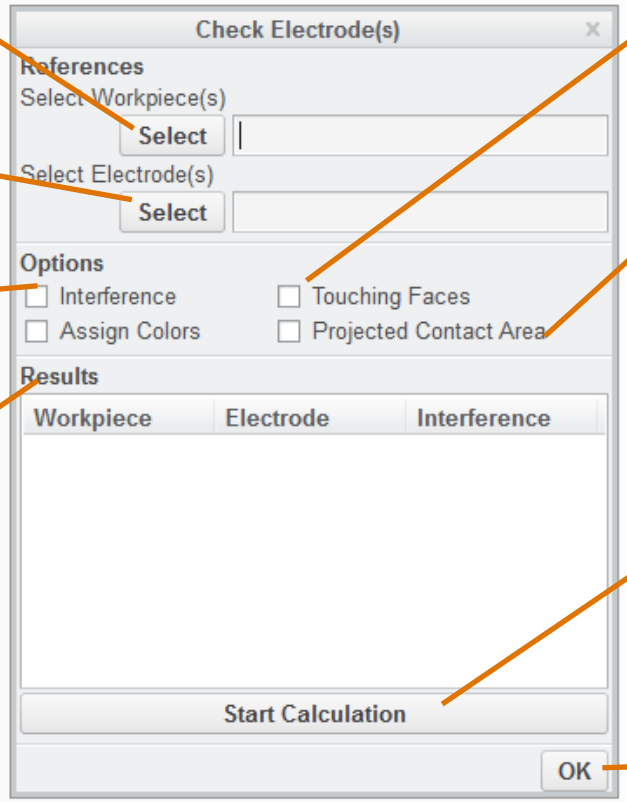
8/10 – Check

Core Models/workpieces
Selection of workpieces

Electrodes
Selection of electrodes

Interference
Check interference

Assign colors
Map color format



Touching surfaces
Get touching surfaces between workpieces and electrodes

Projected touching area
Calculate projected area. Only accessible if touching surfaces analysis is active

Start calculation
Process activated analysis

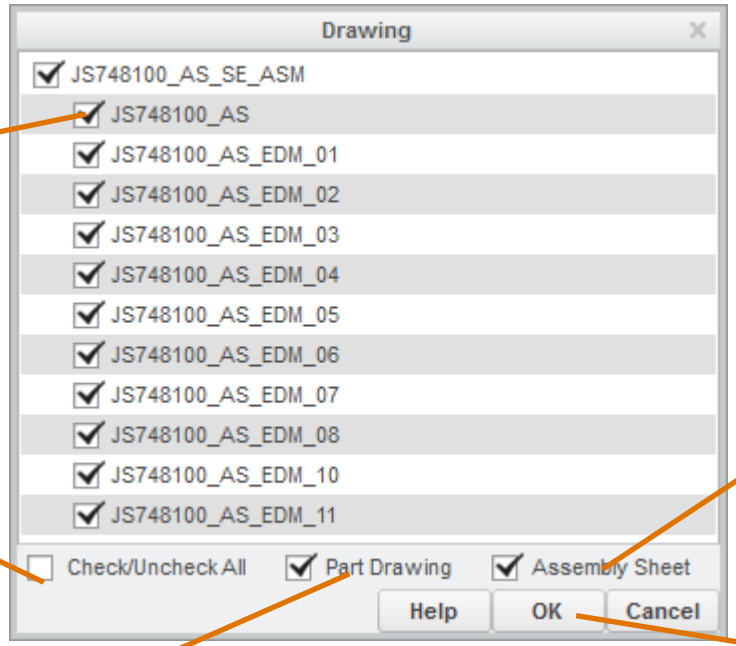
OK
Close dialog

9/10 – Drawings

- **Drawings are created from templates**
  - Asm_bom.drw / asm_bom.tbl
    Template for sheet -1- of assembly drawing
  - Asm_wp.drw / asm_wp.tbl
    Template for sheet -2- of assembly drawing
  - Asm_edm.drw / asm_edm.tbl
    Template for electrode sheets
  - Edm_default.drw
    Template for single part drawings
- **Drawing creation can take place at any time**

9/10 – Drawings

List of object
Main assembly
Workpieces
Electrodes



Check / uncheck all

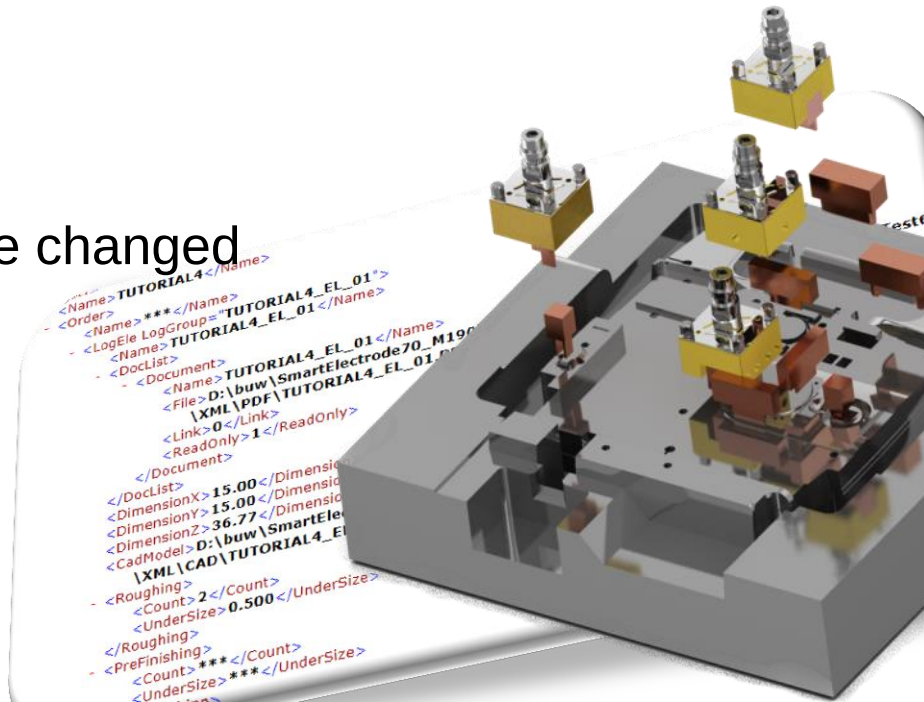
Create part drawing

Create assembly sheet

OK
Close dialog and create drawings

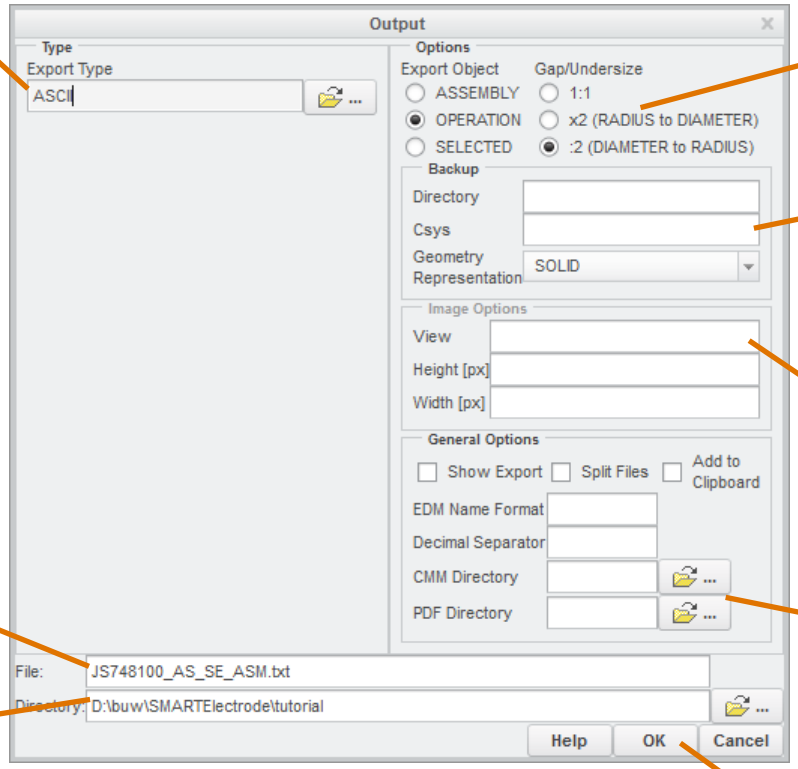
10/10 – Data Output

- **Options for every export can be changed**
- **Automated data transfer to different formats:**
  - 2d and 3d design data
  - EDM programming systems
  - CMM data
  - CAM data
  - Microsoft Office Products
  - XML or HTML format
  - Manufacturing control systems
  - Options for every export can be changed



10/10 – Data Output

Selected format Processor



File name for export

Directory for export

Export object

3d-Export
Directory
Alternative Csys

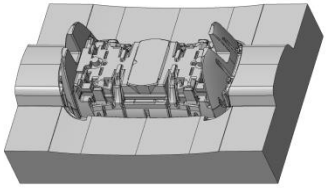
Image settings
For HTML-export

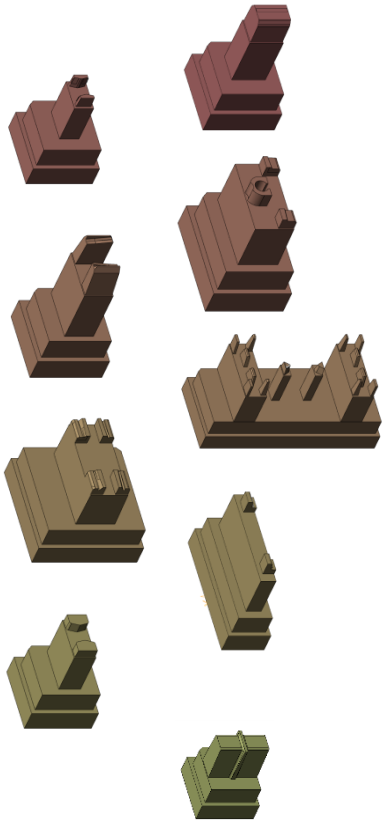
Subdirectories
For measuring points
PDF files

OK
Close dialog and start export

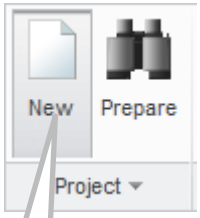
Training

- Start New Project
- Set Operation Origin
- Electrode 1
- Electrode 2
- Electrode 3
- Electrode 4
- Electrode 5
- Electrode 6
- Electrode 7
- Electrode 8
- Electrode 9

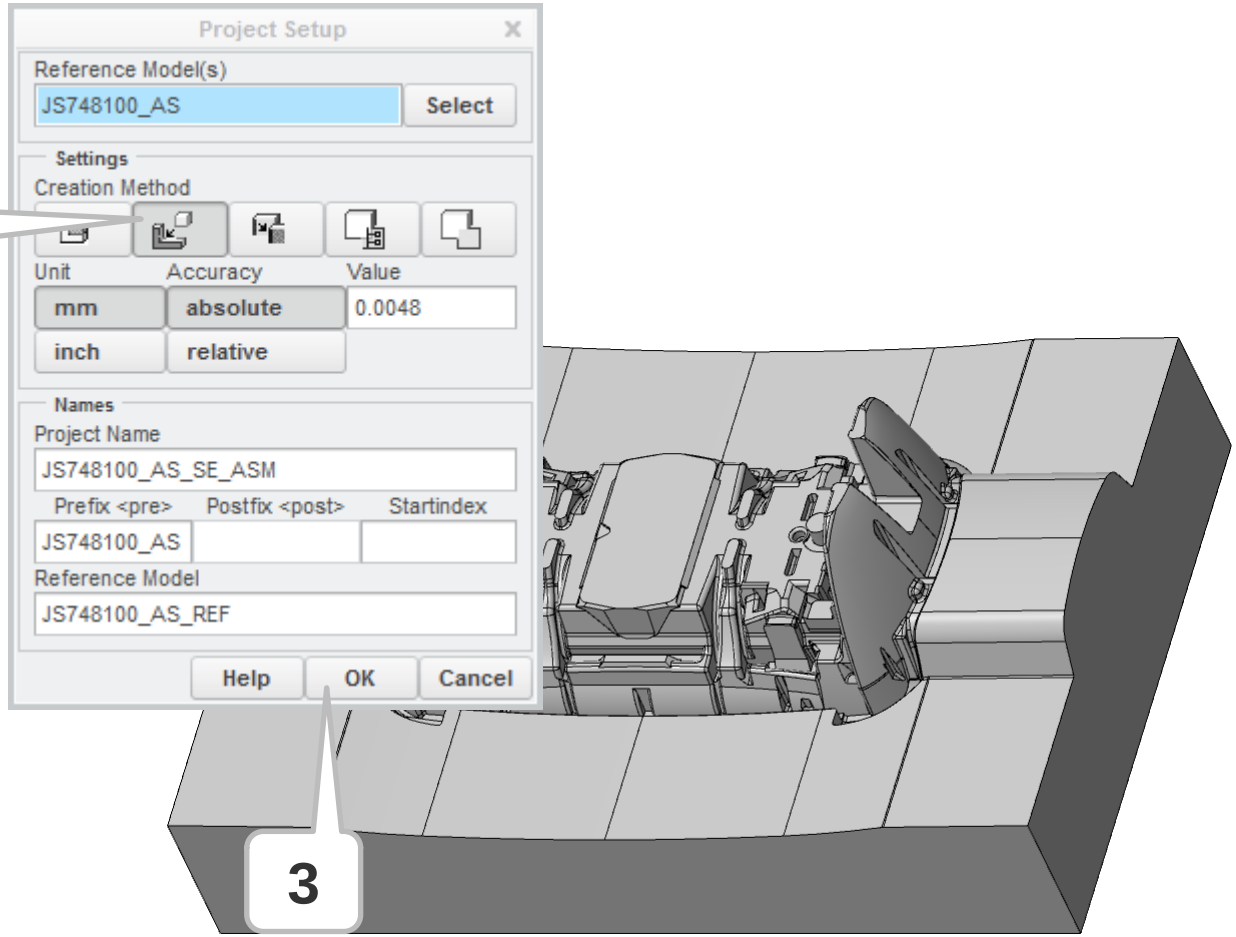




Create Project Assembly



1

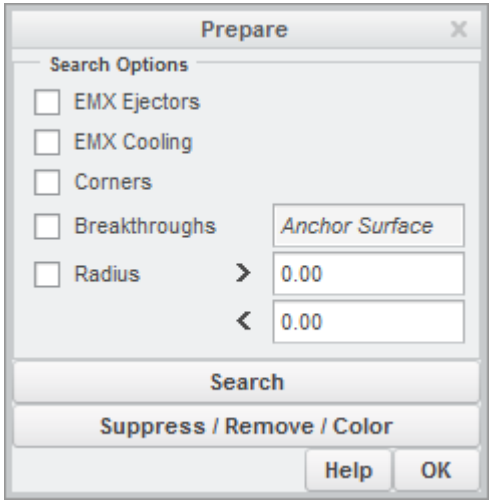


2

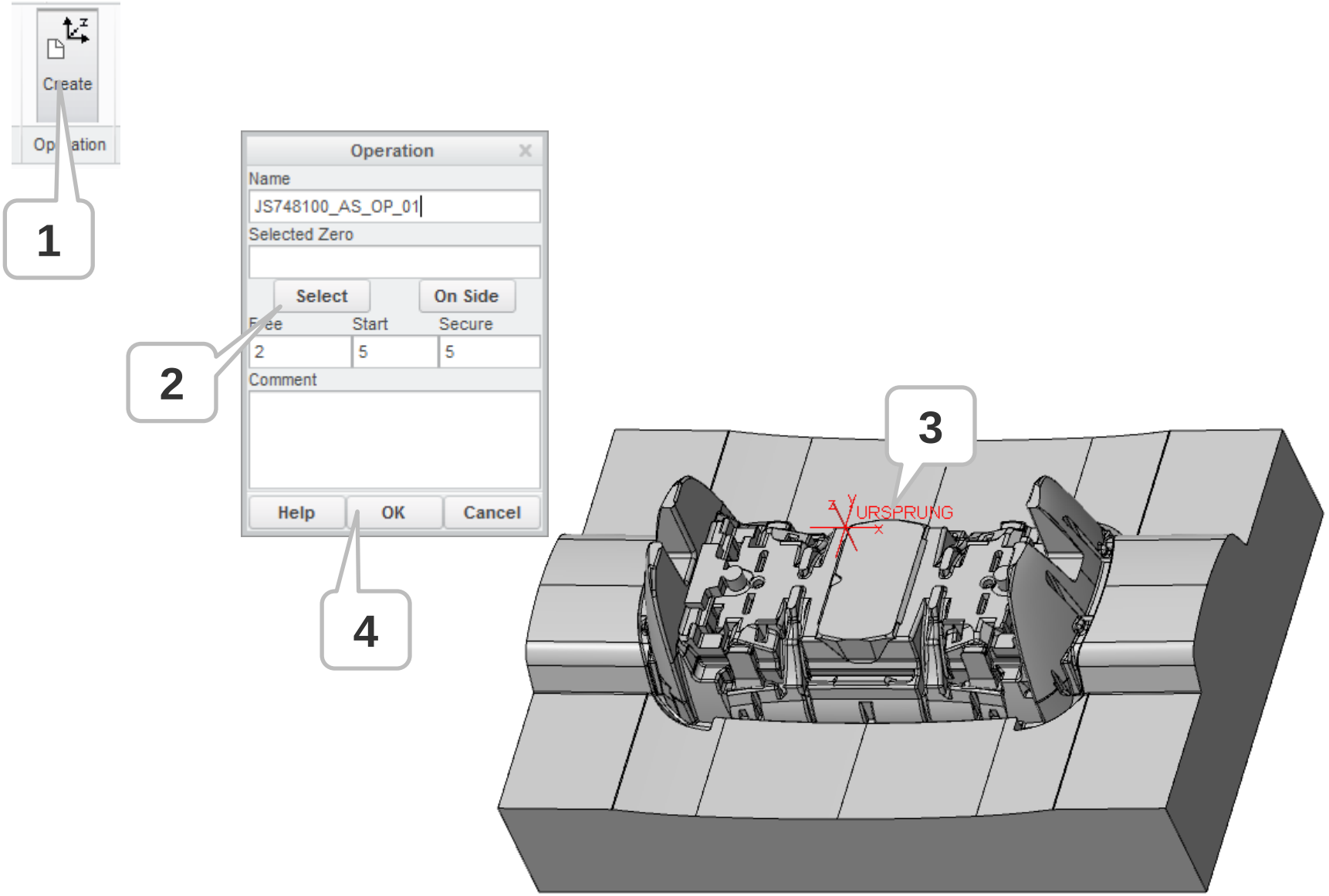
3

Preparation

- **Nothing to prepare in tutorial part**



Set Operation Origin

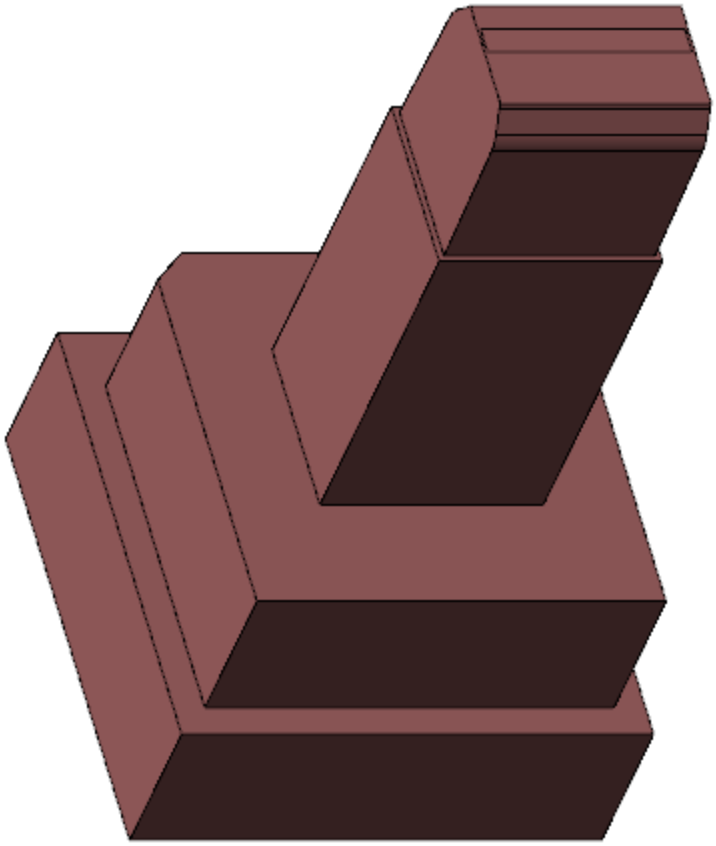


Electrode 1

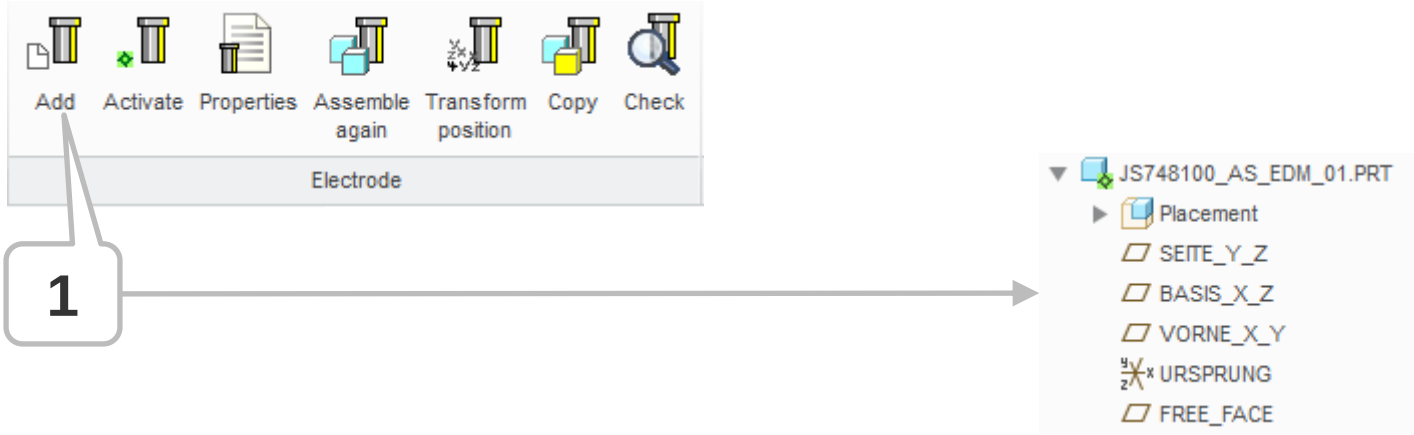
Topics of this exercise

- **Add new electrode**
- **Copy burn-faces**
- **Cleanup solid**
- **Mirror solid**
- **Attach to FREE_FACE**
- **Add base**

- **Assemble electrode 2nd time**



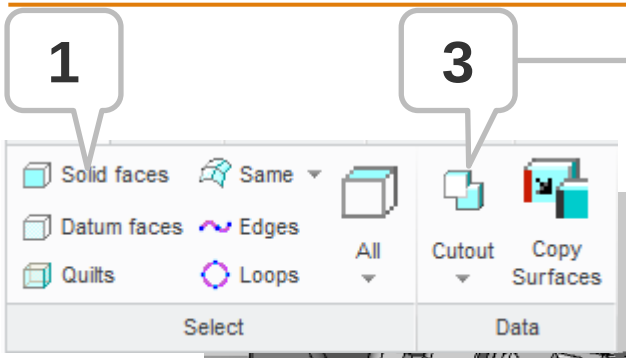
Electrode 1 – Add New Electrode

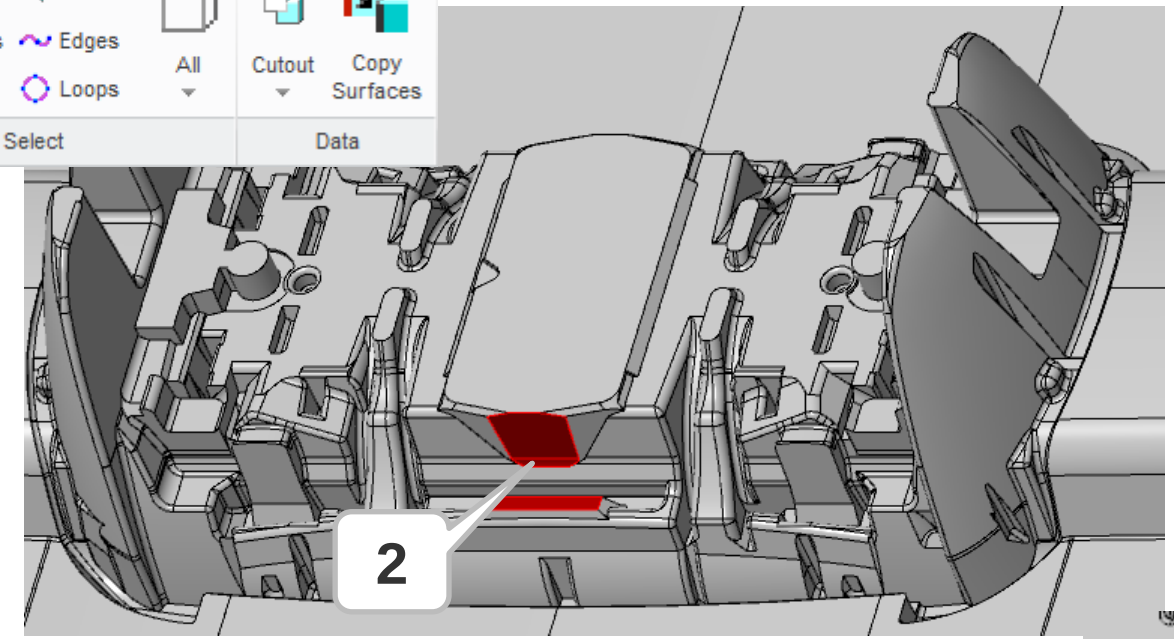


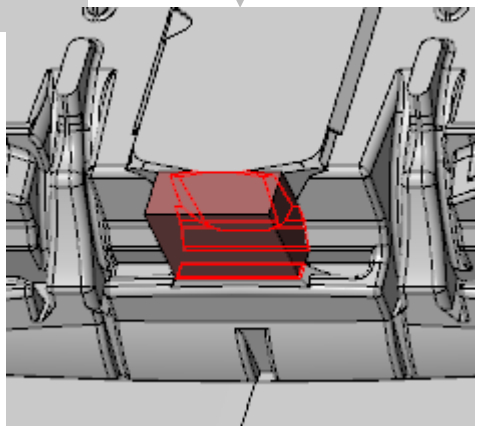
Command ‚Add' performs some subsequent tasks

- **Copies a new, empty part from default template** (Creo option ‚TEMPLATE_SOLIDPART ')
- **Sets the name following the naming format** (SME option ‚ELECTRODE_NAME_FORMAT')
- **Assembles the model on operation default**
- **Copies FREE_FACE to the model**

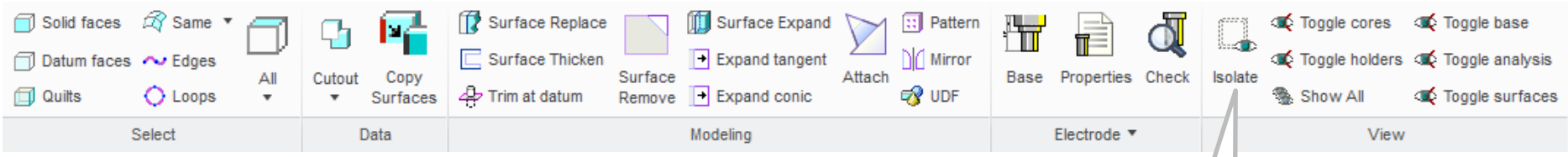
Electrode 1 – Add Solid To Electrode





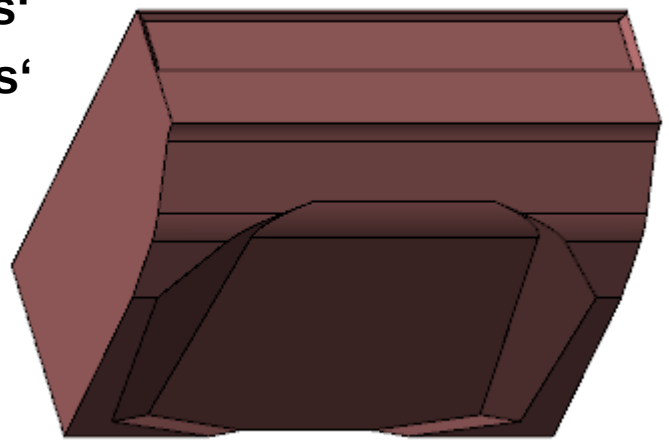


Electrode 1 – Set View

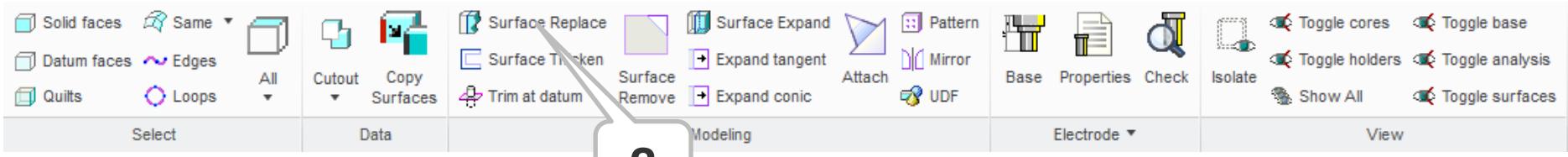


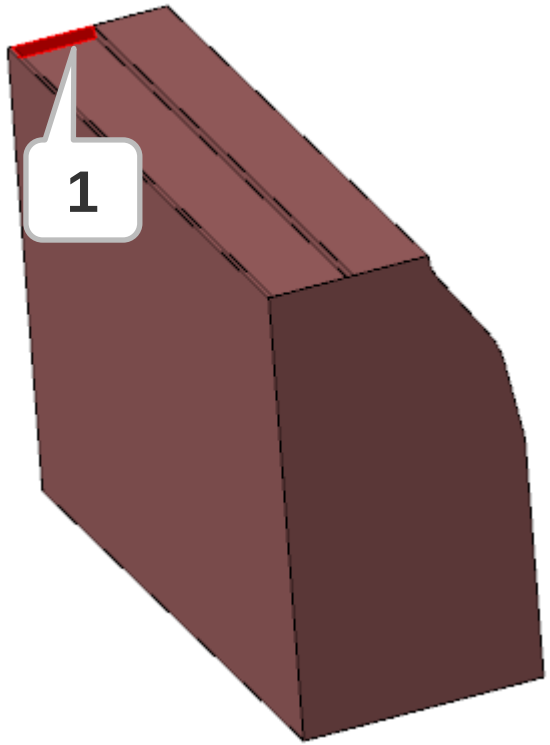
Use view control commands to…

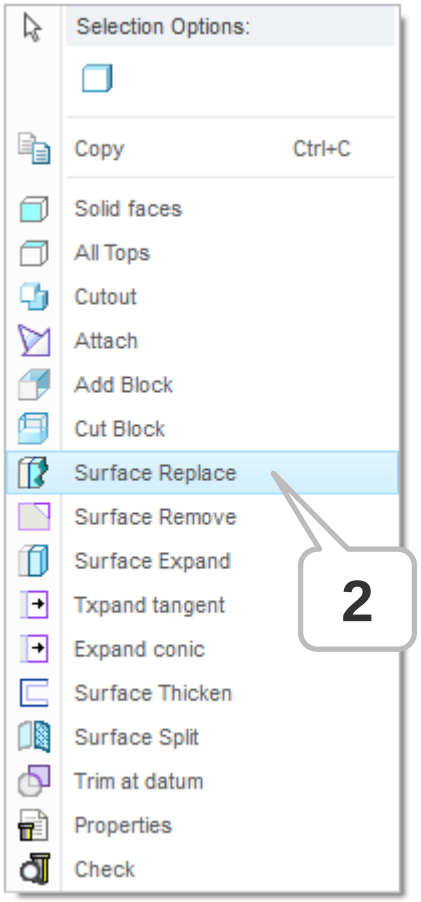
- **Show only activated component → ‚Isolate‘**
- **Show/hide workpieces → ‚Toggle cores‘**
- **Show/hide holders → ‚Toggle holders‘**
- **Show all**
- **Show/hide base groups → ‚Toggle base‘**
- **Show/hide analysis results → ‚Toggle analysis‘**
- **Show/hide datum surfaces → ‚Toggle surfaces‘**

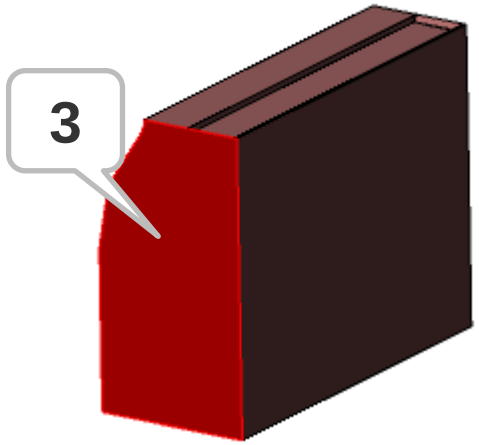


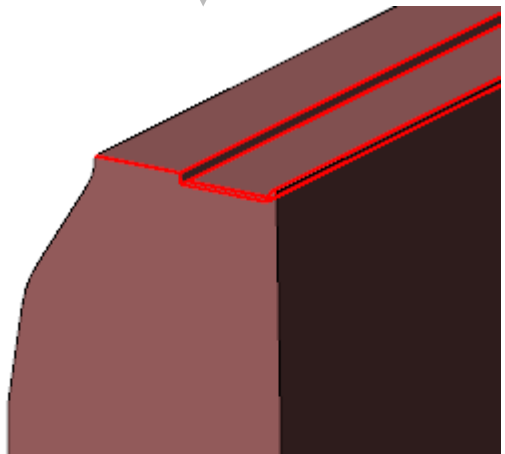
Electrode 1 – Cleanup



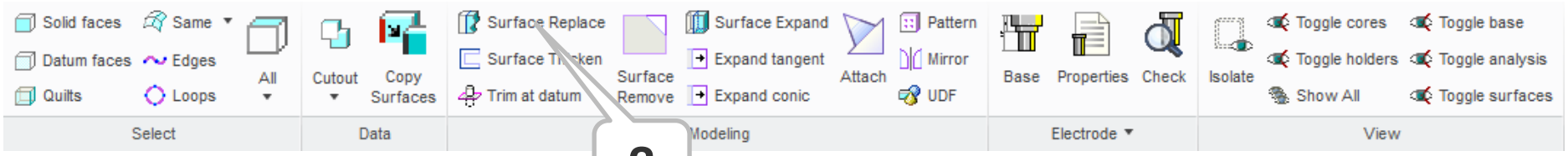


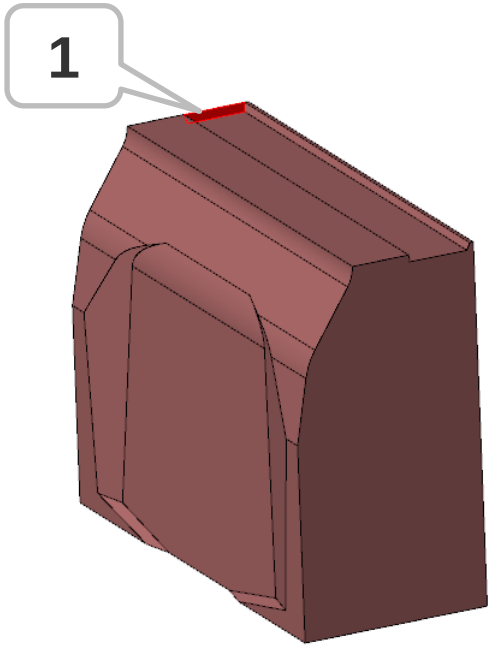


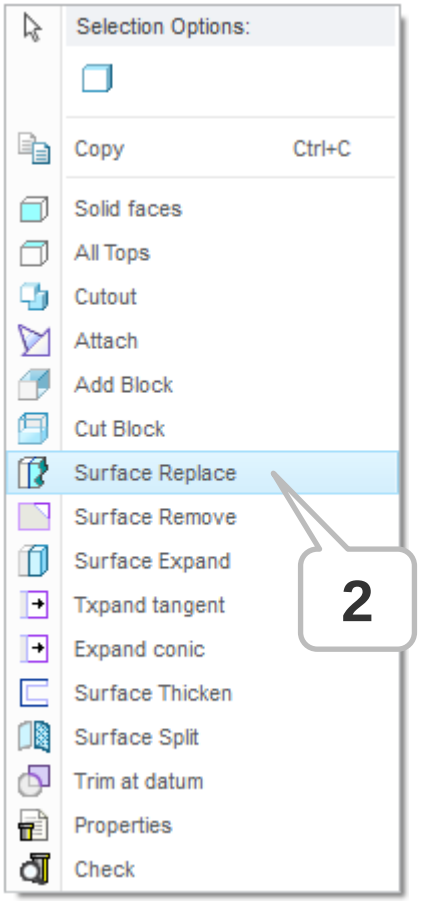


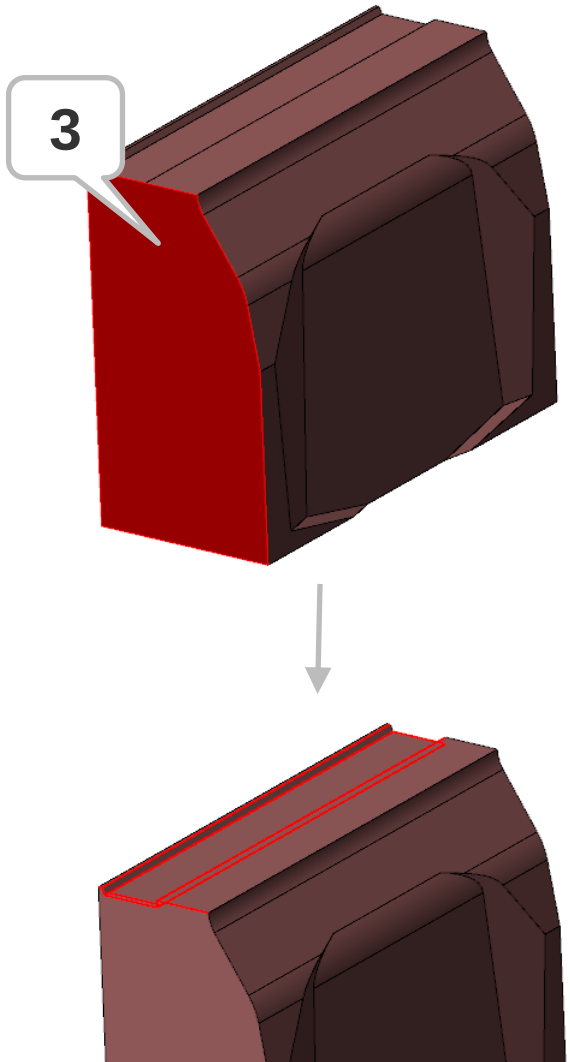


Electrode 1 – Cleanup

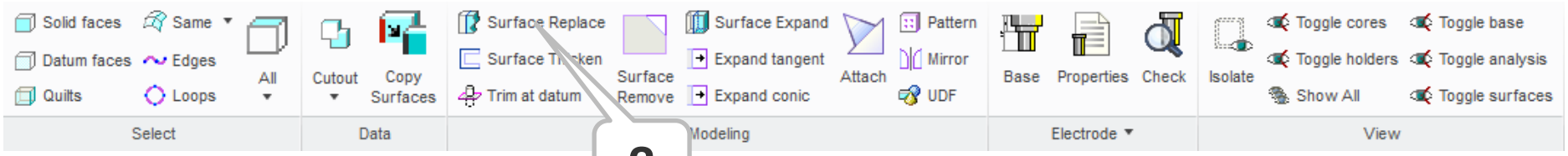


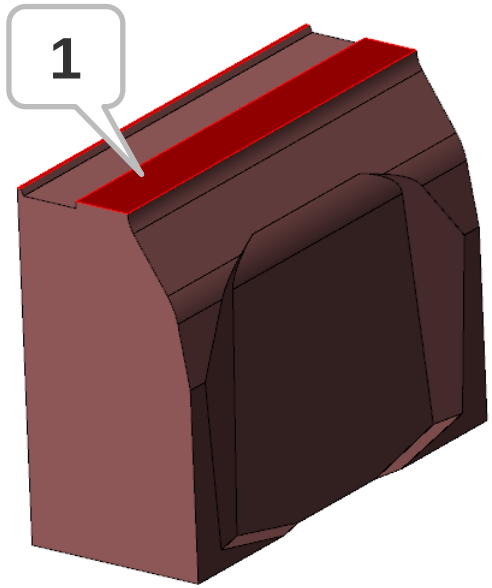


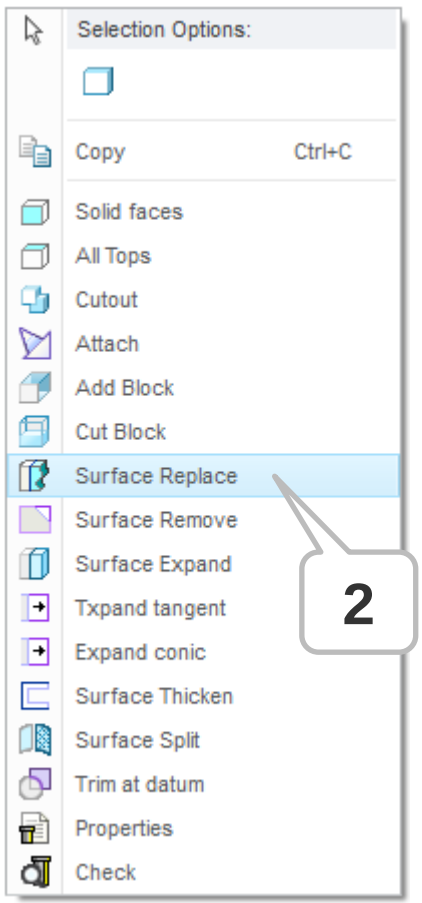


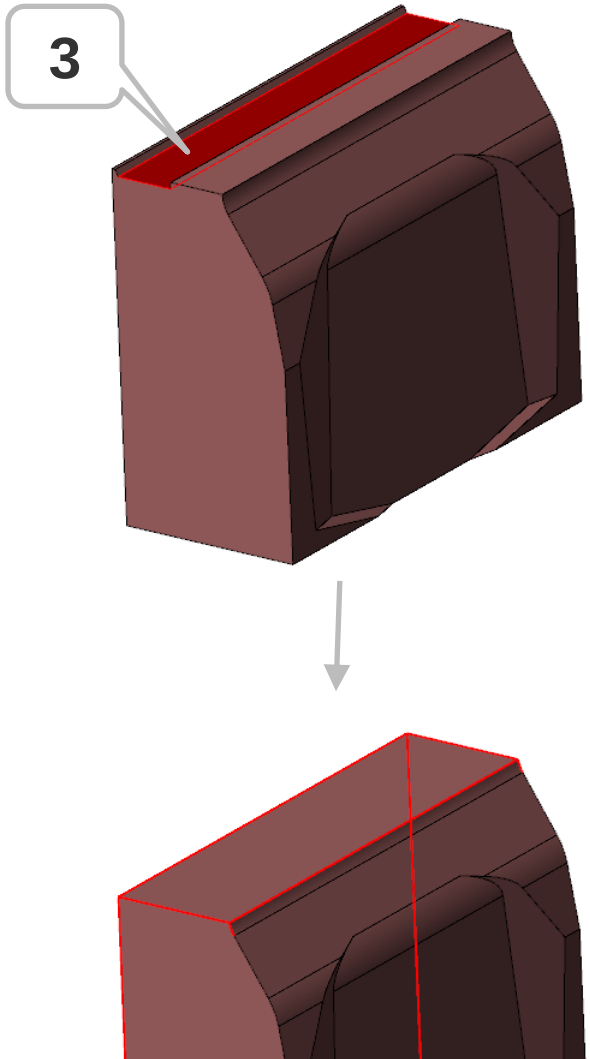


Electrode 1 – Cleanup

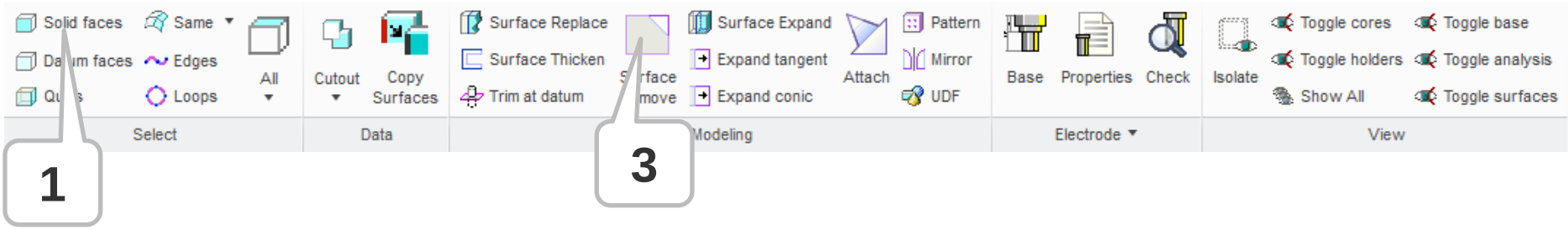


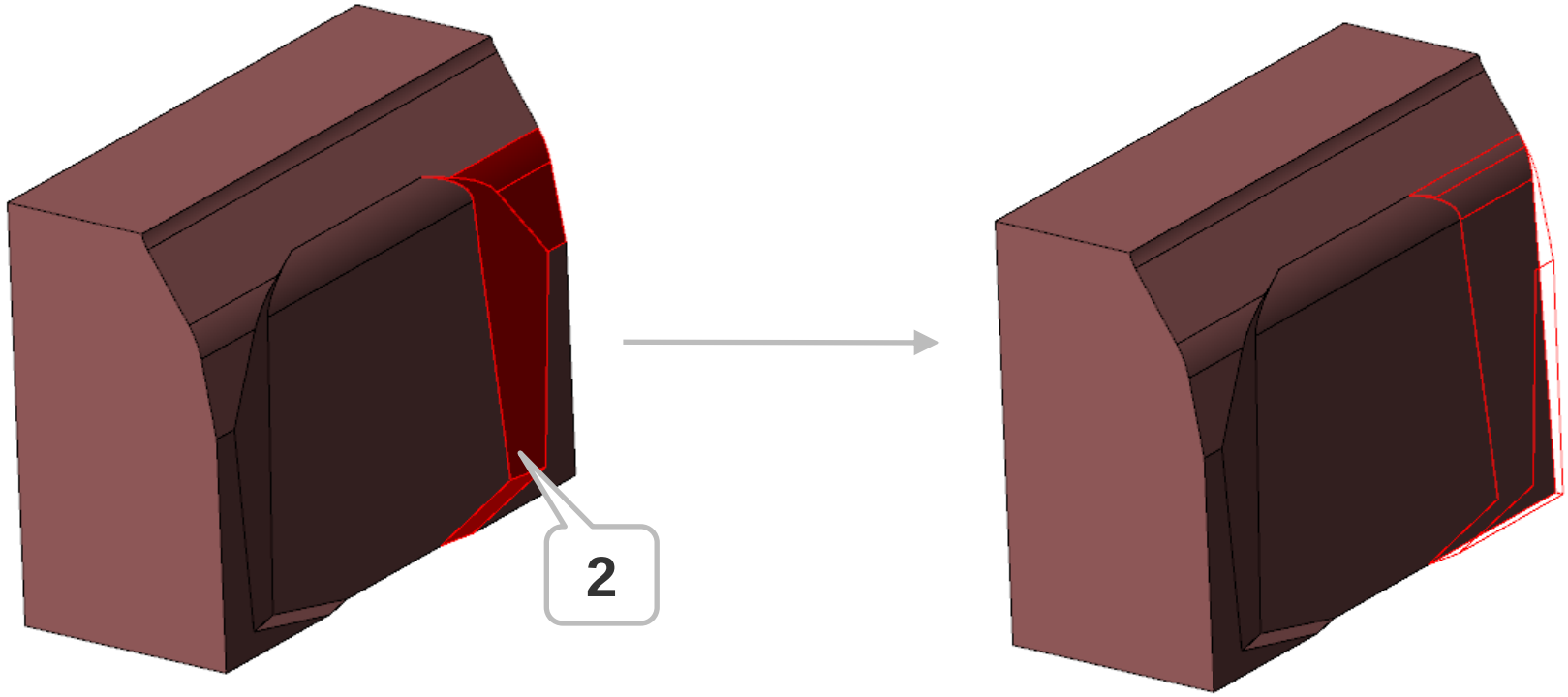




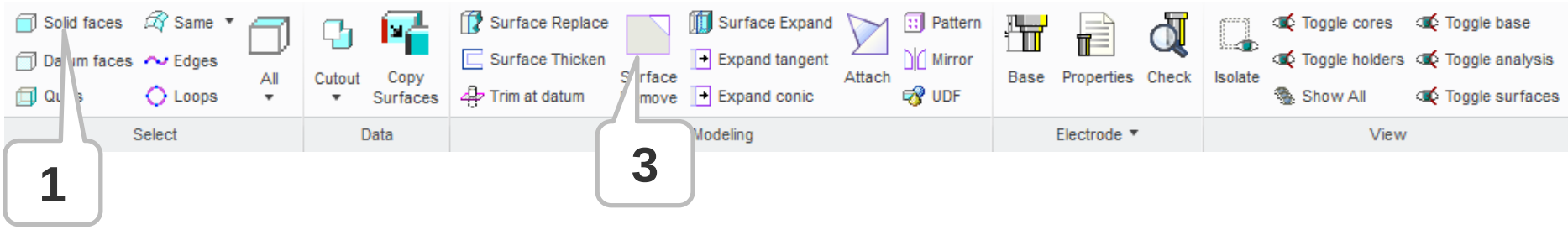


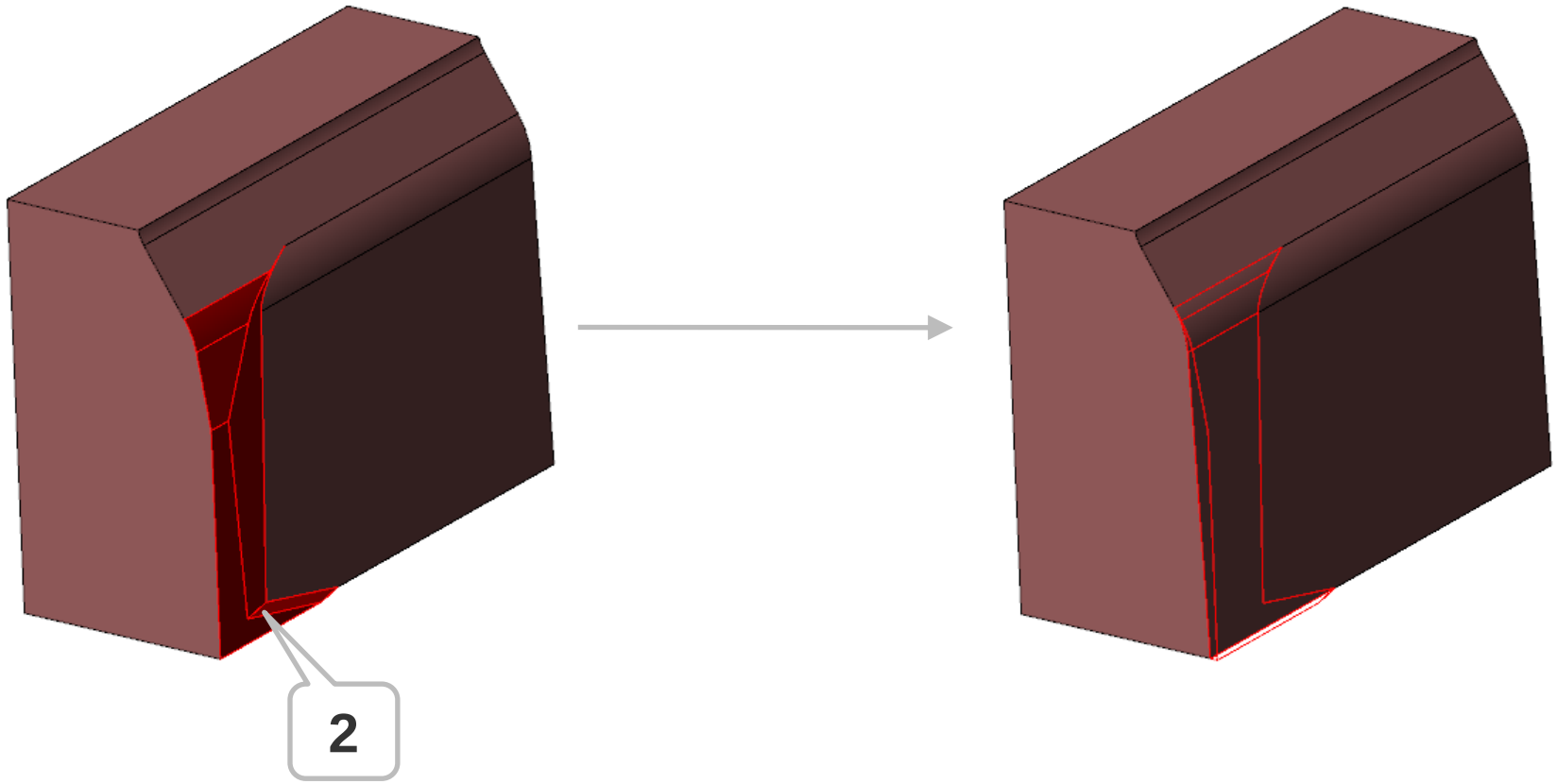
Electrode 1 – Cleanup



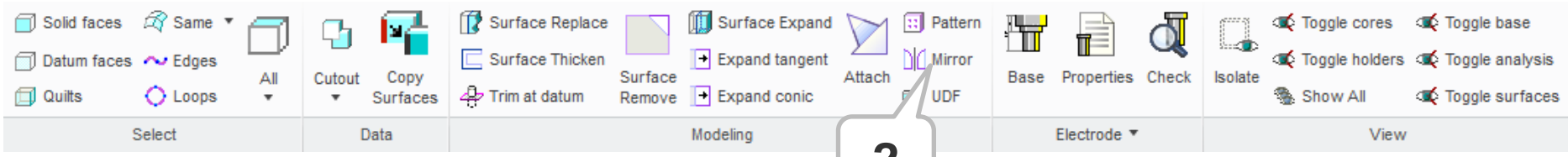


Electrode 1 – Cleanup



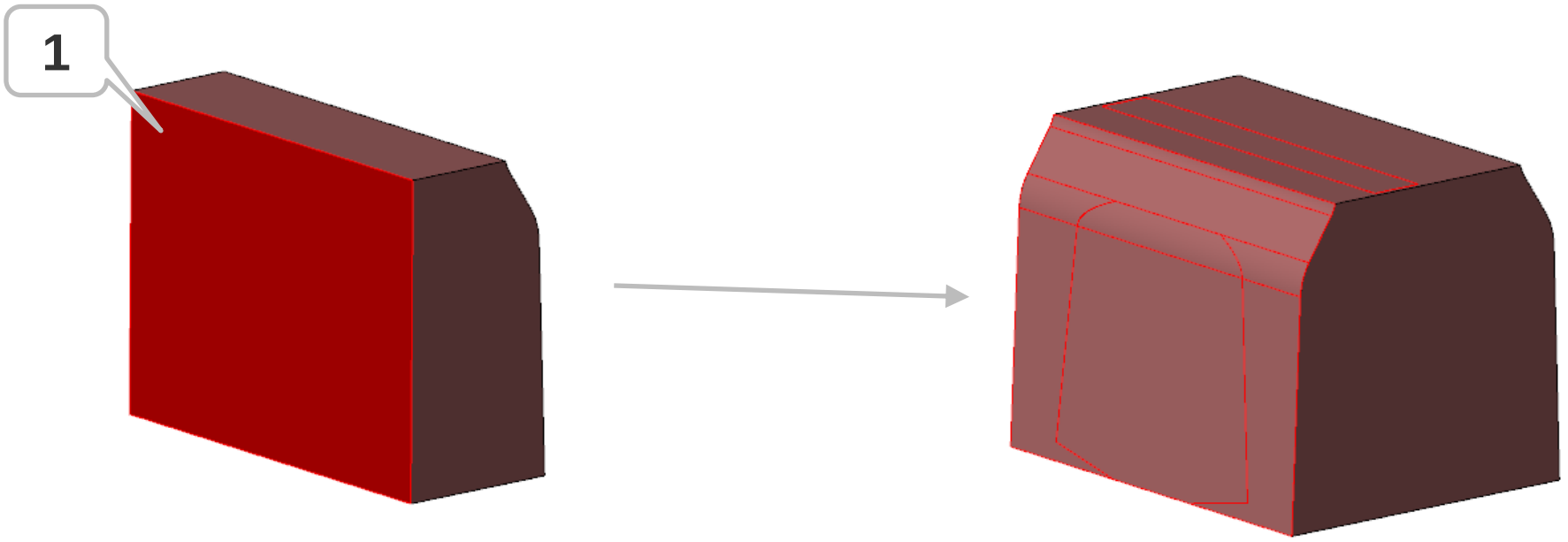


Electrode 1 – Cleanup

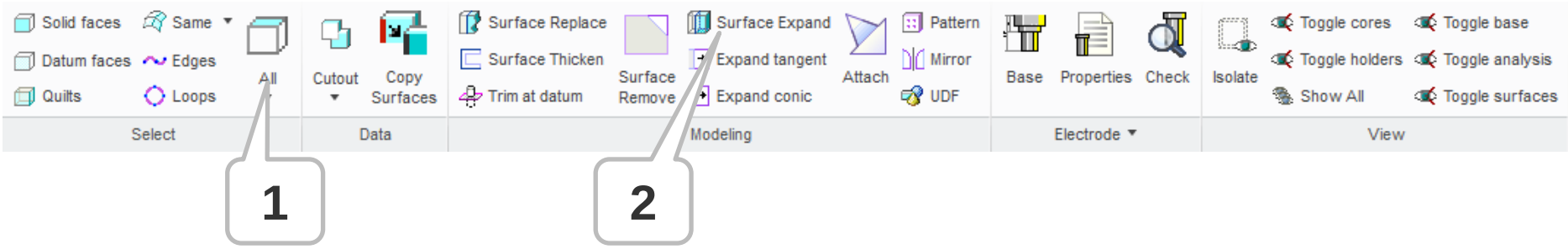


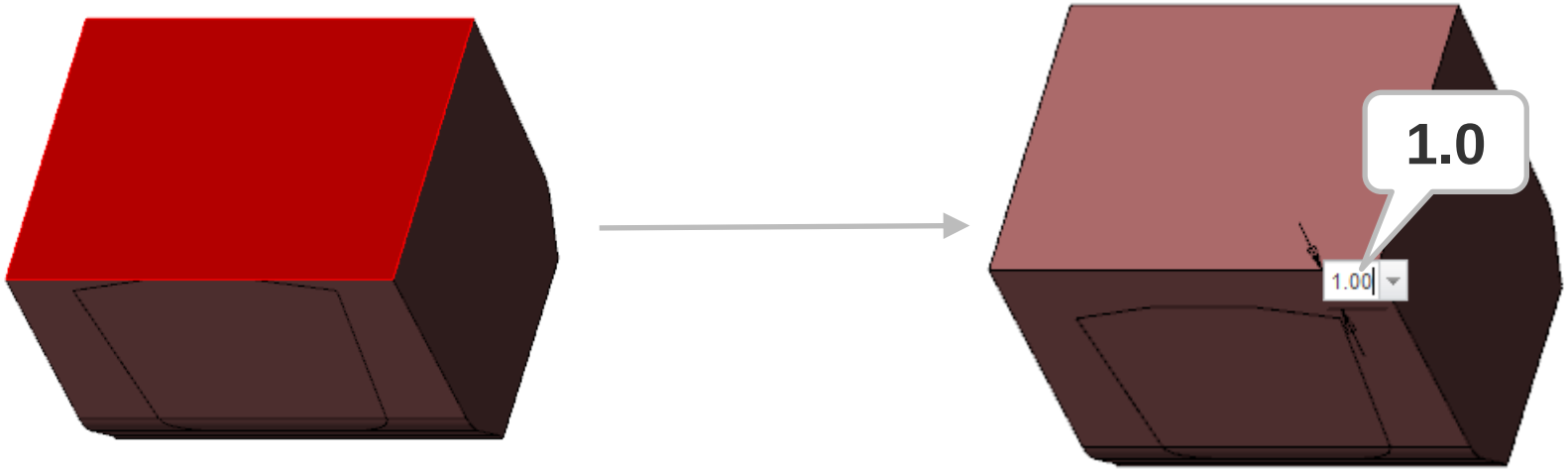
2

1



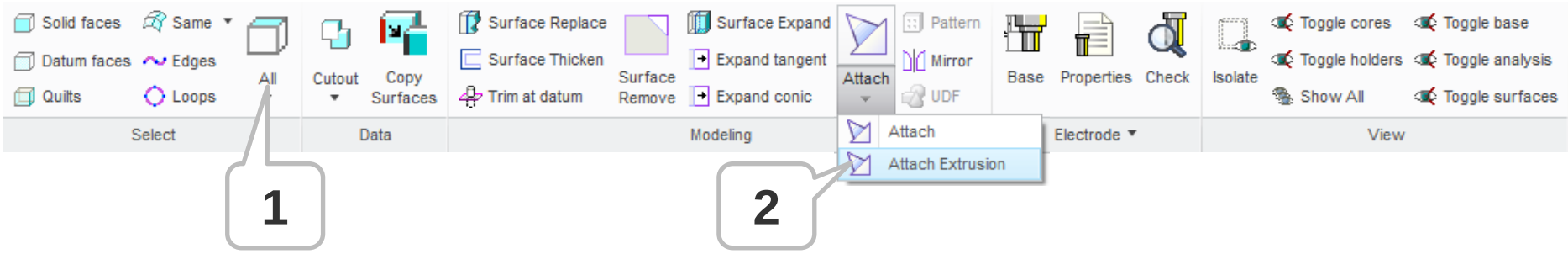
Electrode 1 – Cleanup

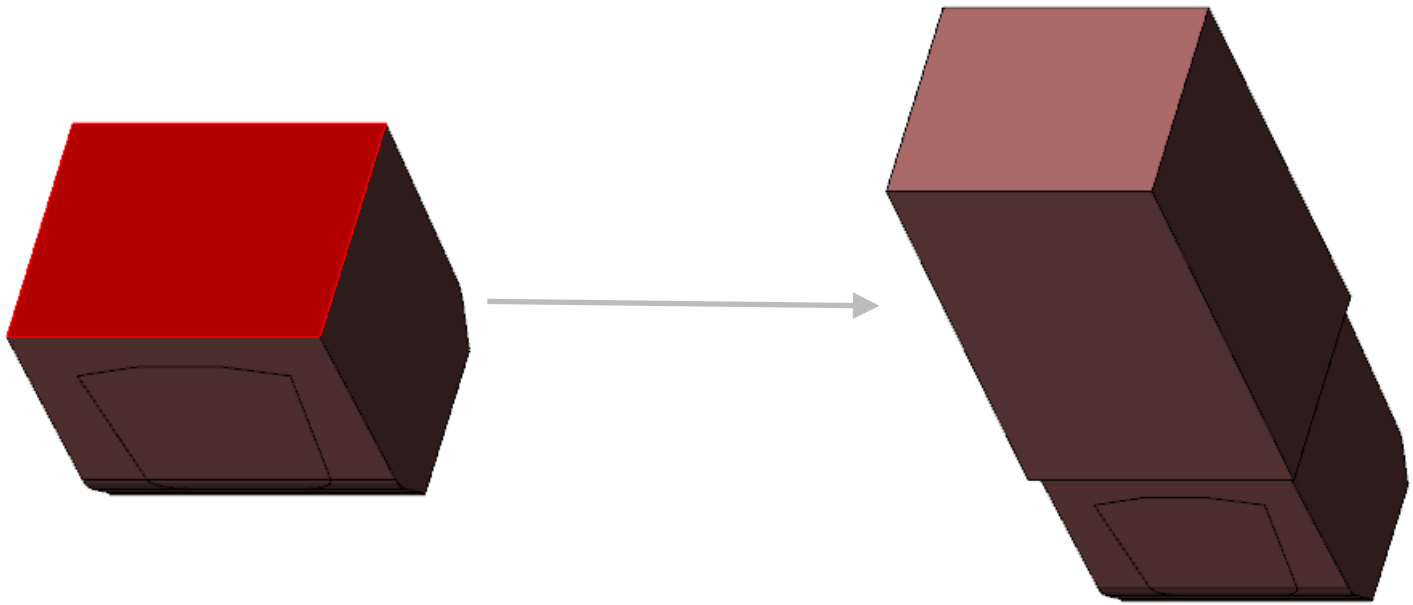




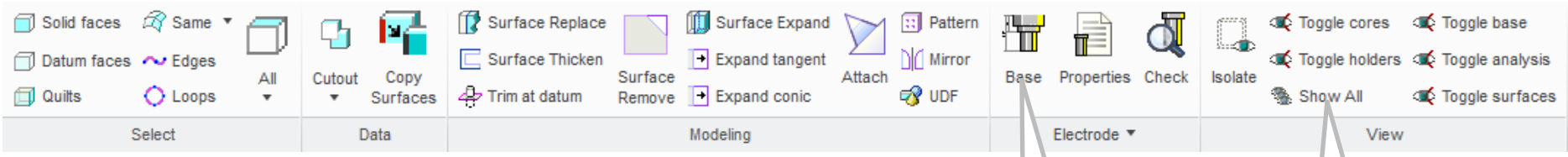
- **Filter command ‚All Top Surfaces‘ selects all plane, top surfaces that are NOT attached to FREE_FACE**

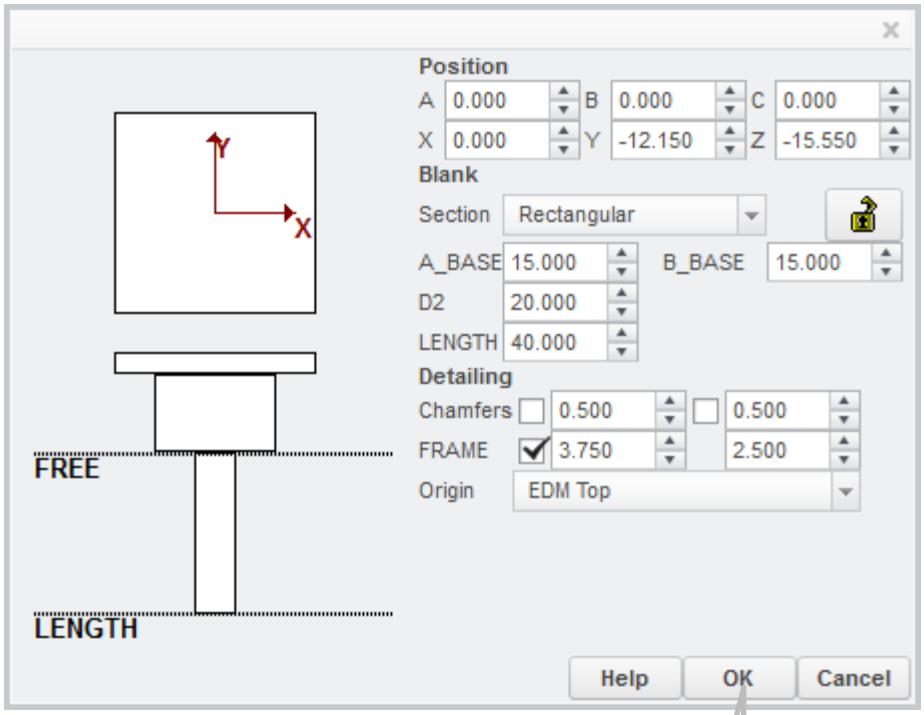
Electrode 1 – Cleanup

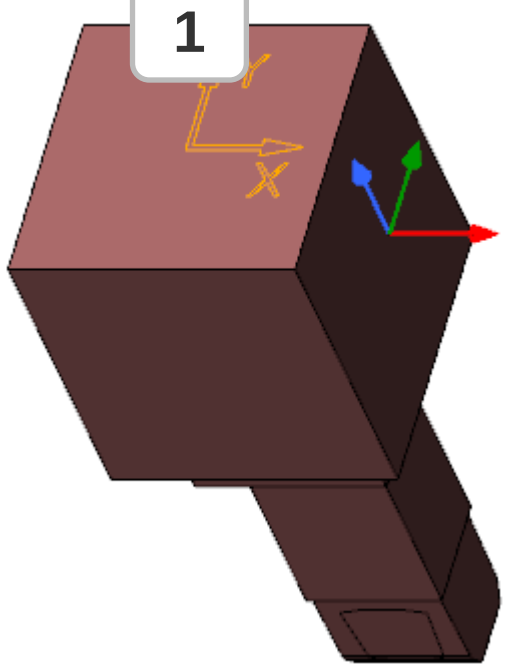




Add Base







1

2

3

4

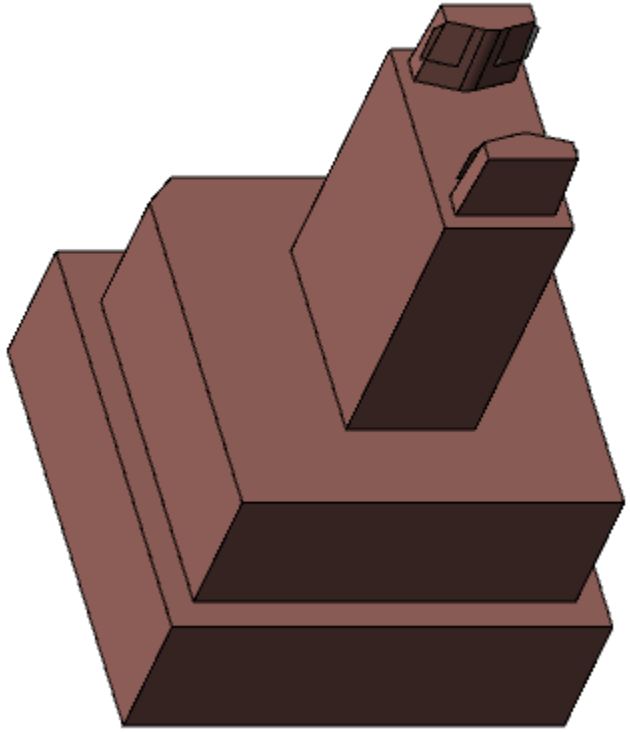
- **Press *Ctrl+A* to activate main assembly again**

Electrode 2

Topics of this exercise

- **Add new electrode**
- **Copy burn-faces**
- **Cleanup solid**
- **Mirror solid**
- **Attach to FREE_FACE**
- **Assemble electrode 2nd time**
- **Add base**

Note:
2nd position is added before
the electrode get‘s a base feature

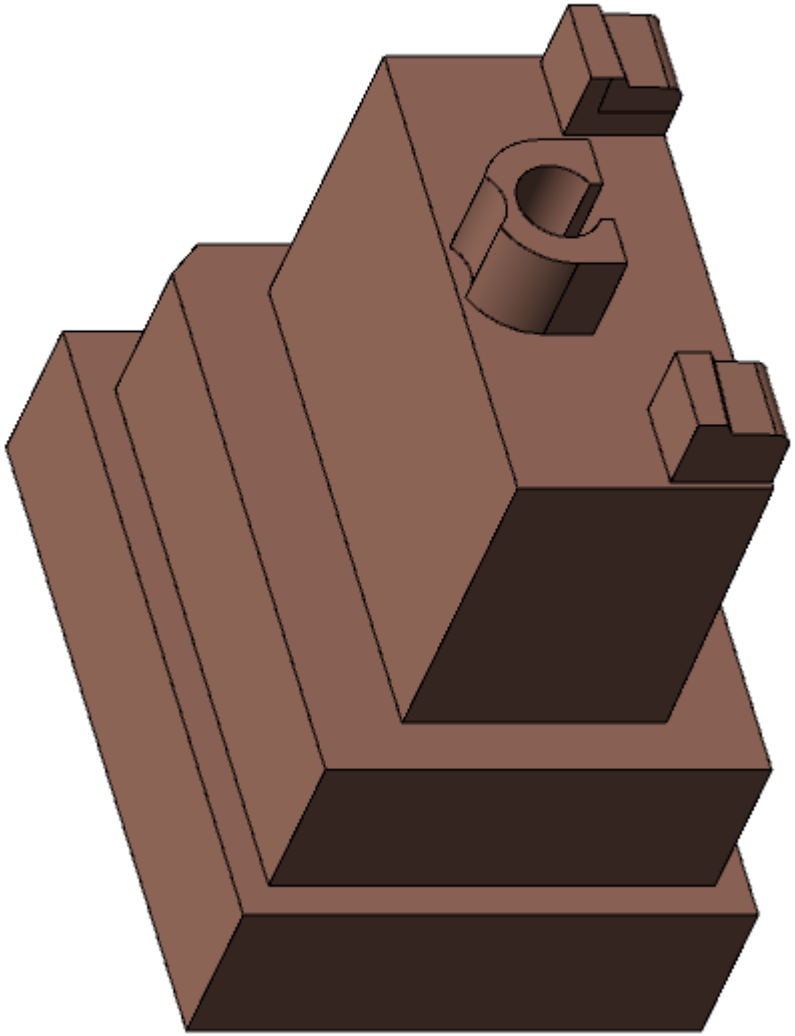


Electrode 3

Topics of this exercise

- **Add new electrode**
- **Copy burn-faces**
- **Cleanup solid**
- **Create another solid cutout**
- **Cleanup solid**
- **Mirror solid**
- **Attach to FREE_FACE**
- **Add base**
- **Assemble electrode 2nd time**

Note:
Multiple solid cutouts are permitted

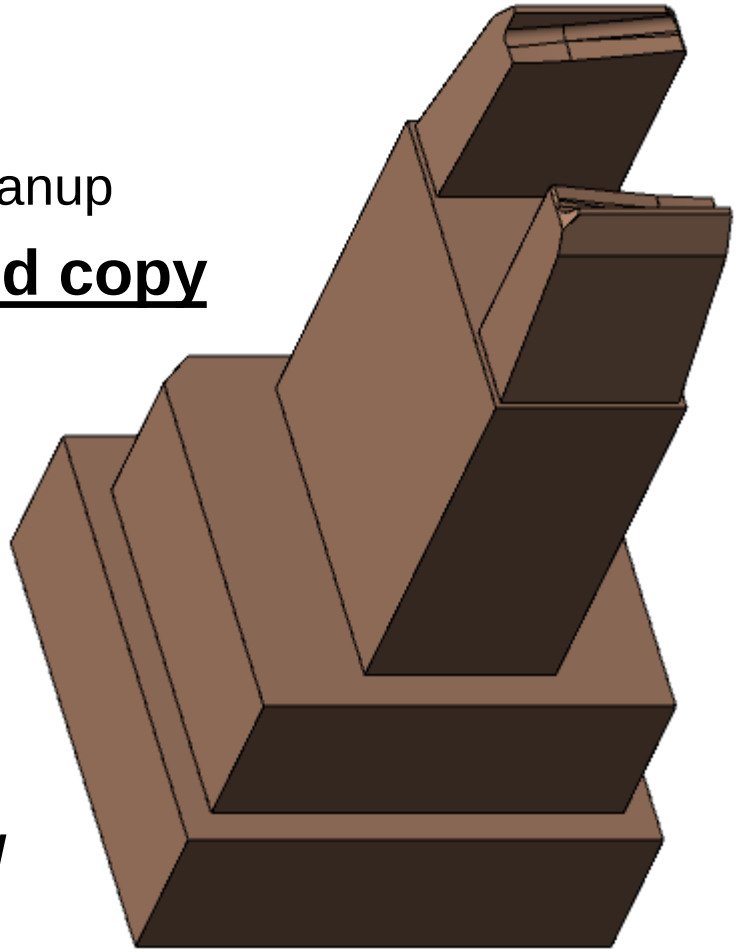


Electrode 4

Topics of this exercise

- **Add new electrode**
- **Copy burn-faces**
- **Cleanup solid**
  - Use of surface copy & solidify for cleanup
- **<u>Geometry pattern & transformed copy</u>**
- **Finish electrode**
  - Attach to FREE_FACE
  - Add base
  - Assemble electrode 2nd time

<u>Note:</u>
It‘s ok to mix Creo features and SMARTElectrode cleanup functions!

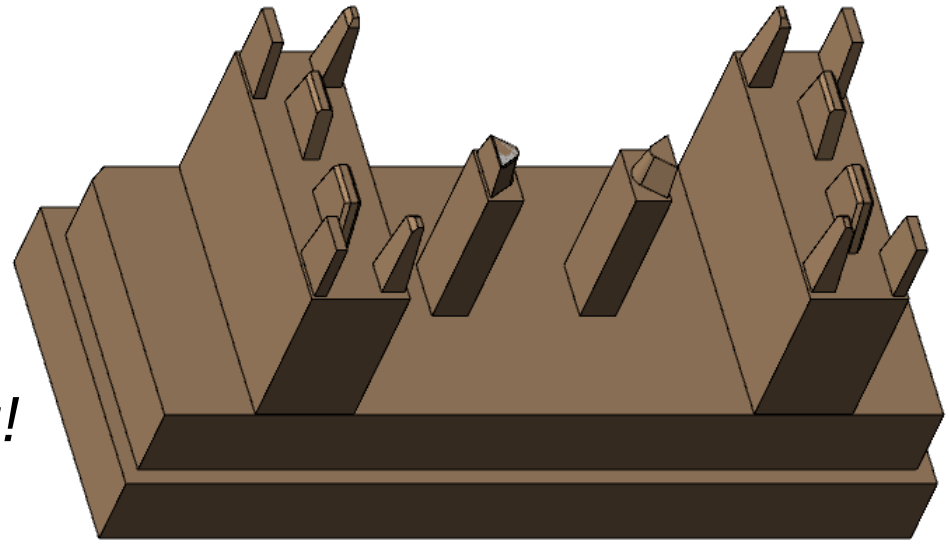


Electrode 5

Topics of this exercise

- **Add new electrode**
- **Create several solid bodies**
- **Usage of RMB (context menu) for cleanup**
- **Finish electrode**
  - Attach to FREE_FACE
  - Add base

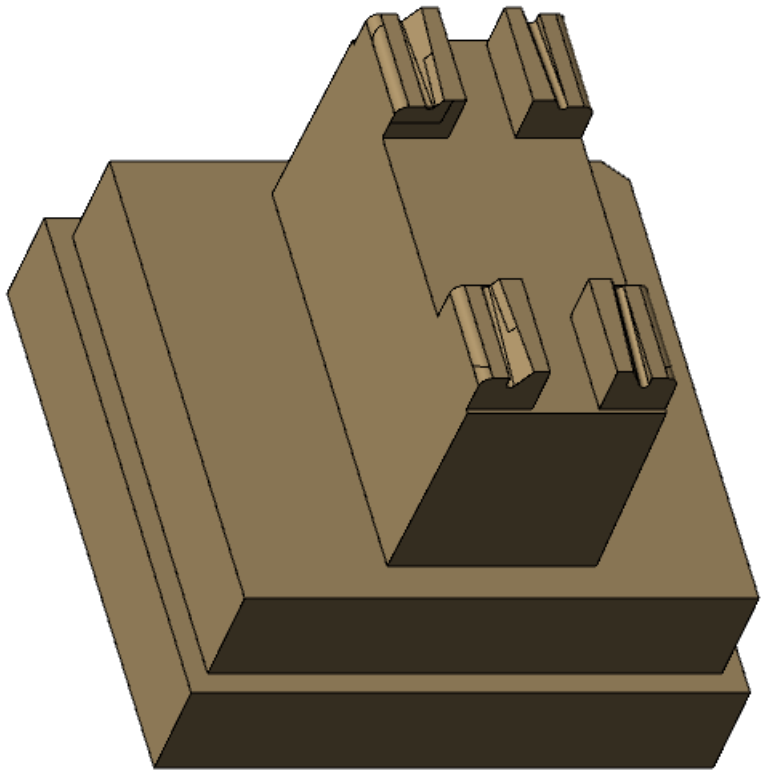
Note:
Most used cleanup functions are available in context menu!



Electrode 6

Topics of this exercise

- Add new electrode
- Add & cleanup solid
- Mirror at On-the-fly datum plane
- Finish electrode

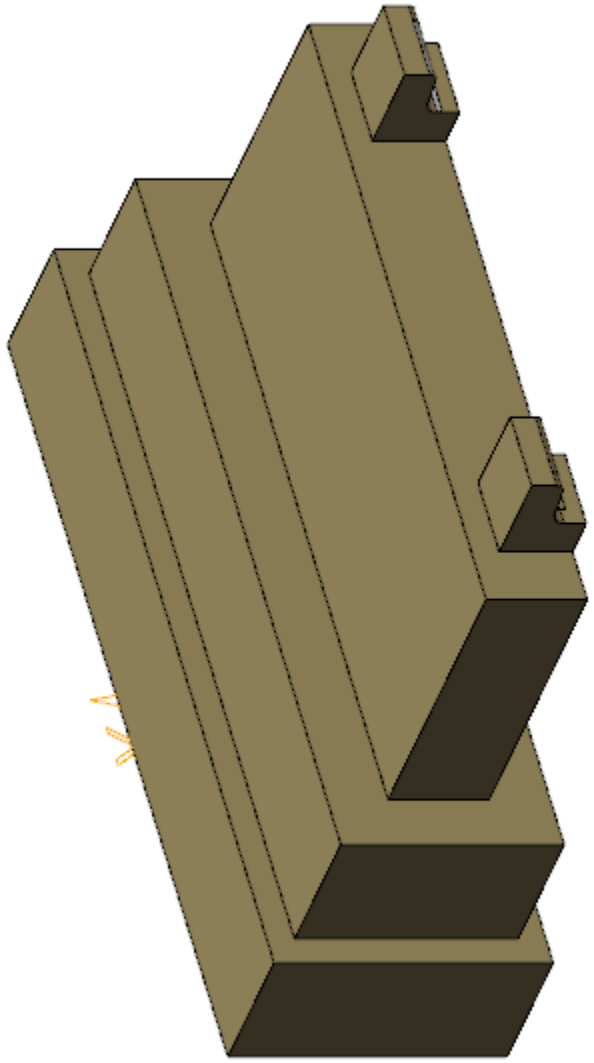


Electrode 7

Topics of this exercise

- **Add new electrode**
- **Add & cleanup solid**
- **Finish electrode**
  - Attach to FREE_FACE
  - Add base
- **Assemble electrode 2nd time**
  - 1st step rotate 180°
  - 2nd step transform position

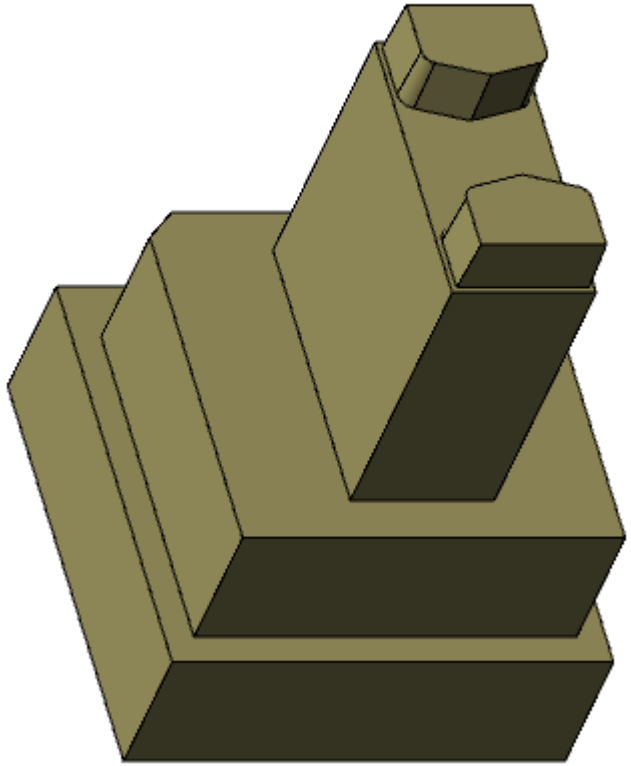
Note:
Use ‚Transform position‘ to move selected electrode component!



Electrode 8

Topics of this exercise

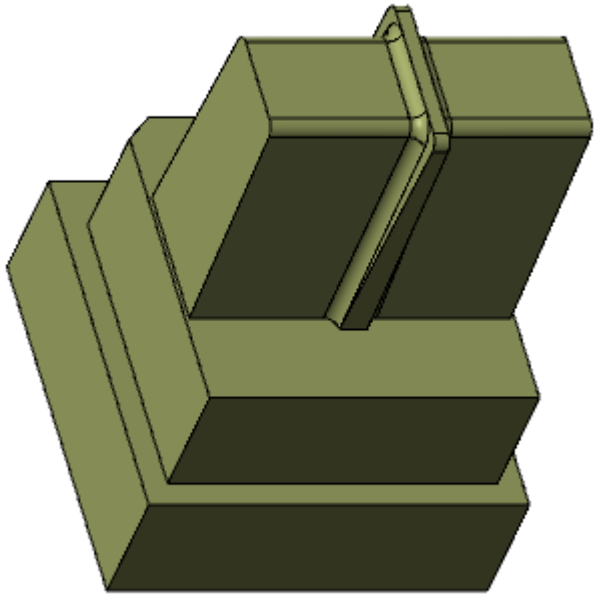
- **Add new electrode**
- **Add & cleanup solid**
- **Finish electrode**
- **Assemble electrode 2nd time**



Electrode 9

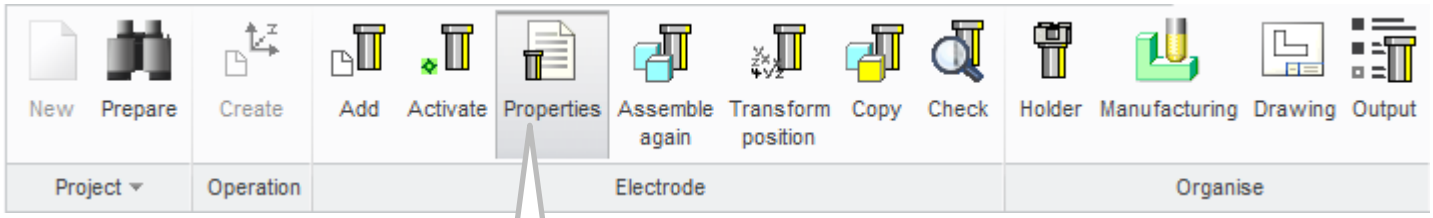
Topics of this exercise

- **Add new electrode**
- **Add solid**
- **Cleanup solid with alternative commands**
  - ‚Replace‘ if ‚Remove‘ fails
  - ‚Cut block‘ if ‚Remove‘ fails
- **Finish electrode**
- **Assemble electrode 2nd time**



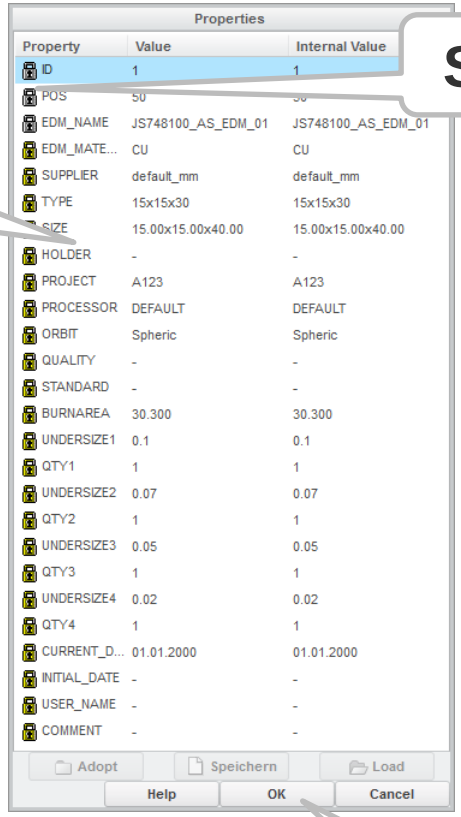
<u>Note:</u>
Different ways lead to success!

Set Electrode Properties



1

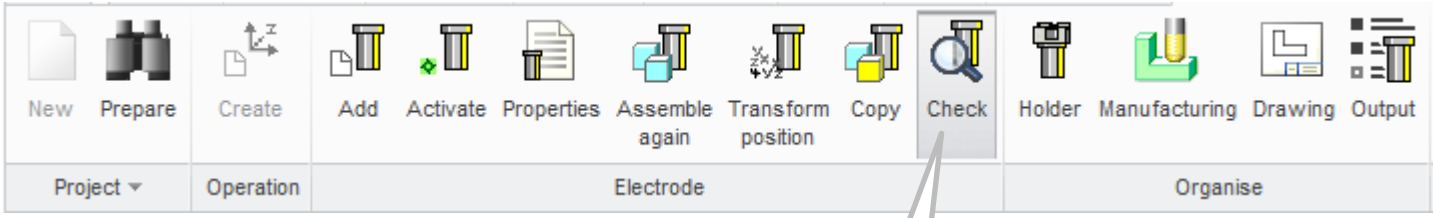
2

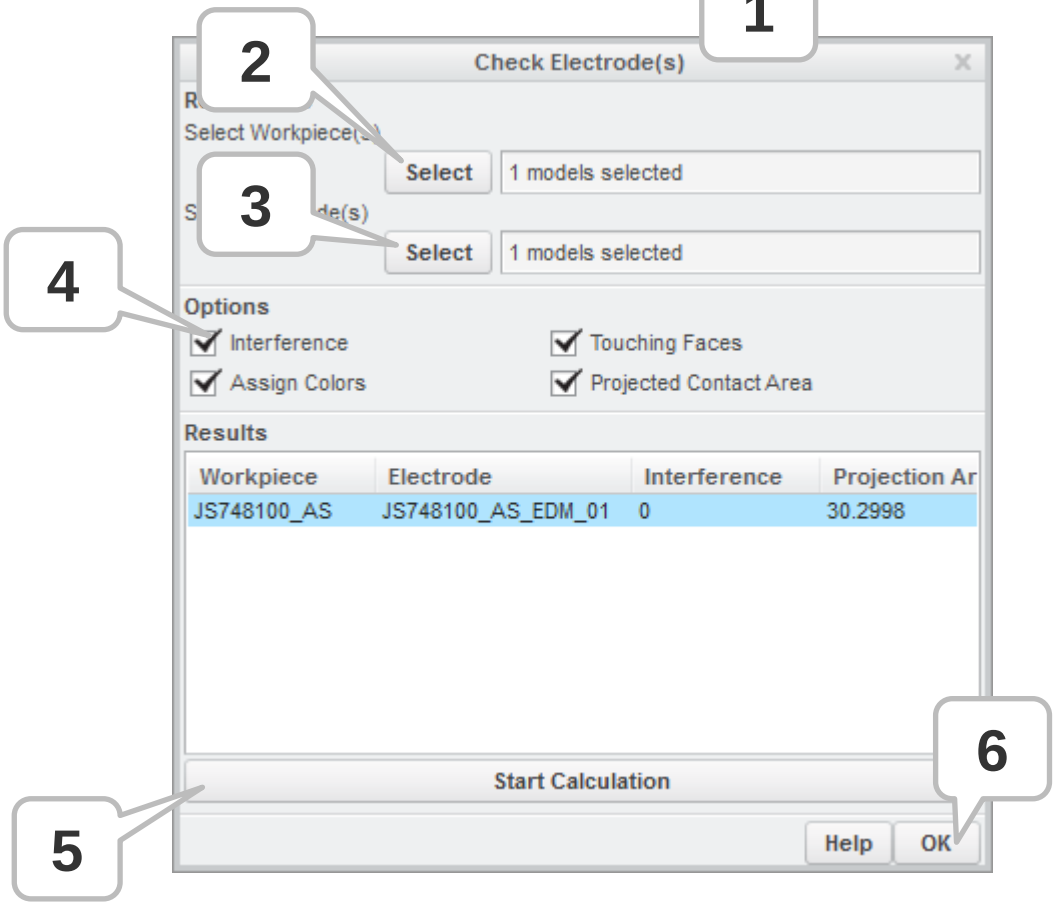


System parameters

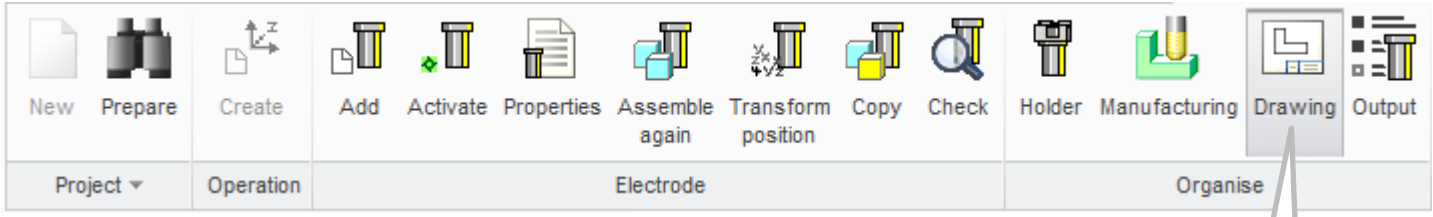
3

Check Electrodes





Drawings



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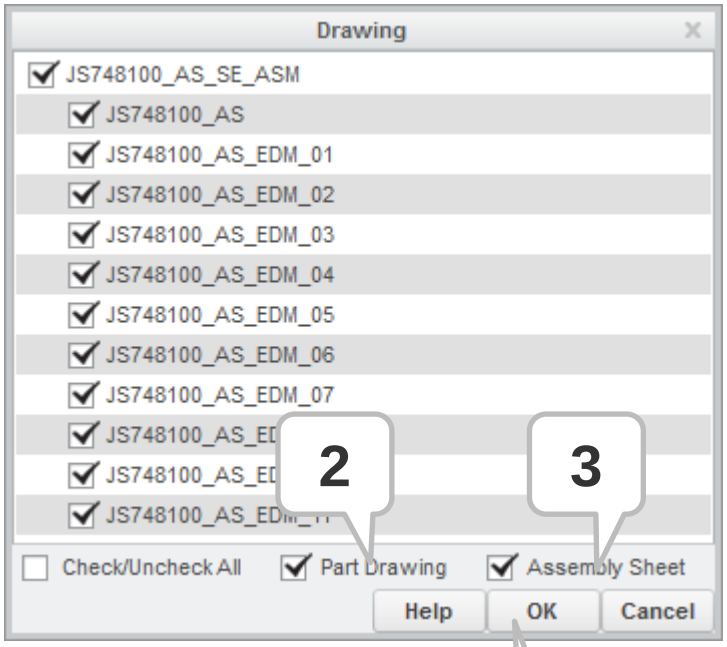
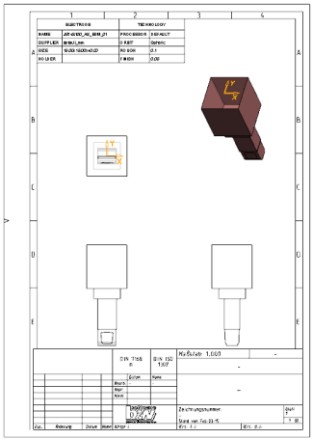
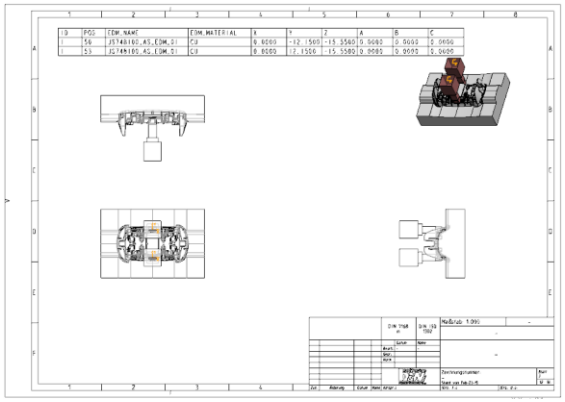


2

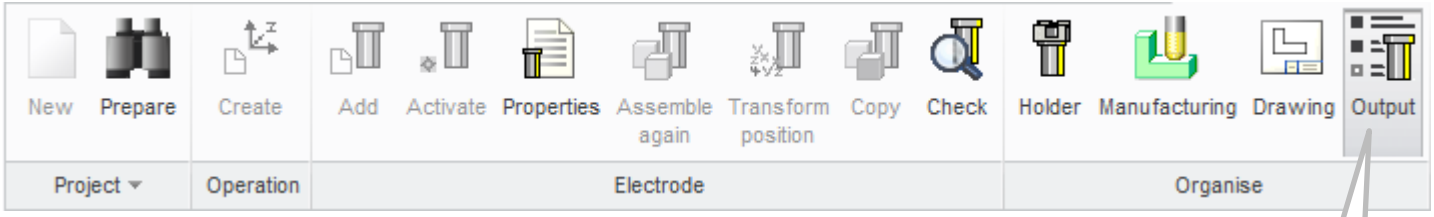
3

4

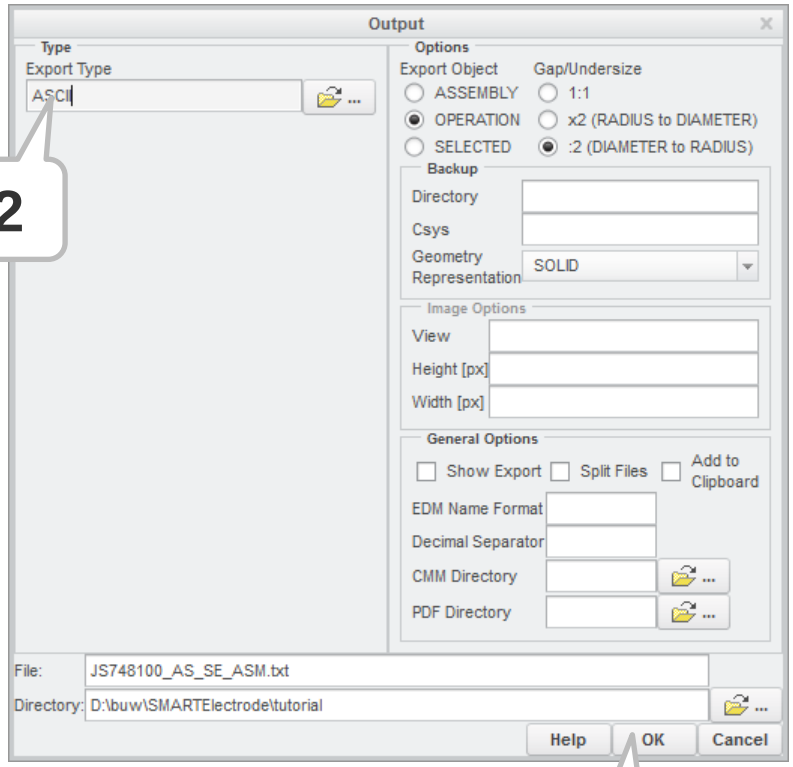




Data Output



1



2

3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