simus systems

Presentation for Company XY

Data Excellence

Empowering Digital Transformation

Karlsruhe, 14.03.2026

simus systems

Data Excellence:

Empowering Digital Transformation

simus systems specializes in delivering software solutions focusing on data transparency, tailored for the manufacturing industry.

2002
Founded

Owner-managed
Located in Karlsruhe

250+
Customers

400+
Projects

Industries
Mechanical and plant engineering, special machine construction, automotive, electronics

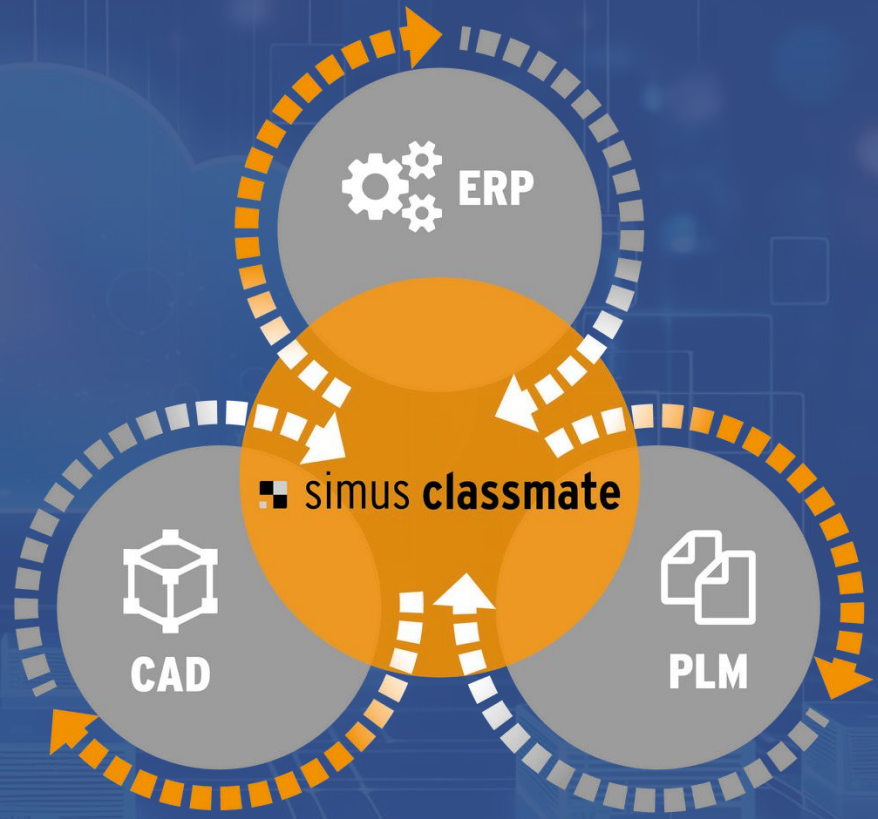
Software Bundesverband IT-Mittelstand Made in Germany
100% Service Quality Future

AERZEN · HSM · KOCH UHLMANN GROUP · KÖRBER · supfina · Rhätische Bahn · TRUMPF · KRONES · marel · pester pac automation

Adding Structure to your Data.

Our innovative solutions work at the interfaces between ERP, CAD and PLM systems, adding intelligent functionality to these systems.

In this way, we help companies become more profitable, more sustainable, and more future-proof.



simus classmate

classmate DATA

Analysis, classification and preparation of master data

classmate CAD

Geometric analysis and classification of CAD models

classmate COSTPILOT

Flexible and dynamic project cost controlling

classmate FINDER

Fast and precise search engine for structured data

classmate DRAW

AI-based analysis of technical drawings

classmate PLAN

Automated determination of manufacturing costs & emissions

Creation of routings

costing24

Online calculation

Installation Options

simus classmate

On-Premise / Local Installation

Advantages of our On-Premise solution:

- Data sovereignty
- Complete access control
- Adherence to individual compliance requirements
- Offline access

simus connect

SaaS / Cloud Installation

Advantages of our SaaS solution:

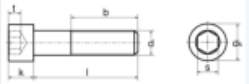
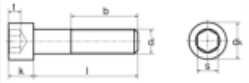
- No hardware costs
- No update effort
- Faster implementation
- No backup effort
- High reliability
- Available from anywhere
- No database administration

Analysis, structuring and rule-based revision of textual data sets

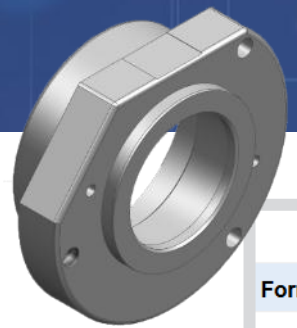
Goals:

- Clean master data
- Find duplicates
- Standardization
- Data preparation for migration
- Classification
- Data enrichment
- Merge data

920601	SCREW,CYL.W/HEX.SOC- M8X35 1.4301 DIN9	M8X35 1.4301 DIN912	DIN 912
920602	SCREW,CYL.W/HEX.SOC- M8X30 3.7035 D912	M8X30 DIN 912 3.7035 GRADE 2	DIN 912
921731	CYLINDER SCREW	M3X10	ITTECH
921732	CYLINDER SCREW	M4X8	ITTECH

ident	Type cheese head screw	Thread	Screw length [mm]	Rotational direction	Self locking
...					
920601	 cheese-head w. internal hex	M8	35.00 mm	RH	No
920602	 cheese-head w. internal hex	M8	30.00 mm	RH	No
921731		M3	10.00 mm	RH	No
921732		M4	8.00 mm	RH	No

classmate CAD



Geometric analysis and classification of 3D models, integrated into the CAD system

- Geometric similarity search
- Customizable set of rules
- Flexible connection to databases and ERP/PDM/PLM systems

Goals:

- Quickly find existing models
- Increase reuse rate
- Reduce engineering costs

Form elements

Form element holes

Total qty. of holes:	5		
Qty. of holes:	2	1	2
Hole alignment:	linear alignment	single hole	linear alignment
Attachment of hole alignment:	rotational part step face	rotational part step face	rotational part step face
Qty. of bolt circles:	-	-	-
Bolt circle diameter [mm]:	-	-	-
Edge distance-1 [mm]:	4,38 mm	-	14,29 mm
Edge distance-2 [mm]:	5,37 mm	-	5,20 mm
Spacing-1 [mm]:	42,13 mm	-	-
Spacing-2 [mm]:	-	-	46,00 mm
Qty. spacing-1:	2	-	1
Qty. spacing-2:	1	-	2
Hole form:	threaded through hole	threaded through hole	threaded blind hole
Hole diameter [mm]:	4,20 mm	4,20 mm	2,50 mm
Hole depth [mm]:	10,00 mm	10,00 mm	9,00 mm
Hole-basis fit:	-	-	-
Thread information (cleaned):	M5	M5	M3
Metric nominal thread dimension:	M5	M5	M3 <guess>
Tapped hole diameter [mm]:	5,00 mm	5,00 mm	3,00 mm
Tapped hole depth [mm]:	10,00 mm	10,00 mm	9,00 mm

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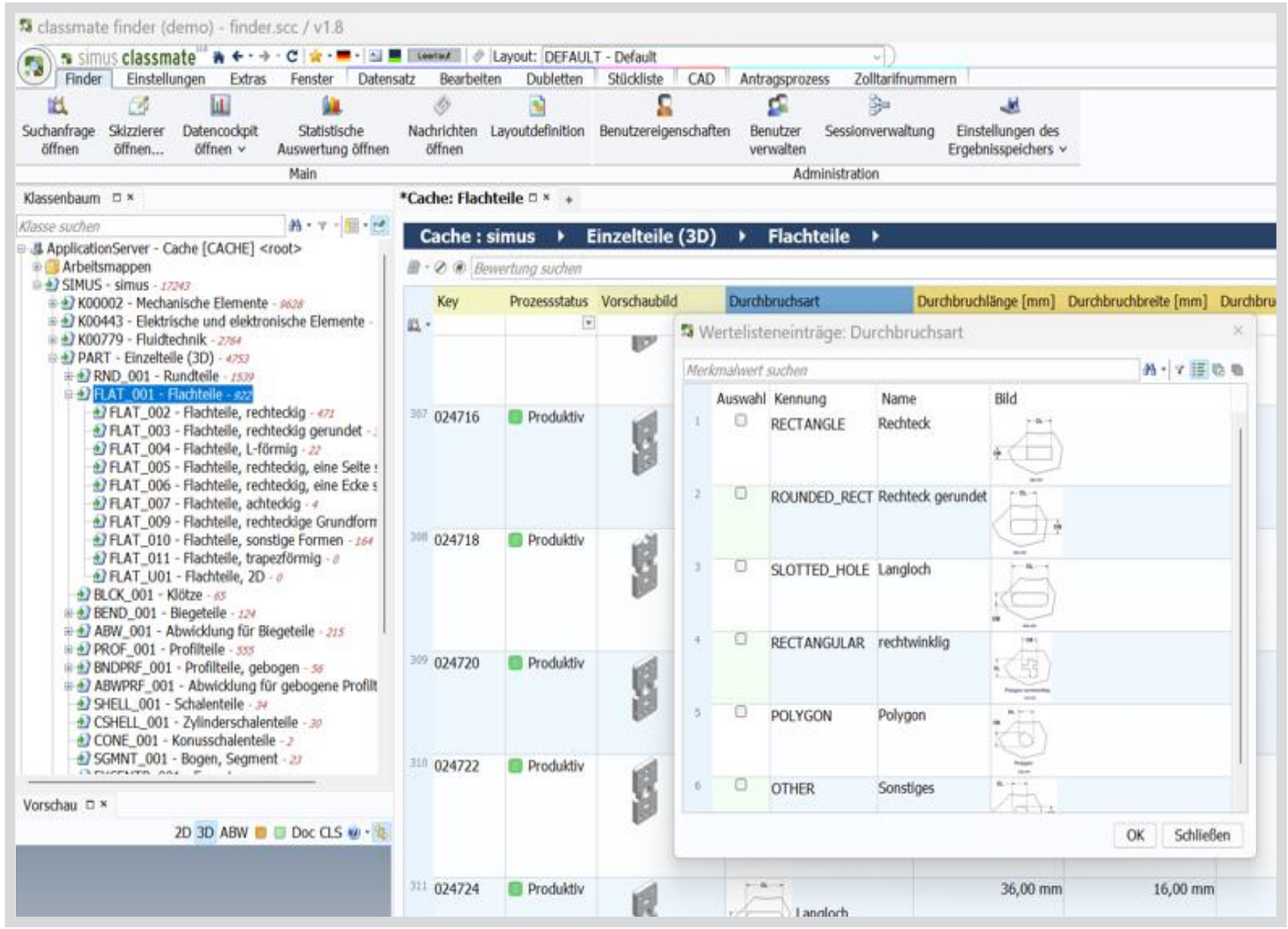
Fast and precise "search engine" for structured data

- Wide range of search options
- Optimal for large databases
- Graphically supported search
- Results from different sources (PDM, ERP, CAD)
- Similar part search / sub-area search

- Local installation (FINDER)
- Browser based (easyFINDER)

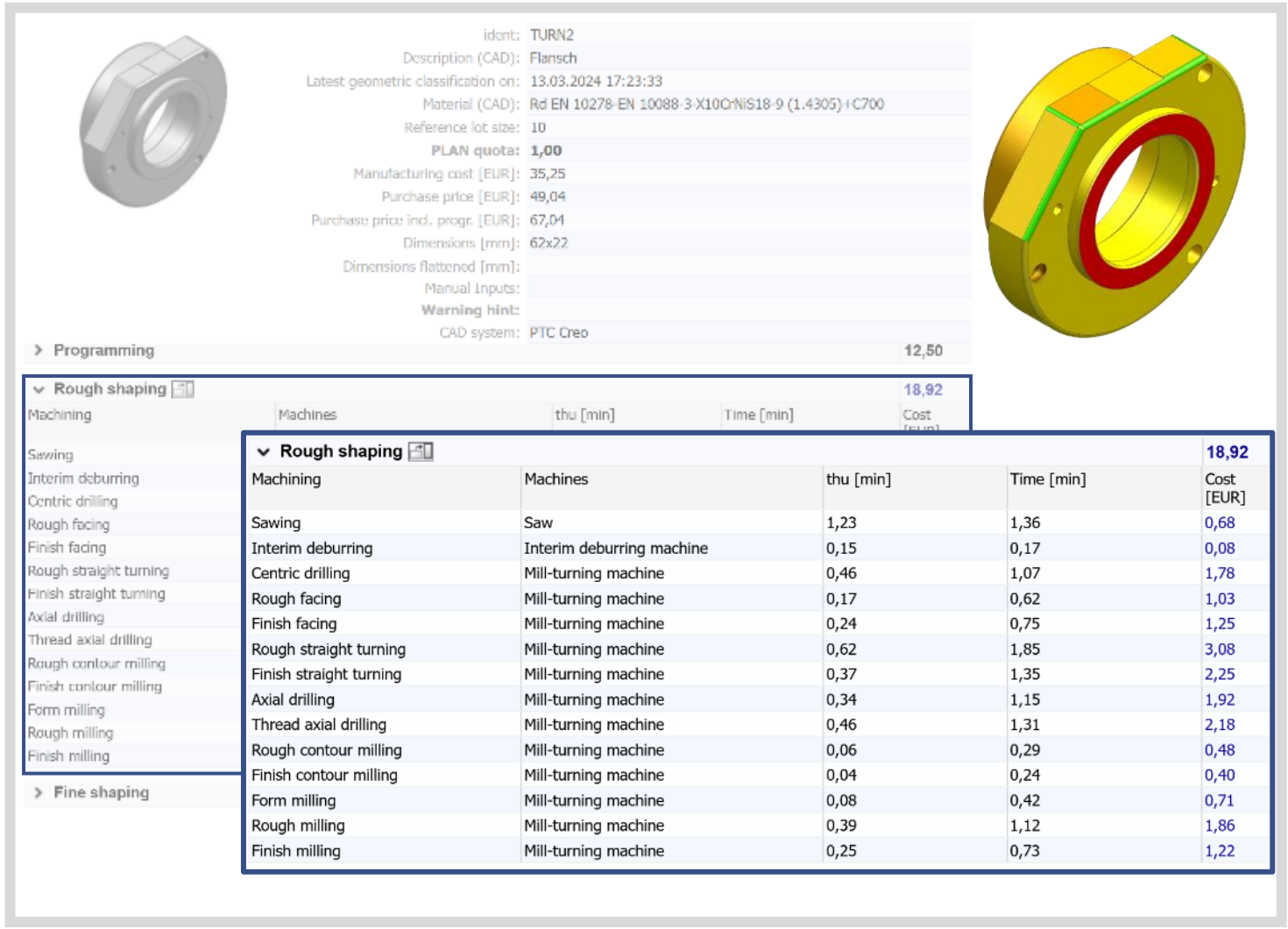


Preliminary costing, CO2 emissions and routings automatically from the CAD model

- Integrated in Solid Edge, SolidWorks, NX, Creo Parametric, Inventor and CATIA

Goals:

- **Design:** Early knowledge of manufacturing costs and emissions
- **Work preparation:** Accelerate work planning
- **Purchasing:** Actively set target prices
- **Contract manufacturing:** Create quotes quickly



Rough shaping 18,92

Machining	Machines	thu [min]	Time [min]	Cost [EUR]
Sawing	Saw	1,23	1,36	0,68
Interim deburring	Interim deburring machine	0,15	0,17	0,08
Centric drilling	Mill-turning machine	0,46	1,07	1,78
Rough facing	Mill-turning machine	0,17	0,62	1,03
Finish facing	Mill-turning machine	0,24	0,75	1,25
Rough straight turning	Mill-turning machine	0,62	1,85	3,08
Finish straight turning	Mill-turning machine	0,37	1,35	2,25
Axial drilling	Mill-turning machine	0,34	1,15	1,92
Thread axial drilling	Mill-turning machine	0,46	1,31	2,18
Rough contour milling	Mill-turning machine	0,06	0,29	0,48
Finish contour milling	Mill-turning machine	0,04	0,24	0,40
Form milling	Mill-turning machine	0,08	0,42	0,71
Rough milling	Mill-turning machine	0,39	1,12	1,86
Finish milling	Mill-turning machine	0,25	0,73	1,22

costing24

Online tool - Determine manufacturing costs in seconds

Simple calculation solution with the calculation engine of classmate PLAN

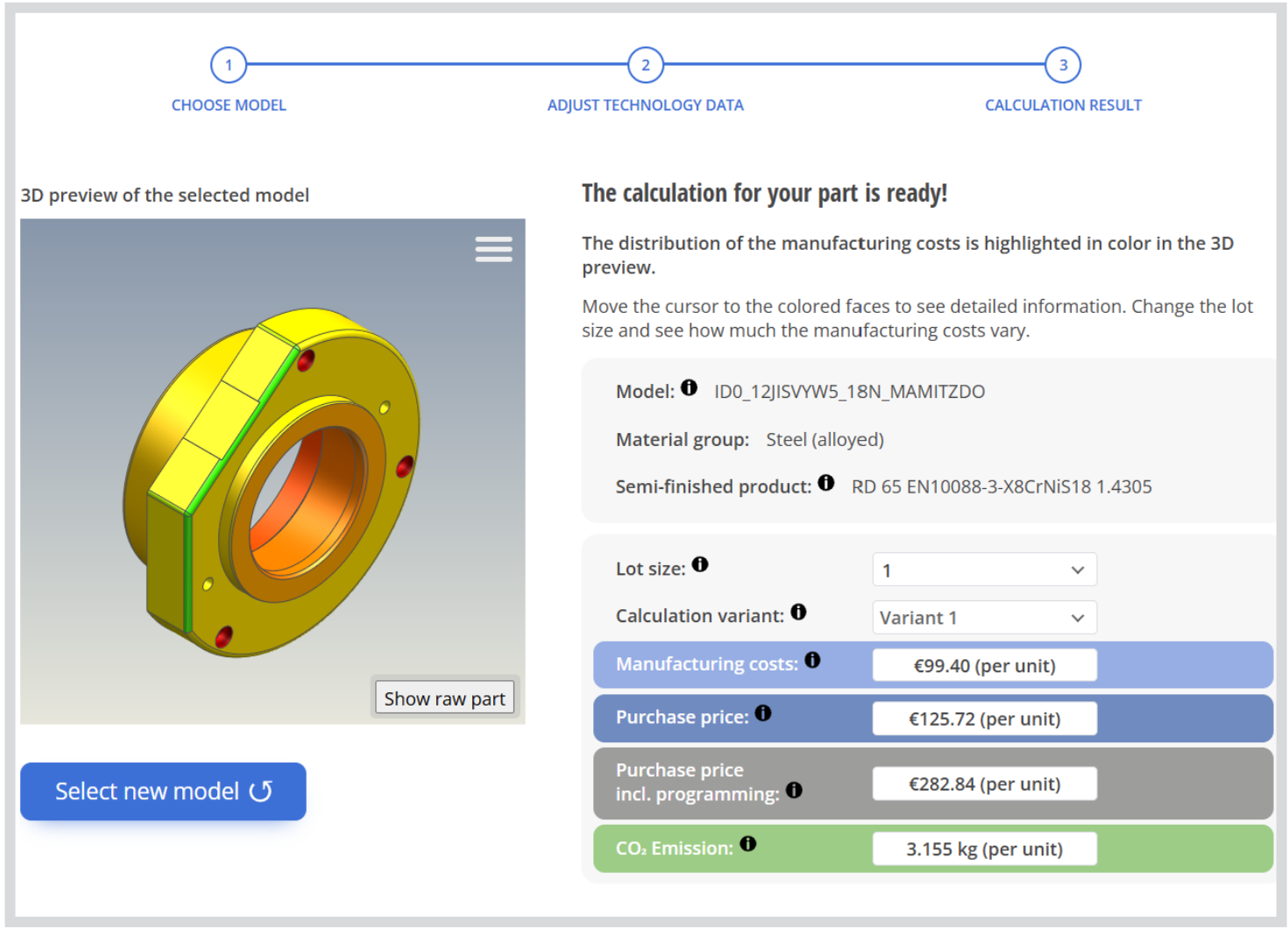
Turned, milled and sheet metal parts

Simple configuration options

Cost-effective subscription model

Advantages:

- Ideal for individual components
- Quick calculation
- Intuitive handling
- Browser based



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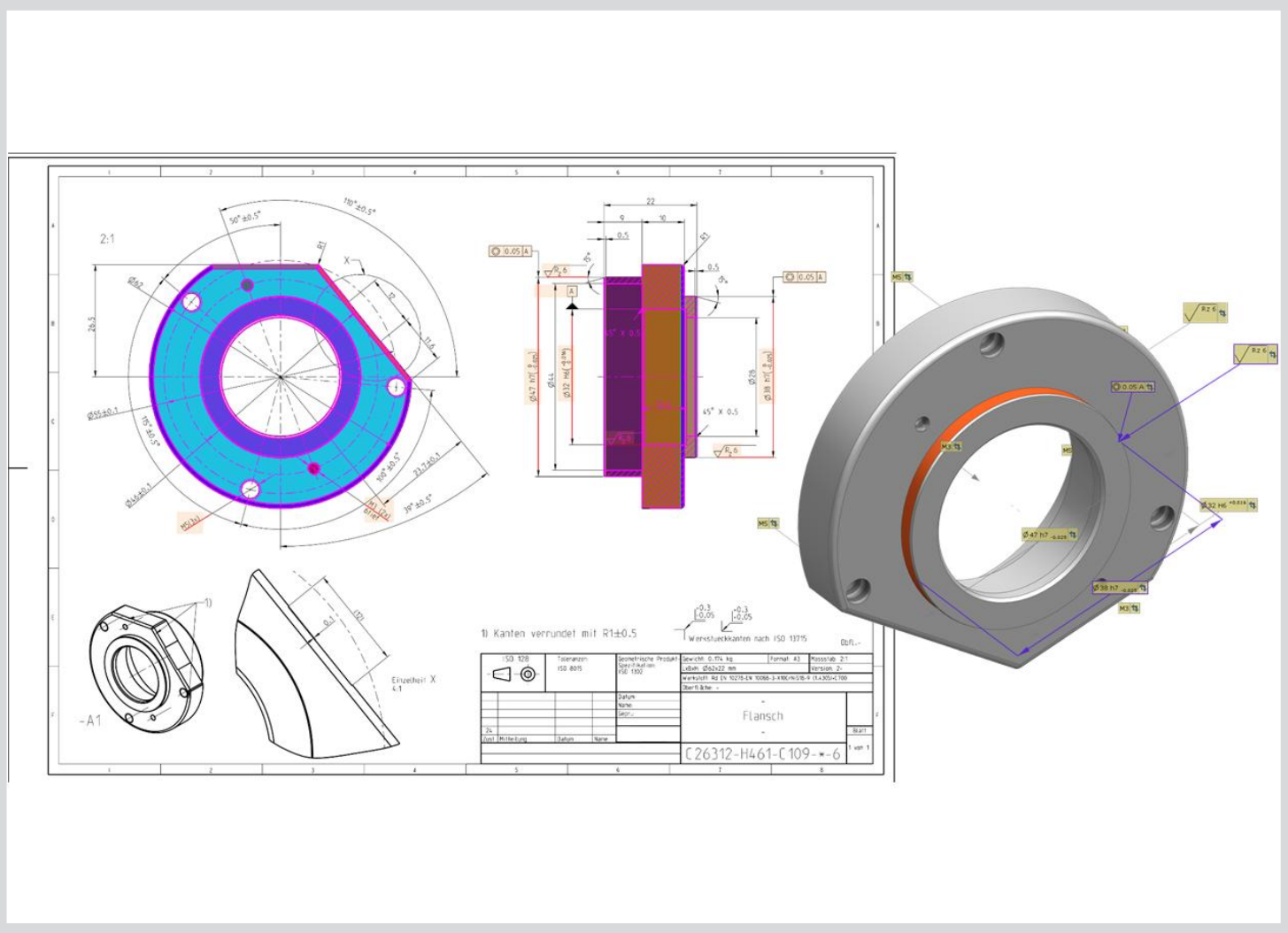
AI-based analysis of technical drawings and mapping to the S3D model

Success factors:

- Assignment of drawing information to the S3D model
- Time savings due to automatic data capture and transfer
- Consistent, complete and correct data throughout the entire digital process
- Greater calculation accuracy thanks to a better data basis
- Similar part search based on 2D drawings

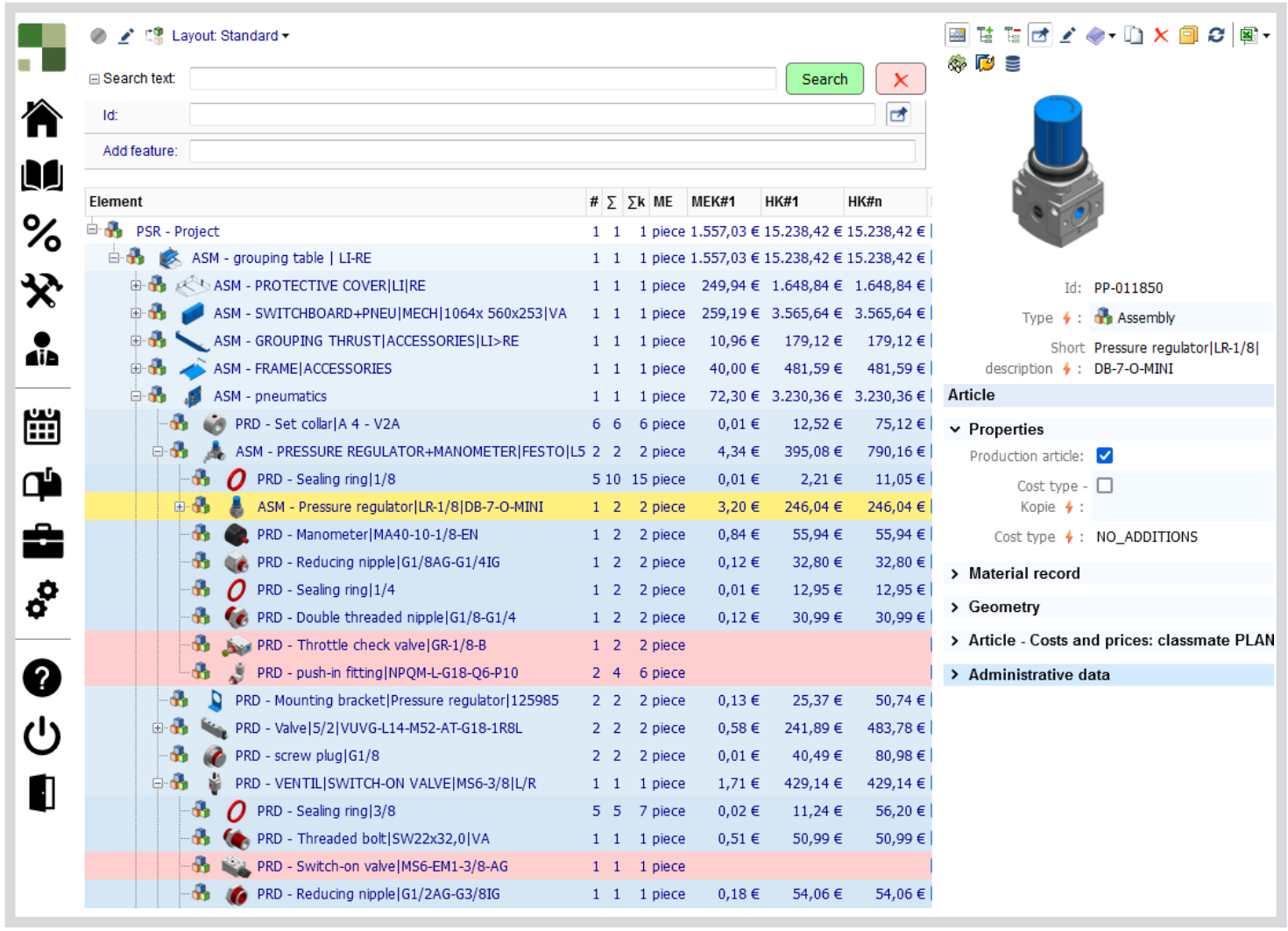


Progressive calculation of development projects

- Reliable cost planning that grows with the project
- Flexible structure
- Documentation of project progress
- Dynamic integration of sources

Goals:

- Quick overview of current costs at the touch of a button
- Simple target / actual comparison
- Target costing applied



Other possible uses of the software

Create and maintain material master data centrally:

Maintaining high data quality in the long term

Text standardization:

Standardized texts at the touch of a button

Product group assignment and supplier selection:

Support for technical purchasing

Customs tariff numbers:

Support with the selection of customs tariff numbers

classmate modules for SAP®: Flexible use for numerous application scenarios

Administration support:

- Creating and maintaining classification structures
- Data migration

User support:

- Maintaining objects
- Searching for data records
- Evaluating data records

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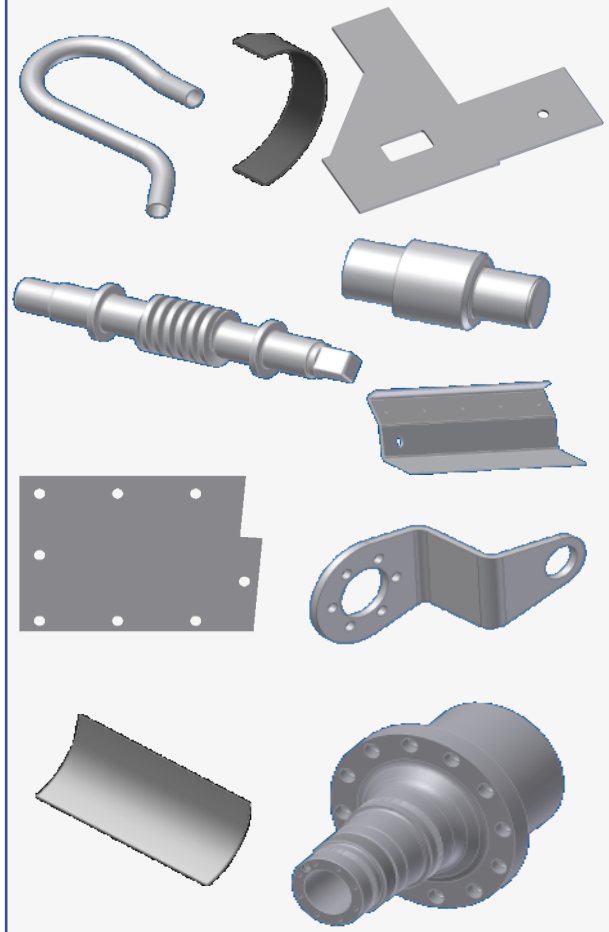
classmate CAD

Geometric Classification

Finding Models with Ease

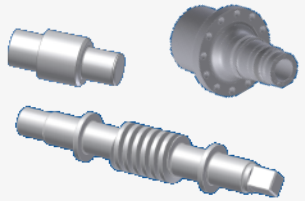
Automatic Classification of CAD Models

CAD models



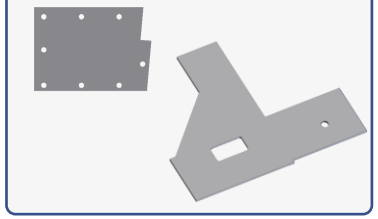
classmate CAD

Round parts

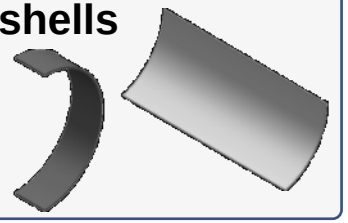


Moulded parts, bent

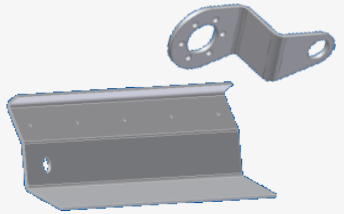
Flat parts



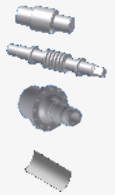
Cylindrical shells



Bent parts



Geometry index



XX00112345425

YY00912345426

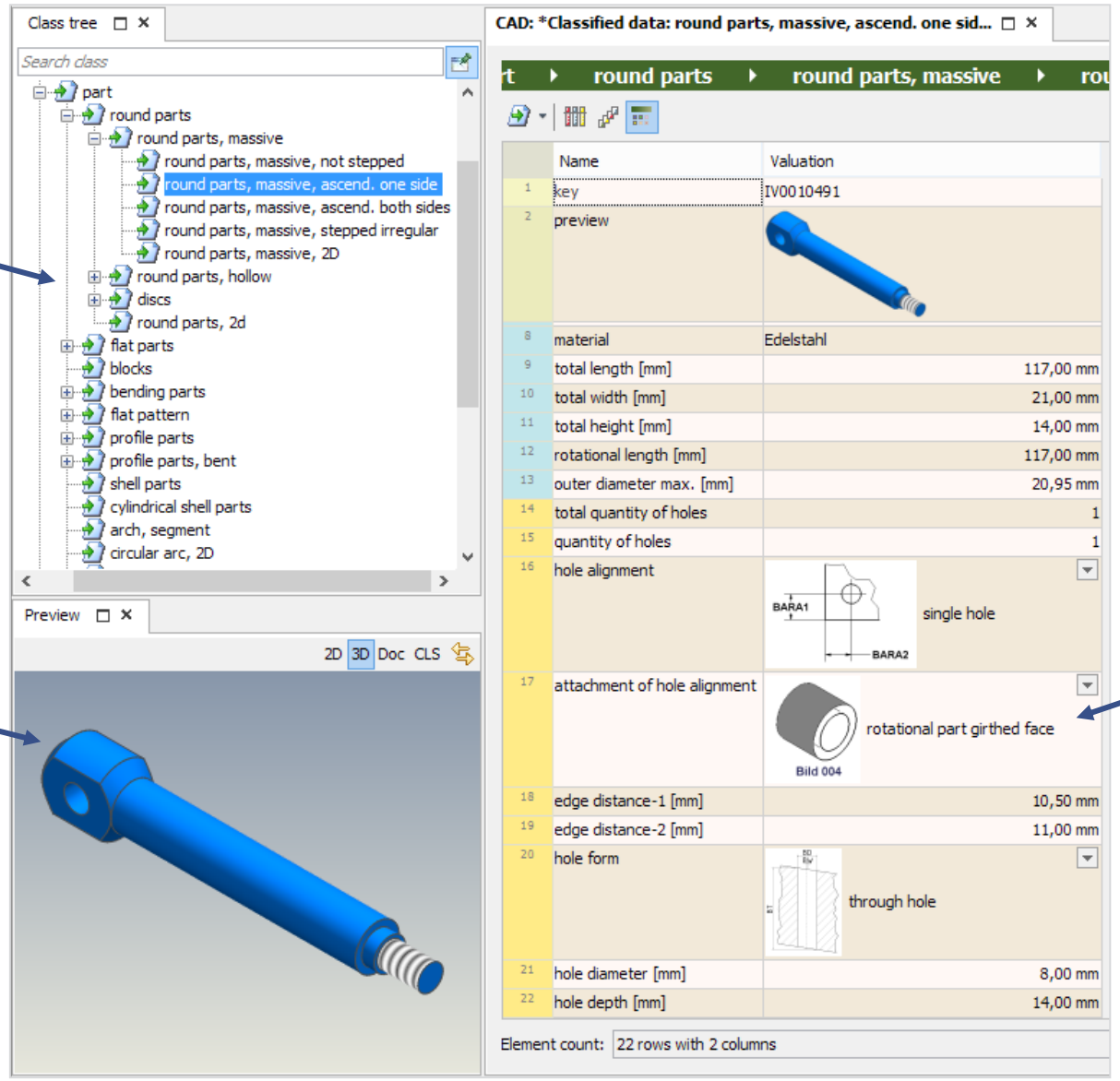
ZZ00912345444

BB00102345731

Example of Round Model Classification

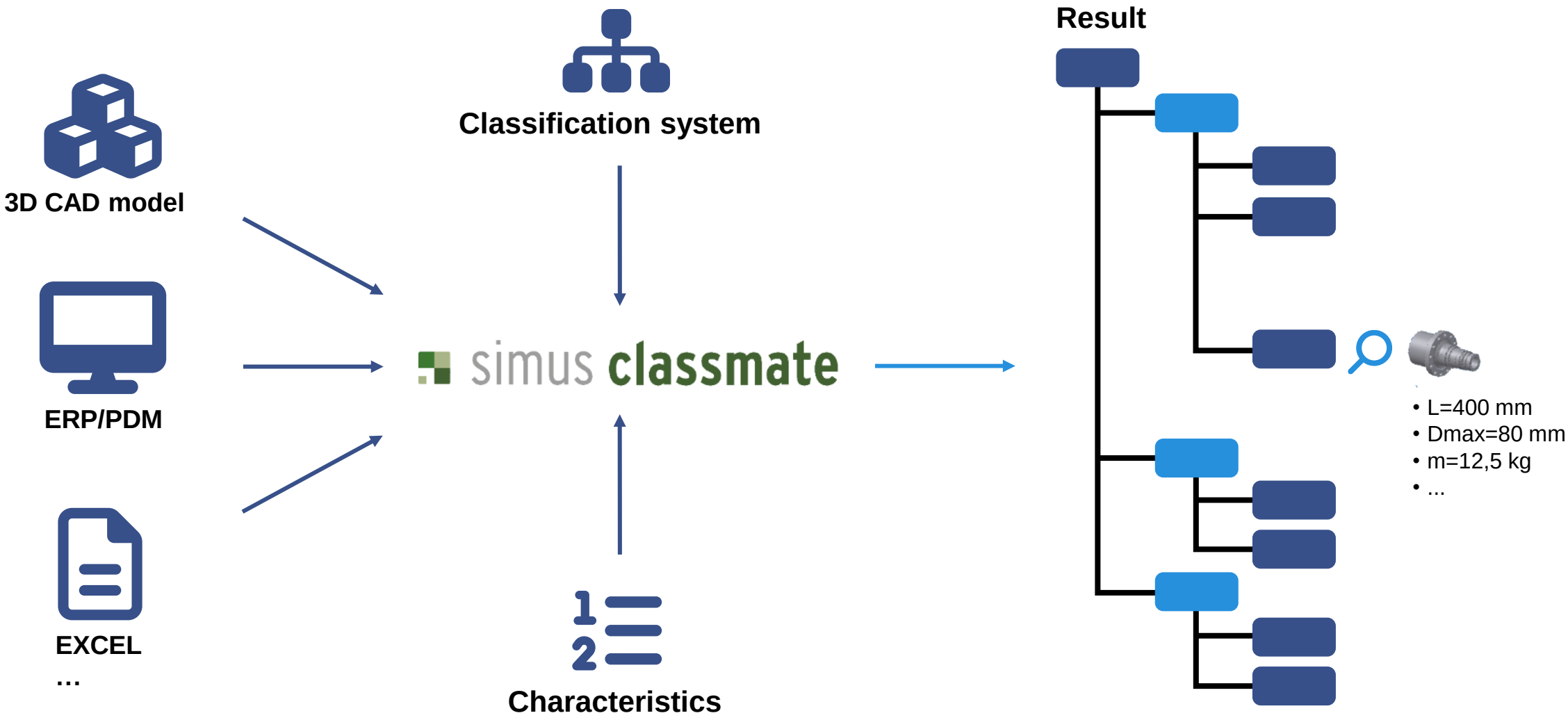
Class structure

2D/3D preview



Geometric features

simus classmate – Rule-Based Data Preparation



Visions – Aims

- Automatic classification of any 3D CAD model
- No effort for the designer to
  - Sort the part into the respective class
  - Describe the characteristics of a part
- Always 100% correct values, regardless of
  - Daily condition
  - State of knowledge
  - Personal interpretation
  - Modelling methodology
- Easy and quick localization of existing CAD models

By reusing a single existing part companies can save up to

several thousands of euros per part and year!

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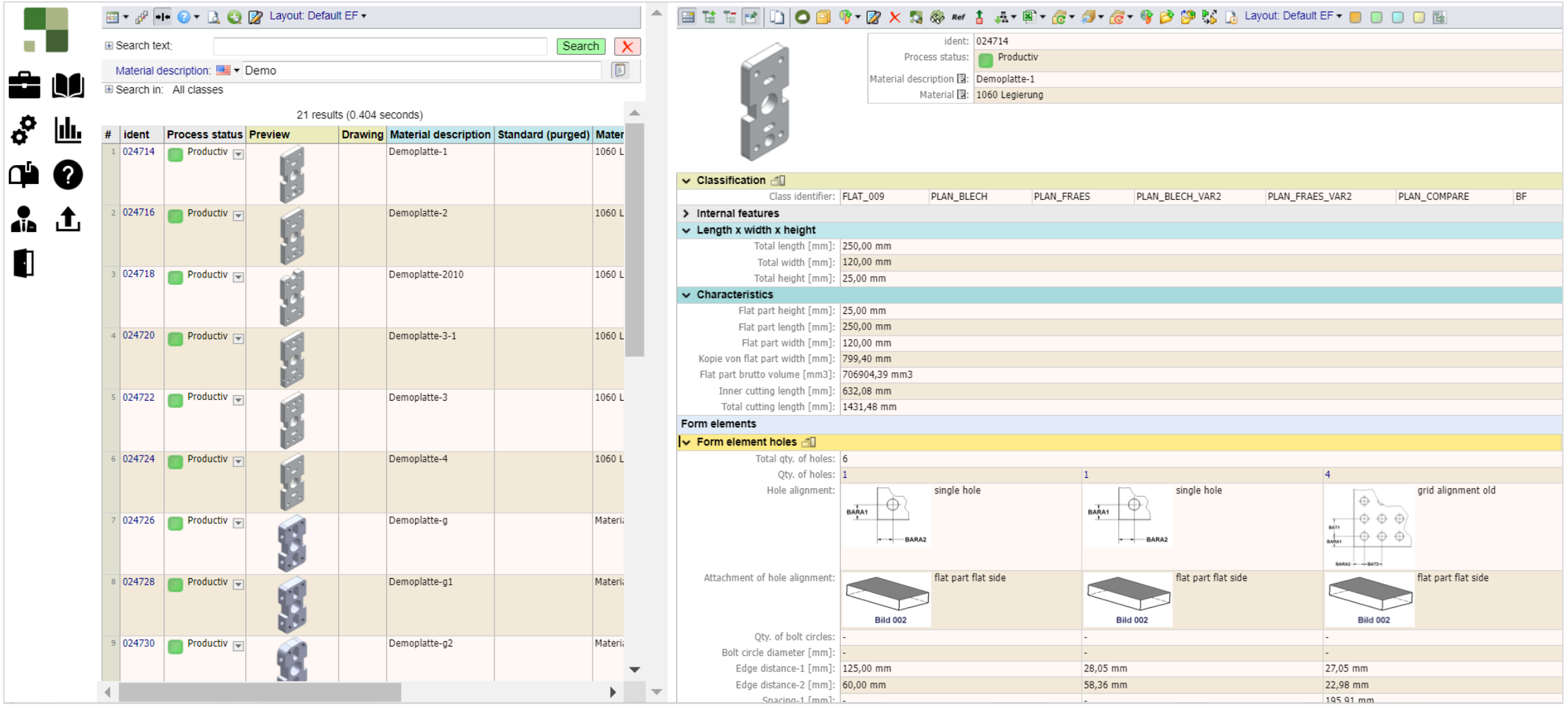
classmate FINDER

The "Search Engine"

Clear View of your Data

easyFINDER Search Cockpit



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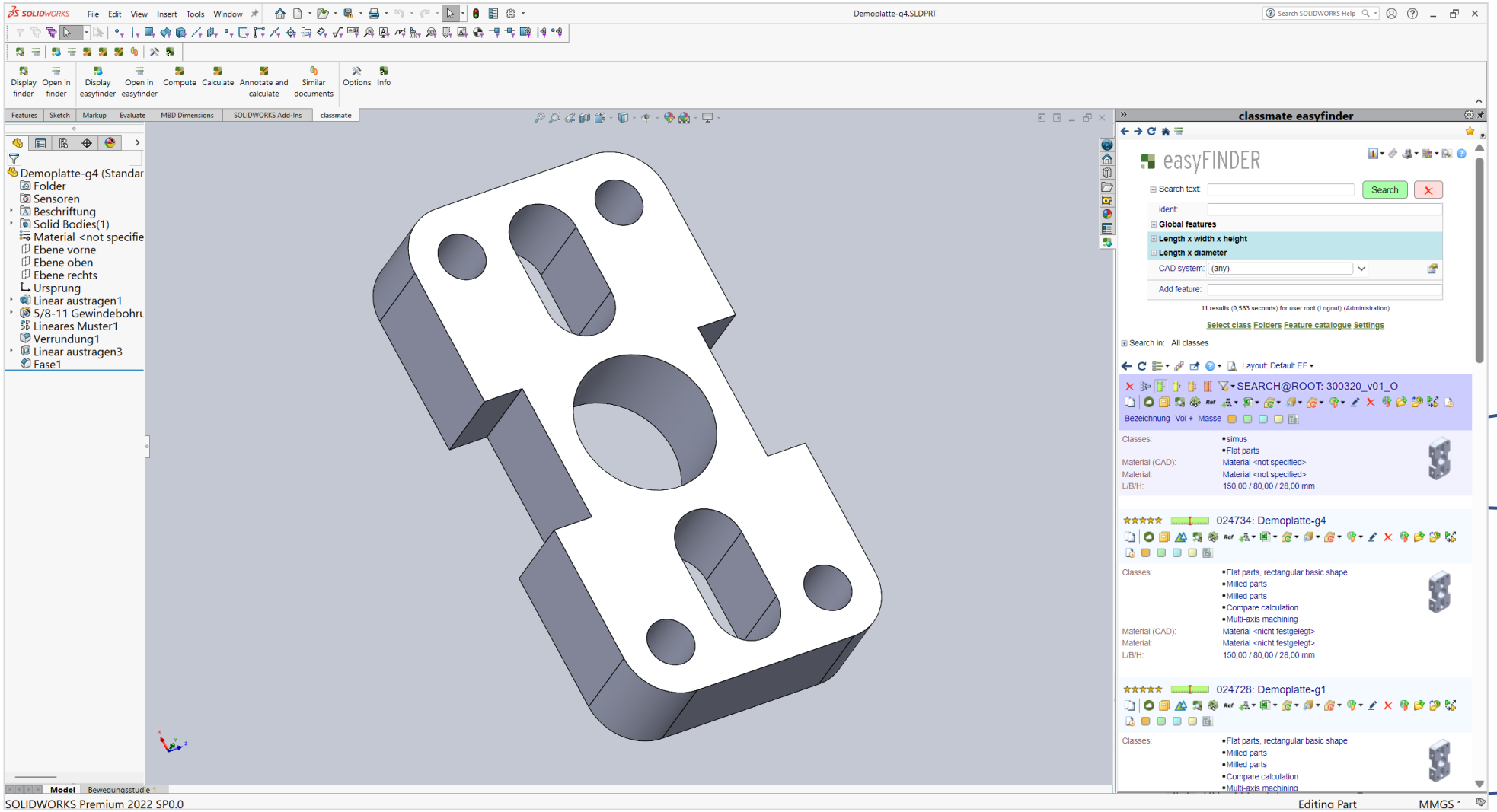
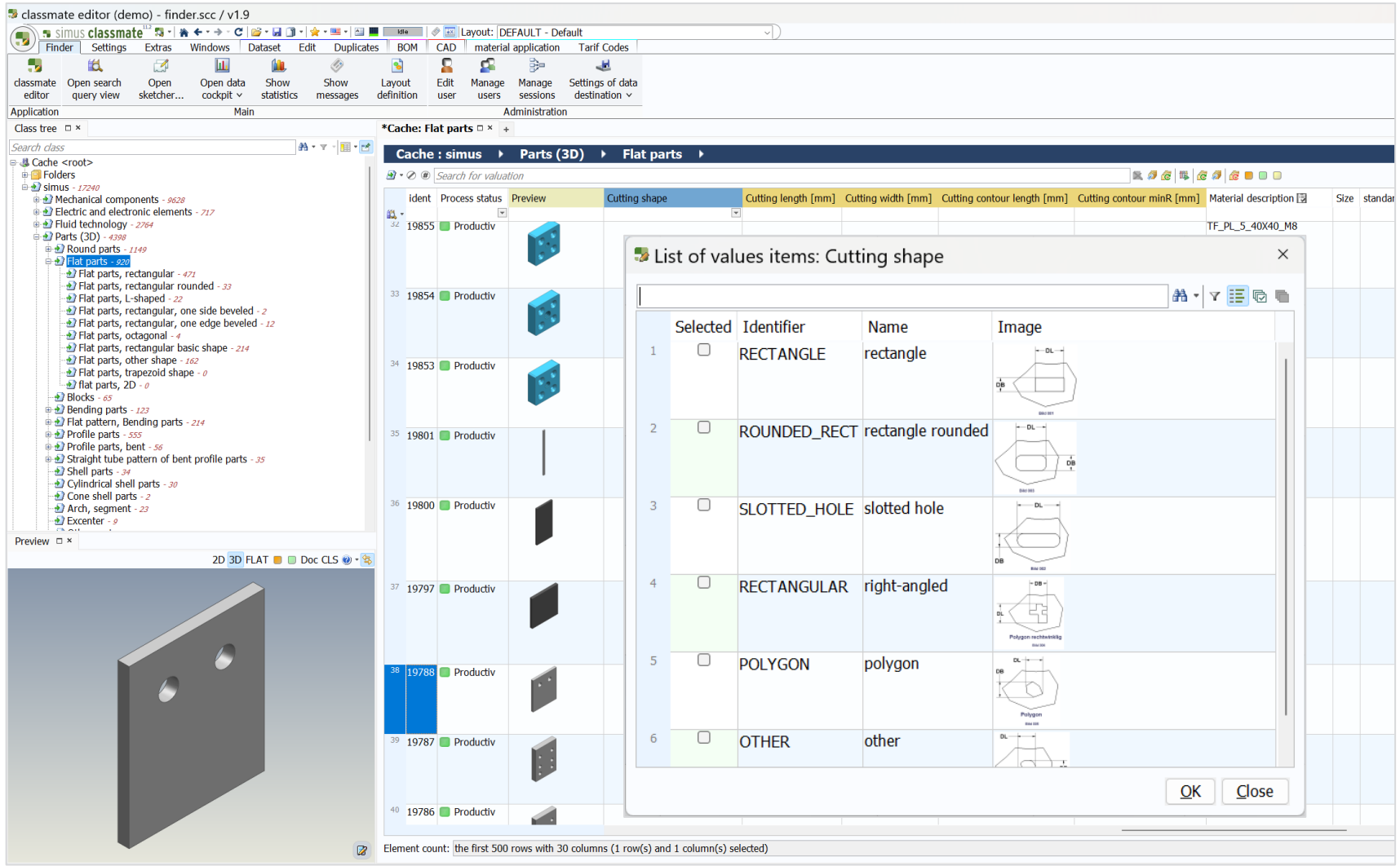
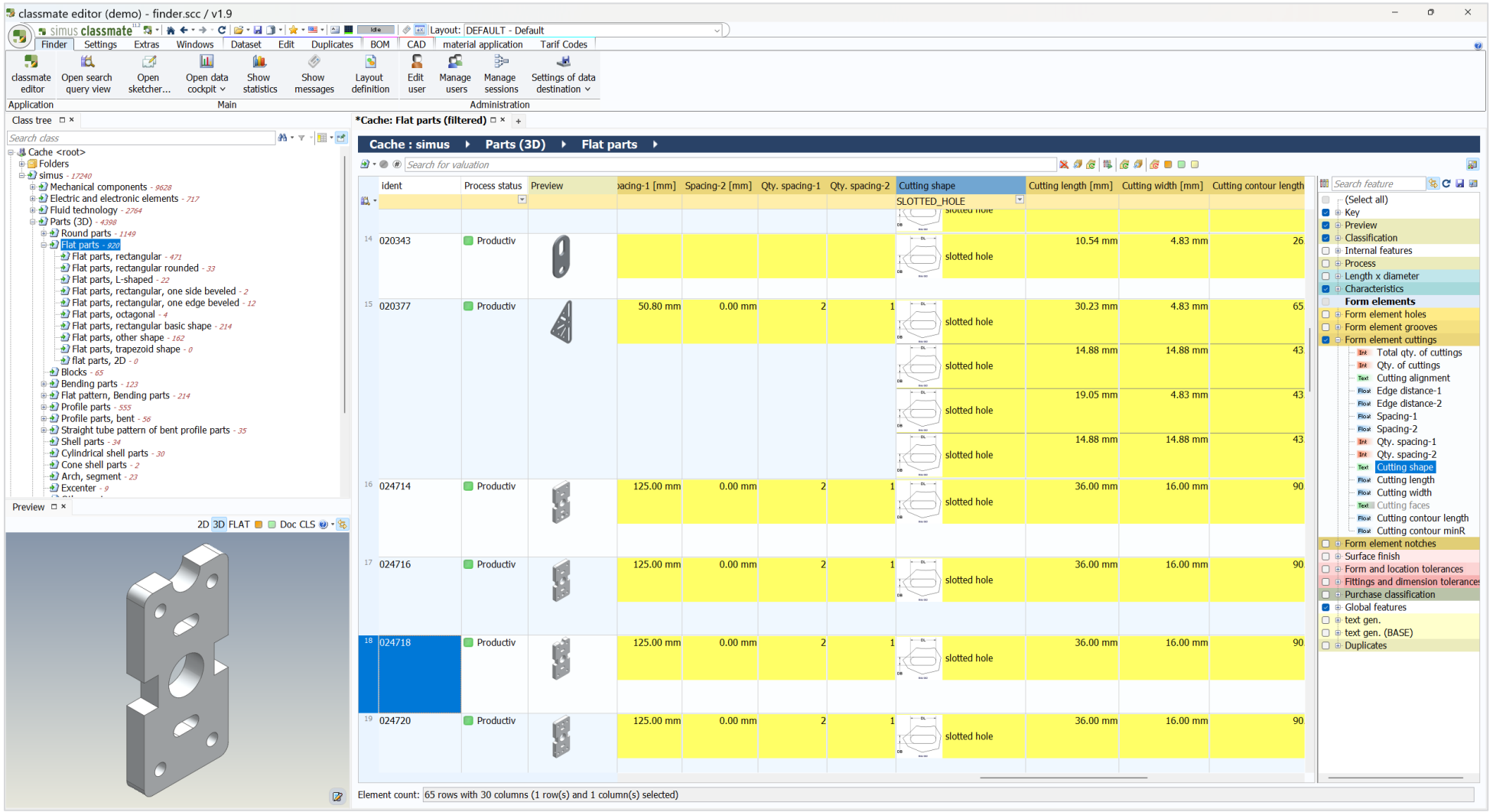
easyFINDER – CAD Integration (Example of Similarity Search)



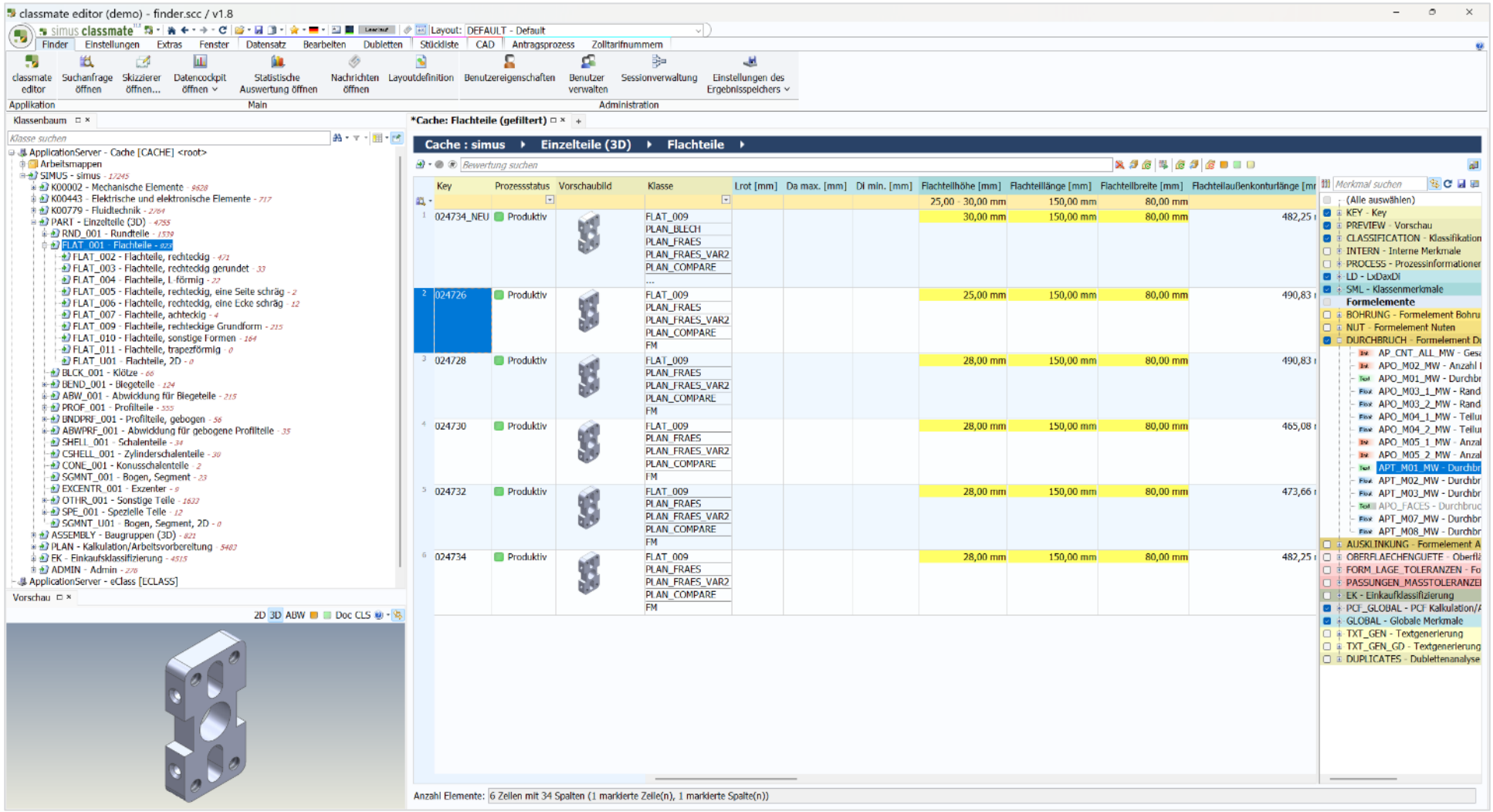
classmate FINDER – Search Query via Feature Values



classmate FINDER – Search Query via Feature Values



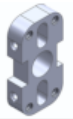
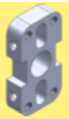
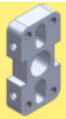
classmate FINDER – Quick Search / Search Result



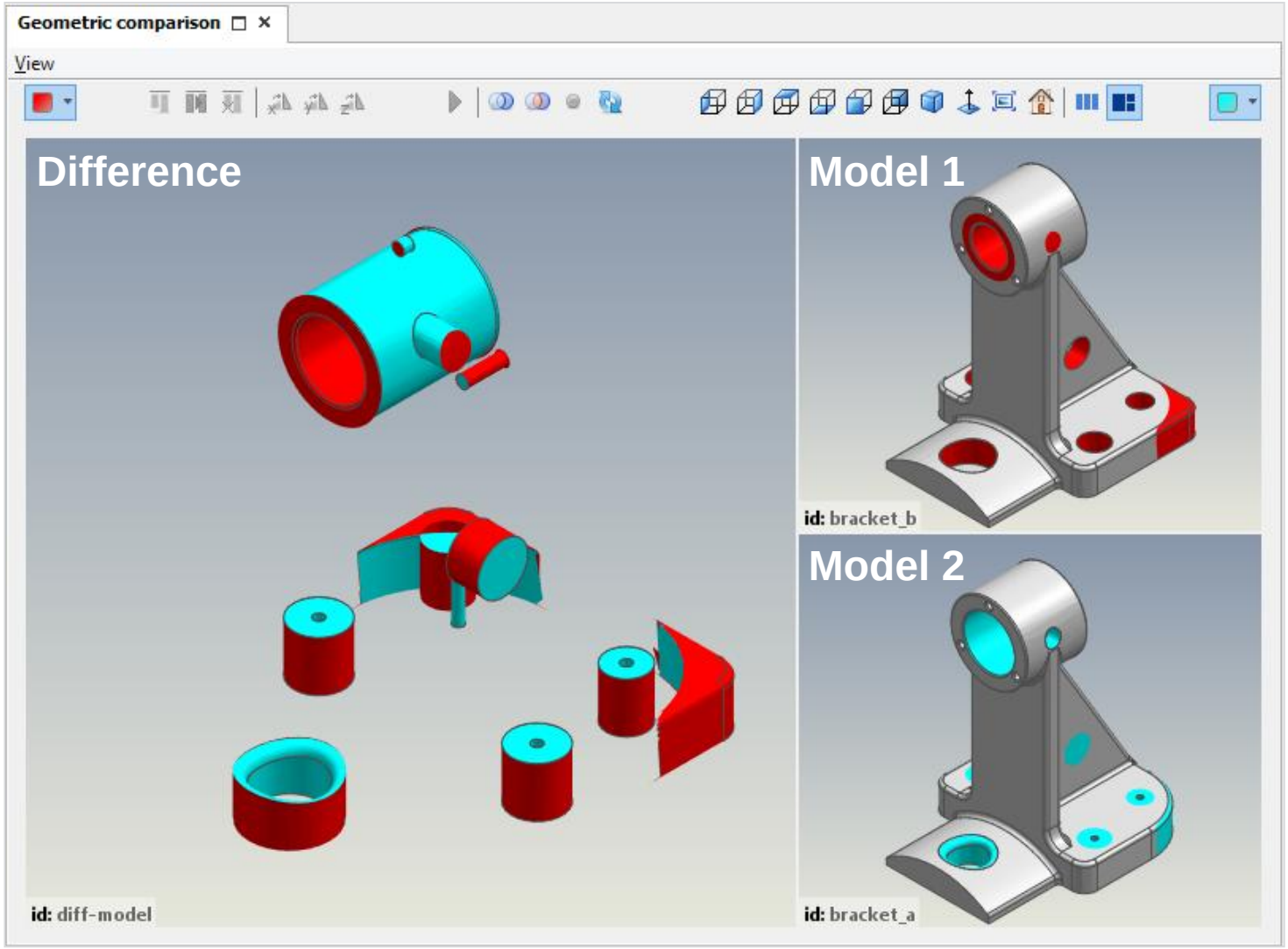
classmate FINDER – Text-Based Comparison

- Differences to the comparison data record are highlighted in color

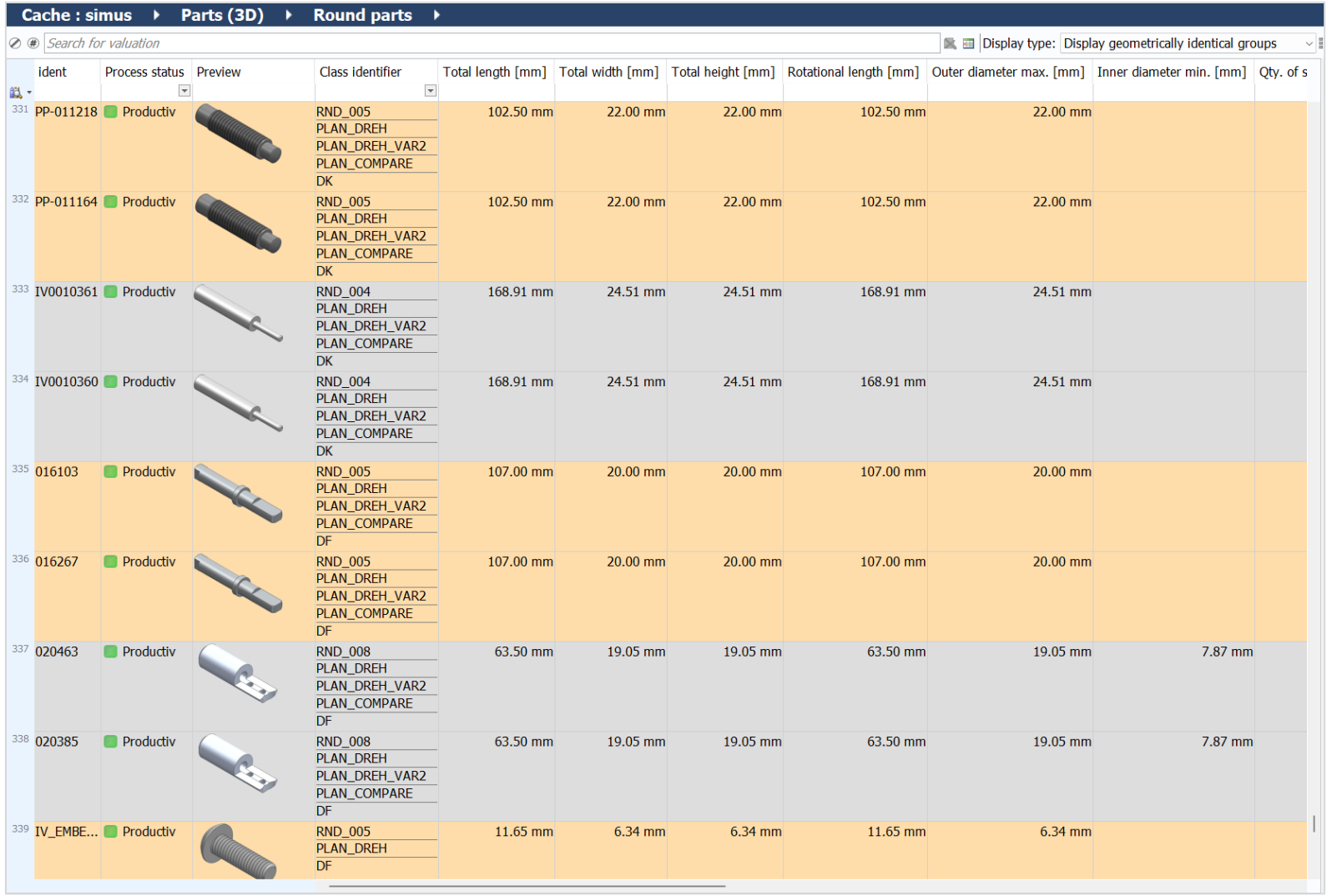
*Cache: Flat parts (filtered)

	#	Name	Valuation	Valuation	Valuation
1	1	ident	024730	024732	024734
...					
3	3	Preview			
4	4	Class identifier	FLAT_009	FLAT_009	FLAT_009
...					
8	8	Kopie von flat part width	465.08 mm	473.66 mm	482.25 mm
9	9	Flat part brutto volume	294085.53 mm3	299495.90 mm3	303704.63 mm3
...					
11	11	Total cutting length	1028.76 mm	1037.34 mm	1045.92 mm
12	12	Material description	Demoplatte-g2	Demoplatte-g3	Demoplatte-g4

classmate FINDER – Geometric Comparison



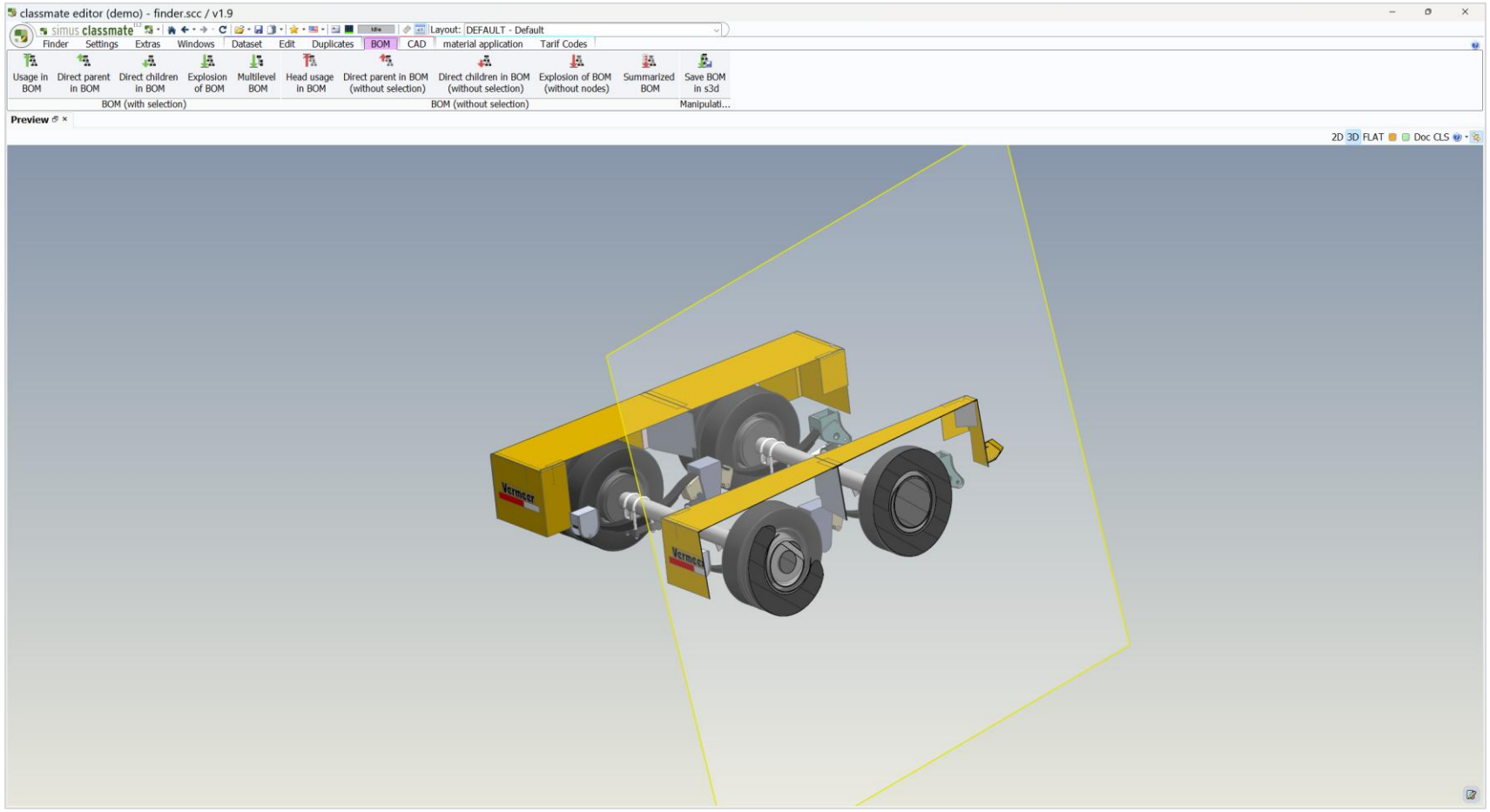
classmate FINDER – Duplicate Identification



	ident	Process status	Preview	Class identifier	Total length [mm]	Total width [mm]	Total height [mm]	Rotational length [mm]	Outer diameter max. [mm]	Inner diameter min. [mm]	Qty. of s
331	PP-011218	Productiv		RND_005 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DK	102.50 mm	22.00 mm	22.00 mm	102.50 mm	22.00 mm		
332	PP-011164	Productiv		RND_005 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DK	102.50 mm	22.00 mm	22.00 mm	102.50 mm	22.00 mm		
333	IV0010361	Productiv		RND_004 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DK	168.91 mm	24.51 mm	24.51 mm	168.91 mm	24.51 mm		
334	IV0010360	Productiv		RND_004 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DK	168.91 mm	24.51 mm	24.51 mm	168.91 mm	24.51 mm		
335	016103	Productiv		RND_005 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DF	107.00 mm	20.00 mm	20.00 mm	107.00 mm	20.00 mm		
336	016267	Productiv		RND_005 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DF	107.00 mm	20.00 mm	20.00 mm	107.00 mm	20.00 mm		
337	020463	Productiv		RND_008 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DF	63.50 mm	19.05 mm	19.05 mm	63.50 mm	19.05 mm	7.87 mm	
338	020385	Productiv		RND_008 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE DF	63.50 mm	19.05 mm	19.05 mm	63.50 mm	19.05 mm	7.87 mm	
339	IV_EMBE...	Productiv		RND_005 PLAN_DREH DF	11.65 mm	6.34 mm	6.34 mm	11.65 mm	6.34 mm		

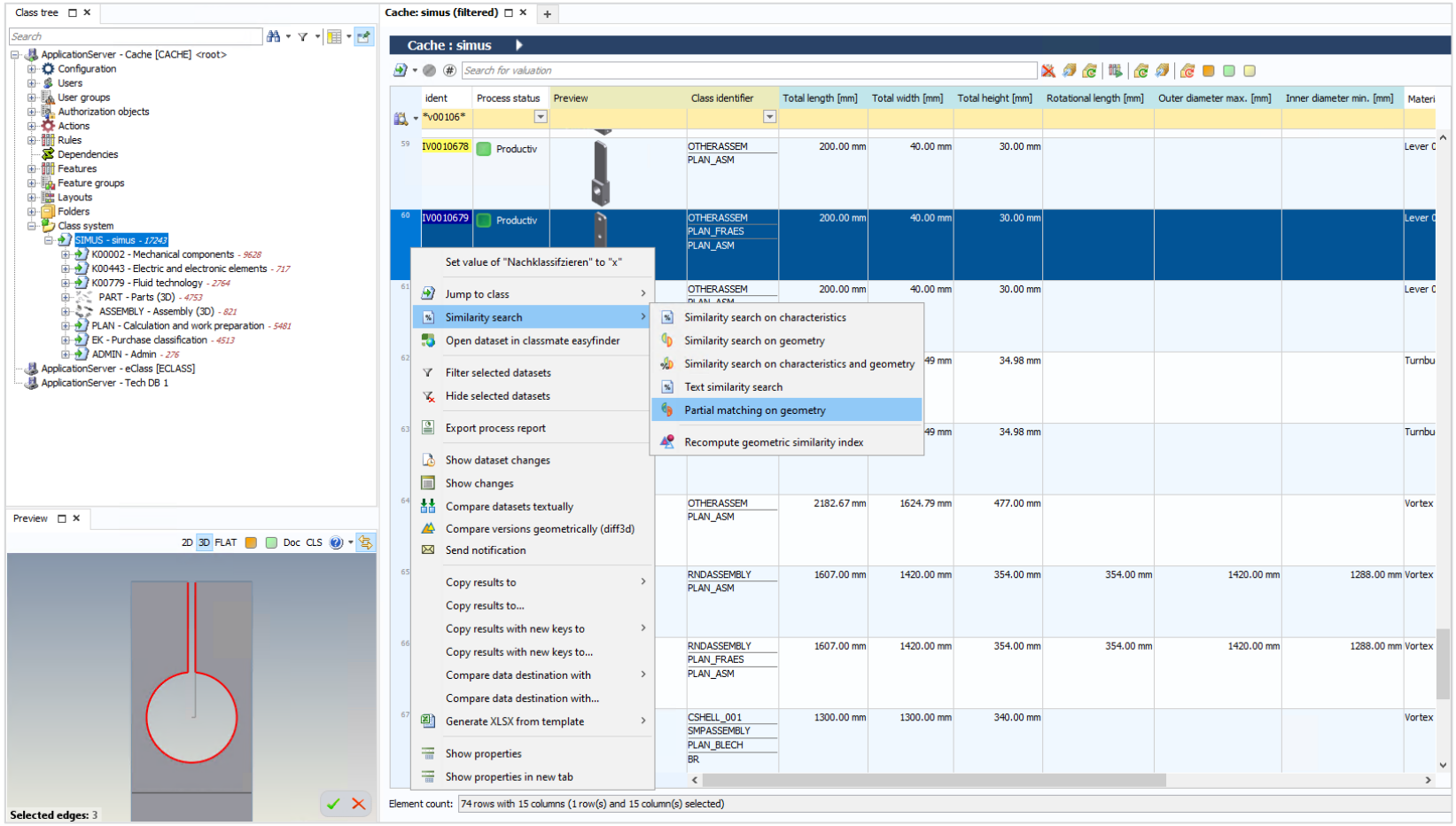
classmate FINDER – Integrated Viewer

- Setting a sectional plane
- View the model tree / BOM structure
- Hide elements
- Measuring dimensions
- …

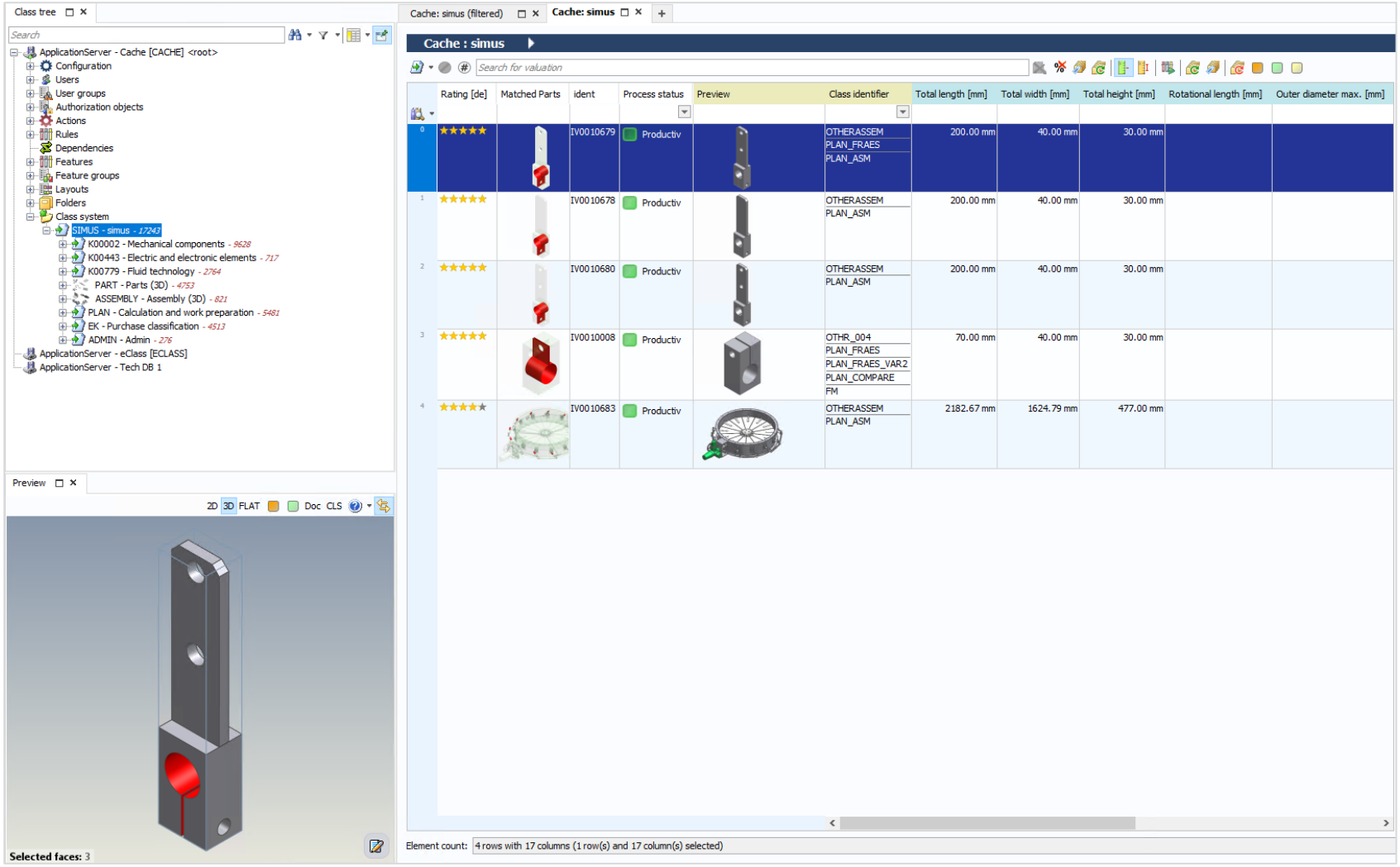


Partial Matching (1)

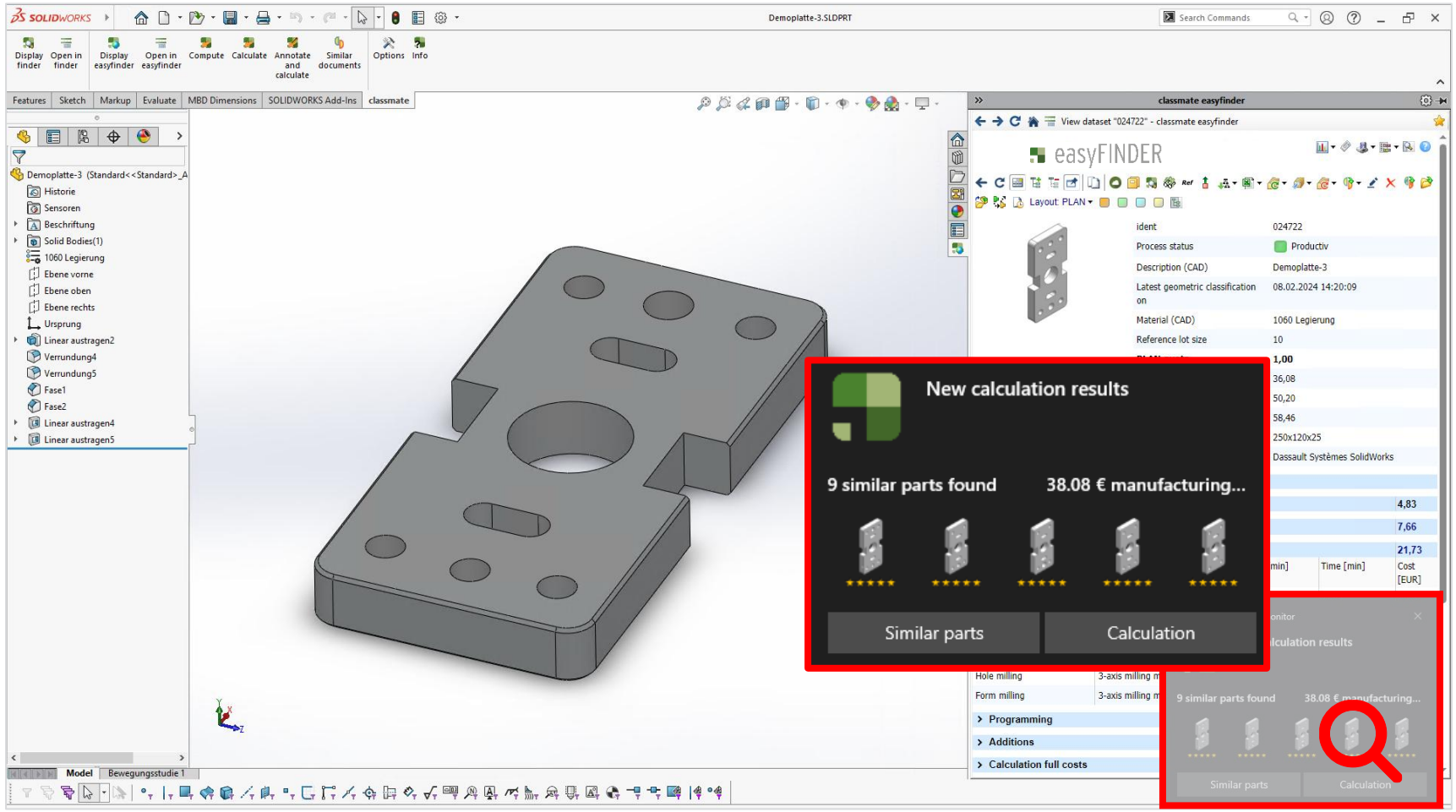
- Geometric features of individual models can be searched for in other models (individual parts and assemblies) using the partial matching



Partial Matching (2)



classmate modelmonitor



- Display of the number of similar models and manufacturing costs in the information window (toast)
- Complete presentation of results can be accessed with one click in easyFINDER

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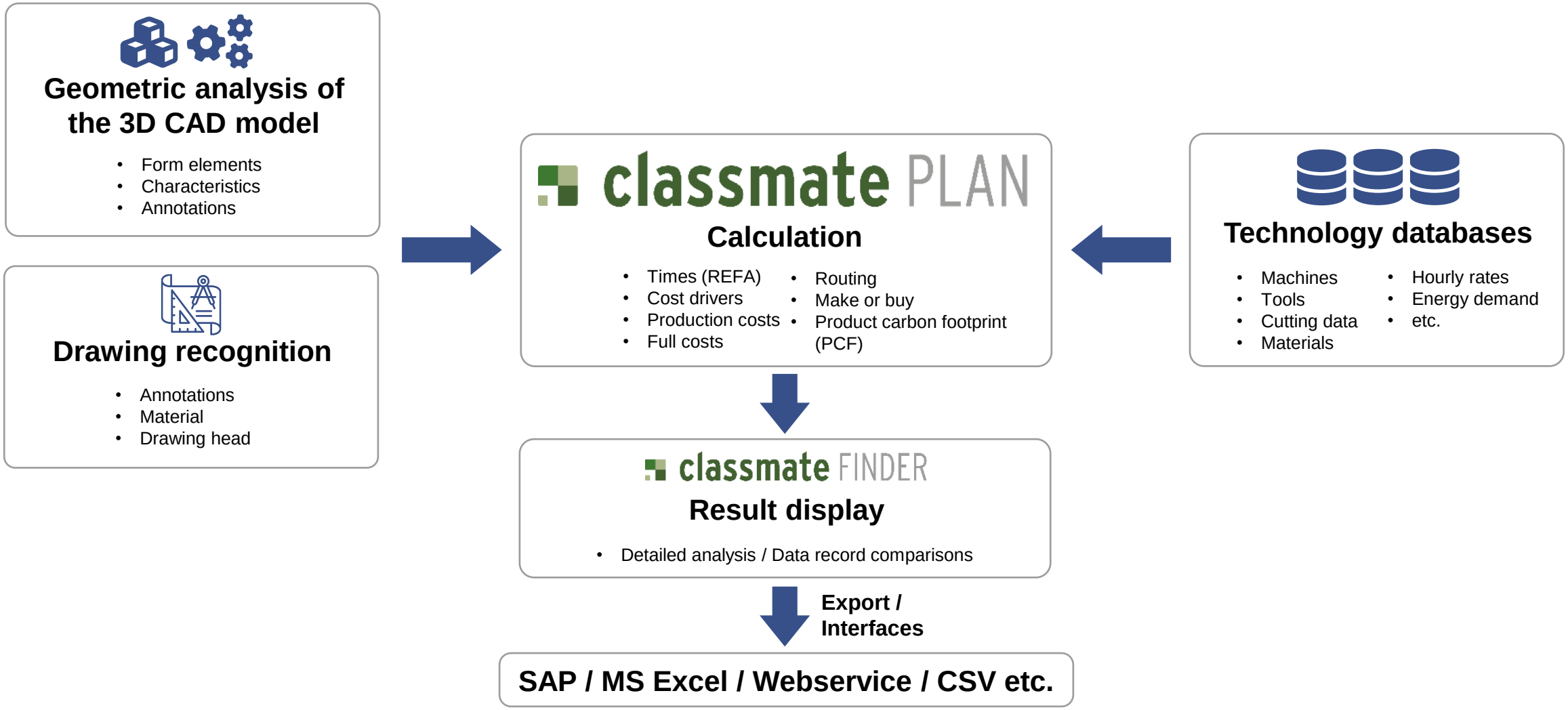
classmate PLAN

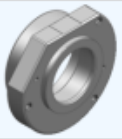
Preliminary Calculation, Emissions and Routings

Design Stage Costing

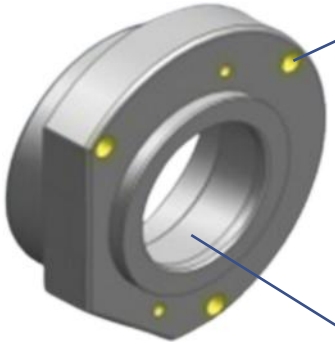
Architecture classmate PLAN



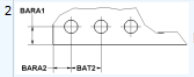
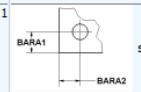
Geometric Analysis

Name	Valuation
Key	TURN2
Preview	
Class	RND_010 PLAN_DREH PLAN_DREH_VAR2 PLAN_COMPARE REFERENZ
Description (CAD)	Flansch
Material (CAD)	Rd EN 10278-EN 10088-3-X10CrNiS18-9 (1.4305)+C700
Material ID	00006052
Material description	Material number: 1.4305 description: X8CrNiS18 price per kilo: 4.33 density: 7.9
Dimensions flattened [mm]	
Dimensions [mm]	62x22
Total length [mm]	62.00 mm
Total width [mm]	54.70 mm
Total height [mm]	22.00 mm
Rotational length [mm]	22.00 mm
Outer diameter max. [mm]	62.00 mm
Inner diameter min. [mm]	28.00 mm

Main characteristics (excerpt)

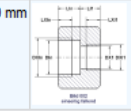


Quantity | Hole alignment | Hole form | Diameter | Depth | Thread

Qty. of holes	Hole alignment	Hole form	Hole diameter [mm]	Hole depth [mm]	Thread information (cleaned)
2	 linear alignment	 threaded through hole	4,20 mm	10,00 mm	M5
1	 single hole	 threaded through hole	4,20 mm	10,00 mm	M5

Example: form element drilling including dimensions

Di min | Shape | Quantity | Diameter | Length

Inner diameter min. [mm]	Inner shape	Qty. of inner shoulders	Inner shoulder diameter [mm]	Inner shoulder length [mm]
28,00 mm	 one-sided ascending	3	28,00 mm 32,00 mm 44,00 mm	2,50 mm 10,50 mm 9,00 mm

Example: form element internal shape including dimensions

Example of Technology Database (Excerpt)

Milling machine (excerpt)

Name	Bewertung
Object	M5B
Ref operation	FRAES_CNC
Hourly Rate [EUR/h] full costs	95
Type	CNC 5-axis
Power max. whole machine [kW]	45
Power to power level [kW]	22,5
	31,5
	27
	9
	2,25
tr basic [min]	15
tr basic to clamping [min]	2
tr/ clamping device [min]	4
tr/tool flat [min]	1
processing time limit for additional factor on set...	10
	30
	60
additional setup time based on factor on te until processing time limit [min](<=)	0,5
	0,35
	0,2
Additional factor on setup time from te via max....	0,1
factor allowances	0,11
traversing time / object [min]	0,033
	0,044
Lmin (>=) for traversing time [mm]	0
	500
Lmax (<) for traversing time [mm]	500
tool changing time [min]	0,15

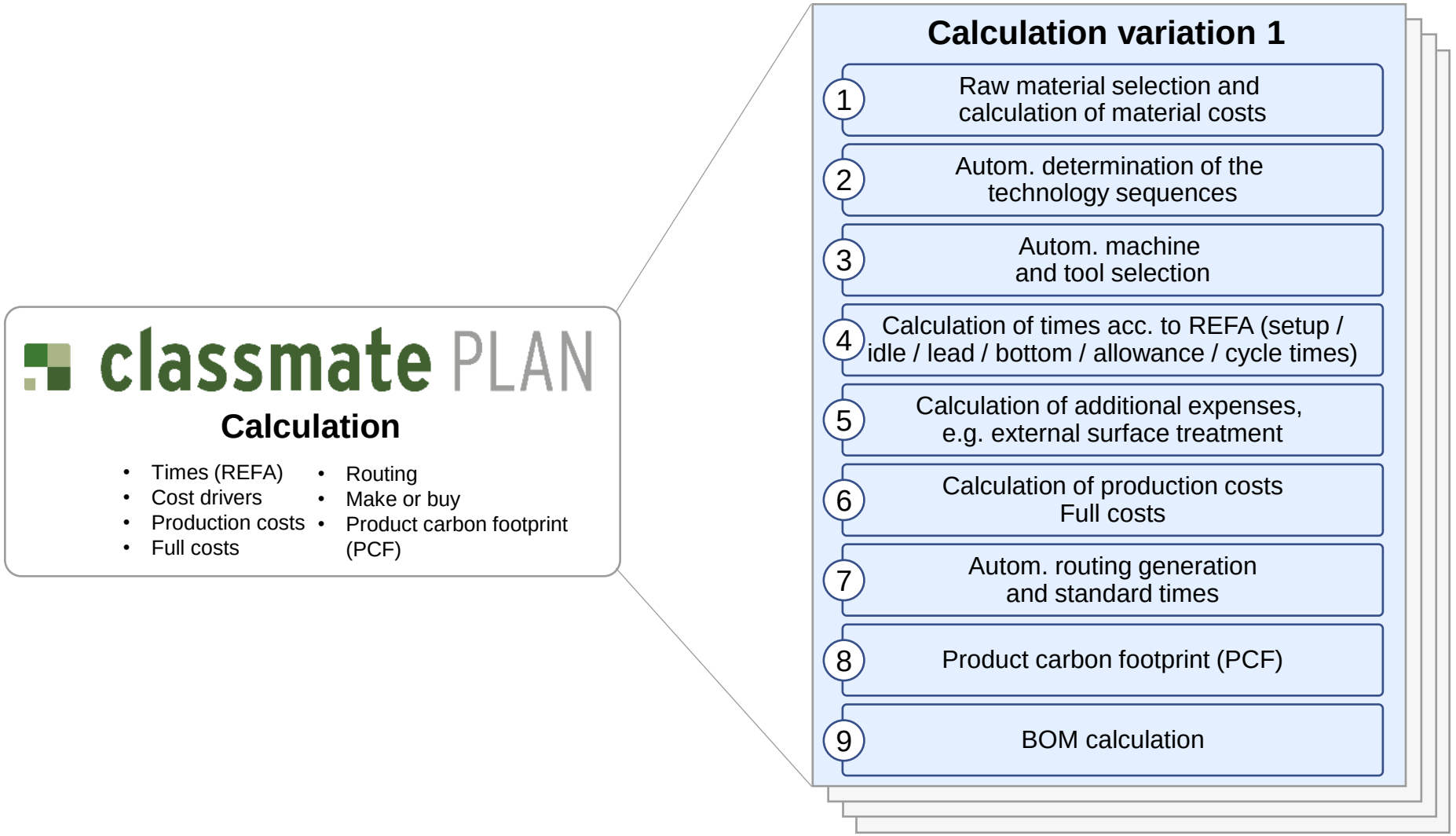
End mill (excerpt)

Object	Milling tool diameter [...	No. of te...	Immersion depth ma...
F04XL	4	4	28
F05XL	5	4	35
F80	80	8	100
F63	63	8	100
F50	50	7	130
F40	40	6	160
F32	32	5	38
F25	25	4	45
F20XL	20	4	98
F20L	20	4	57
F20	20	4	38

Disk milling cutter (excerpt)

Object	Milling tool diameter [...	Cutting width [m...	Cutting depth
SF1	100	1	
SF1.6	125	1,6	
SF2	160	2	
SF2.5	160	2,5	
SF3	200	3	
SF3.5	50	3,5	
SF4	50	4	
SF4.5	63	4,5	
SF5	50	5	
SF6	50	6	
SF8	50	8	

Calculation Process with classmate PLAN

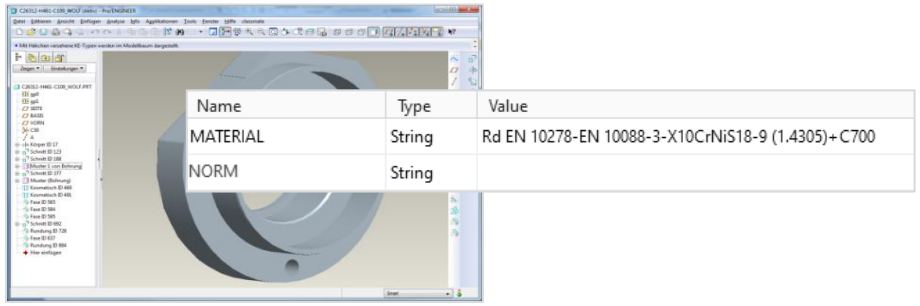


Step 1: Raw Material and Material Costs – e.g. Turned / Milled Part

Material group

- Material group (Steel, Alu, …) of the CAD file properties is required at least to make the cutting values selectable.
- Calculation of material costs are based on prices per kilogram.
- Cutting volume is based on the bounding cube and bounding cylinder respectively, if necessary with surcharges.

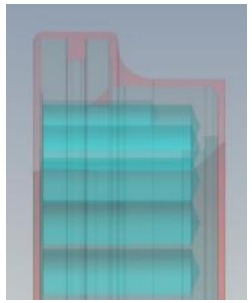
Semi-finished parts



- Raw material costs from ERP
- Raw material dimensions from ERP

Forging blank

Finished part



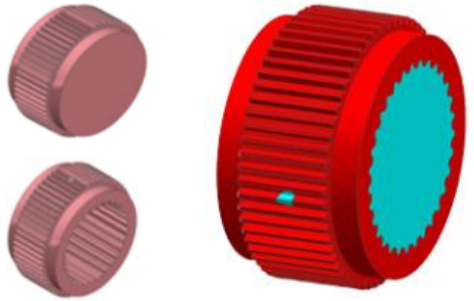
Differential volume

- Raw material costs from ERP
- Exact calculation of the cutting volume

Castings / Forgings, Blanks

Semi-finished part

Finished part



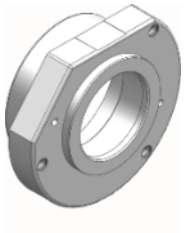
Differential volume

- Costs for semi-finished part from ERP
- Exact calculation of the removal volume

Rework / Semi-finished parts

Step 2 & 3: Technology Sequence, Machine and Tool Selection

3D model + material



1 Geometry objects

Status | Status as image

```
1  SAEGEN-0
2  ZWISCHENGRATEN-0
3  PLANDREHEN-0
4  PLANDREHEN-1
7  ABSATZ_AUSSEN-2
8  VORBOHREN_ZENTR-0
9  ABSATZ_INNEN-0
10 ABSATZ_INNEN-2
11 TASCHE-0
12 ZW_EBENE-0
```

OUTER_SHOULDER-0

2 3

4 Possible processing methods and machines

Status | Status as image

```
1  SAEGEN-0:saegen@SAW
2  ZWISCHENGRATEN-0:zwischengraten@IDE
3  PLANDREHEN-0:plandrehen_schrupp@TSC|TBC|TM|TMB+plandr
4  PLANDREHEN-1:plandrehen_schrupp@TSC|TBC|TM|TMB+plandr
7  ABSATZ_AUSSEN-2:langdrehen_schrupp@TSC|TBC|TM|TMB+lan
8  VORBOHREN_ZENTR-0:bohrungdrehen_zentr@TSC|TBC|TM|TMB#
9  ABSATZ_INNEN-0:langdrehen_schrupp@TSC|TBC|TM|TMB+lang
10 ABSATZ_INNEN-1:langdrehen_schrupp@TSC|TBC|TM|TMB+lang
11 ABSATZ_INNEN-2:langdrehen_schrupp@TSC|TBC|TM|TMB+lang
12 TASCHE-0:schruppfraesen@M3S|M3M|M3B|M5S|M5M|M5B|TM|TM
```

OUTER_SHOULDER-0: external straight turning@TSC | TBC | TM | TMB

5

6 Selected technology sequence

Status | Status as image

```
1  SAEGEN-0:saegen@SAW
2  ZWISCHENGRATEN-0:zwischengraten@IDE
3  PLANDREHEN-0:plandrehen_schrupp@TM
4  PLANDREHEN-0:plandrehen_schlicht@TM
8  ABSATZ_AUSSEN-0:langdrehen_schlicht@TM
9  ABSATZ_AUSSEN-1:langdrehen_schrupp@TM
10 ABSATZ_AUSSEN-1:langdrehen_schlicht@TM
11 ABSATZ_AUSSEN-2:langdrehen_schrupp@TM
12 ABSATZ_AUSSEN-2:langdrehen_schlicht@TM
```

OUTER_SHOULDER-0: external straight turning@TM

Technology database

2 3

Object	Basic processing techniques	Name	Lmax (<=) [mm]	Wmax (<=) [mm]
TM	General turning (all)	Mill-turning machine	500	500
	Bores with driven tools (all)			
	Eccentric turning (all)			
	Rolling			
	General milling (all)			
	Circular milling (all)			
	Disk milling			
TBC_HQ	General turning (all)	CNC Turning Machine	1000	950
	Axial and radial bores (all)			

3 Information of the 3D model

Dimensions [mm]	20x24
Outer diameter max. [mm]	20.00 mm
Material description	
Rotational length [mm]	24.00 mm

5 Automatic selection process according to customer specifications

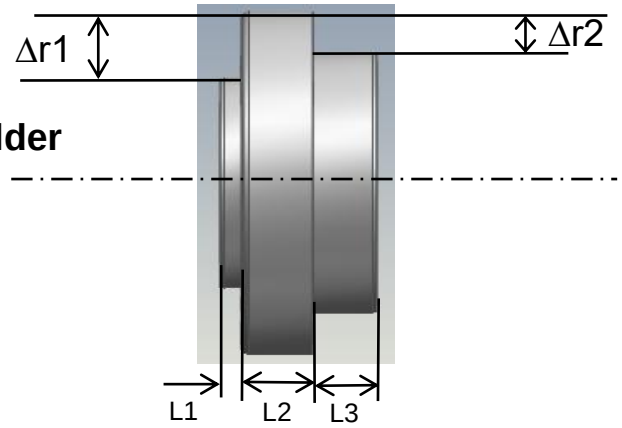
Step 4: Main Time Determination – e.g. External Straight Turning (Roughing)

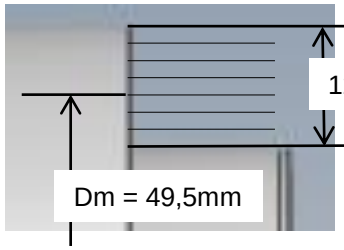
Technology database

Cutting values Plain turning outside

Object	REF turning tool	Material group	Turning rough	Turning finish	Turning precision	Cutting speed rough turning	Cutting speed finish turning	Cutting speed precision turning	Feed rate rough turning	Feed rate finish turning	Feed rate precision turning
00012275	Outer slow	VA	2	0.5	0.2	150000	240000	240000	0.15	0.08	0.05
00012291	Outer medium	VA	3	0.5	0.2	170000	240000	240000	0.25	0.08	0.05
00001772	Outer fast	VA	4	0.4	0.1	175000	240000	290000	0.45	0.2	0.1
00009210	Outer slow	Ti	2	0.5	0.2	75000	120000	120000	0.075	0.04	0.025
00009214	Outer medium	Ti	3	0.5	0.2	100000	120000	120000	0.125	0.04	0.025
00009206	Outer fast	Ti	4	0.4	0.1	87500	120000	145000	0.225	0.1	0.05

Total feed per shoulder



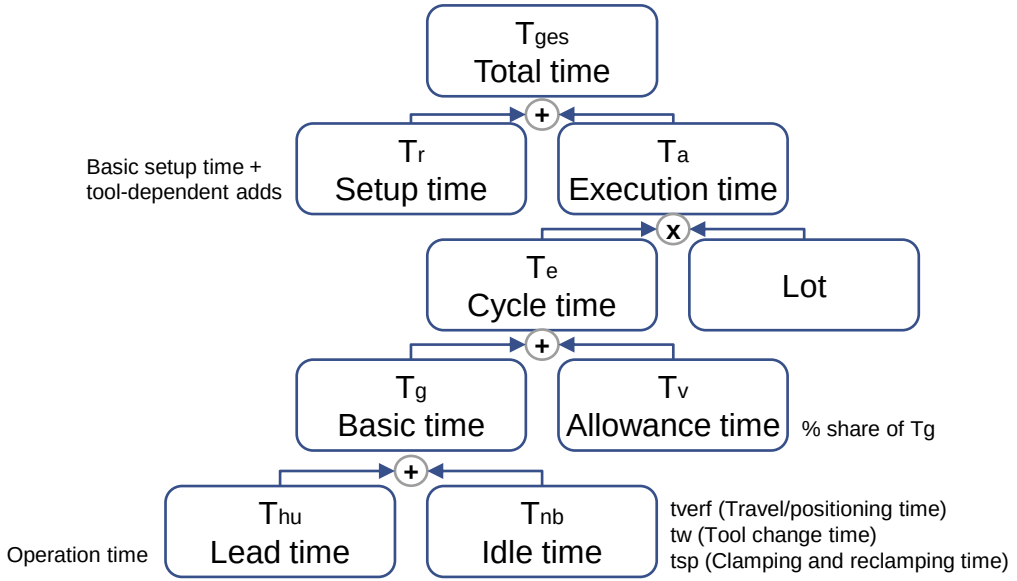


Number of feeds:
Δr2 / feed roughing
→ next integer
→ 5 feeds

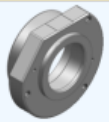
Rpm = Cutting speed roughing / (Dm*PI) = 1093 U/min

Cutting time roughing = 5 * L3 / (rpm * feed rate roughing)
= 5 * 9mm / (1093 U/min * 0.25 mm/U) = 0.164min

Step 4: Process Time Calculation acc. to REFA



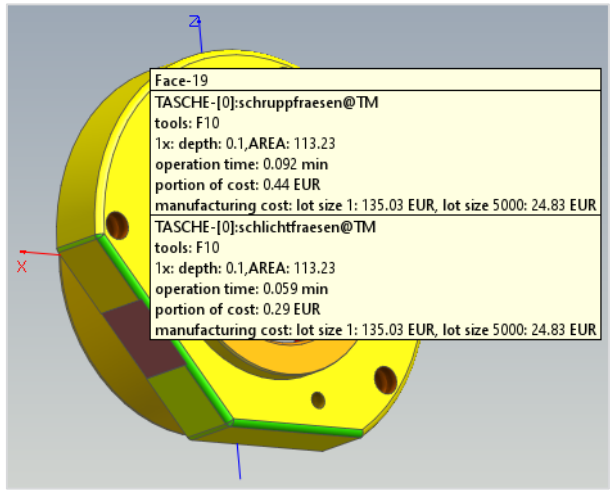
Calculation variation 1

Preview	Machines	Tr [min]	thu [min]	Tnb [min]	Tg [min]	tv [min]	Te [min]	Setup time total [min]	Total production time per unit [min]
		Setup time	Lead time	Idle time	Basic time	Allowance time	Cycle time	Setup time (sum)	Cycle time (sum)
	Saw	5.000	1.291	0.000	1.291	0.142	1.433	80.08	15.41
	Interim deburring	0.000	0.150	0.000	0.150	0.017	0.167		
	Mill-turning machine	44.080	3.632	6.352	9.984	1.098	11.083		
	Cylindrical grinding machine	30.000	1.852	0.000	1.852	0.204	2.056		
	Deburring (manual)	1.000	0.600	0.000	0.600	0.066	0.666		

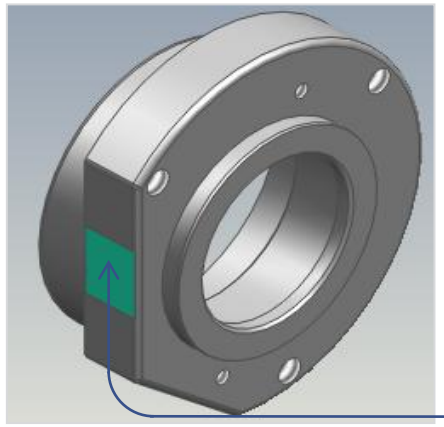
Calculation variations X

Step 4: Detailed Direct Costs

Cost driver



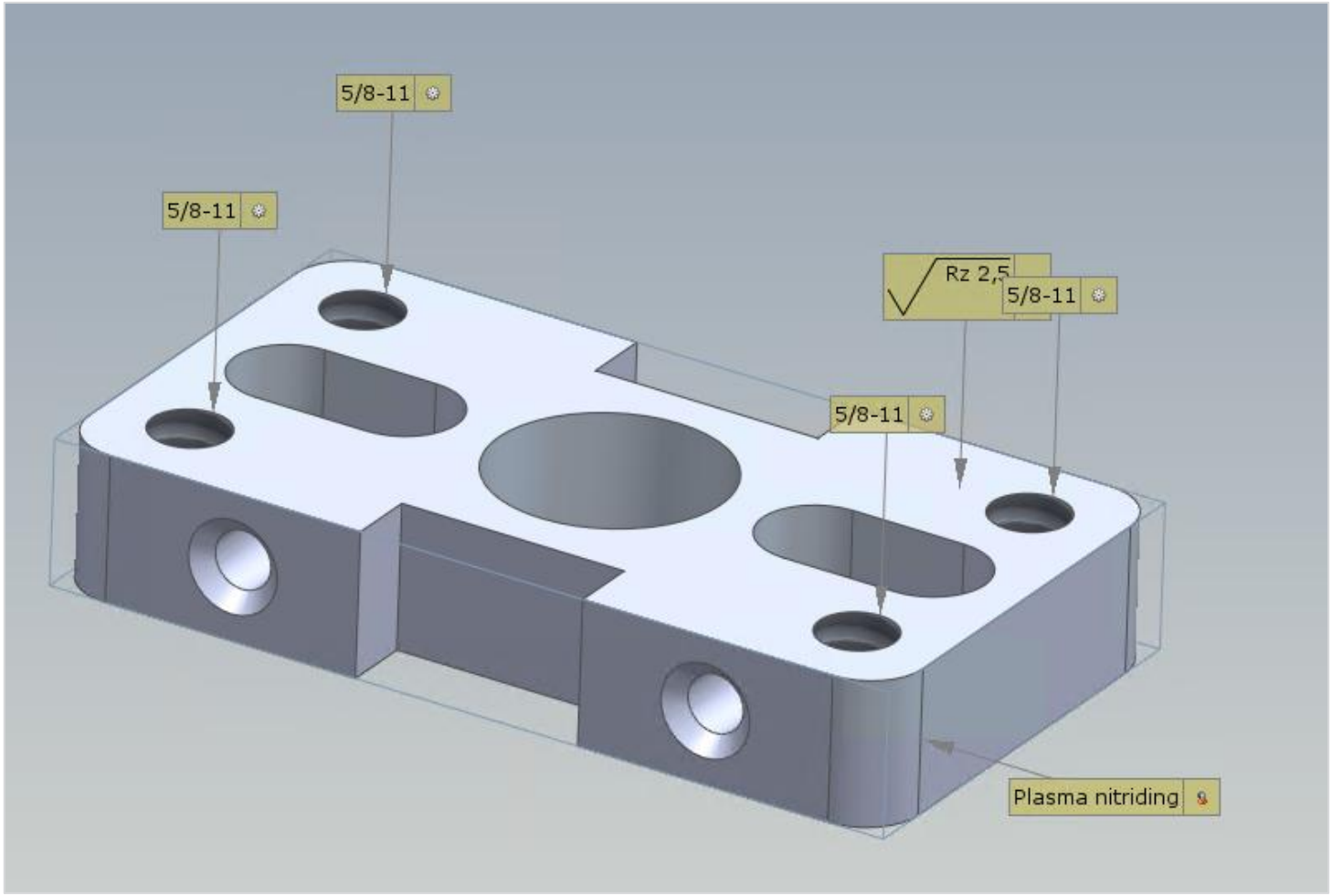
Geometric reference



Machining objects	Info	Non-influencable activity time f. object	Share of cost for machining object
		Lead time	Share of cost
SAEGEN-[0]:saegen@SAW	1x: diameter: 65.0	1.291	0.717
ZWISCHENGRATEN-[0]:zwischengraten@IDE	1x: deburring after sawing	0.150	0.083
PLANDREHEN-[0]:plandrehen_schrupp@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.091	0.525
PLANDREHEN-[0]:plandrehen_schlicht@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.125	0.635
PLANDREHEN-[1]:plandrehen_schrupp@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.091	0.525
PLANDREHEN-[1]:plandrehen_schlicht@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.125	0.635
ABSATZ_AUSSEN-[0]:langdrehen_schrupp@TM	1x: diameter: 38.0, length: 5.0, raw material diameter: 65.0, fit h7	0.193	0.778
ABSATZ_AUSSEN-[0]:langdrehen_schlicht@TM	1x: diameter: 38.0, length: 5.0, raw material diameter: 65.0, fit h7	0.037	0.260
ABSATZ_AUSSEN-[1]:langdrehen_schrupp@TM	1x: diameter: 62.0, length: 10.0, raw material diameter: 65.0	0.055	0.321
ABSATZ_AUSSEN-[1]:langdrehen_schlicht@TM	1x: diameter: 62.0, length: 10.0, raw material diameter: 65.0	0.113	0.512
ABSATZ_AUSSEN-[2]:langdrehen_schrupp@TM	1x: diameter: 47.0, length: 11.0, raw material diameter: 65.0, fit h7	0.162	0.759
ABSATZ_AUSSEN-[2]:langdrehen_schlicht@TM	1x: diameter: 47.0, length: 11.0, raw material diameter: 65.0, fit h7	0.095	0.537
VORBOHREN_ZENTR-[0]:bohrungdrehen_zentr@TM	1x: diameter: 27.0,length: 26.0,raw material inner diameter: 0.0	0.485	1.830
ABSATZ_INNEN-[0]:langdrehen_schrupp@TM	1x: diameter: 28.0,length: 4.5,raw material inner diameter: 0.0,predilled inner diameter: 27.0,dimensional tolerance 0.1/-0.1	0.013	0.263
ABSATZ_INNEN-[0]:langdrehen_schlicht@TM	1x: diameter: 28.0,length: 4.5,raw material inner diameter: 0.0,predilled inner diameter: 27.0,dimensional tolerance 0.1/-0.1	0.019	0.285
ABSATZ_INNEN-[1]:langdrehen_schrupp@TM	1x: diameter: 32.0,length: 10.5,raw material inner diameter: 0.0,predilled inner diameter: 27.0,fit H6	0.063	0.347
ABSATZ_INNEN-[1]:langdrehen_schlicht@TM	1x: diameter: 32.0,length: 10.5,raw material inner diameter: 0.0,predilled inner diameter: 27.0,fit H6	0.051	0.306
ABSATZ_INNEN-[2]:langdrehen_schrupp@TM	1x: diameter: 44.0,length: 11.0,raw material inner diameter: 0.0,predilled inner diameter: 27.0	0.159	0.666
ABSATZ_INNEN-[2]:langdrehen_schlicht@TM	1x: diameter: 44.0,length: 11.0,raw material inner diameter: 0.0,predilled inner diameter: 27.0	0.073	0.380
TASCHE-[0]:schruppfraesen@TM	1x: depth: 0.1,AREA: 113.23	0.092	0.444
TASCHE-[0]:schlichtfraesen@TM	1x: depth: 0.1,AREA: 113.23	0.059	0.291
ZW_EBENE-[0]:schruppfraesen@TM	1x: depth: 5.86,AREA: 214.31 (including subpockets 113.23 Face-19)	0.147	0.627

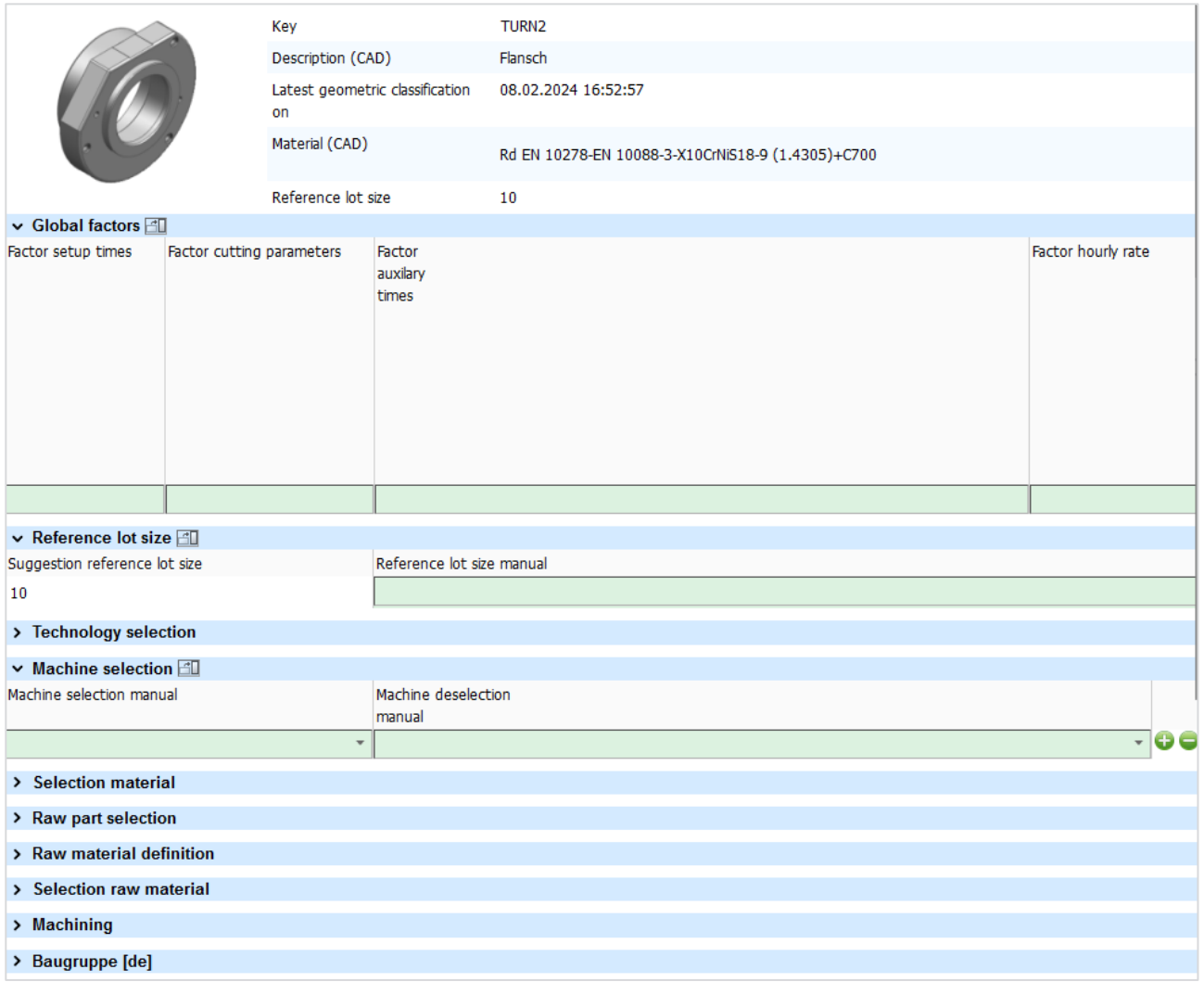
Step 5: Calculation of Additional Expenses / Influence

- Area-based or global influence
- Influencing factors can be individualized



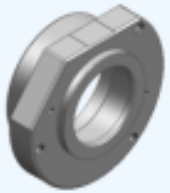
Step 5: Calculation of Additional Expenses / Influence

- Global influence
- Influencing factors can be customized and expanded



Step 6: Result of Production Costs Determination

Setup costs (total) | Cycle costs (total) | Setup costs / Machine | Cycle costs / Machine | Lot grading | Production costs

Preview	Machines	Setup time total [min]	Total production tim...	Set-up cost f. machine cost [...	Cost per unit f. machine cost ...	Lot	Manufacturing cost...
	Saw	80.08	15.41	2.50	0.72	1	135.03
	Interim deburring			0.00	0.08	2	79.92
	Mill-turning mac...			73.47	18.47	5	46.85
	Cylindrical grindi...			30.00	2.06	10	35.83
	Deburring (man...			0.50	0.33	25	29.22
						50	27.01
						100	25.91
						500	25.03
						1000	24.92
						2000	24.86
						5000	24.83

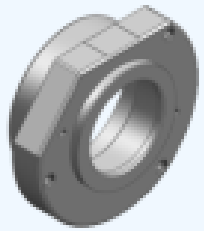
Step 6: Machine-Related Costs / Production Costs

Direct comparison of different calculation variations

Calculation variation 1

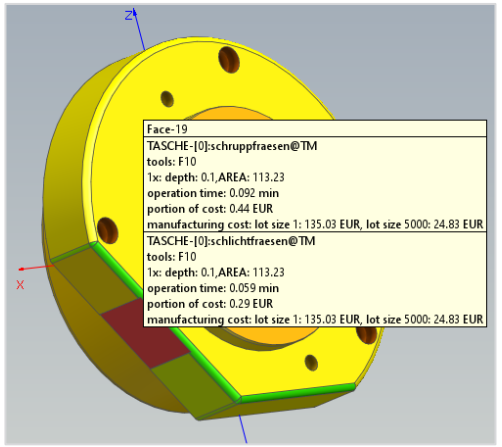
Preview	Machines	Setup time total [min]	Total production tim…	Set-up cost f. machine cost […	Cost per unit f. machine cost …	Lot	Manufacturing cost…
	Saw	80.08	15.41	2.50	0.72	1	135.03
	Interim deburring			0.00	0.08	2	79.92
	Mill-turning mac…			73.47	18.47	5	46.85
	Cylindrical grindi…			30.00	2.06	10	35.83
	Deburring (man…			0.50	0.33	25	29.22
						50	27.01
						100	25.91
						500	25.03
						1000	24.92
						2000	24.86
						5000	24.83

Calculation variations X

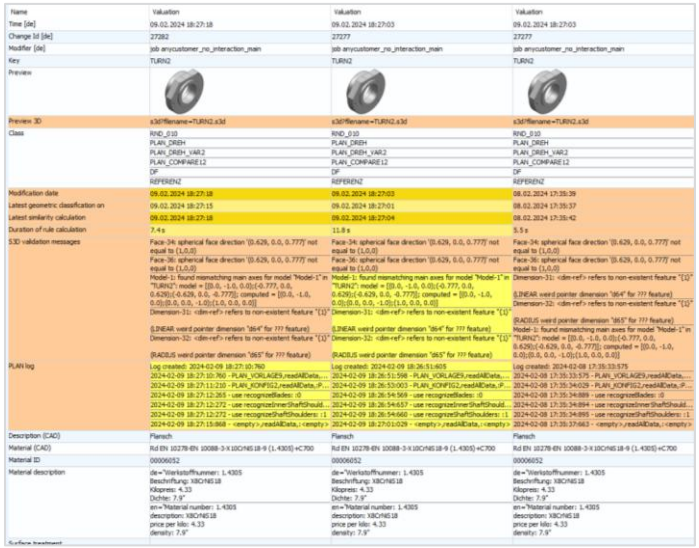
Preview	Lot	Manufacturing cost…	Manufacturi…
	1	135.03	101.84
	2	79.92	62.26
	5	46.85	38.51
	10	35.83	30.60
	25	30.60	29.22
	50	25.85	27.01
	100	24.26	25.91
	500	23.47	25.03
	1000	22.84	24.92
	2000	22.76	24.86
	5000	22.72	24.83

Step 6: Detailed Analysis / Cost Driver

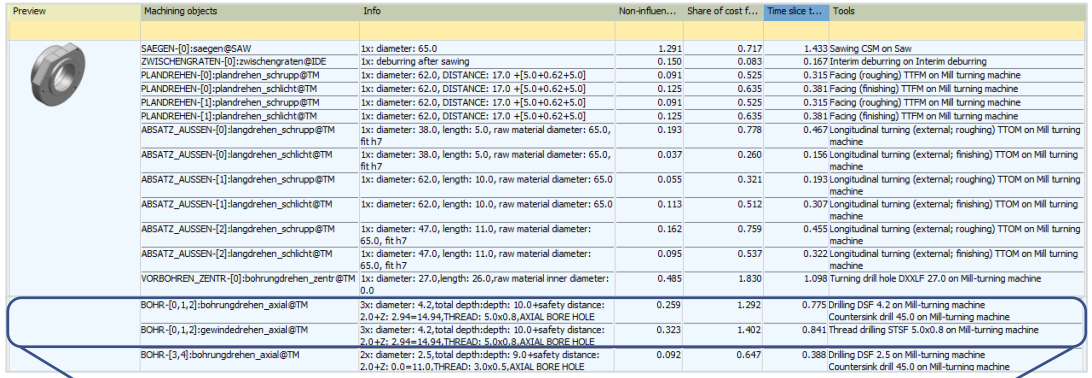
Cost driver



Change history

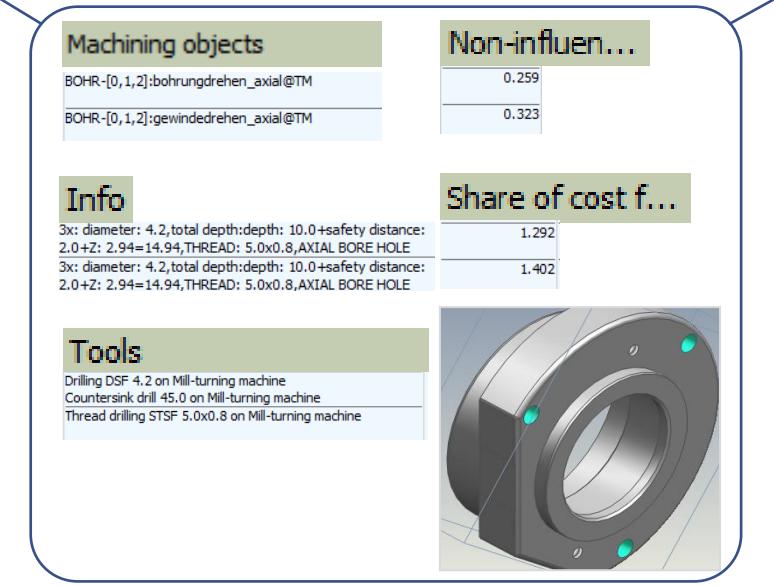


Detailed analysis



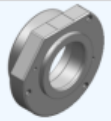
Preview	Machining objects	Info	Non-influen...	Share of cost f...	Time slice t...	Tools
	SAEGEN-[0]:saegen@SAW	1x: diameter: 65.0	1.291	0.717	1.433	Sawing CSM on Saw
	ZWISCHENGRATEN-[0]:zwischengraten@IDE	1x: deburring after sawing	0.150	0.083	0.167	Interim deburring on Interim deburring
	PLANDREHEN-[0]:plandrehen_schrupp@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.091	0.525	0.315	Facing (roughing) TTFM on Mill turning machine
	PLANDREHEN-[0]:plandrehen_schlicht@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.125	0.635	0.381	Facing (finishing) TTFM on Mill turning machine
	PLANDREHEN-[1]:plandrehen_schrupp@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.091	0.525	0.315	Facing (roughing) TTFM on Mill turning machine
	PLANDREHEN-[1]:plandrehen_schlicht@TM	1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0]	0.125	0.635	0.381	Facing (finishing) TTFM on Mill turning machine
	ABSATZ_AUSSEN-[0]:langdrehen_schrupp@TM	1x: diameter: 38.0, length: 5.0, raw material diameter: 65.0, fit h7	0.193	0.778	0.467	Longitudinal turning (external; roughing) TTOM on Mill turning machine
	ABSATZ_AUSSEN-[0]:langdrehen_schlicht@TM	1x: diameter: 38.0, length: 5.0, raw material diameter: 65.0, fit h7	0.037	0.260	0.156	Longitudinal turning (external; finishing) TTOM on Mill turning machine
	ABSATZ_AUSSEN-[1]:langdrehen_schrupp@TM	1x: diameter: 62.0, length: 10.0, raw material diameter: 65.0	0.055	0.321	0.193	Longitudinal turning (external; roughing) TTOM on Mill turning machine
	ABSATZ_AUSSEN-[1]:langdrehen_schlicht@TM	1x: diameter: 62.0, length: 10.0, raw material diameter: 65.0	0.113	0.512	0.307	Longitudinal turning (external; finishing) TTOM on Mill turning machine
	ABSATZ_AUSSEN-[2]:langdrehen_schrupp@TM	1x: diameter: 47.0, length: 11.0, raw material diameter: 65.0, fit h7	0.162	0.759	0.455	Longitudinal turning (external; roughing) TTOM on Mill turning machine
	ABSATZ_AUSSEN-[2]:langdrehen_schlicht@TM	1x: diameter: 47.0, length: 11.0, raw material diameter: 65.0, fit h7	0.095	0.537	0.322	Longitudinal turning (external; finishing) TTOM on Mill turning machine
	VORBOHREN_ZENTR-[0]:bohrungdrehen_zentr@TM	1x: diameter: 27.0,length: 26.0,raw material inner diameter: 0.0	0.485	1.830	1.098	Turning drill hole DXXLF 27.0 on Mill-turning machine
	BOHR-[0,1,2]:bohrungdrehen_axial@TM	3x: diameter: 4.2,total depth:depth: 10.0+safety distance: 2.0+Z: 2.94=14.94,THREAD: 5.0x0.8,AXIAL BORE HOLE	0.259	1.292	0.775	Drilling DSF 4.2 on Mill-turning machine Countersink drill 45.0 on Mill-turning machine
	BOHR-[0,1,2]:gewindedrehen_axial@TM	3x: diameter: 4.2,total depth:depth: 10.0+safety distance: 2.0+Z: 2.94=14.94,THREAD: 5.0x0.8,AXIAL BORE HOLE	0.323	1.402	0.841	Thread drilling STSF 5.0x0.8 on Mill-turning machine
	BOHR-[3,4]:bohrungdrehen_axial@TM	2x: diameter: 2.5,total depth:depth: 9.0+safety distance: 2.0+Z: 0.0=11.0,THREAD: 3.0x0.5,AXIAL BORE HOLE	0.092	0.647	0.388	Drilling DSF 2.5 on Mill-turning machine Countersink drill 45.0 on Mill-turning machine

Geometric reference



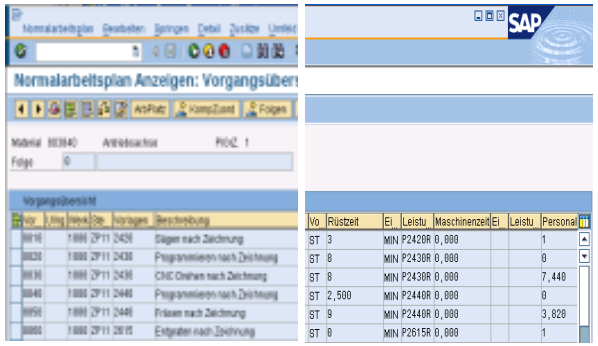
Step 7: Routing Generation

Calculation variation 1

Preview	Operation number	Control key	Work center	Short text	Standard time tr	Standard time te	Standard time tp	Long text
	0010	PP01	SAW	Sawing raw-material on length: 26.0mm	5.000	1.430	0.140	TURN2: Sawing raw-material on length: 26.0mm 1x: diameter: 65.0
	0020	PP01	IDE	Interim deburring	0.000	0.170	0.020	TURN2: Interim deburring 1x: deburring after sawing
	0030	PP01	TM	Programming machine: Mill-turning machine	75.000	0.000	0.000	TURN2: Programming machine: TM
	0040	PP01	TM	1. dp. Turning (CNC) Machining with driven tools 2. dp. Turning (CNC)	44.080	11.080	7.450	TURN2: 1. dp. Turning (CNC) 1x: diameter: 62.0, DISTANCE: 17.0 +[5.0+0.62+5.0] 1x: diameter: 38.0, length: 5.0, raw material diameter: 65.0, fit h7 1x: diameter: 62.0, length: 10.0, raw material diameter: 65.0 1x: diameter: 27.0,length: 26.0,raw material inner diameter: 0.0 1x: diameter: 28.0,length: 4.5,raw material inner diameter: 0.0,predilled inner diameter: 27.0,dimensional tolerance 0.1/-0.1
	0050	PP01	DEBM	Deburring	1.000	0.670	0.070	TURN2: Deburring 1x: number of remaining edges: 6
	0060	PP01	RG	Circular grinding	30.000	2.060	0.200	TURN2: Circular grinding 1x: AREA: 0.1 dm2,fit H6

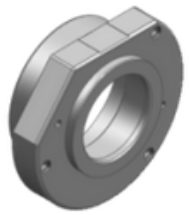
Calculation variations X

ERP Export



Step 8: Product Carbon Footprint (PCF)

- Detailed determination of emissions
- Selection of the underlying electricity mix possible



Material (CAD)	Rd EN 10278-EN 10088-3-X10CrNiS18-9 (1.4305)+C700
Reference lot size	10
PLAN quota	**1,00**
Total emission [kg]	2,53 kg
Dimensions [mm]	62x22
Dimensions flattened [mm]	

Raw material emission — **0,91 kg**

Material group	Raw material	Material	Emission from raw material/material [kg]
Steel (alloyed)	00001904, Round, RD 65, Steel (alloyed) , 1.4305, 78.31 €/m	X8CrNiS18	1,30 kg

Raw part mass [kg]	Chips mass [kg]	Mass [kg]	Emission reduction from chips [kg]	Emission reduction from recycling [kg]
0,682 kg	0,507 kg	0,175 kg	0,39 kg	0,00 kg

Setup + machining emission — **1,37 kg**

Setup emission — **0,09 kg**

Machines	max. power [kW]	Power setup[kW]	Electricity consumption [kWh]	Setup emission [g]	Setup emission per unit [g/unit]
Saw	10,00	0,50	0,04	20,21	2,02
Interim deburring	5,00	0,25	0,00	0,00	0,00
Mill-turning machine	43,00	2,15	1,58	766,07	76,61
Cylindrical grinding machine	8,00	0,40	0,20	97,00	9,70
Deburring (manual)	3,00	0,15	0,00	1,21	0,12

Machining emission — **1,28 kg**

Machines	Power level	Power [kW]	Electricity consumption [kWh]	Emission per unit [g]
Saw	Standard processing	6	0,129	62,62
Interim deburring	Standard processing	3	0,008	3,64
Mill-turning machine	Standard processing	25,8	0,033	16,23

Step 9: Result of a BOM Calculation

Assembly / Parts list structure
Price
Price from ERP
Production costs from classmate
Calculation lot size
Unit price
Unit price*quantity
Info
Calculation result

Preview	Article ID	Price [EUR]	ERP price	CLM price (p...	CLM calc. batch sz.	Unit Price Used [EUR]	Unit price used*number	Info	Manufacturing cost ...
	1x S _ZS06 SEASCOOTER FINAL	6465.02			10	16.5	16.5	Sum, Price incomplete	6465.02
	1x C UPPER CONE MESH	655.14		655.14	10	655.14	655.14	Price from CLM, Quota: 0.99, Calculati...	
	1x S ZS06 BATTERY & GEARBOX FINAL	1470.59			10	10.74	10.74	Sum, Price incomplete	
	1x S BATTERY COVER_FINAL	1142.53			10	1.35	1.35	Sum	
	1x C BATTERY COVER_FINAL@PART_0	4.15		4.15	10	4.15	4.15	Price from CLM, Quota: 1.0, Calculatio...	
	1x C BATTERY COVER_FINAL@PART_1	1137.03		1137.03	10	1137.03	1137.03	Price from CLM, Quota: 1.0, Calculatio...	

Calculation on the basis of single parts

Standard / Purchased parts:
Pricing from ERP system as standard

Drawing parts:
Post calculation value from ERP if available, otherwise: preliminary costing result from simus classmate

Calculation lot size configurable

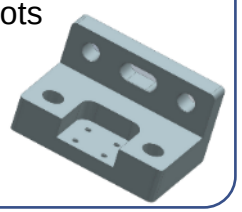
Mounting lump sums can be considered

Modifications of an assembly as for example subsequently added bore holes can be considered

Currently Supported Processing Methods (1/3)

Milling operations

- Roughing, finishing, fine finishing, hard machining
- Face milling, peripheral milling
- Form milling, deburr milling, circular milling, disk milling
- Taking the clamping situation into account
- Planning levels, slopes, chamfers, radiuses
- Circumferential groove, T-Slots
- Outer and inner contours
- Pockets, grooves
- Bore holes, threads
- Milling engravings

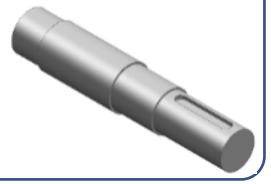


Internal broaching

- Hexagon socket
- Square socket

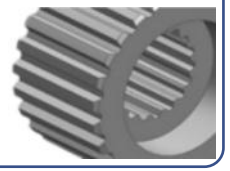
Turning operations

- Roughing, finishing, fine finishing, burnishing, hard machining
- Internal and external straight turning, face turning, eccentric turning
- Turned recesses, grooves, plane grooves
- Cutting-off
- Screw threads
- Driven tools
- Bar loaders
- Double spindle machining



Gear cutting

- Gear hobbing
- Gear shaping
- Gear broaching

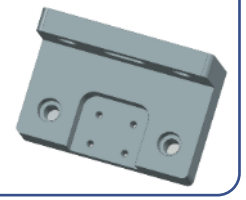


Grooves

- broaching
- …

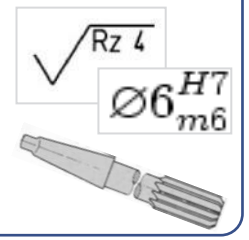
Drilling

- Through holes, blind holes
- Countersunk holes, stepped holes
- Threads
- Deep hole drilling



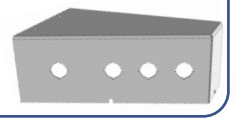
Finishing works

- Consideration of surface finish, dimensional tolerances / fits, shape and position tolerances
- Fine finishing on cutting machines
- Reaming
- Roller burnishing
- Flat grinding
- Cylindrical grinding
- Coordinate grinding
- Flat polishing
- Cylindrical polishing

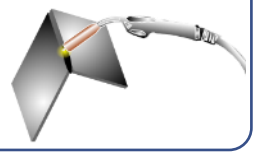


Currently Supported Processing Methods (2/3)

Sheet metal forming
- Punching, nibbling, embossing, thread-forming
- Laser cutting
- Flame cutting
- Plasma cutting
- Water jet cutting



Welding
- Manual welding
- Robot welding
- Spot welding, stud welding
- Machining / Chipping in the assembly context



Forming
- Bending / Edge folding (sheet metal, bars, pipes)
- Stamping-bending
- Straightening
- Cylinder production: deep-drawing presses
- Cylinder production: flanging machines

Pipe lasering
- Rectangular pipes, square pipes, round pipes
- Friction drilling
- Profile loader

Sawing
- Panel saw
- Band saw

Angle grinding, cut-off grinding
- Cutting
- Chamfers

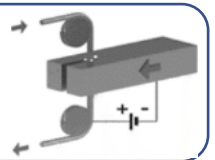
Primary shaping processes
- Injection moulding
- 3D print MJF
- (Sand casting)

Currently Supported Processing Methods (3/3)

Heat treatments
- Hardening
- Annealing
- Tempering
- Quenching and tempering

Surface treatments
- Powder coating
- Varnishing
- Galvanizing
- Black-oxide
- etc.

Erode
- Die sinking
- Wire eroding

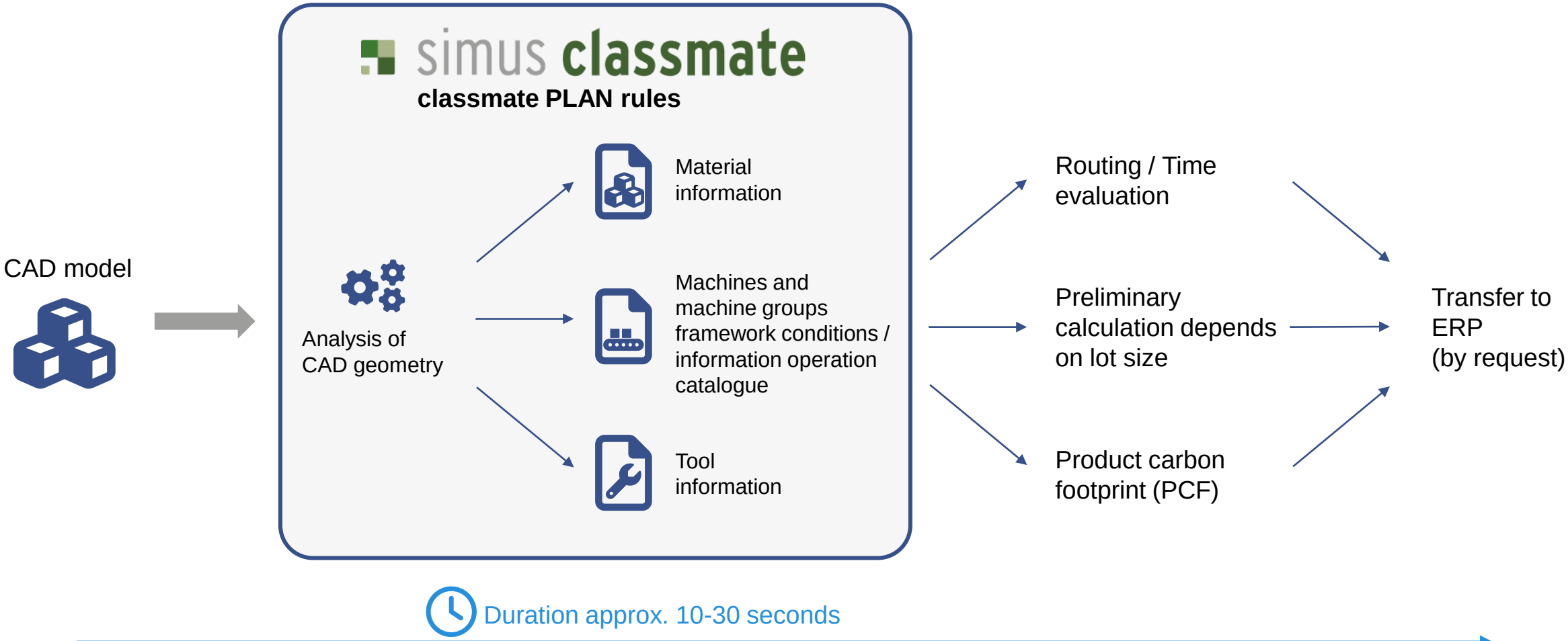


Assembly calculation
- Lump sum for assembly
- Depending on the amount of parts, the volume, the weight, the type of the parts
- Machining / Chipping in the assembly context
- Pressing
- Staking

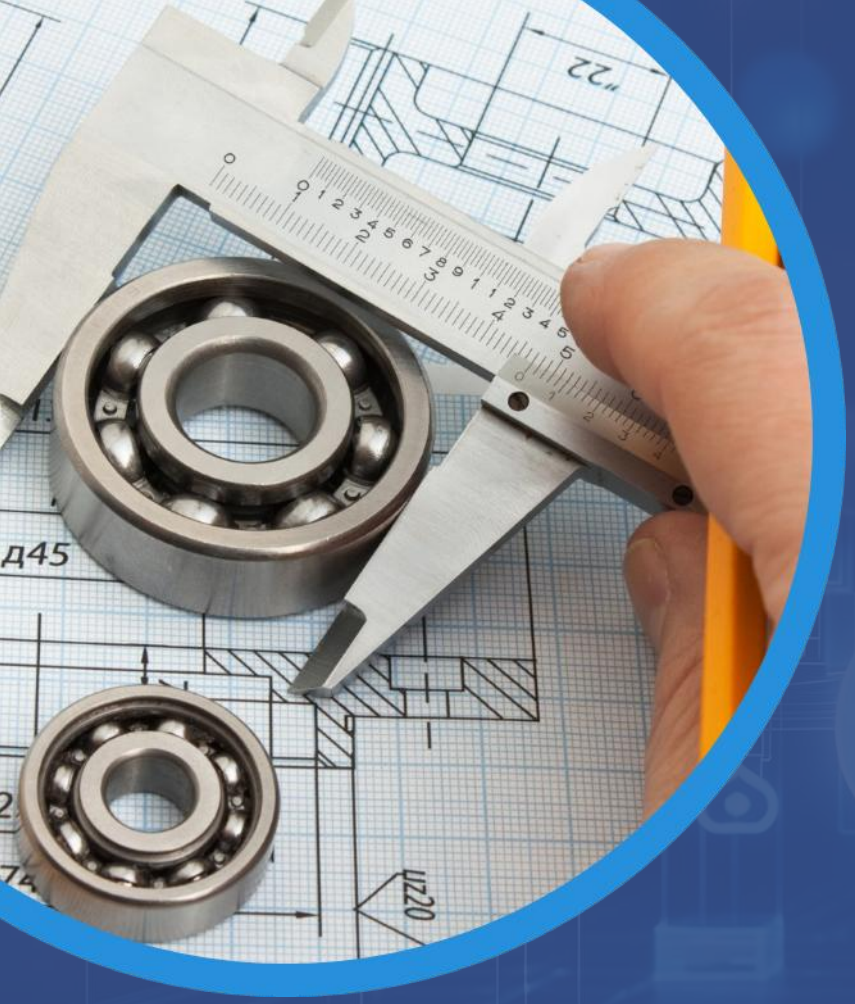
Programming
- Determination of programming costs
- Optionally as part of the processing costs

Other operations
- Deburring
- Laser signature
- Checking
- Cleaning
- Transport

Schematic Approach and Operation Duration



Software Presentation



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AI-Supported Drawing Recognition

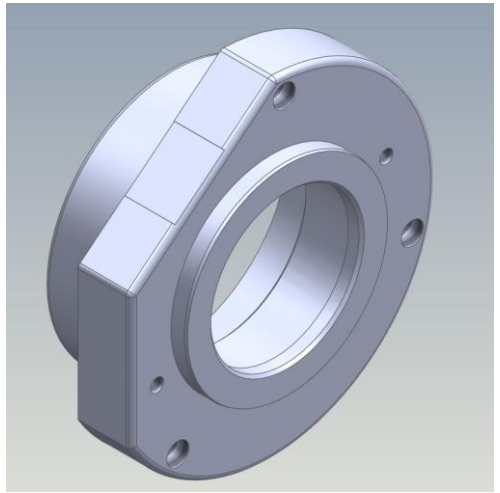
Capture Drawing Information with AI and Assign it to the 3D Model

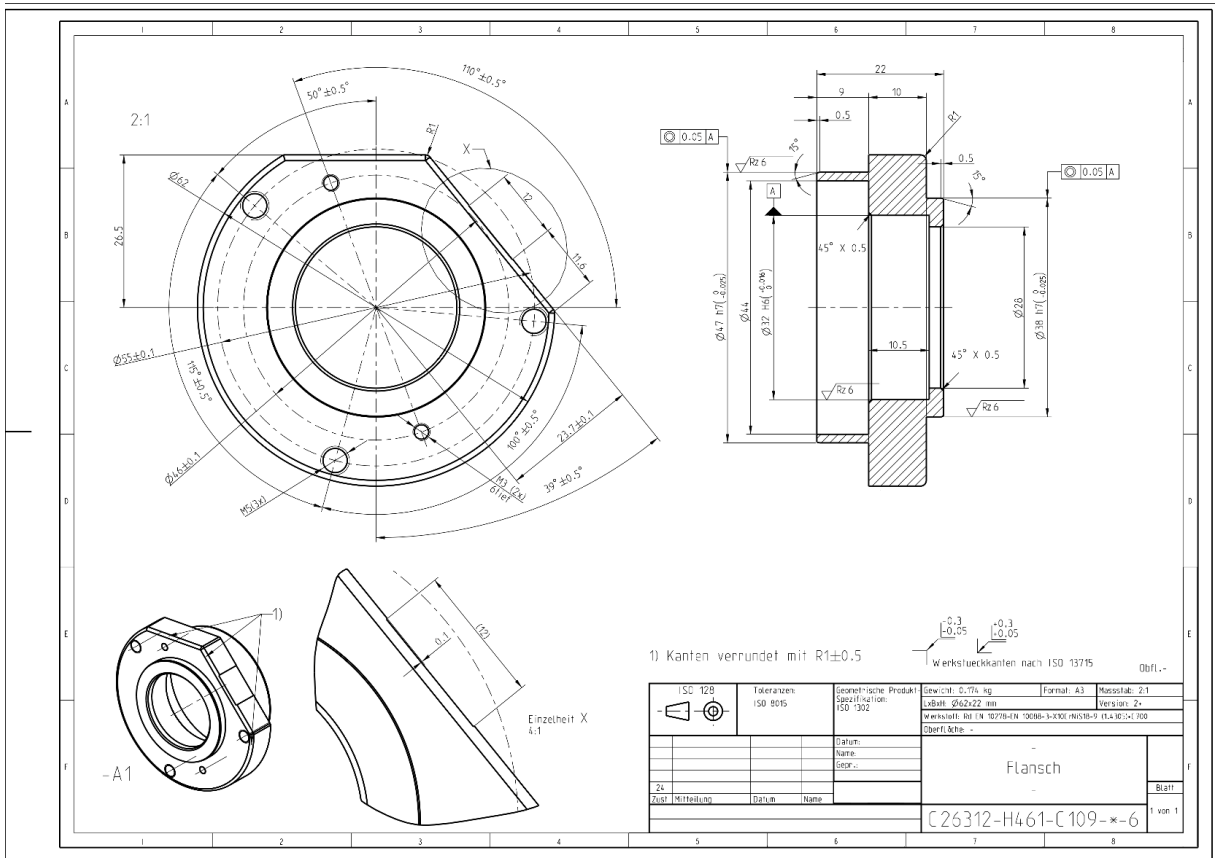
Initial Situation

Output data: Drawing and 3D model

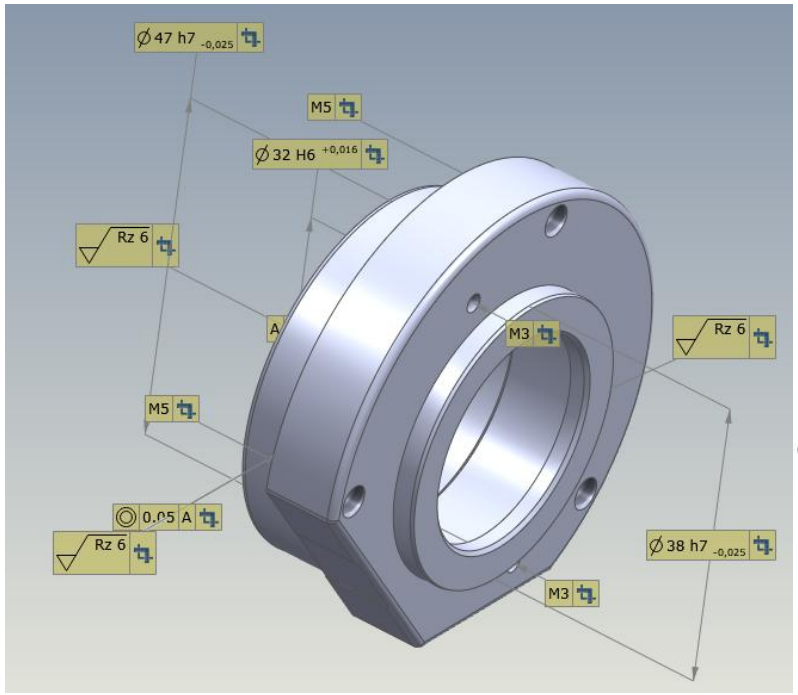
Information from technical drawings should be used:

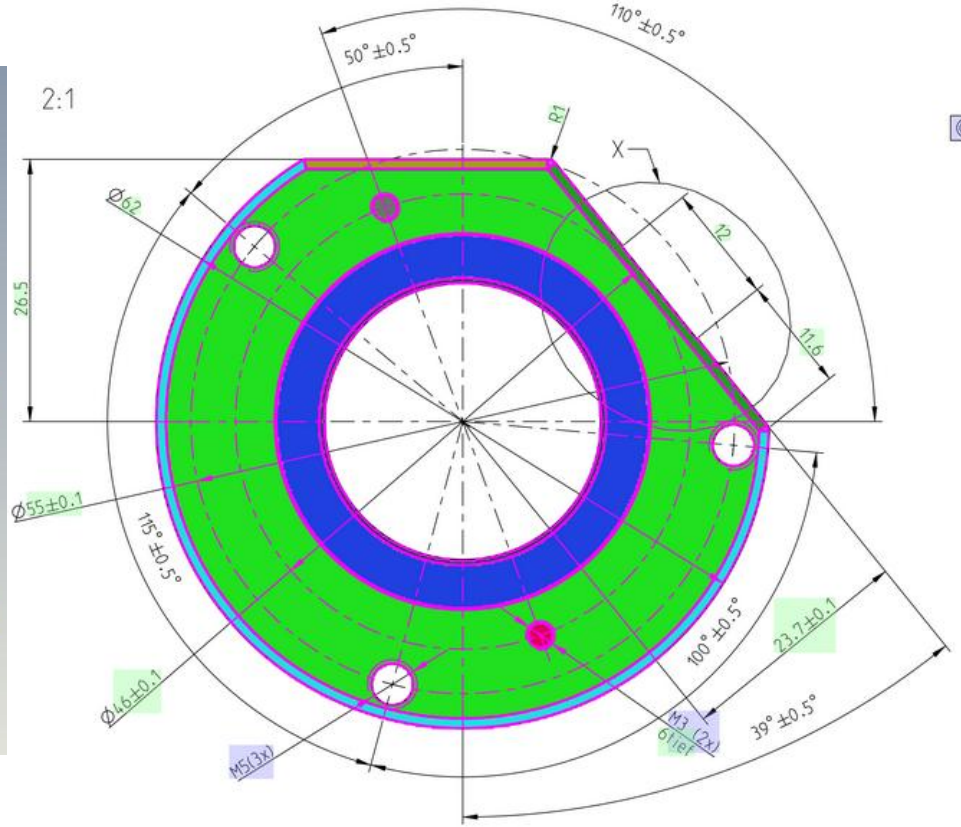
- Tolerances / fits ⌀47 h7(0 -0.025)
- Thread information M5(3x)
- Surface quality R_z 6
- Shape and position tolerances ◎ 0.05 A
- Information from the drawing header e.g. material
- etc.

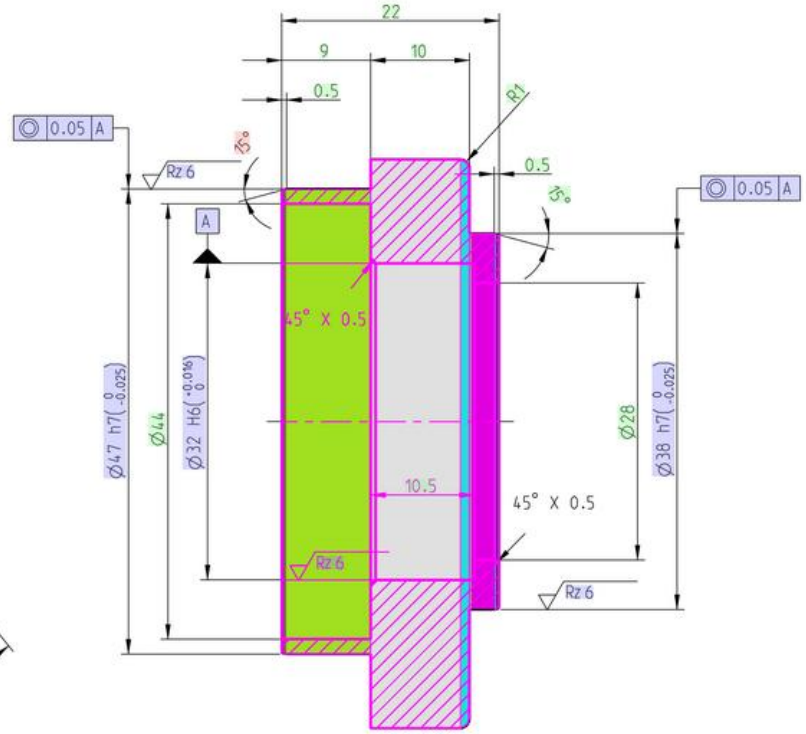




Annotations Found



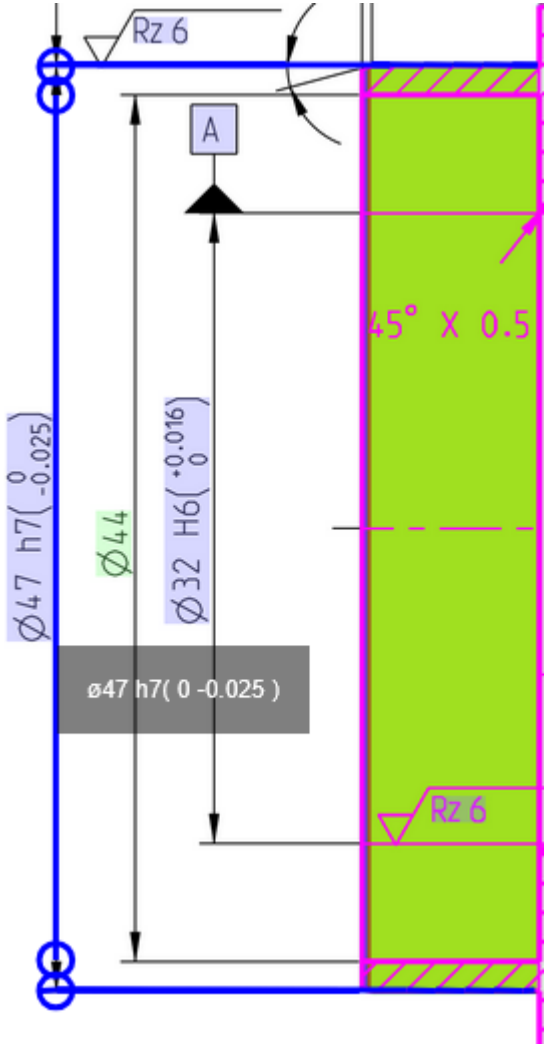


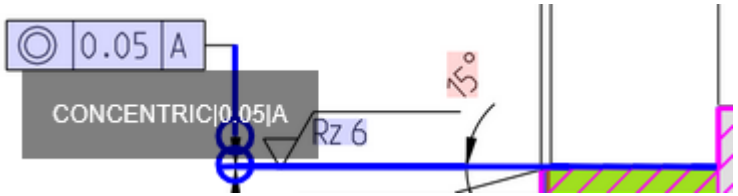


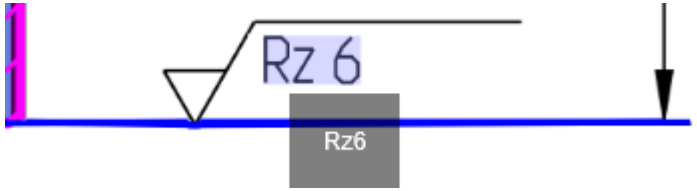
Examples of Highlighted Annotations

Dimension line data is found and processed

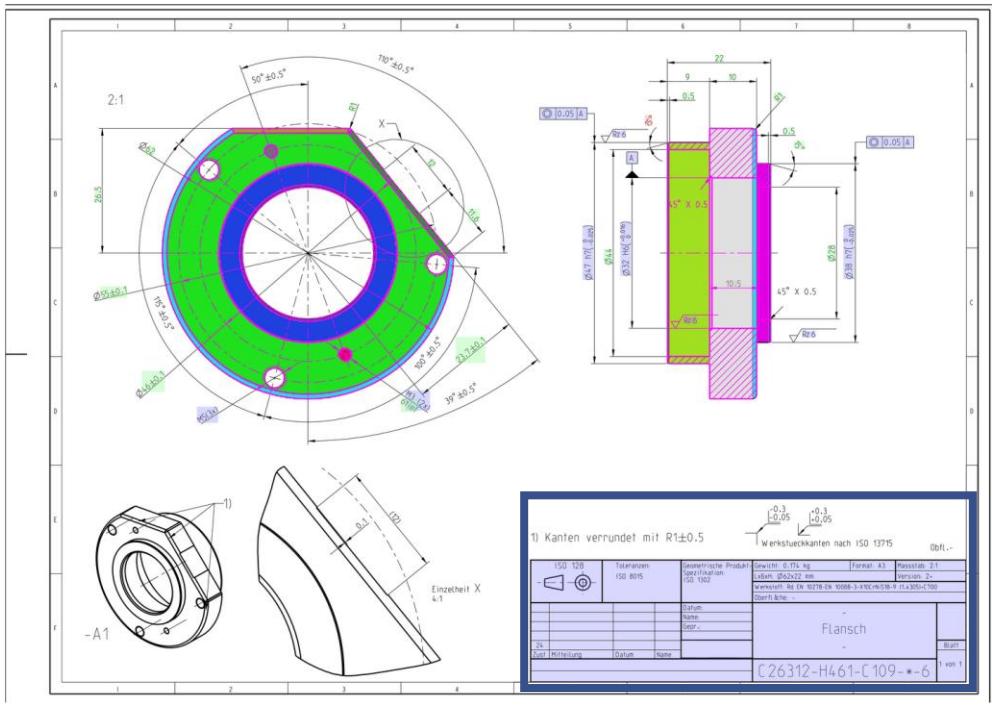
→ Area allocation possible



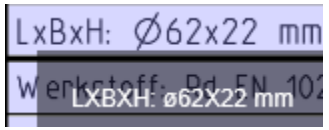




Drawing Head – Analysis

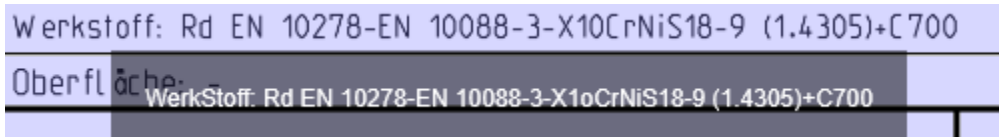


Data can be read out

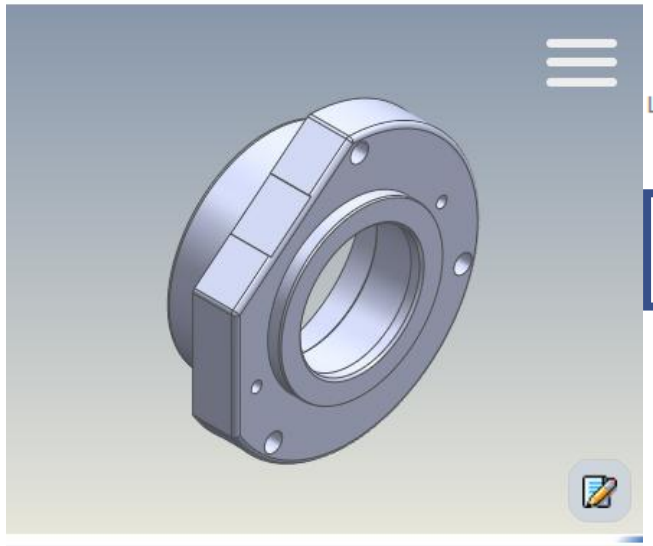


Goal:

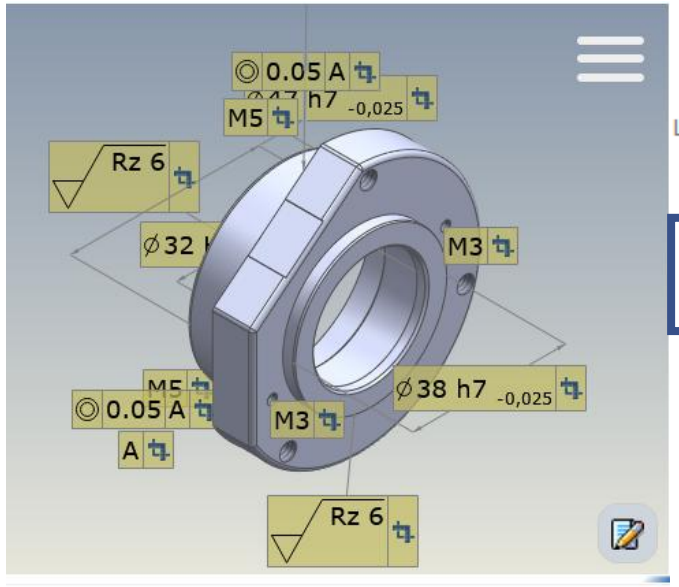
- Checks with dictionary to detect spelling mistakes or unknown materials



Calculation of Manufacturing Costs after Drawing Recognition



ident:	TURN2-2
Type :	TURN2-2
Latest geometric classification on:	06.05.2025 15:17:04
Reference lot size:	1
PLAN quota:	**1,00**
Manufacturing cost [EUR]:	95,28
Purchase price [EUR]:	132,57
Purchase price incl. progr. [EUR]:	294,60
Dimensions [mm]:	62x22



ident:	TURN2-2
Type :	TURN2-2
Latest geometric classification on:	06.05.2025 15:21:56
Reference lot size:	1
PLAN quota:	**1,00**
Manufacturing cost [EUR]:	131,24
Purchase price [EUR]:	182,60
Purchase price incl. progr. [EUR]:	362,63
Dimensions [mm]:	62x22

More precise cost calculation due to automatic extraction of shape / position tolerances and other PMIs from the drawing

In this example: **Increase in costs by 37% (taking into account the annotations and the resulting change in production processes)**

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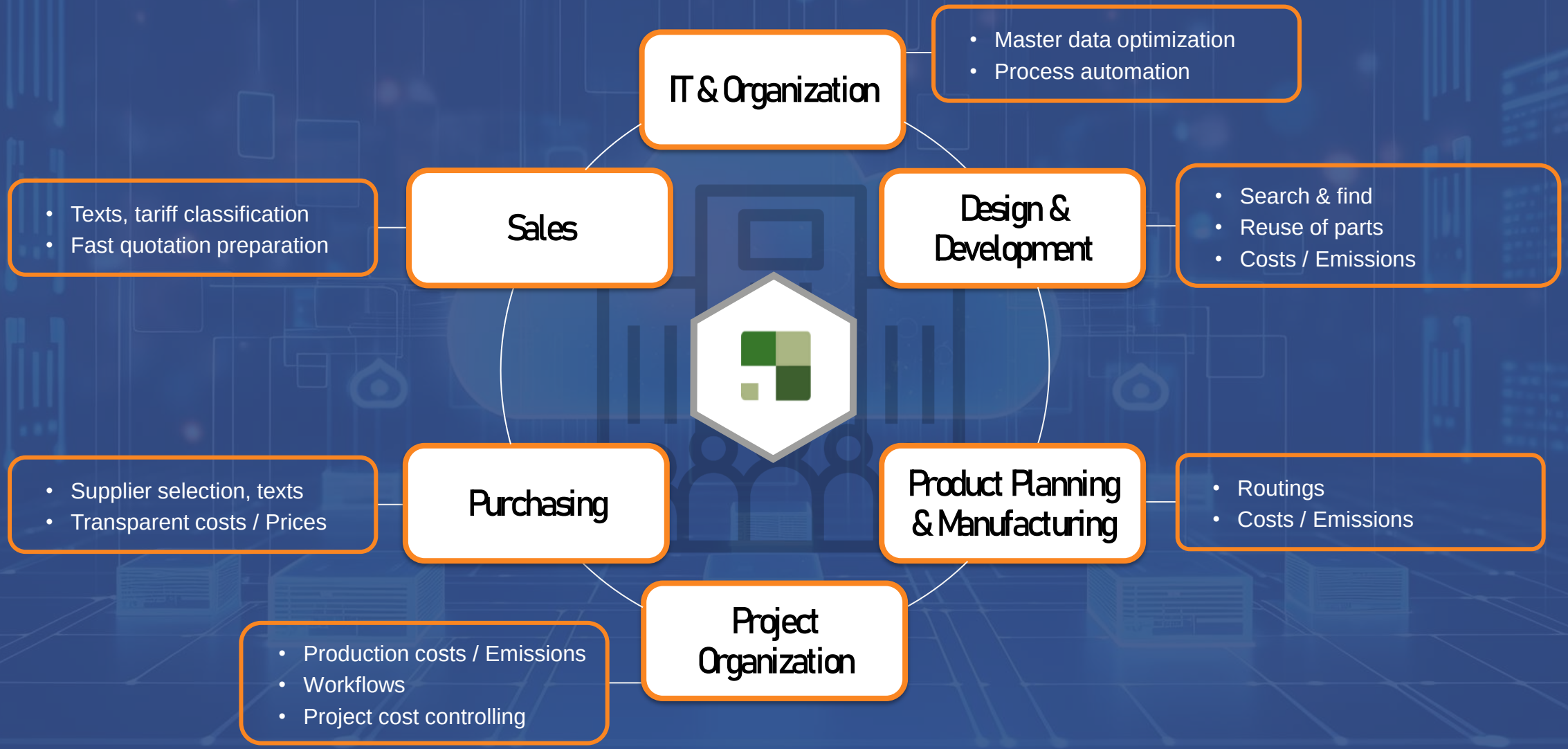
classmate PLAN

Merchandise Category Assignment / Supplier Screening

Support for Technical Purchasing

Benefits for the Entire Company



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Thank you for your attention.

I look forward to your questions.

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