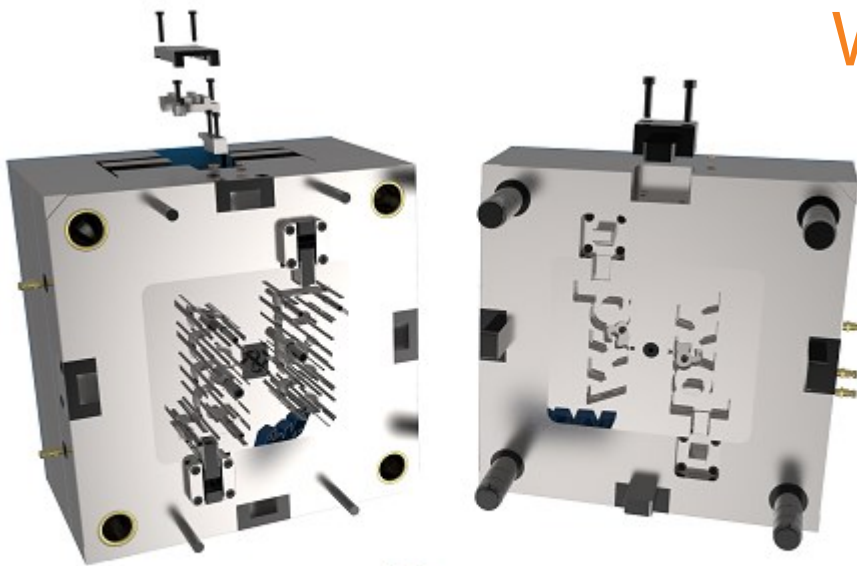


EMX 10 M053

What's New?



Enhancements

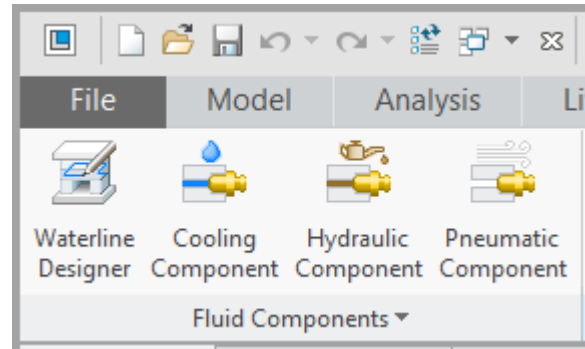
New Commands for Hydraulic and Pneumatic components:

New Hydraulic components:

- Meusburger E1700, E7140

New Pneumatic components

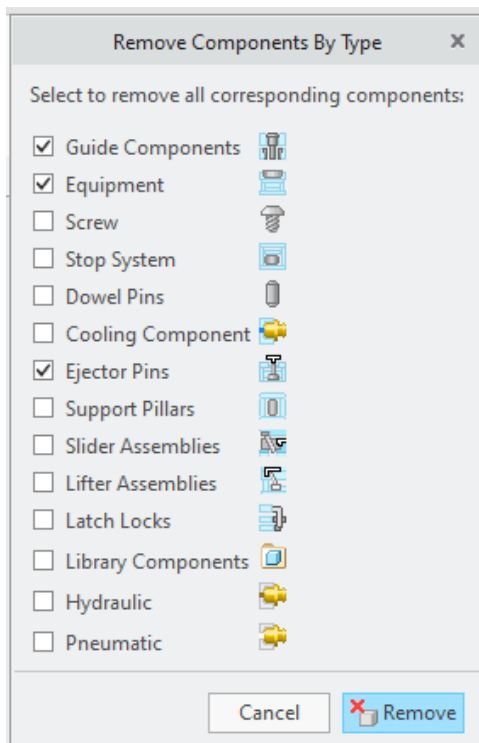
- Festo GS-G-I, QS-R-I



Enhancements

New Dialog to delete all components of a selected type:

Current function to delete all cooling components or all ejector pins is extended for all different components types.



Enhancements

New Option in Component Dialog to automatically create chamfers on edges in cutout UDFs for all kind of components:

Dimension Name	Value	Type
DM1 - Diameter	10	
LG1 - Length	120	
OFFSET - Offset	-12.000	
REF1 - Reference Di...	112.000	

Part Name: 555_E1200_10_120 Alternate part name

DATUM POINT:F175(APNT20) PROTRUSION:F10(PLATE):555 PROTRUSION:F10(PLATE):5

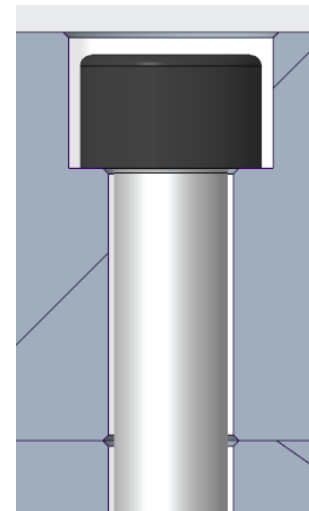
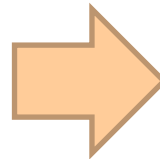
Component options: Options BOM Data Parameter Relation

Counterbore

Blind Hole

One Plate

Add additional chamfers to edges



A rule set for chamfer sizes can be defined in EMX options.

Options		Parameter		Project Parameter		Part Names		Technology		Cooling Bore Data	
Ejector Bore Data				Screw Hole Data		Export to Excel		Order Number Rules		Chamfer Size	
UDF ...	Cate...	Supp...	...	Lower Bound...	Upper Bound...	Chamfer Size					
*	*	*	mm	0	1.5	0.2					
*	*	*	mm	1.5	3	0.3					
*	*	*	mm	3	22	0.5					
*	*	*	mm	22	100	1					

Enhancements

New Command to transfer surface parameters from reference part to mold volumes:

- Manufacturing information can be transferred from the reference part to further derived models in the cavity.
- Supports model-based definition approach.

Enhancements and Improvements

New Option SOLID_TOLERANCE_STANDARD:

- Set solid tolerance standard independent from unit.

IGES, STEP, DXF export in BOM works with active Windchill workspace

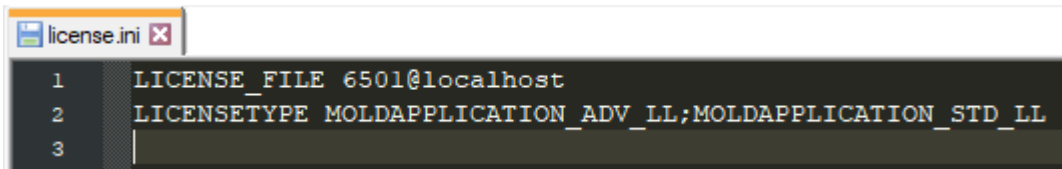
New MEUSBURGER guide components

- E5140, E5152 and E5202

Option BOM_BALLOON_CUSTOM_PARAM works now with component parameters

License.ini supports multiple license types on same license server

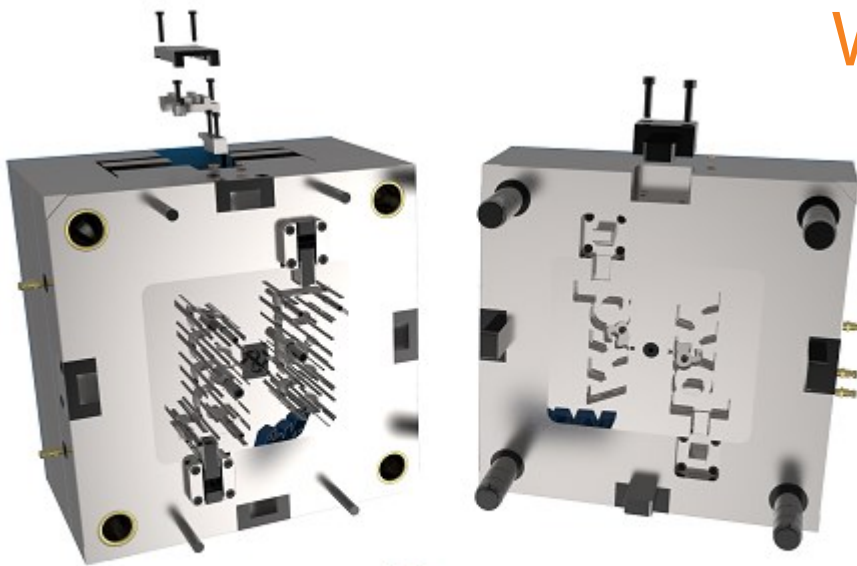
- In case multiple license types are defined a license can be selected from a dialog box.

A screenshot of a text editor window titled 'license.ini'. The window contains three lines of text: '1 LICENSE_FILE 6501@localhost', '2 LICENSETYPE MOLDAPPLICATION_ADV_LL;MOLDAPPLICATION_STD_LL', and '3'.

```
license.ini x
1 LICENSE_FILE 6501@localhost
2 LICENSETYPE MOLDAPPLICATION_ADV_LL;MOLDAPPLICATION_STD_LL
3
```

EMX 10 M052

What's New?



Enhancements

“Trimmed “ and “Shortened length” can be added to Ejector Pin notes parameter:

- Create an ejector pin pre or post note string using the EMX options EJP_NOTE_PRE_STRING or EJP_NOTE_POST_STRING
- In case the configuration option contains the placeholder <geometry_option> it will be replaced with „trimmed“ or „shorted_length“

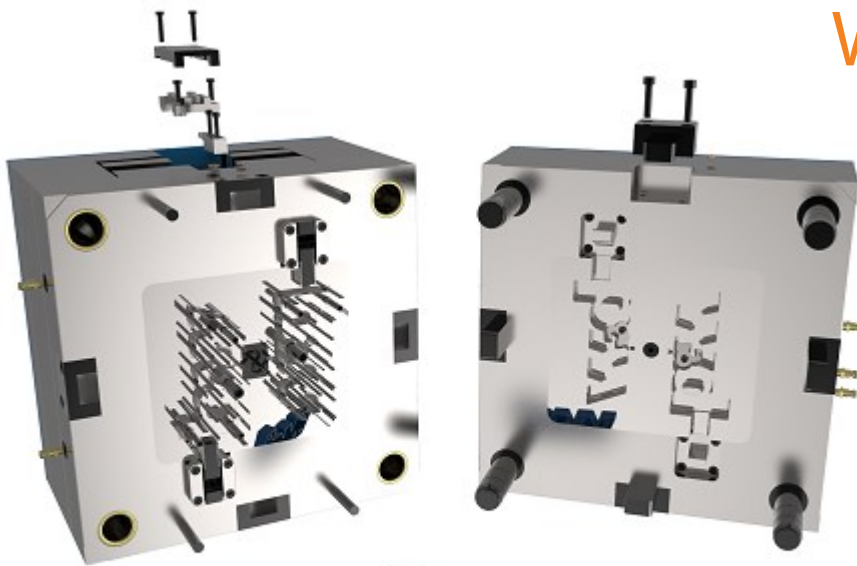
Enhancements

New configuration file `customer_number.cfg` introduced:

- This config file can be used to overwrite the content of the `USER_NUMBER` parameter based on supplier, category, type and instance of a component.
- This allows the configuration of customer number values without modifying the component `*dat` files at all.

EMX 10 M051

What's New?



Enhancements

New Function in Bill of Materials:

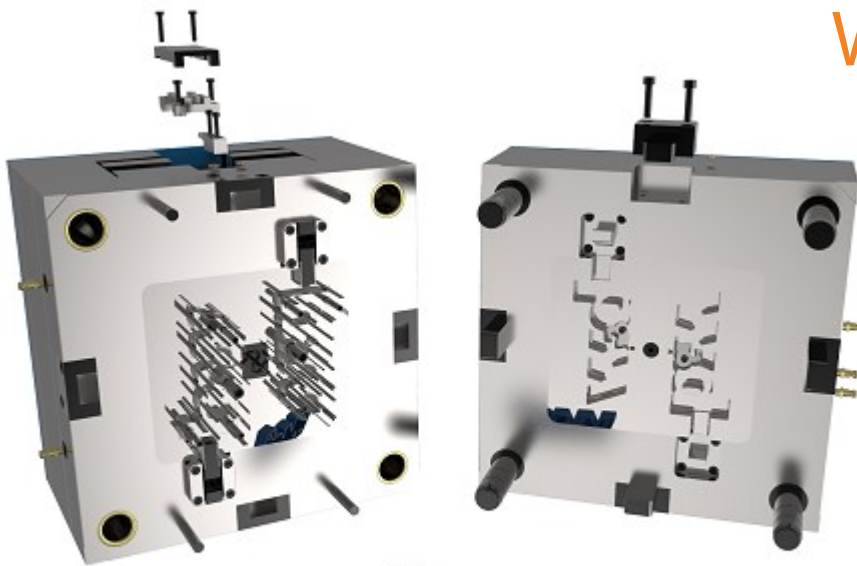
- All balloons on drawing can be deleted with one click

STRACK components updated, new guide components

- Guides: Z4412, Z4415, Z4416

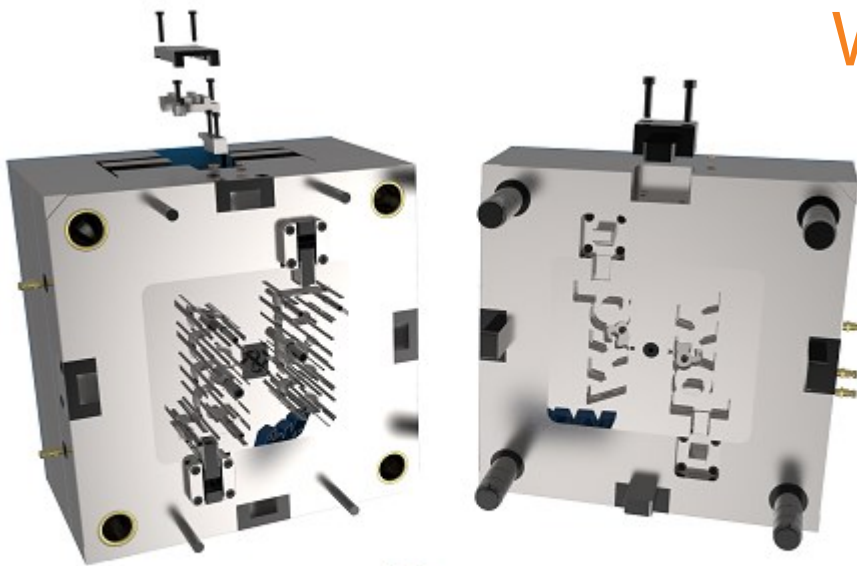
EMX 10 M050

What's New?



EMX 10 M040

What's New?



b&w

Components

New HASCO screws:

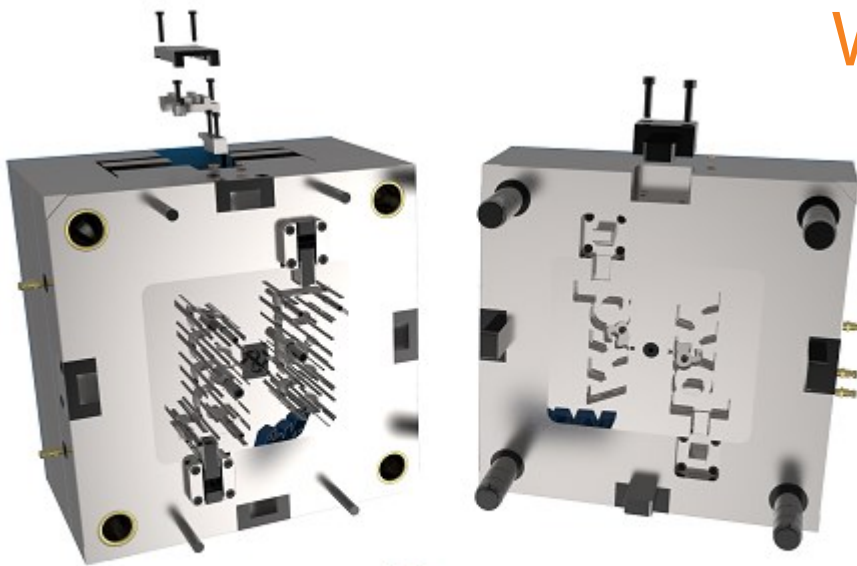
- Z34, Z351, Z371, Z372, Z3721, Z721

New HASCO sprue bushings:

- Z510, Z530
- 
- Decorative curved lines in the bottom right corner of the slide, consisting of a thick grey arc and a thin orange arc.

EMX 10 M033

What's New?

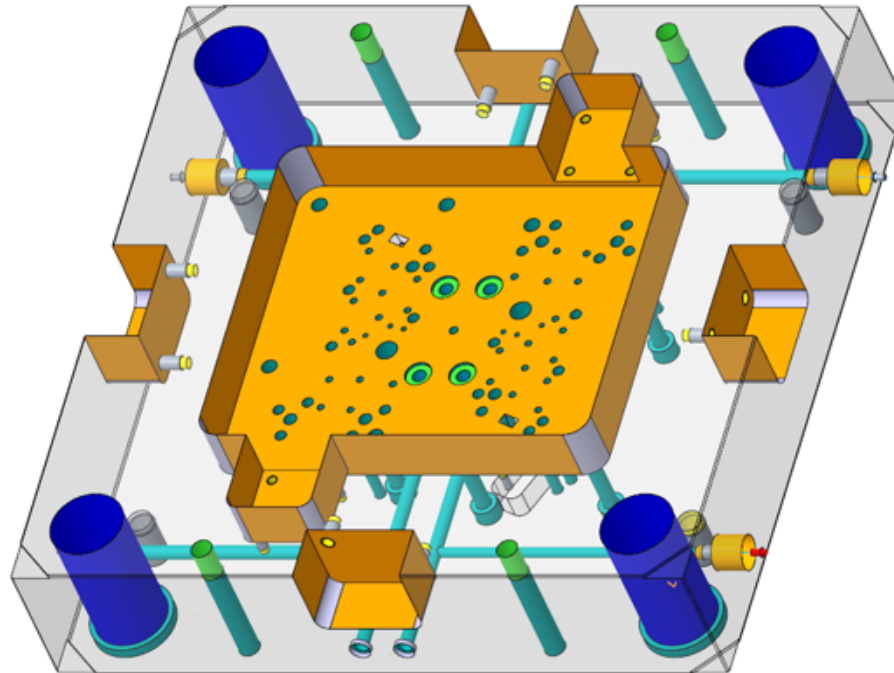


Enhancements

EMX is now SMARTColor ready!

- Apply color coding rules with B&W SMARTColor application
- More information on our website: [SMARTColor in EMX](#)

R 192 G 192 B 192			$\sqrt{Ra\ 0.8-6.3}$
R 0 G 175 B 175	$\pm 0,10$		$\sqrt{Ra\ 6.3}$
R 255 G 175 B 0	$\pm 0,10$		
R 255 G 255 B 0	$\pm 0,10$		
R 0 G 0 B 255	H7 $\pm 0,01$		$\sqrt{Ra\ 1.6-3.2}$
R 183 G 183 B 220	$\pm 0,10$		$\sqrt{Ra\ 6.3}$
R 84 G 255 B 84	$\pm 0,05$		$\sqrt{Ra\ 3.2}$
R 255 G 128 B 0	$\pm 0,01$		$\sqrt{Ra\ 1.6-3.2}$



Enhancements

New STRACK Z4 latch lock assembly

- New assembly contains all variation of the Z4 latch lock

STRACK[®]
NORMALIEN

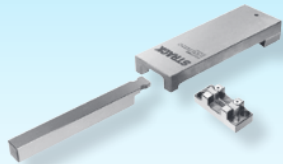
Entformungselemente – indirekt | Demoulding elements – indirect
Éléments de démoulage – indirects

Klinkenzüge

Latch locks

Ouvres-moules

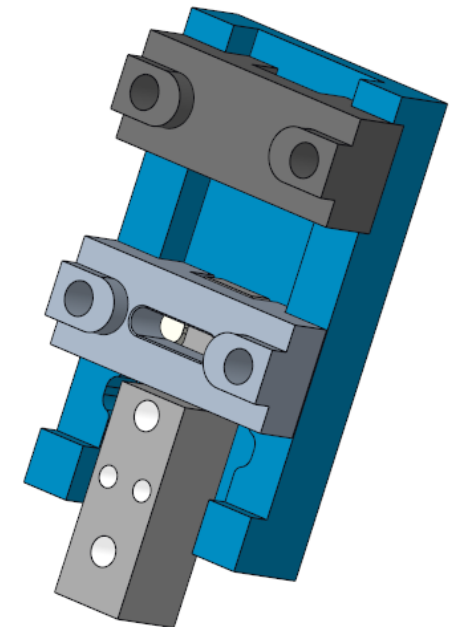
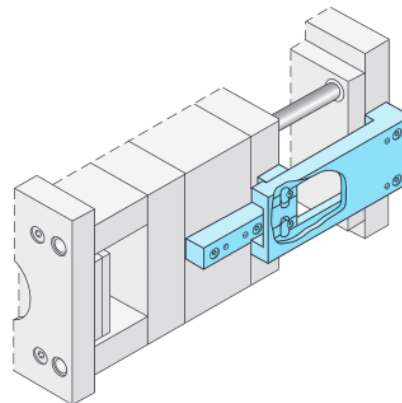
DLC 



Z4-1-

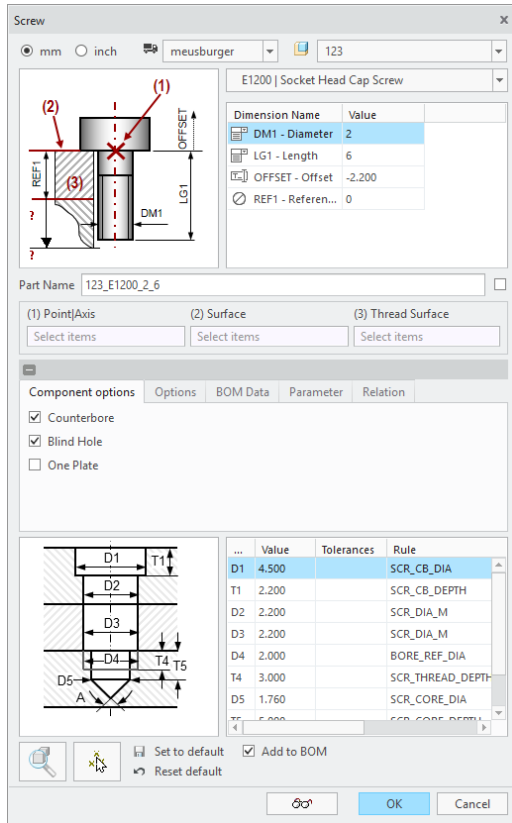
i deutsch 6.84-94
english 6.95-105
français 6.106-116

 Z4-1-Type

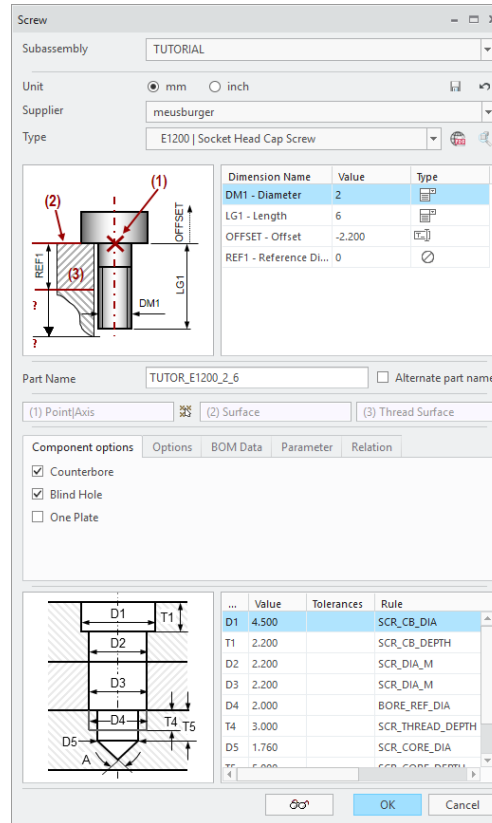


Enhancements

Streamlined UI of Component Dialog:



• Old



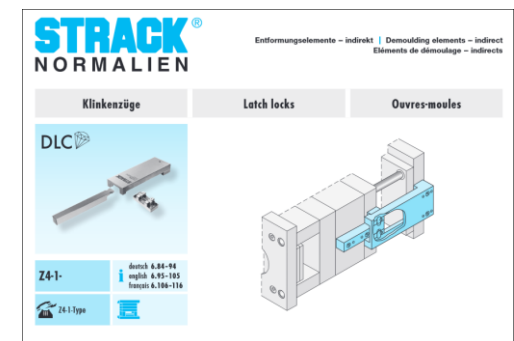
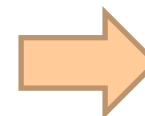
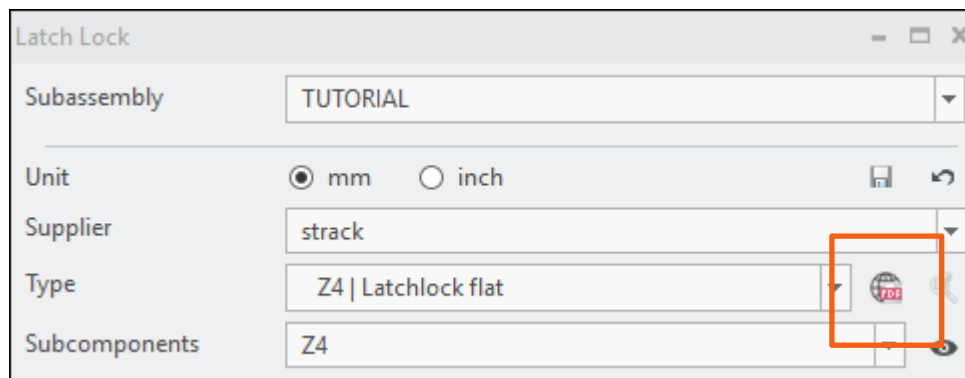
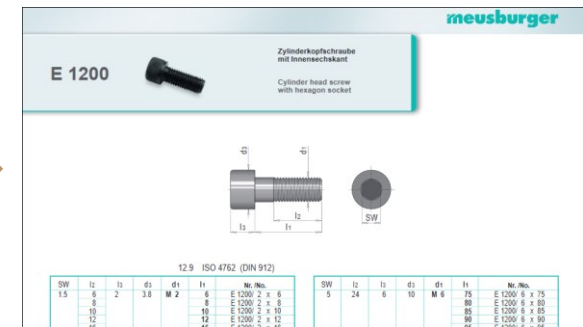
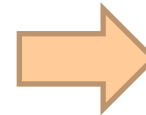
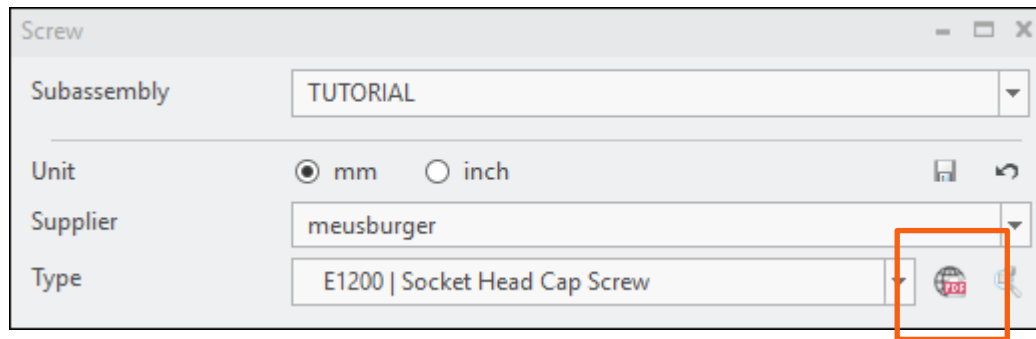
• New

- Type selection improved
- Buttons moved from bottom area to related UI elements
- Dialog is resizable and can be maximized
- Missing UI descriptions added

Enhancements

New weblink button in Component Dialog:

- Access data sheets on supplier website with one click!



Plates

HASCO plates updated:

- All plates and instance updated to latest revision

New KNARR plates added:

- KNARR – F (Meusburger compatible) and K (Hasco compatible) plates are now available

Components

New KNARR guide components:

- 551000, 551000DLC, 551010, 551010DLC and 551100

New KNARR ejector pins:

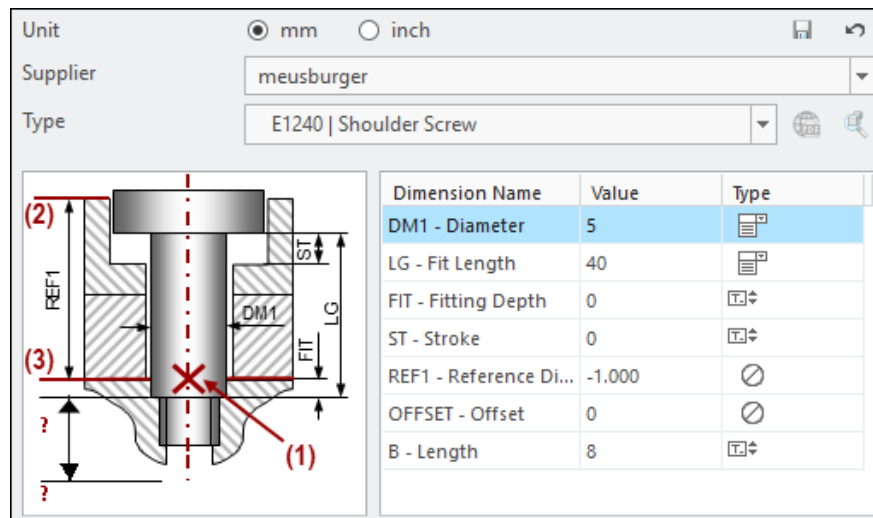
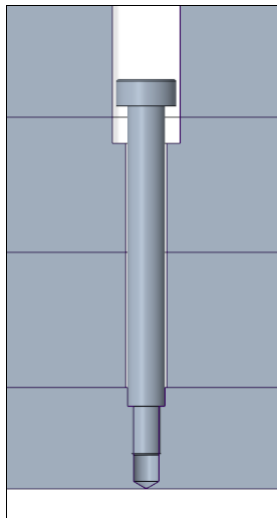
- 539111, 39111DLC and 39414

New KNARR insulation plates:

- 77335 and 77336

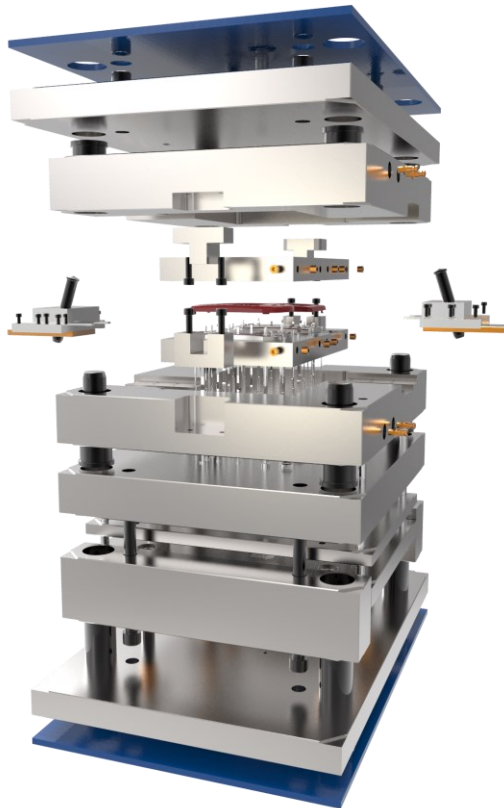
Improved shoulder screw functionality:

- Meusburger E1240, Hasco Z38, Knarr 40038, DME WZ412 and DIN 7379



EMX 10 M032

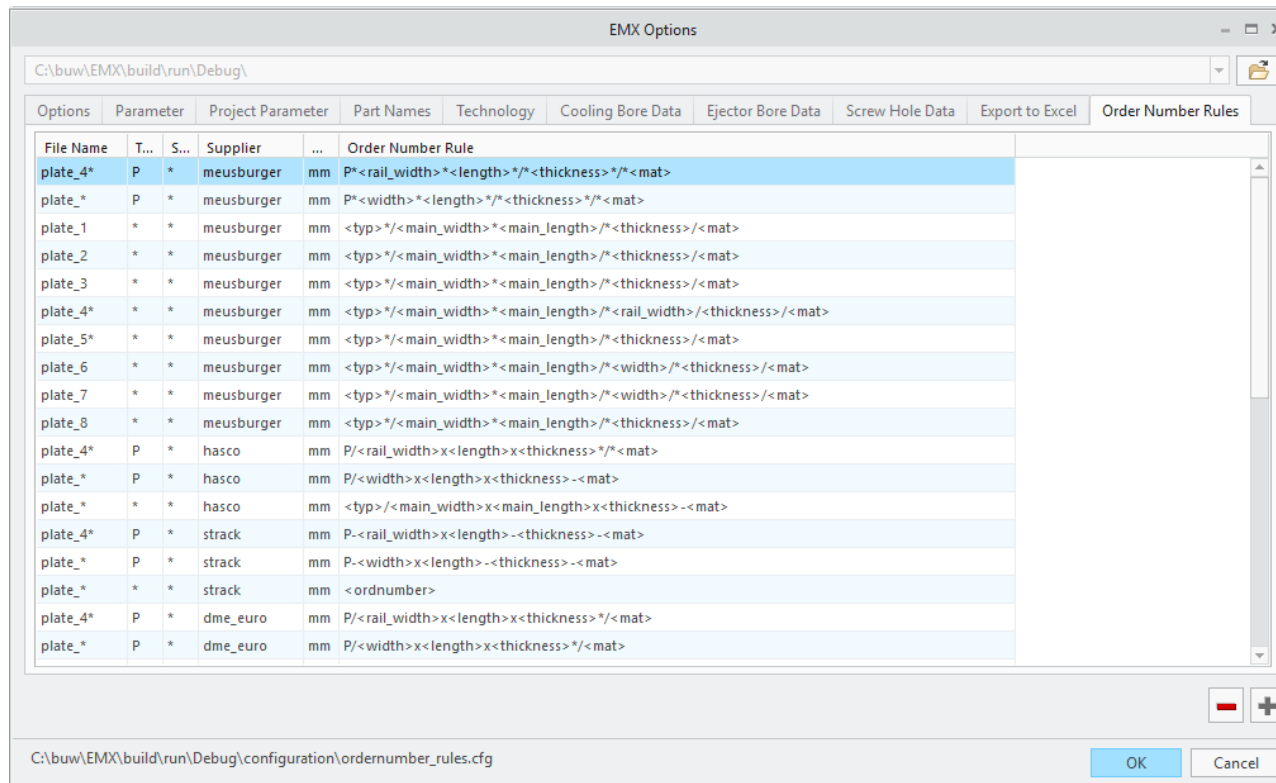
What's New?



Enhancements

New configuration section: Define custom order number rules

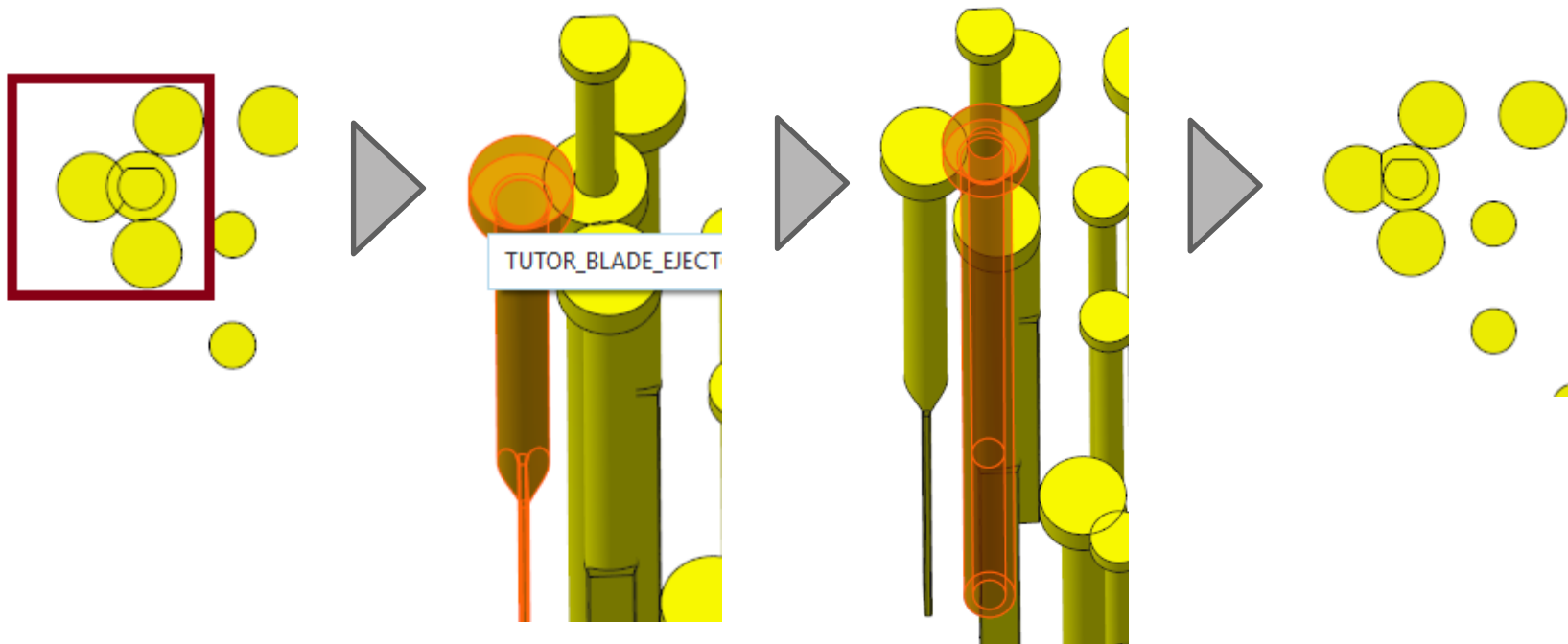
- Rules can now be different for different suppliers, type, units and file names



Enhancements

New Feature: Trim Ejector Pin heads against each other

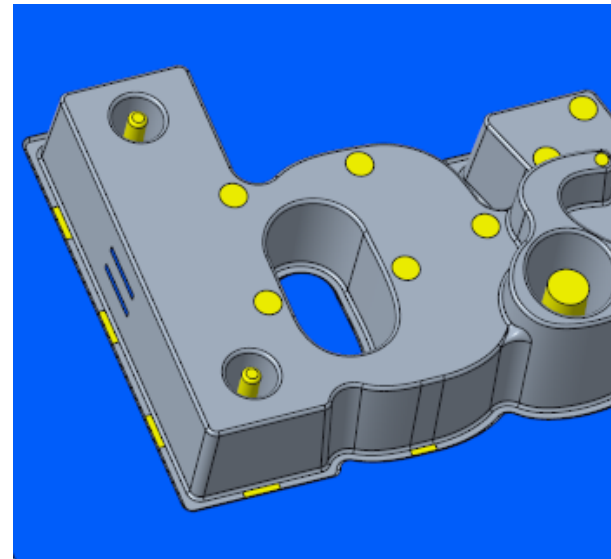
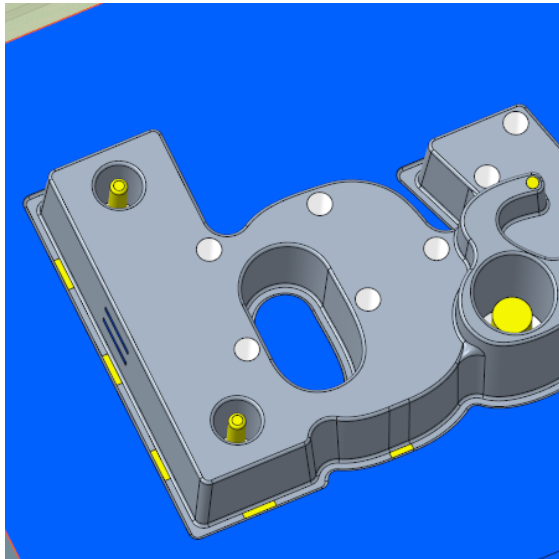
- Interfering ejector pin heads can be trimmed by selecting to different ejector pins



Enhancements

New Feature: Update Existing Ejector Pins Dialog

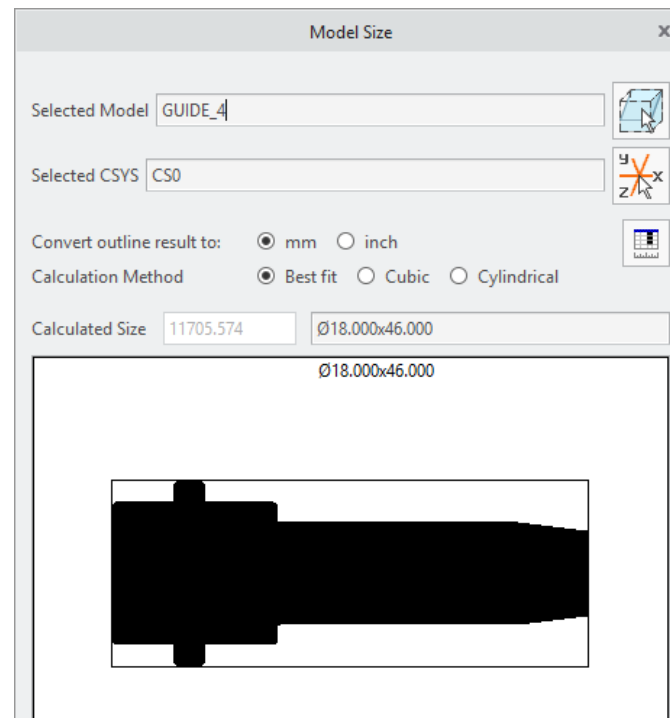
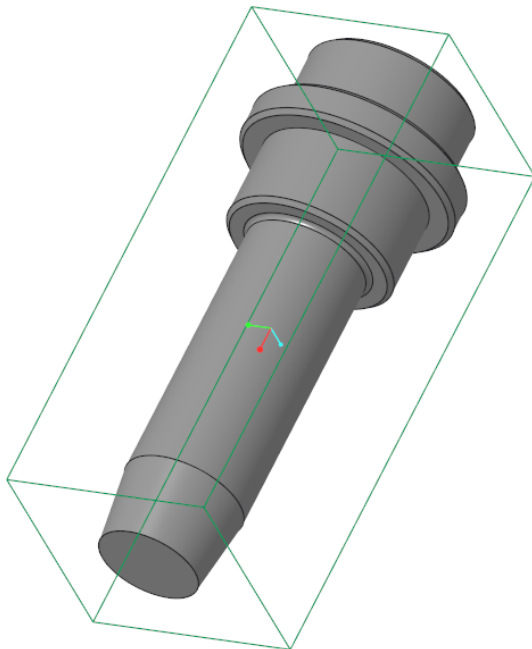
- New command in Ribbon
- Update ejector pins length and order number in case required reference distance has changed.



Enhancements

Improvement for Model Size Dialog

- Display outline values in drawing area
- Allow user to toggle between cubical and cylindrical result in case cylindrical result was determined.
- Improve algorithm to detect cylindrical parts



Enhancements

Improved performance of parameter read and write function

Reduce time working with EMX!

- Assembling of Components

 i.e. 240 Ejector Pins: ~45 % faster

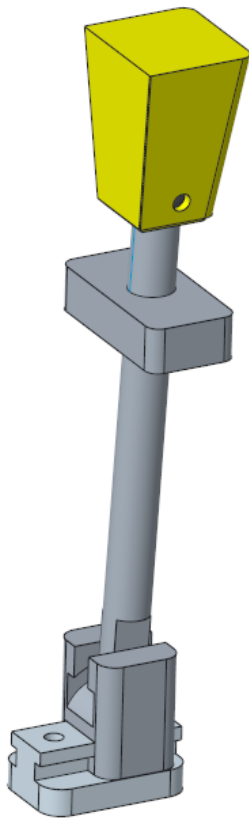
- Bill of Materials

 i.e. Open Bill Of Materials Dialog: ~ 40 % faster
i.e. Close Bill Of Materials Dialog: ~ 55 % faster

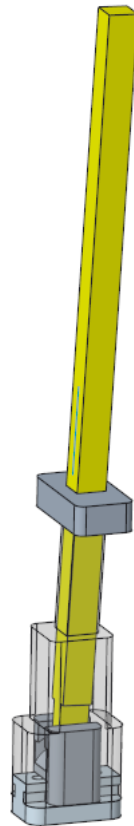
Enhancements

New MEUSBURGER Lifter assemblies added

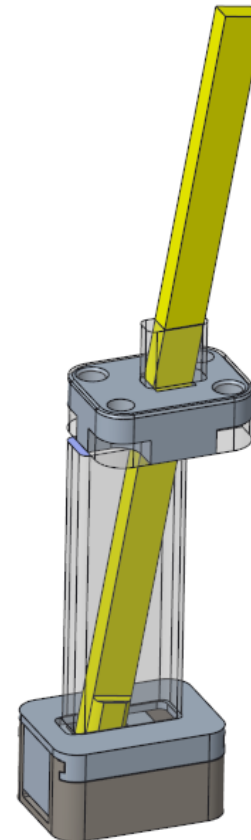
- Additional improvement: Trimmed body can be displayed in Preview



- E3244 + E3240



- E3246 + E3240

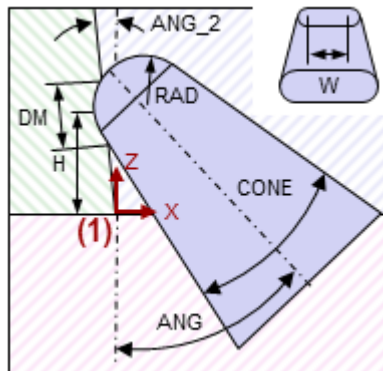


- E32481 +
E3248 +
E3249

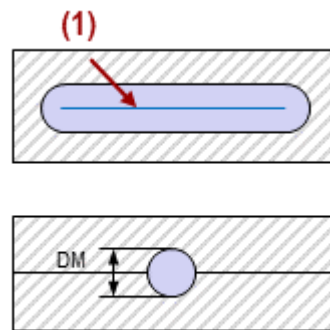
Enhancements

New Runner Library Components

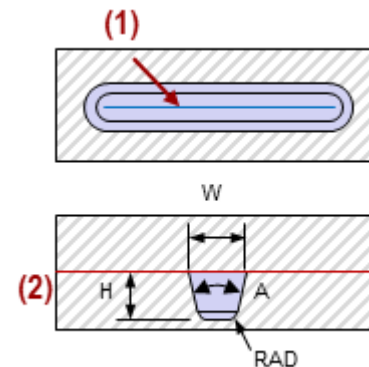
- With the new library components and UDFs runners can be designed easily.



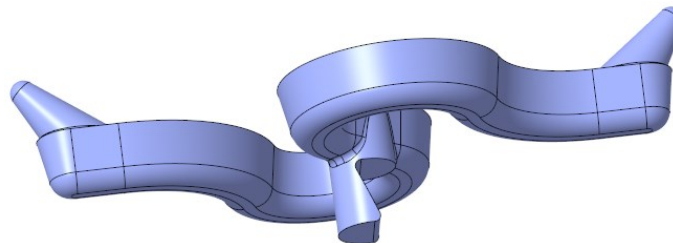
- Conic Gate



- Round runner section UDF



- Trapezoid runner section UDF




New Components

MEUSBURGER

- New Cooling Components: O-Ring E21311
- New Ejector Pins: E17003 and E1723
- New Side Interlocks: W44, Z38,Z46

HASCO

- New slide plates Z555, Z556 and Z557
 - New and updated Ejector Pins Z412, Z4650, Z4651, Z4670, Z4671, Z413, Z443, Z457, Z461, Z465, Z44, Z441, Z45 and Z45
 - New Guides Z14 and Z1105
 - New Cooling Components Z9430 and Z9400
- 
- Decorative curved lines in the bottom right corner, consisting of a thick grey arc and a thin orange arc.

Updated Components

MEUSBURGER

- Update E-Components to latest state: 1st quarter 2019

HASCO

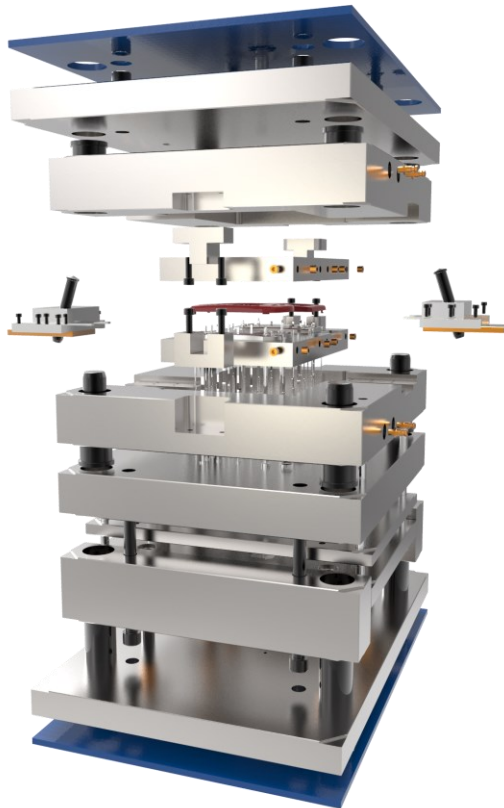
- Remove deprecated Z30 screw
- Screws: Z30 and Z33
- Knockouts: Z02
- Locating Rings: K100, K107, K500, K501, K505, K506, K1000, Z7510, Z7515, Z7520, Z7525, Z7530, Z7535 and Z7540.
- Dowel Pins: Z25 and Z26
- Guides: Z01, Z010, ZU10, Z20, Z040 and Z0100
- Cooling Components: Z94, Z940 and Z9661

DIN

- More screw lengths are available for DIN screws
- 
- A decorative curved line in the bottom right corner, consisting of a grey outer curve and an orange inner curve.

EMX 10 M031

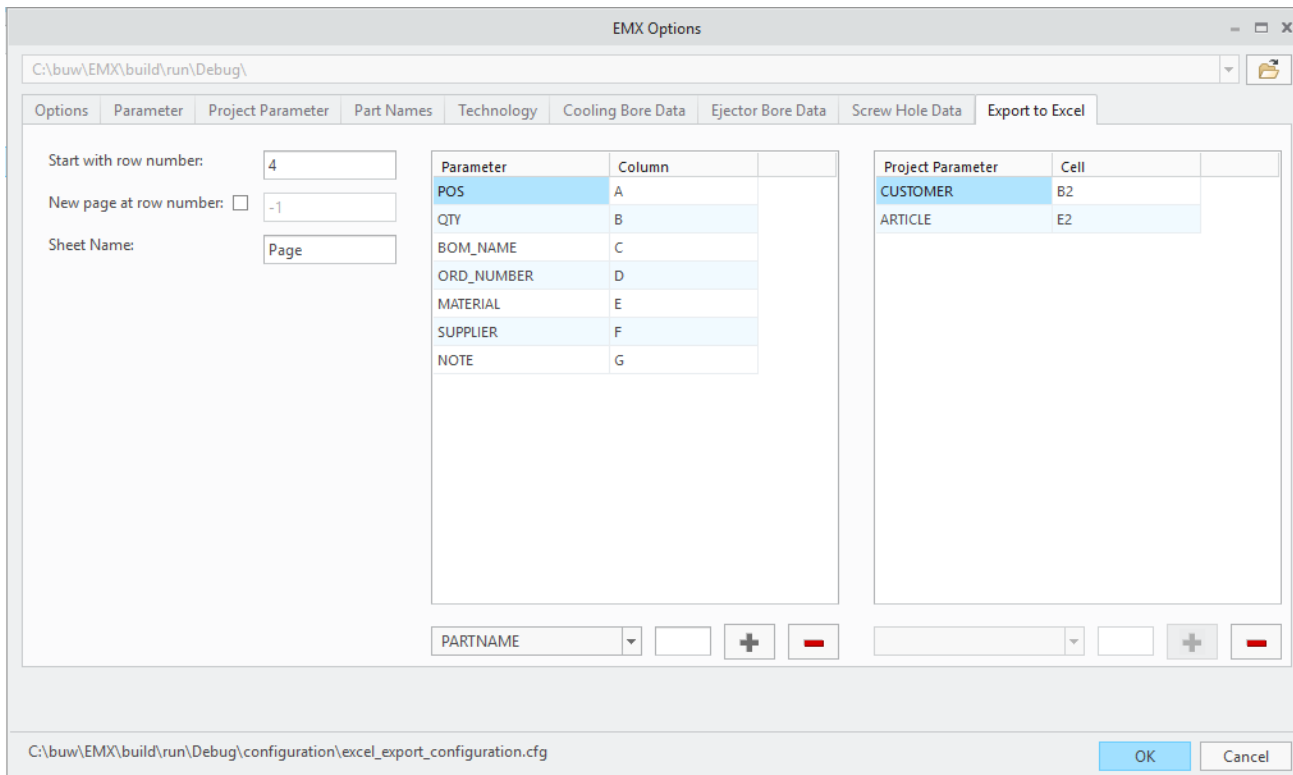
What's New?



Enhancements

New Feature: Direct Interface for Export to Excel available

- No more Visual Basic macro in Excel required.
- Settings can be configured in EMX Options.
- Export to any selected Excel BOM template possible.



EMX Options

C:\buw\EMX\build\run\Debug\

Options | Parameter | Project Parameter | Part Names | Technology | Cooling Bore Data | Ejector Bore Data | Screw Hole Data | **Export to Excel**

Start with row number:

New page at row number:

Sheet Name:

Parameter	Column
POS	A
QTY	B
BOM_NAME	C
ORD_NUMBER	D
MATERIAL	E
SUPPLIER	F
NOTE	G

Project Parameter	Cell
CUSTOMER	B2
ARTICLE	E2

PARTNAME

C:\buw\EMX\build\run\Debug\configuration\excel_export_configuration.cfg

Enhancements

New Feature: Direct Interface for Export to Excel available

Both Options still available:



1. Direct Interface

2. Export by VBA-Macro

Position	Quantity	Description	Order Number	Material	Supplier	Note
1	1	Clampingplate MovingHalf	F20/346x346x36-1730	1.1730	Meusburger	
2	1	EjectorRetainerPlate MovingHalf	F85/346x346/256/22-1730	1.1730	Meusburger	
3	1	EjectorBasePlate MovingHalf	F80/346x346/256/17-1730	1.1730	Meusburger	
4	1	Risers MovingHalf Left	F70/346x346/44x86-1730	1.1730	Meusburger	
5	1	Risers MovingHalf Right	F70/346x346/44x86-1730	1.1730	Meusburger	
6	1	Intermediateplate MovingHalf	F60/346x346x36-1730	1.1730	Meusburger	
7	1	Cavityplate MovingHalf	F50/346x346x56-1730	1.1730	Meusburger	
8	1	Cavityplate FixHalf	F50/346x346x76-1730	1.1730	Meusburger	
9	1	Clampingplate FixHalf	F20/346x346x36-1730	1.1730	Meusburger	
10	4	Set screw	E1220/5x16	10.9	Meusburger	
11	4	Stopdisc+Screw	E1500/20	1.1730	Meusburger	
12	4	Stop Disc	E1500/20	1.1730	Meusburger	
13	4	SHC Screw	E1200/12x160	12.9	Meusburger	
14	4	SHC Screw	E1200/12x40	12.9	Meusburger	
15	4	SHC Screw	E1200/8x25	12.9	Meusburger	
16	1	Guidebush	E1100/22-76	1.7131	Meusburger	
17	3	Guidebush	E1100/24-76	1.7131	Meusburger	
18	1	Leaderpin	E1010/22-56/75	1.7131	Meusburger	
19	3	Leaderpin	E1010/24-56/75	1.7131	Meusburger	

What's Possible:

- Parameter to defined column.
- Project Parameter to defined cell.
- Start from defined row number
- Optional: New sheet at defined row number.

Enhancements

New STRACK Sliders:

New Types:

Z4290, Z4290L, Z4292, Z4293, Z4294, Z4294L, Z4295, Z4296,
Z4296L and Z4298



Z4290L



Z4294L



Z4296L

Enhancements

New Components:

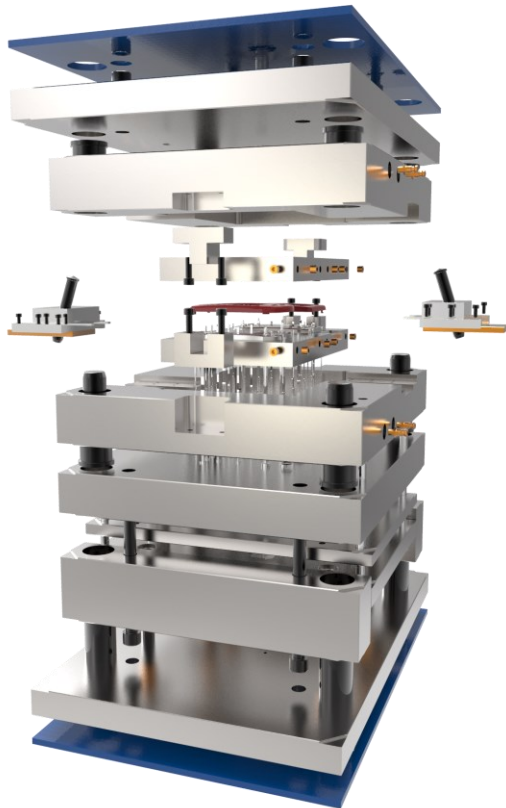
- STRACK – Ejector Pins: R1628 and R1634
- HASCO – Torx Screw: Z330
- MEUSBURGER - Cooling Component: E2112
- MEUSBURGER - Guide Component: E5000 and E5200
- MEUSBURGER - Ejector Pins: E1711 and E17264DLC
- DIN – Ejector Pins: DIN1530-D, DIN6751, DIN8405, DIN8693 and DIN8694.

Updated Components:

- MEUSBURGER – Plates and Component
 - HASCO – Insulation Plates
- 
- A decorative graphic element consisting of a thick grey curved line with a thin orange line underneath it, starting from the bottom right and curving towards the center.

EMX 10 M030

What's New?



Enhancements

New Option: USE_LAYERS_FOR_SIDE_VIEWS

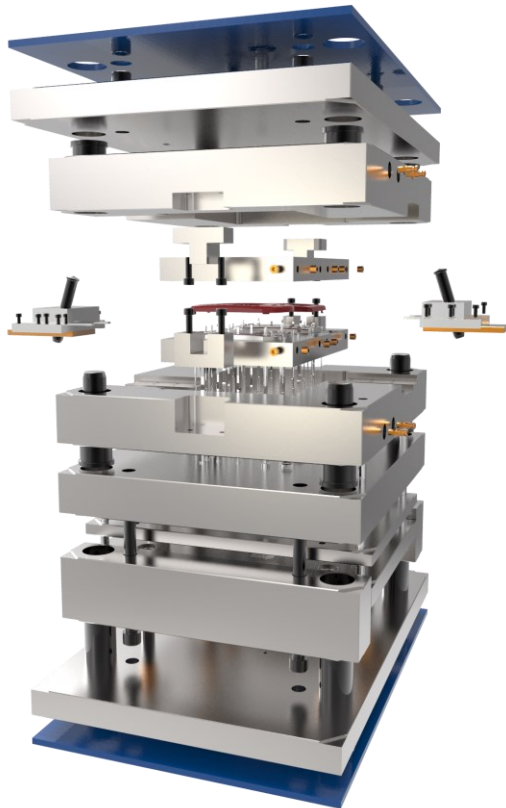
- Instead of simplified representations all EMX components can be put on layers to display the moving and fixed half in the View functionalities.

Major Bug Fixes

- Creo Toolkit API function ProMathExpressionEvaluate behaves different beginning with Creo 4 M080. An Update to EMX 10.0 M030 is required.

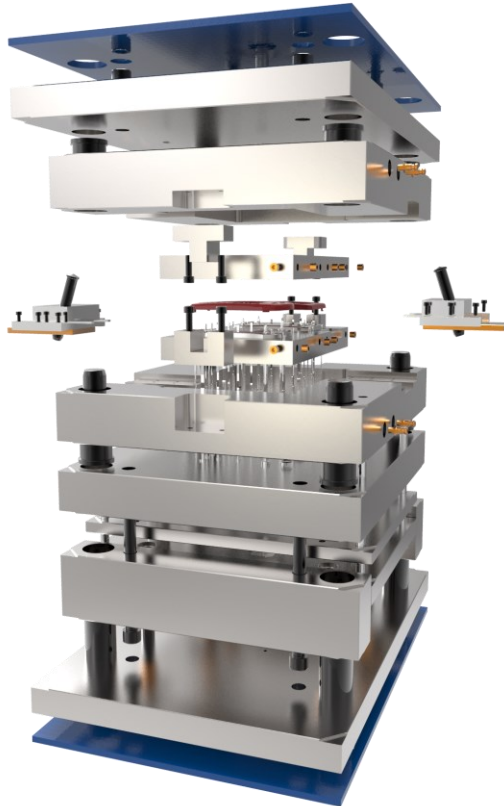
EMX 10 M022

What's New?



EMX 10 M021

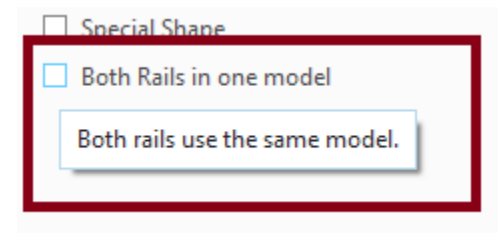
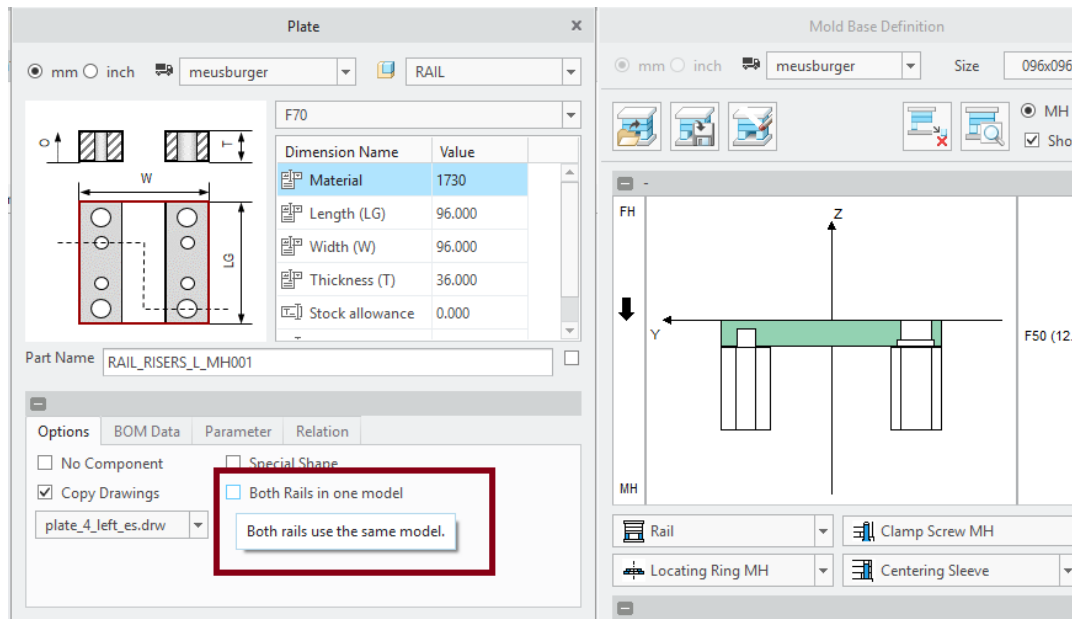
What's New?



Enhancements

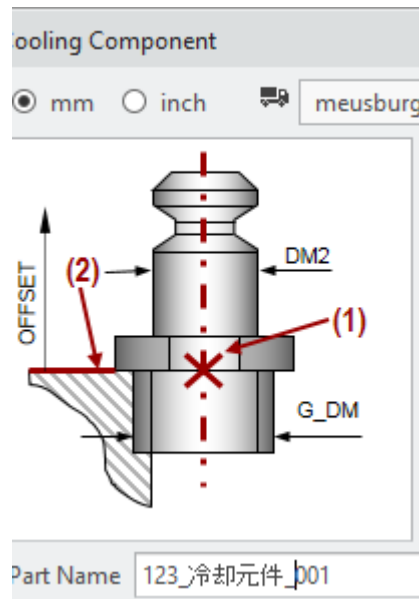
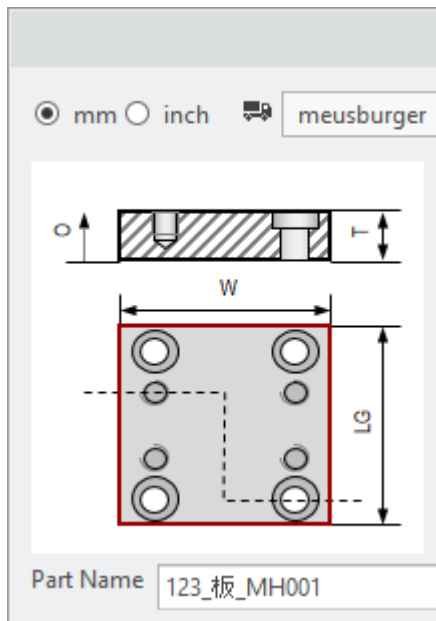
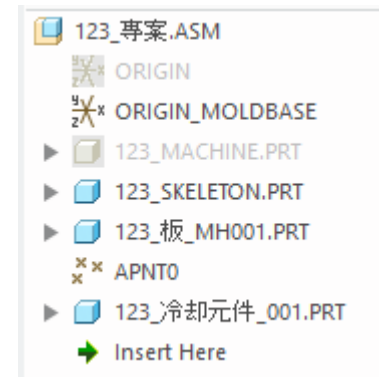
“Use One Model Rail” can be modified from Rail Plate Dialog

- The EMX Option USE_ONE_MODEL_RAIL only sets the default for check button
- Different types of rail models can be assembled to one mold base



Enhancements

Unicode characters are supported for file names, parameter names and parameter values.



Enhancements

In BOM Dialog use UP and DOWN arrow keys to jump to next cell at top or bottom.

- Reduces clicks when working in the BOM
- Current cell value is confirmed and next cell is activated

PARTID	BOM_NAME	S
01-0001	Aufspannplatte Auswerferseite	M
01-0001	Auswerferplatte Auswerferse...	M
01-0001	Auswerferplatte Auswerferseite	M
01-0001	Leiste Auswerferseite	M
01-0001	Leiste Auswerferseite	M
01-0001	Zwischenplatte Auswerferseite	M
01-0001	Rahmenplatte Auswerferseite	M
01-0001	Rahmenplatte Duesenseite	M
01-0001	Leiste Duesenseite	M
01-0001	Leiste Duesenseite	M
01-0002	Aufspannplatte Duesenseite	M
01-0001	Auswerferplatte Duesenseite	M
01-0001	Auswerferplatte Duesenseite	M



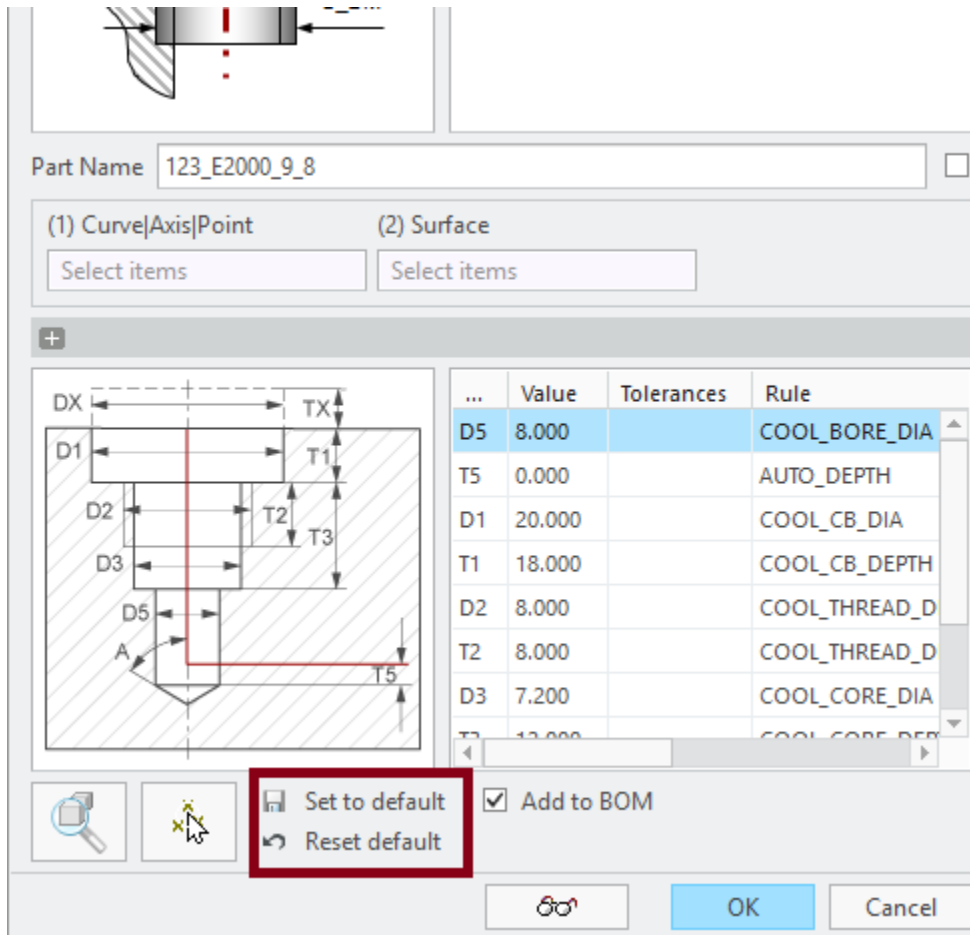
01-0001	Auswerferplatte Auswerferseite	I
01-0001	Leiste Auswerferseite	I
01-0001	Leiste Auswerferseite	I
01-0001	Zwischenplatte Auswerferseite	I
01-0001	Rahmenplatte Auswerferseite	I



01-0001	Auswerferplatte Auswerferseite	I
01-0001	Leiste Auswerferseite	I
01-0001	Leiste Auswerferseite	I
01-0001	Zwischenplatte Auswerferseite	I
01-0001	Rahmenplatte Auswerferseite	I

Enhancements

New button in Component Dialog to reset saved component instances to default.



Part Name: 123_E2000_9_8

(1) Curve|Axis|Point (2) Surface

Select items Select items

...	Value	Tolerances	Rule
D5	8.000		COOL_BORE_DIA
T5	0.000		AUTO_DEPTH
D1	20.000		COOL_CB_DIA
T1	18.000		COOL_CB_DEPTH
D2	8.000		COOL_THREAD_D
T2	8.000		COOL_THREAD_D
D3	7.200		COOL_CORE_DIA
T3	12.000		COOL_CORE_DEPTH

Set to default
 Reset default

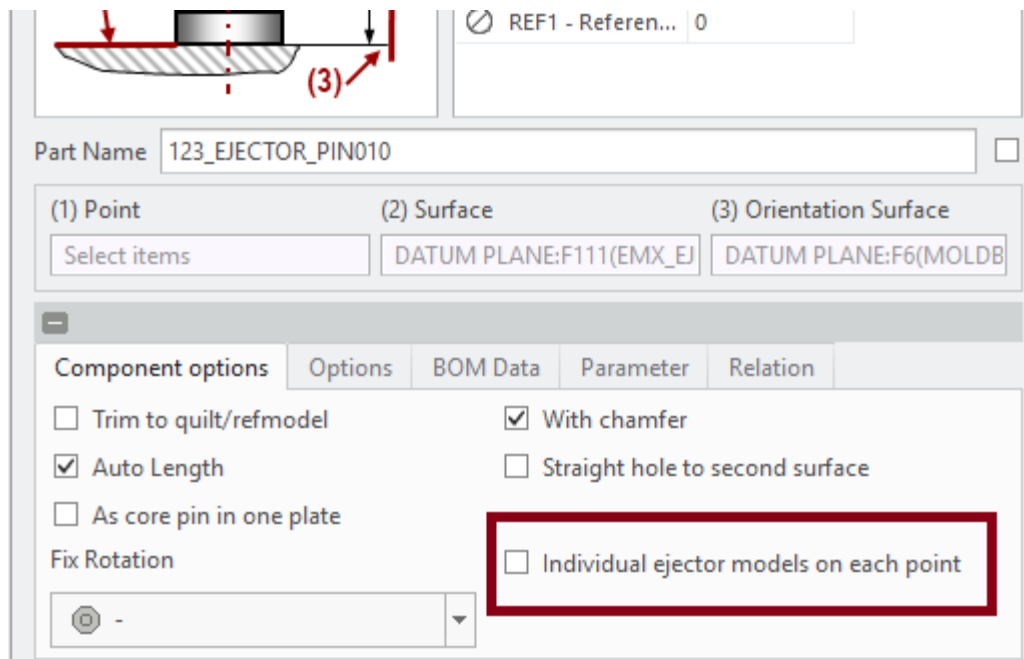
Add to BOM

OK Cancel

Enhancements

Ejector pins defined on multi point features can be forced to be created as individual models.

- Previously option ENABLE_MULTI_EJP behavior in EMX Options
- The EMX Option ENABLE_MULTI_EJP only the sets default for check button



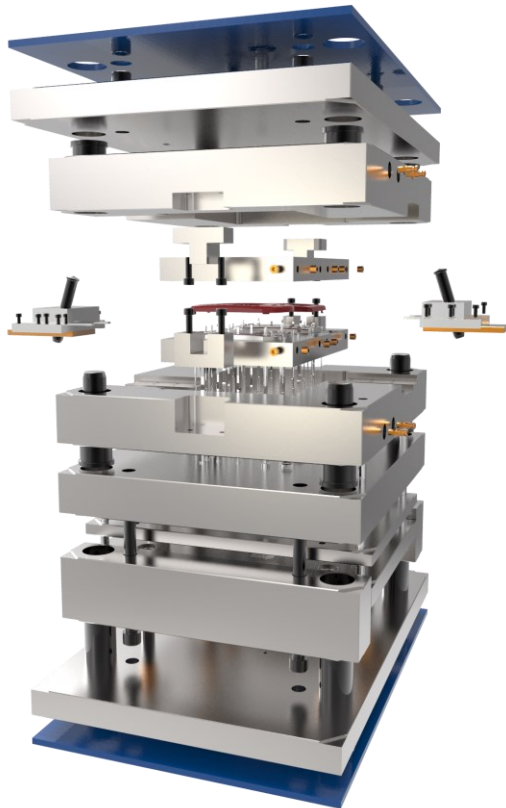
Components

New components

- MEUSBURGER cooling components E20749 and E2074D.

EMX 10 M020

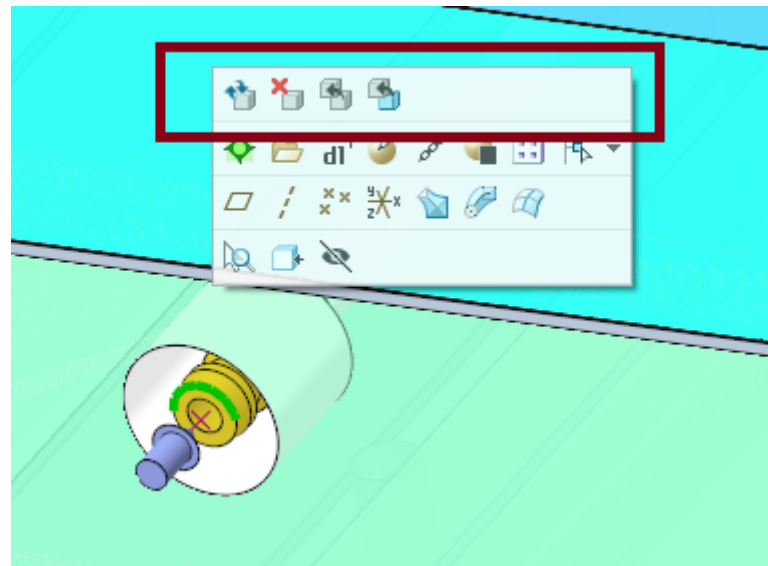
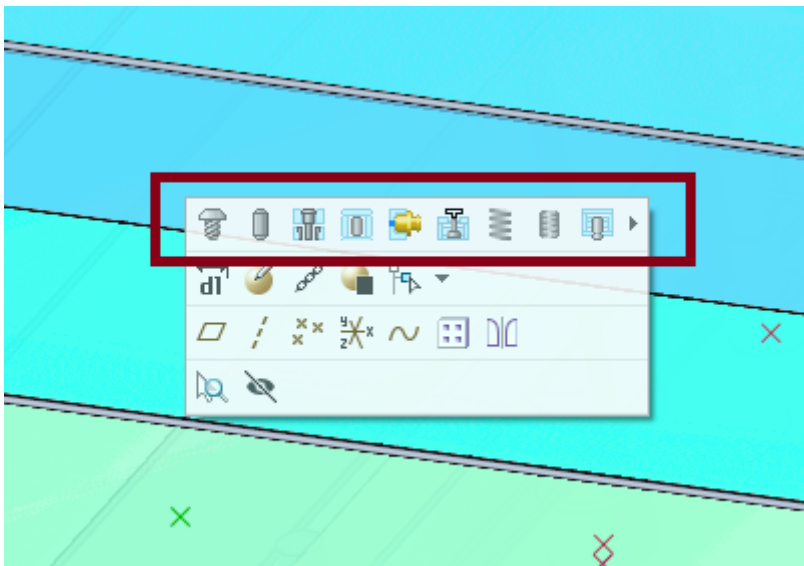
What's New?



Enhancements

Enable Mini Tool Bar with EMX 10 and Creo 4.0

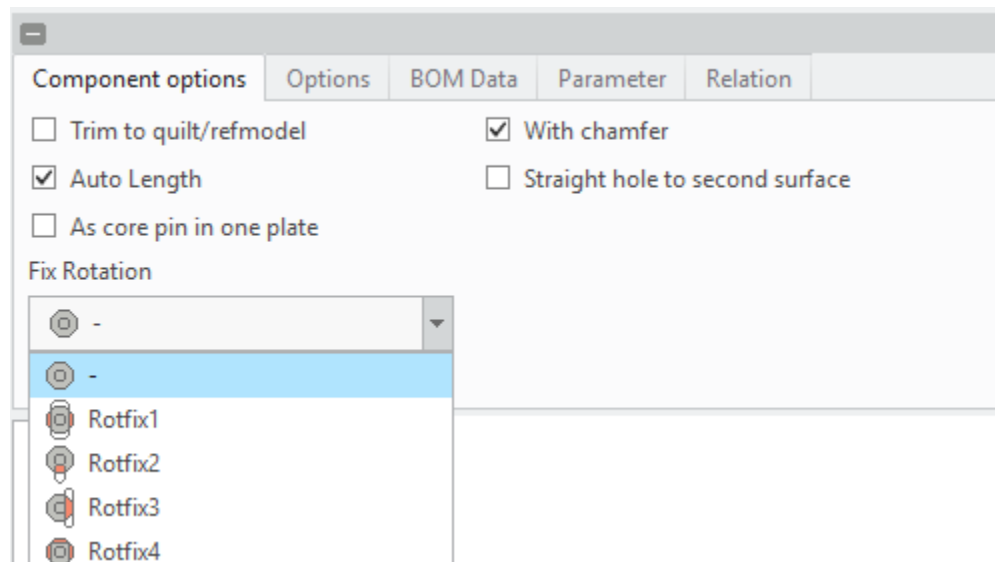
- Select Datum Points and Axis
- Create Components by Mini Tool bar commands
- Selection of selected datums is immediately stored in Component Dialog



Enhancements

Improve Ejector UDFs and Options

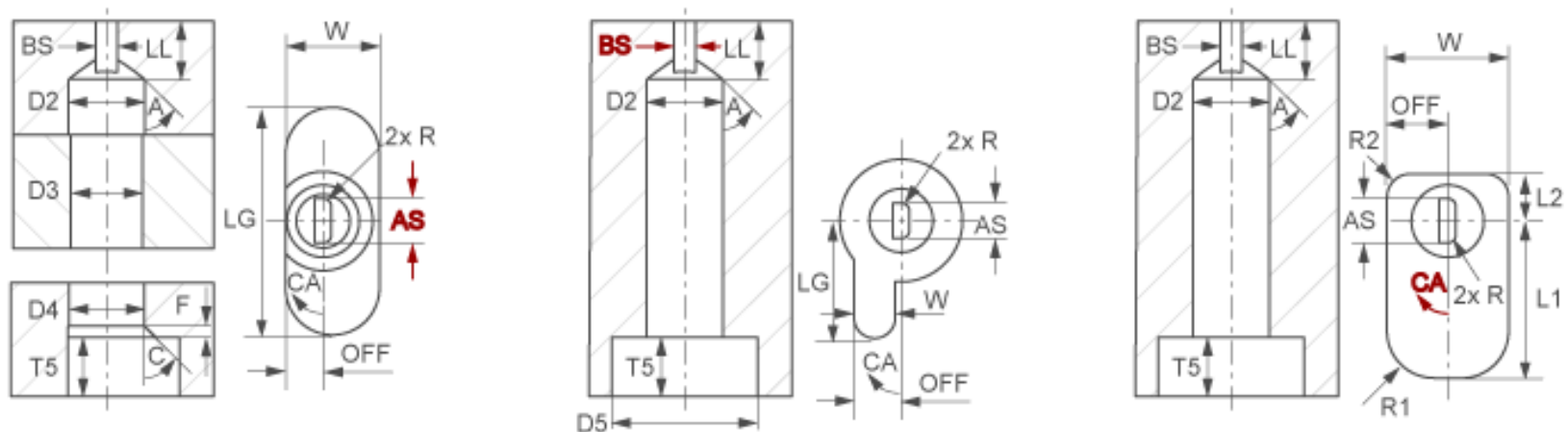
- New Rotation Fixture Type
- New Chamfer Option
- Visualization of Trim Option
- Separate Rotation Fixture Angle for all UDF Types
- Improved Preview Sketch UDFs
- Separate Tabs for Component Options and Assembly Options



Enhancements

New UDF Images for Cooling Components, Guides, Ejector Pins and Dowel Pins

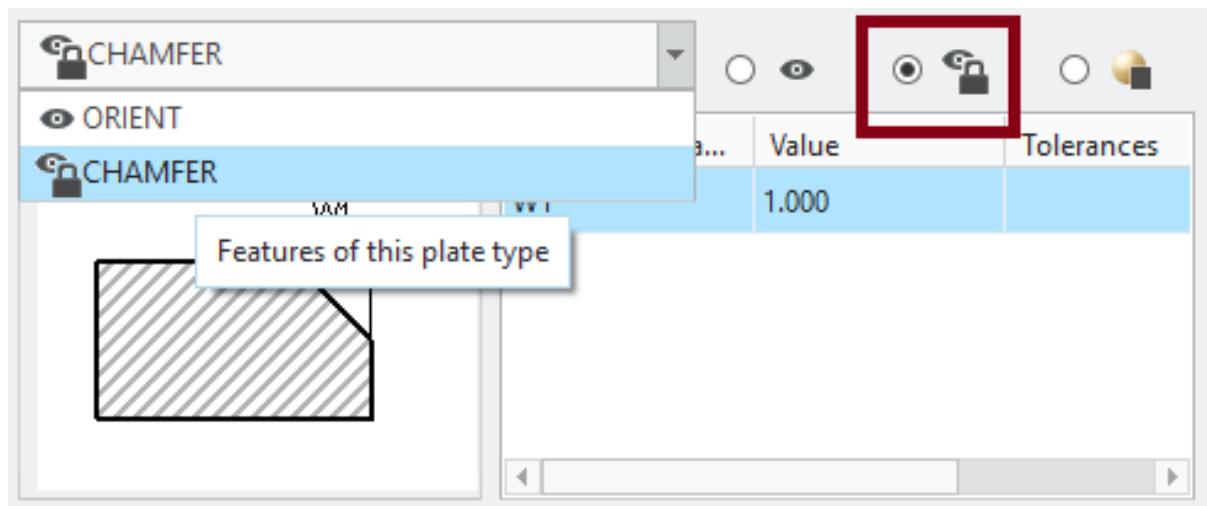
- Verification of all visualized UDF dimensions
- New Design



Enhancements

New Feature Visibility Status Type “Visible Locked” in Plate Dialog

- Feature can be resumed and locked.
- It will not be suppressed when changing the size of the plate



Components

STRACK

- Update of existing ejectors
- New Springs: SN2520, SN2540, SN3560, SN3580, SN2590, SN2600, SN2625
- New Side Interlocks: W44, Z38,Z46

EBERHARD

- Update of existing ejectors
- New Ejectors: 6116, 6118, 612R, 6143, 6178, 6261, 6271, 6281, 6331, 6335, 6341, 6351, 6361, 6371, 6381, 6441, 6622

MEUSBURGER

- Update component and plate data to latest state

LKM

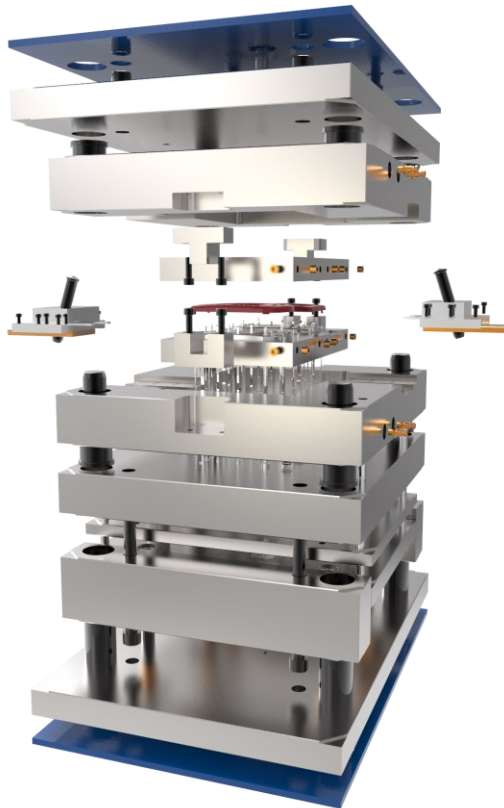
- Clamping Slots available for side gate plates

KNARR

- Update component data to latest state
- 
- A decorative curved line in the bottom right corner, consisting of a grey outer curve and an orange inner curve.

EMX 10 M013

What's New?



Components

Side Interlock

- Strack Z38, Z46, W44

Top Interlock

- Agathon 7992, 7993
- Meusbürger E1311

Library

- Hasco Z67 (Circlip)

Screw

- Hasco Z715, Z725 (Hoisting)

Guide

- Hasco Z016, Z025

Ejector Pins

- Hasco Z400, Z410, Z492, Z4655, Z4656
- 
- A decorative curved line in the bottom right corner, consisting of a grey outer curve and an orange inner curve.

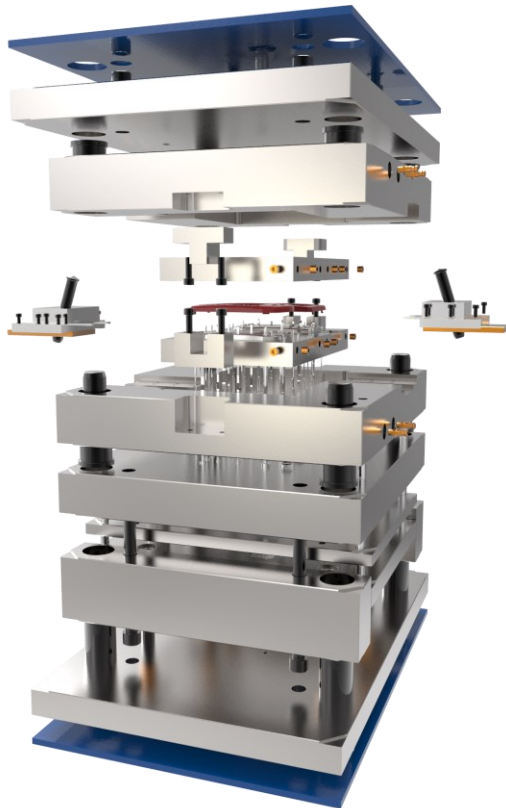
Components

Updated Instances

- HASCO guide components Z011, Z012, Z013 and Z022.
- HASCO screw Z31 and Z32.
- HASCO ejectors Z40, Z41 and Z42.

EMX 10 M012

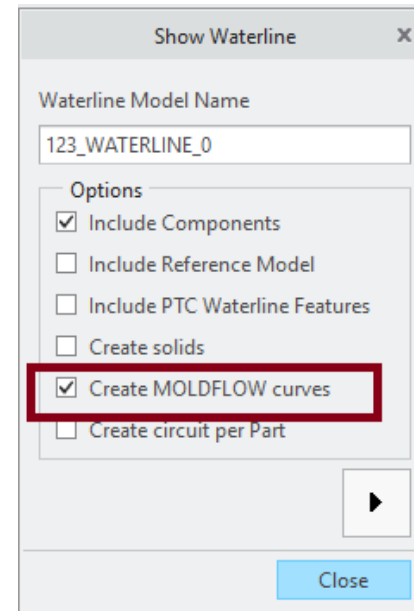
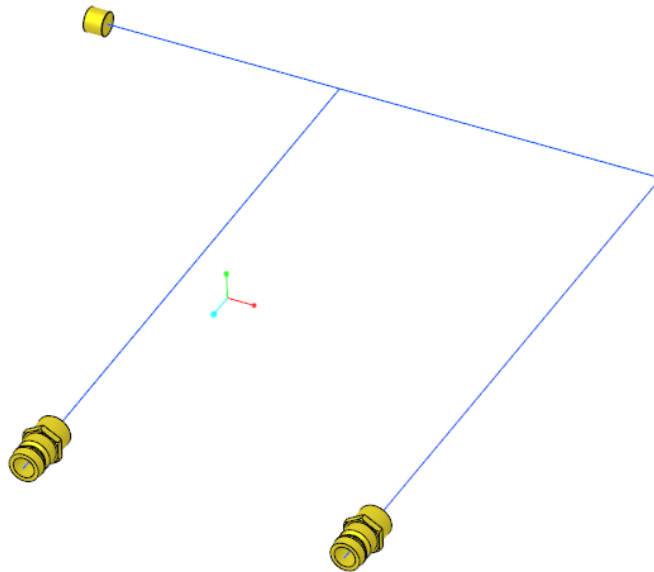
What's New?



Enhancements

Export waterline curves for Moldflow analysis

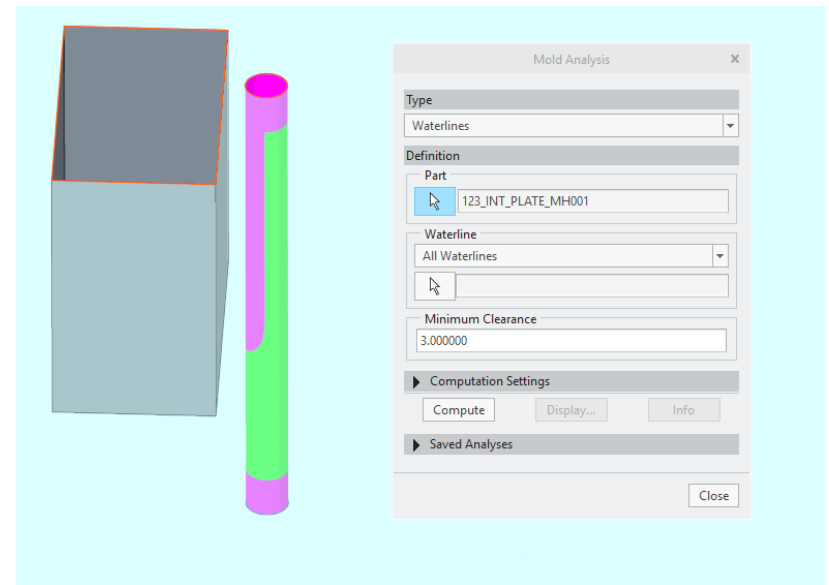
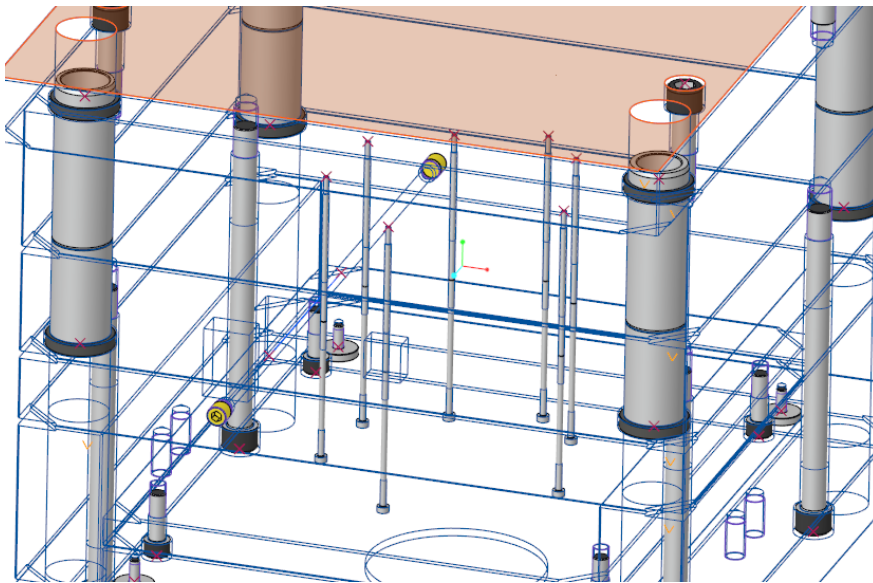
- New option in “Show Waterline” feature
- Curves of waterline circuits are created when option is enabled



Enhancements

New Option: INCLUDE_EJECTOR_BORES_IN_MOLD_ANALYSIS

- All bores created by EMX ejectors are tagged with parameter
- When using wall thickness check in Tool Design, ejector bores are considered as well.

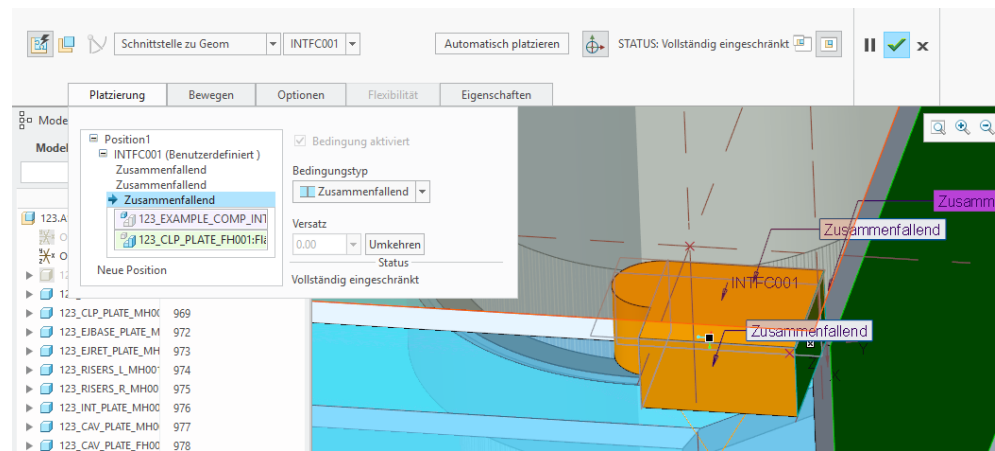
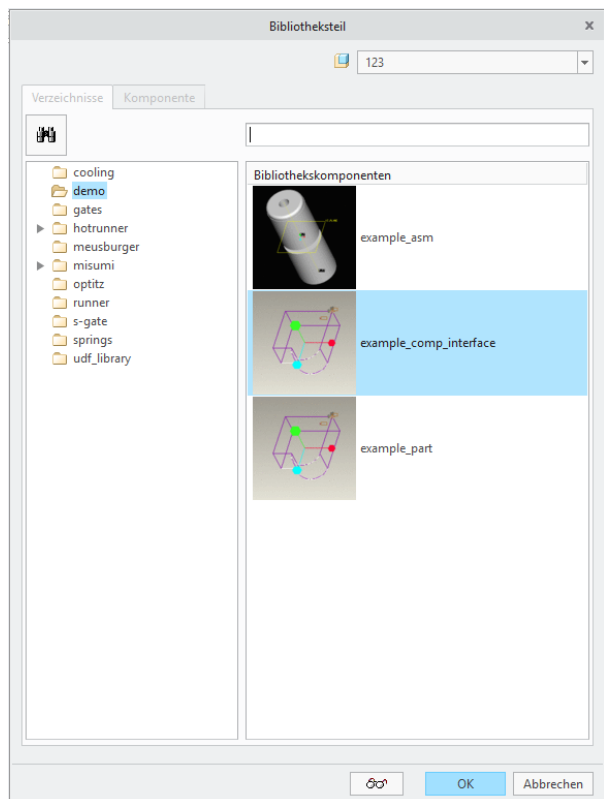


Enhancements

Library components can be placed with Component Interface

- Prepare library parts with Creo component interface
- Example can be found:

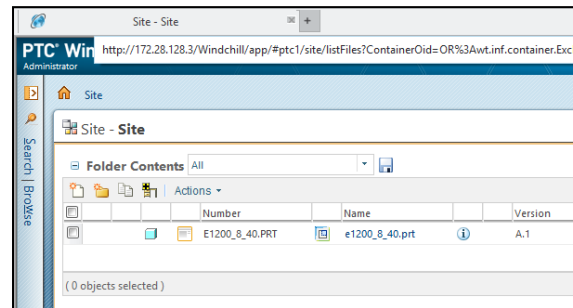
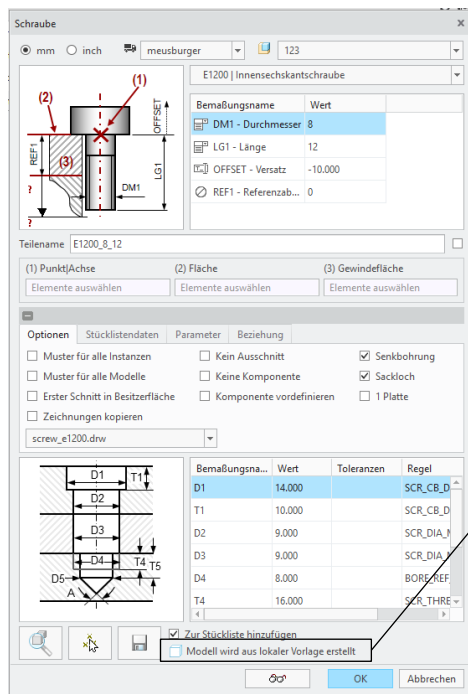
<emx_install> \mm\library\demo\example_comp_interface



Enhancements

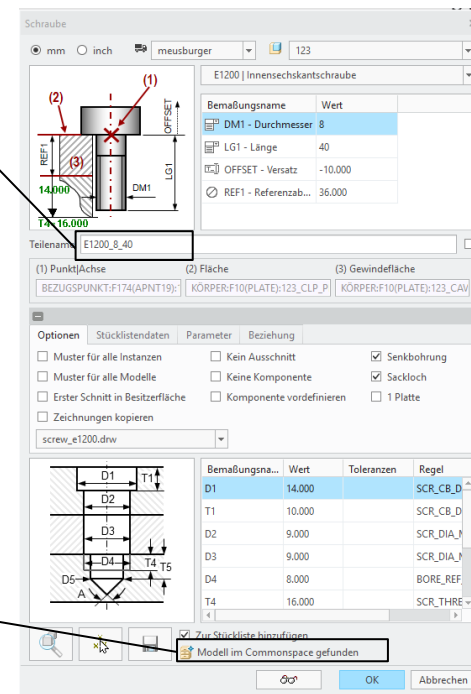
Improve behavior when standard parts are retrieved from Windchill or “search_path” folder.

- When standard part is found in Windchill or search_path folder and active option PDM_SYSTEM is used source status is displayed in Component Dialog.



Modell wird aus lokaler Vorlage erstellt

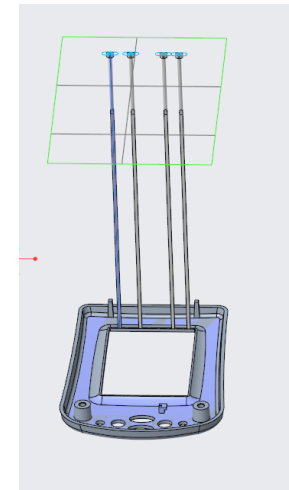
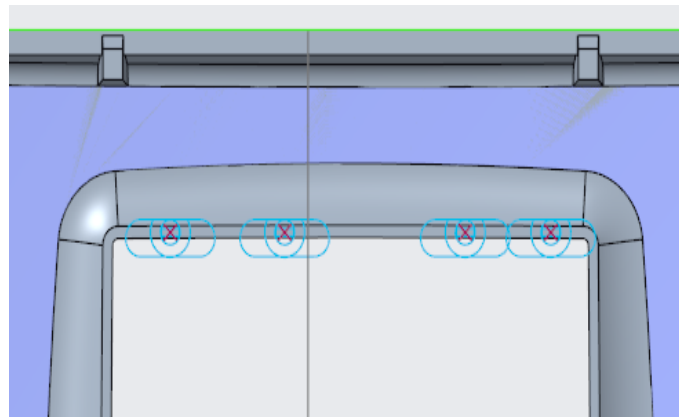
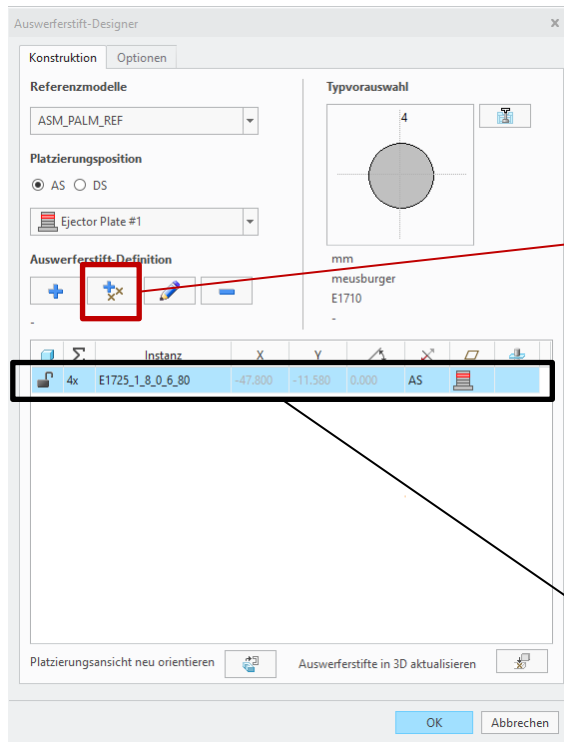
Modell im Commonspace gefunden



Enhancements

New Button in Ejector Pin Designer: Placement of ejector pins on existing points (Sketched points or multiple points features)

- Existing Points can be selected. Multi point features are supported.
- Ejector Pin Designer assembles multiple ejectors in one step
- All advantages of parametric sketches.



4x	E1725_1_8_0_6_80	-47.800	18.193	0.000	AS
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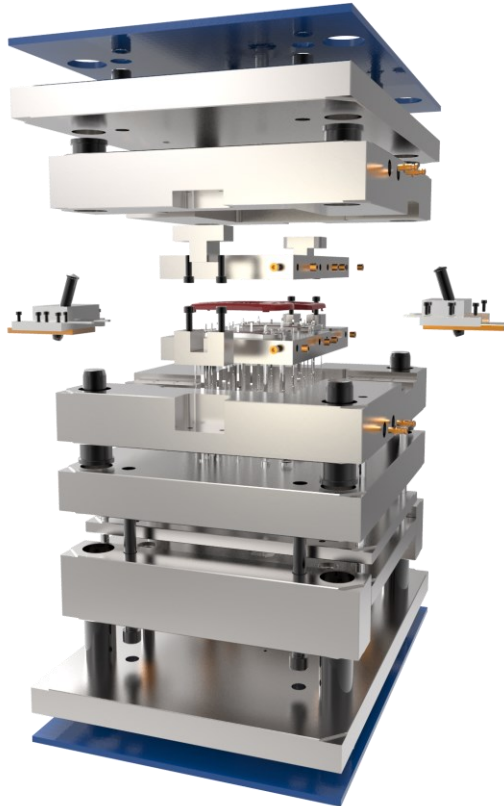
Components

Top Interlock

- AGATHON 7990

EMX 10 M011

What's New?




New Components

Compact slider sets

- Meusburger E3080 with E3082/E3084
- Meusburger E3072 with E3074/E3076/E3078
- Meusburger E3070 with E3074/E3076/E3078
- Meusburger E3360
- Meusburger E3330
- Meusburger E3300
- Meusburger E3045, E3047, E3048 and E3049 – locking for slider
- Meusburger E30110 - slider set

Library Components

- Meusburger E2730 - Cable box as library component
 - Meusburger E2682 - Distance plate round
 - Meusburger E2680 - Distance plate rectangular
 - Optiz DATI1000, DATI2000, DATI2900 and DATI3000 - date stamps
- 
- A decorative graphic element consisting of a thick grey curved line with a thin orange line underneath it, located in the bottom right corner of the slide.

New Components

Guides

- Meusburger E1064 - Guide unit for FW moldbases
- Meusburger E1115, E11202, E11206 and E1170
- Meusburger E1150 - Guide for knockouts with predefined screws

- Strack Z69, Z68, Z4315, Z4085, Z4078-R, Z4078, Z4077-R, W35, W35-R, W33, W33-R, W32, W31, W30, W25, W24, W23, W21 and W20

- Knarr 264180, 51001, 51003, 51011, 510110W, 51100, 51110, 511100W, 51112, 51113W, 51114, 51210, 51211, 51702, 51711, 51712, 51713, 51722, 51911, 51912, 51932, 51934 and 551110.

New Components

Support Pillars

- Meusburger E1512 and E1513
- Strack Z19

Ejectors

- Meusburger E1700DLC, E17103, E1710DLC, E17262, E17262DLC, E17264, E1727DLC, E1728DLC and E1742
- Strack - R1628, R1634, Z6015 and Z6017
- More Knarr ejectors

Dowel Pins

- Meusburger E1301
 - Strack R523
- 
- Decorative curved lines in the bottom right corner, consisting of a thick grey arc and a thinner orange arc below it.

New Components

Locating Rings

- Meusburger E1367, E1372, E1377 and E1382
- Strack Z10, Z11, Z16
- More Knarr Locating Rings


Springs

- Meusburger E1536, E15365, E1537, E15375, E1358, E15385 and E1539

Support Bush

- Meusburger E1662, E1663 and E1664

Cooling Components

- Meusburger E23.. - USA-type
 - Strack Z7714, Z7720, Z7725, Z7748 and Z7771
- 
- A decorative curved line in the bottom right corner, consisting of a thick grey arc and a thin orange arc.

New Components

Plates

- Meusburger FW and FB mold bases with plate features

Screws

- Meusburger E1225, E1226, E1251, E1252, E1274 and E1275

Top Interlock

- Meusburger E1306

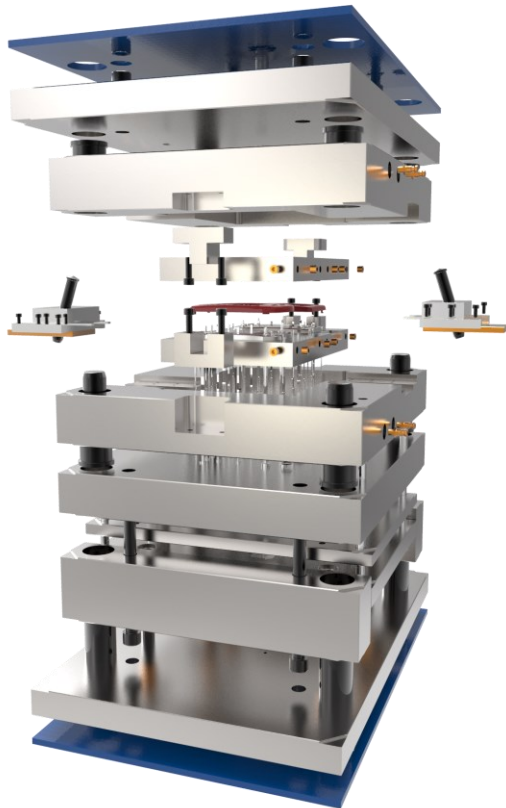
Side Interlock

- Meusburger E1308, E1315 and E1320

Knockout

- Meusburger E1516 and E1517 for FW mold bases.
- 
- A decorative curved line in the bottom right corner, consisting of a grey outer curve and an orange inner curve.

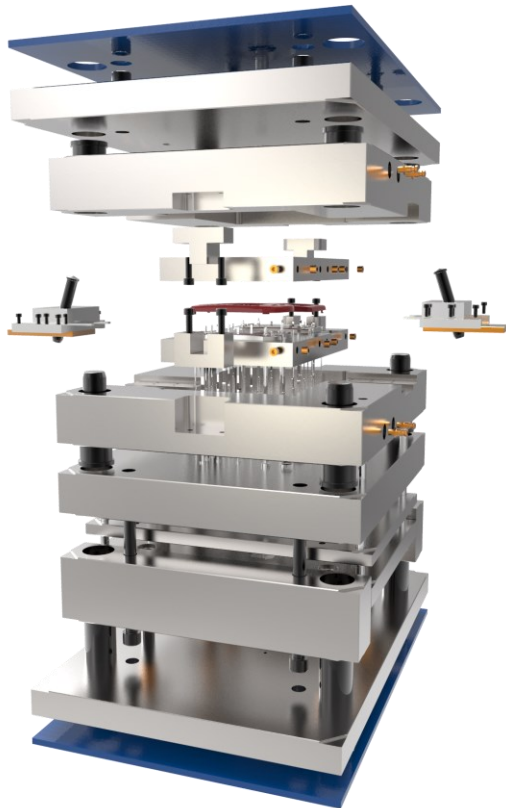
EMX 10 M010



What's New?

- New Features
- Components

EMX 10 M010



What's New?

- New Features
- Components

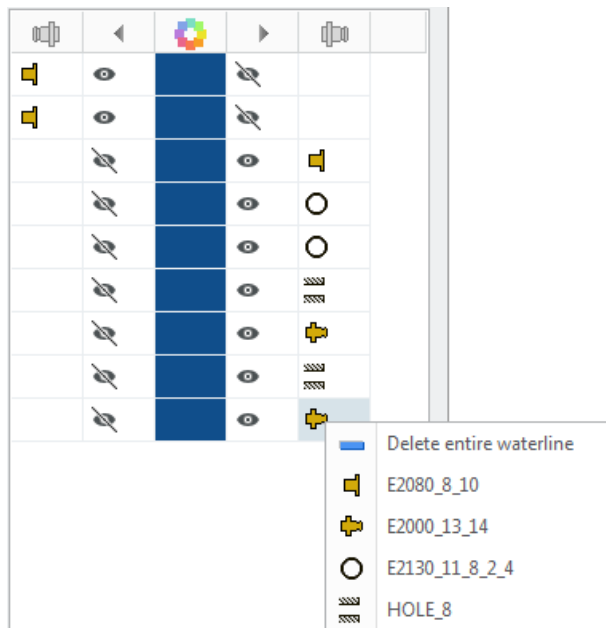
1. Enhanced Waterline Designer

Quick Selection of Components from Waterline List

- Predefine up to 4 default components in EMX Option

WATERLINE_DESIGNER_DEFAULT_COMPONENT mm|meusburger|E2080_8_10&&mm|meusburger|E2000_13_14&&mm|meusburger|E2130_11_8_2_4&&mm|meusburger|HOLE_8

- Use Right Mouse Button in table and assign quickly



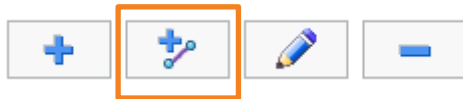
→ Design a complete cooling cooling circuit without opening the Component Dialog once!

1. Enhanced Waterline Designer

Define Waterlines on Existing Curves

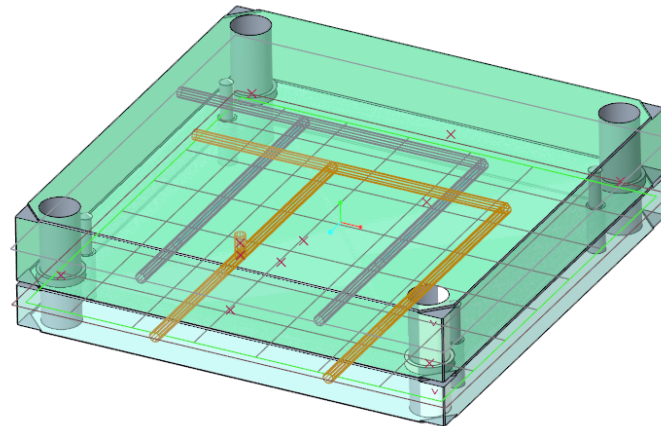
(Only with B&W Direct License)

- Use existing curves in sketches as waterline reference
- New button → Select curves in current working model



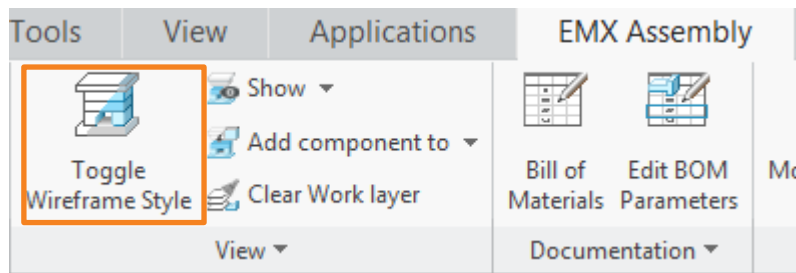
- Vertical waterlines will be attached to the existing curves and updated parametrically when sketch is modified

→ Benefit from parametric sketches and easy definition of cooling circuits

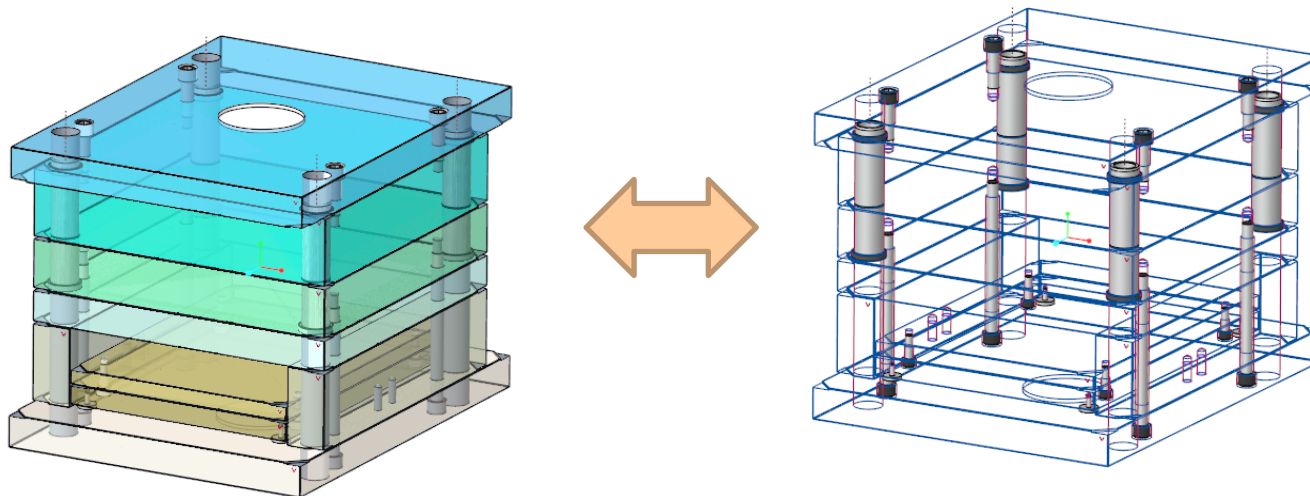


2. Toggle Wireframe Style

Fast Toggle of Wireframe Style from the Ribbon
(Only with B&W Direct License)



No need to open the View Manager anymore

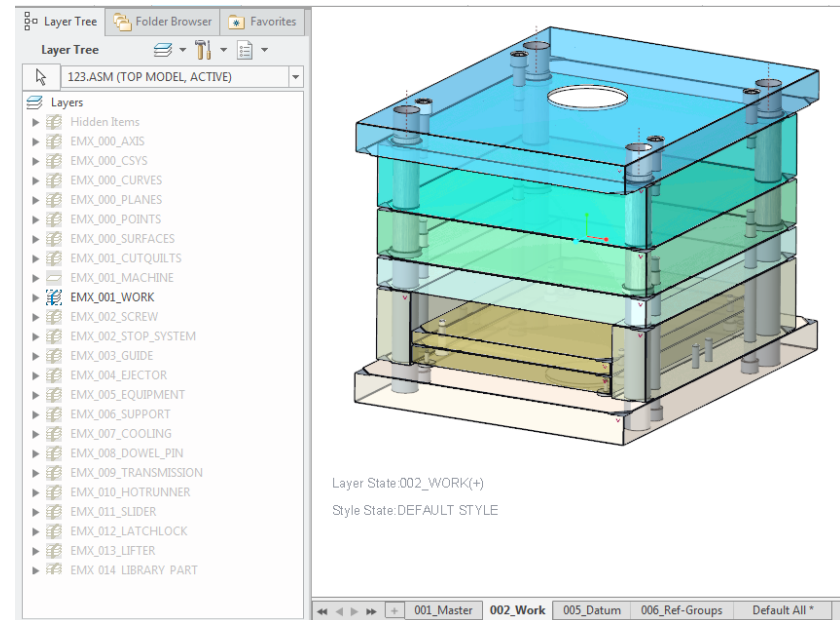


3. New Rule-Based Layer Concept

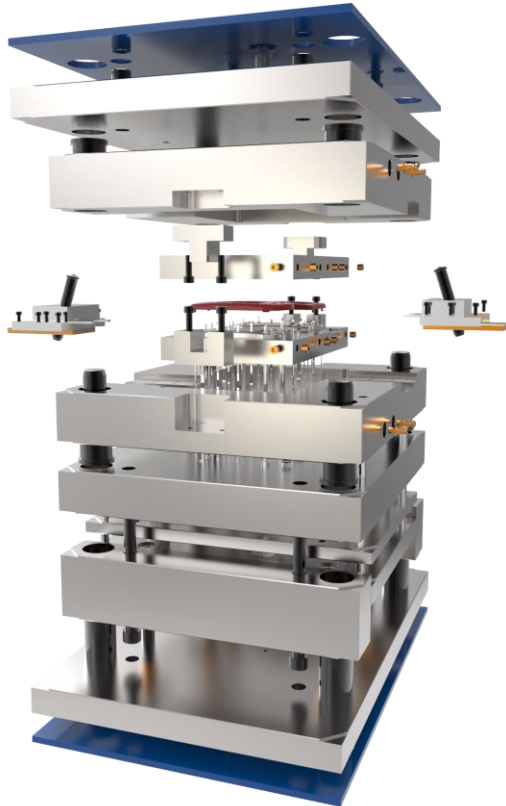
New Option `USE_RULEBASED_LAYER_CONCEPT`

- Layers are copied from template files in folder “configuration\templates\rules_layers.prt/asm”

- Layer concept is completely customizable
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 - WORK layer only shows recently created datums
- Avoids confusion with tons of datums in large assemblies



EMX 10 M010



What's New?

- New Features
- Components

Components

New Components

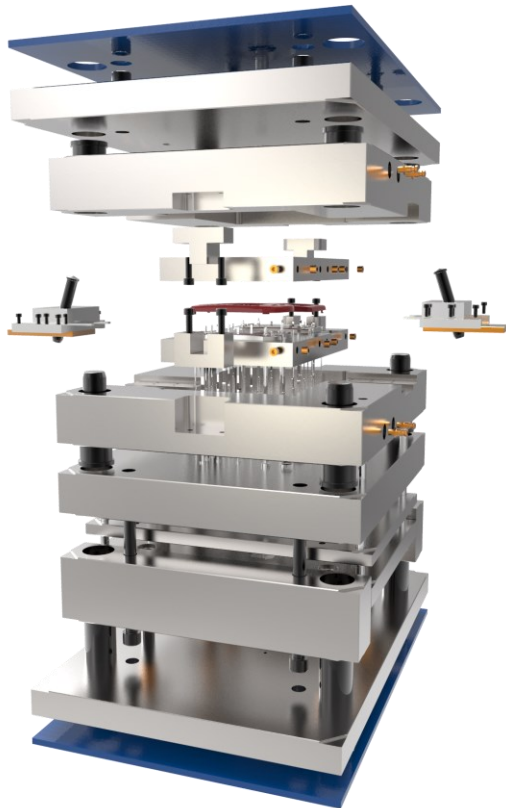
- Hasco – Z14W: Guide bush
- Hasco – Z09: Side interlock
- Rabourdin – 1071, 1005, 1061, 651, 671 and 601: Guide Components
- Knarr – 37711, 33111: Ejector Pins
- Knarr – 38488, 38781, 38881: Ejector Sleeves
- Progressive – SLX: X-Style Side Interlock
- Meusburger – E2800: Stäubli cooling components
- Strack – Z4290 Typ1: Compact Slider

Components

Improved Components

- Meusburger – 3011, 3012, 3130: Slider Assembly
- Hasco – single_locking: Slider Assembly
- Input value is now REACH → Necessary pin length is suggested
- EMX Assembly can contain subassemblies now
- Hasco – Z170, Z173, Z174 Latchlocks
- Strack – Z3, Z4, Z5 Latchlocks
- Meusburger – E1820, E1840 Latchlocks

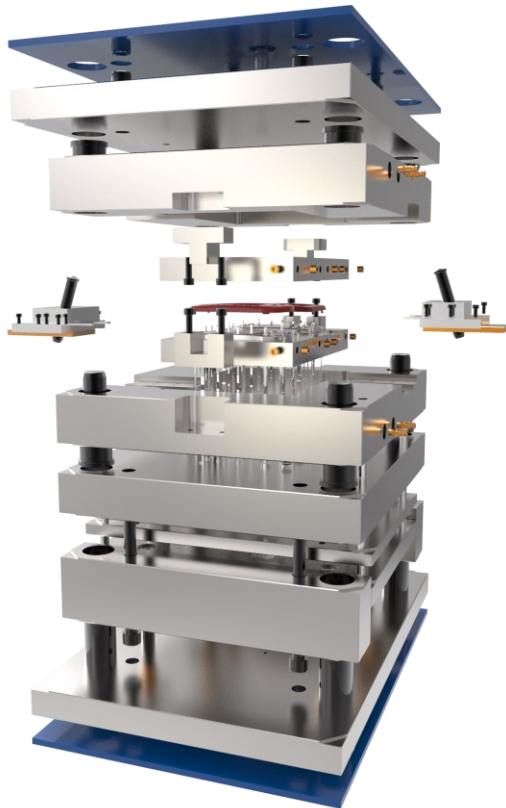
EMX 10 F001



What's New?

- New Features
- Components

EMX 10 F001



What's New?

- New Features
- Components

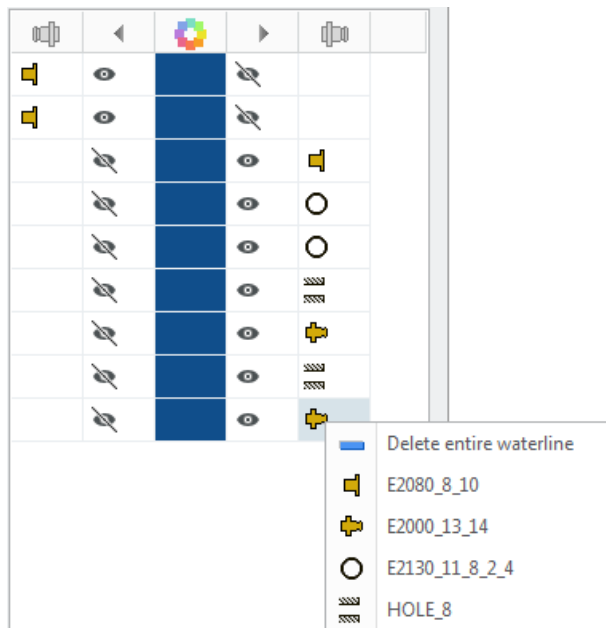
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WATERLINE_DESIGNER_DEFAULT_COMPONENT mm|meusburger|E2080_8_10&&mm|meusburger|E2000_13_14&&mm|meusburger|E2130_11_8_2_4&&mm|meusburger|HOLE_8

- Use Right Mouse Button in table and assign quickly



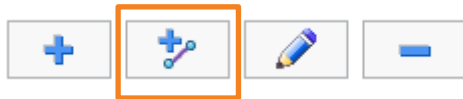
→ Design a complete cooling cooling circuit without opening the Component Dialog once!

1. Enhanced Waterline Designer

Define Waterlines on Existing Curves

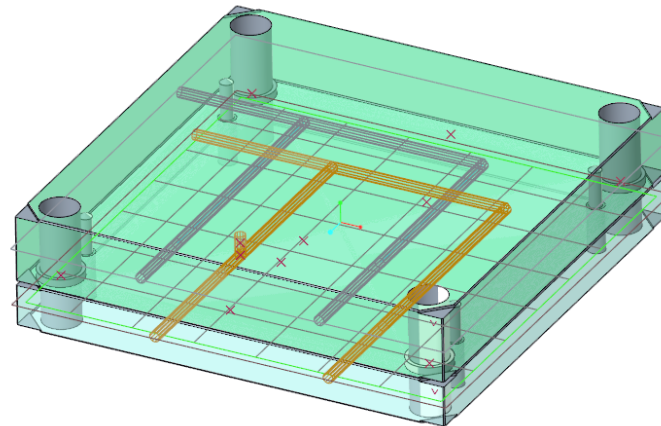
(Only with B&W Direct License)

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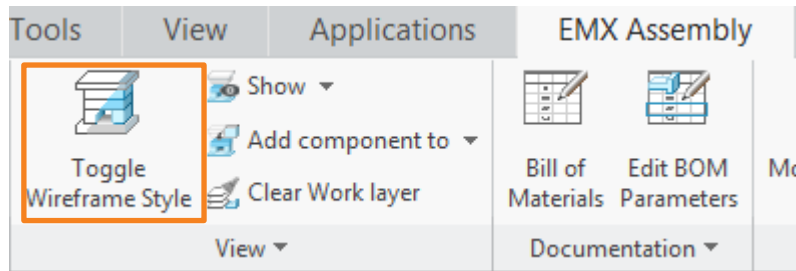
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→ Benefit from parametric sketches and easy definition of cooling circuits

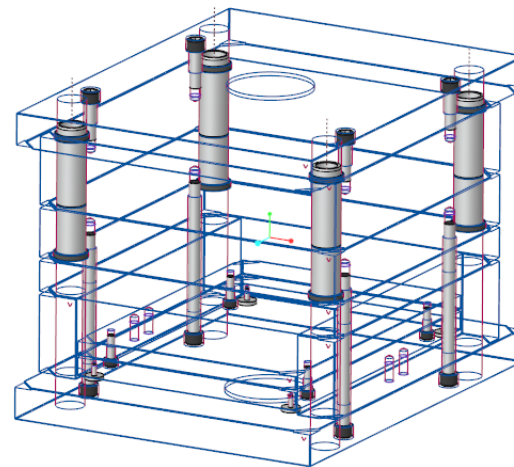
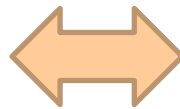
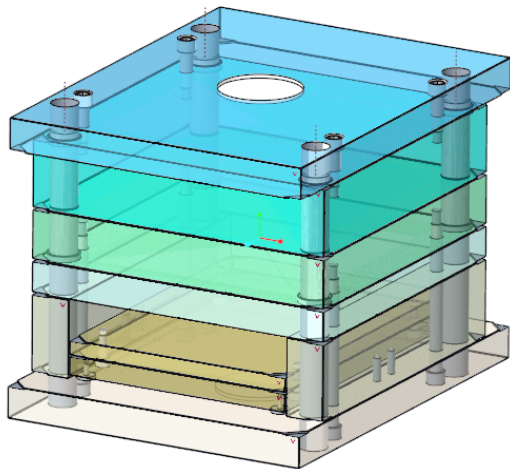


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Fast Toggle of Wireframe Style from the Ribbon
(Only with B&W Direct License)



No need to open the View Manager anymore



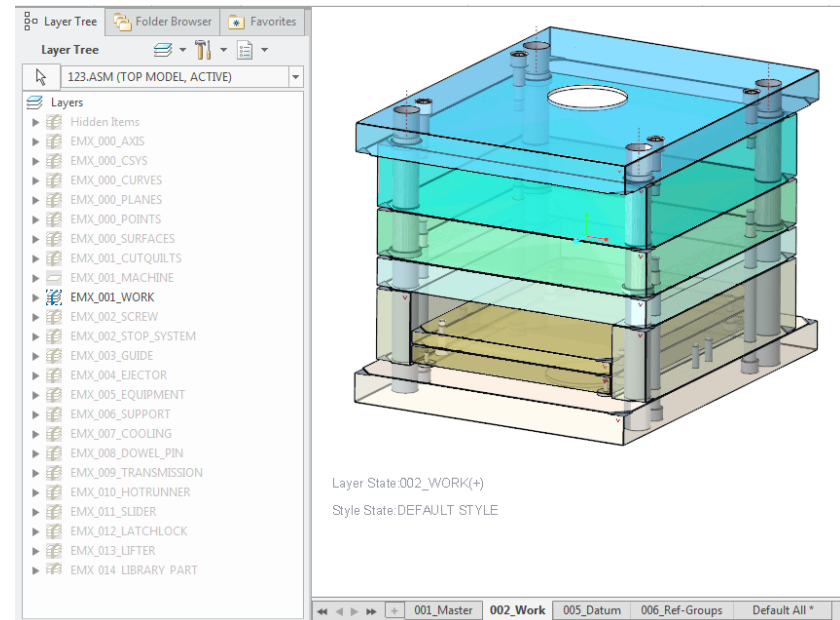
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New Option `USE_RULEBASED_LAYER_CONCEPT`

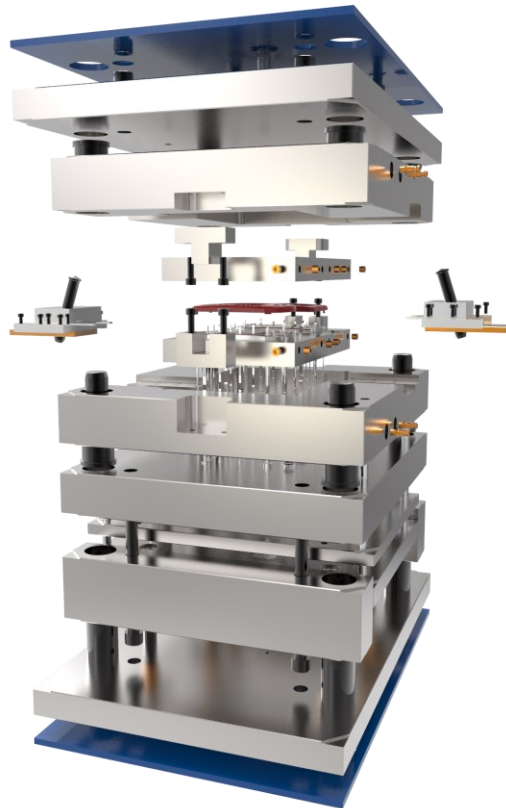
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- Layers are not created by the software anymore
- No more hardcoded layer names
- Combined states and simplified representation are used to visualize datums and solids
- WORK layer only shows recently created datums

→ Avoids confusion with tons of datums in large assemblies



EMX 10 F001



What's New?

- New Features
- **Components**
- 2. Deutsch
- Neue Funktionalität
- Komponenten

Components

New Components

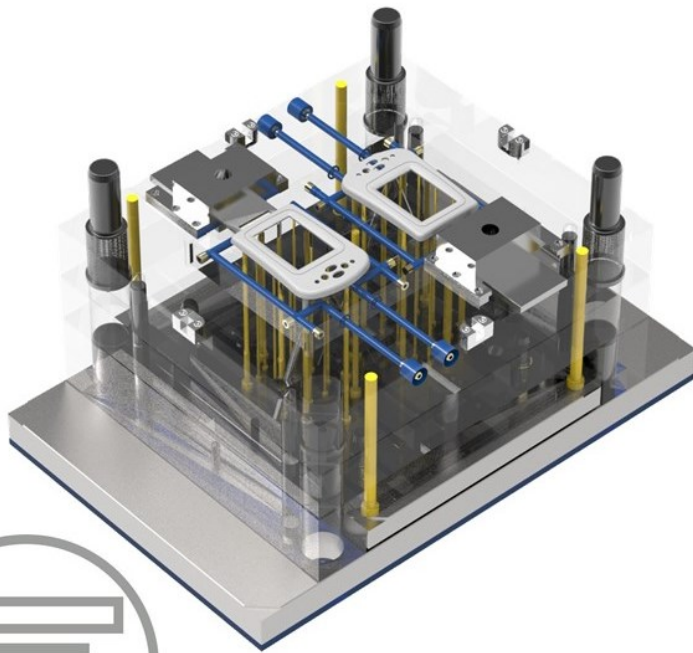
- Hasco – Z14W: Guide bush
- Hasco – Z09: Side interlock
- Rabourdin – 1071, 1005, 1061, 651, 671 and 601: Guide Components
- Knarr – 37711, 33111: Ejector Pins
- Knarr – 38488, 38781, 38881: Ejector Sleeves
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- Input value is now REACH → Necessary pin length is suggested
- EMX Assembly can contain subassemblies now
- Hasco – Z170, Z173, Z174 Latchlocks
- Strack – Z3, Z4, Z5 Latchlocks
- Meusburger – E1820, E1840 Latchlocks

EMX 10 F000

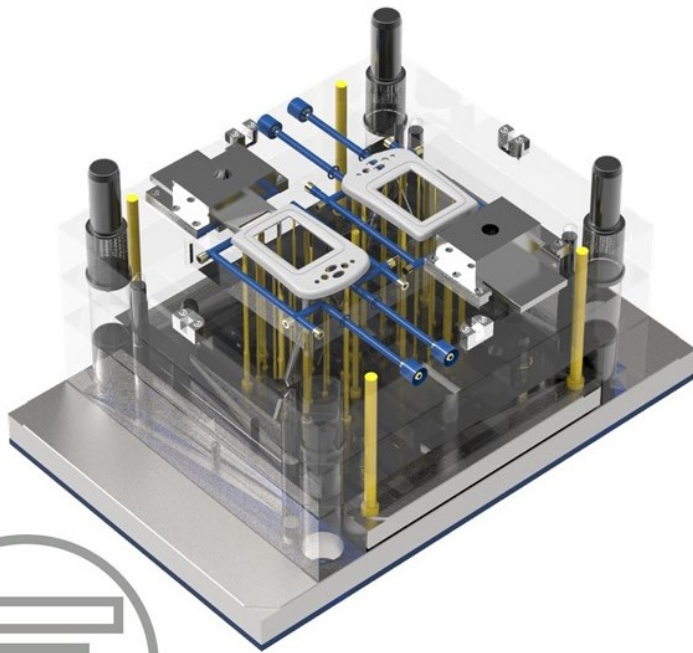


What's New?

- New Features
- Components



EMX 10 F000



What's New?

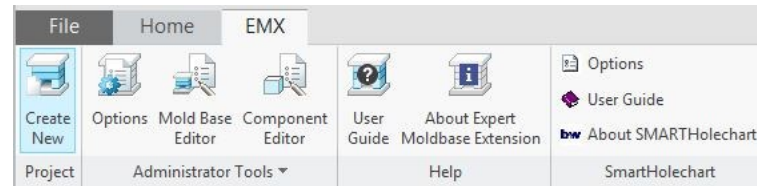
- New Features
- Components



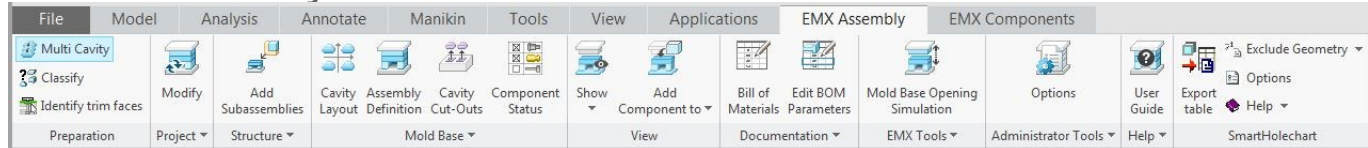
1. Improved EMX Ribbon

- New Design
- Improved Workflow

New Session



EMX Assembly



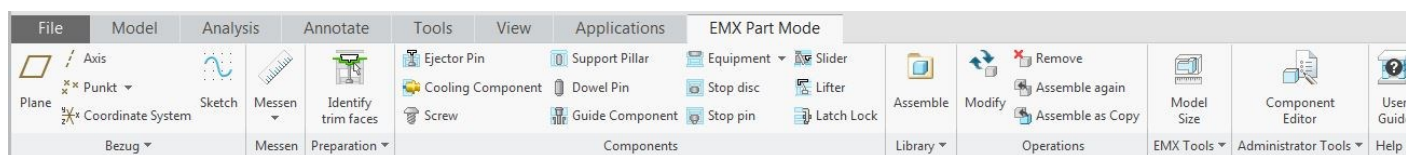
EMX Components



EMX Manufacturing

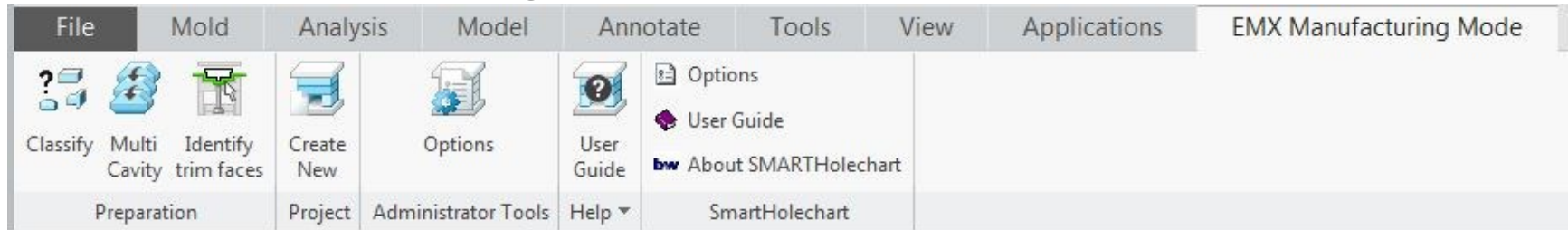


EMX Part Mode

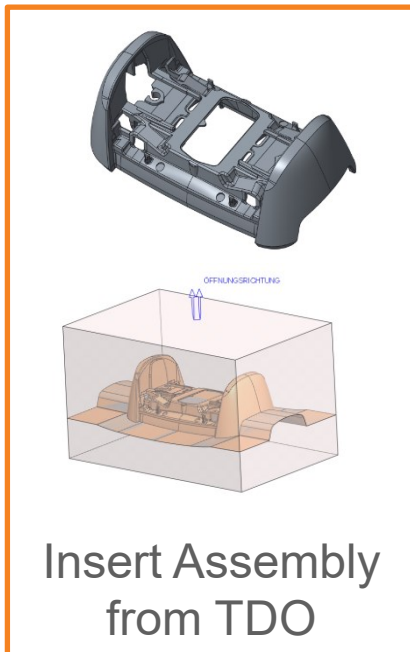


1. Improved Workflow

Preparation in Manufacturing Mode



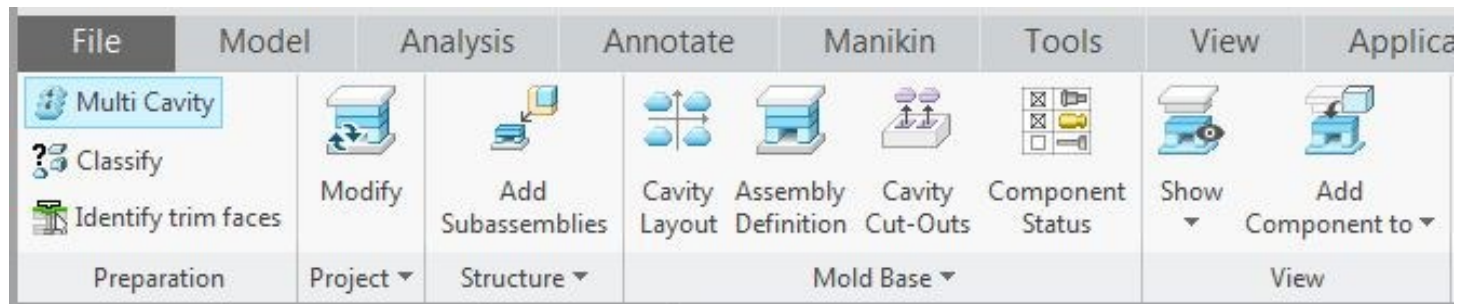
- 1.
- 2.
- 3.
- 4.



1. Classify Assembly
2. Multi Cavity Assemblies
3. Identify Trim Faces (**Enhanced**)
4. Create new Project

1. Improved Workflow

Mold Base in Assembly Mode

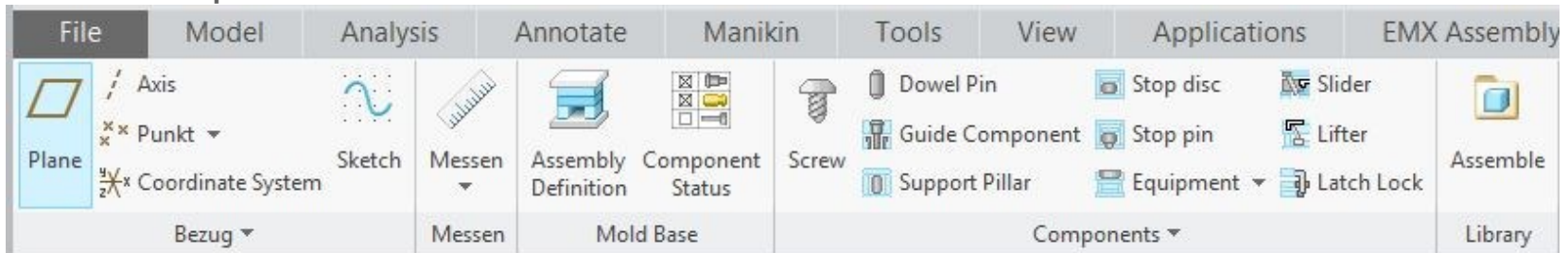


- 1.
- 2.
- 3.
- 4.
- 5.

1. Change Project
2. Set up Structure, Sub Assemblies (Enhanced)
3. Define Cavity Layout (NEW)
4. Define Mold Base(Enhanced)
5. Create Cavity Cuts (NEW)

1. Improved Workflow

EMX Components Part 1



1.

2.

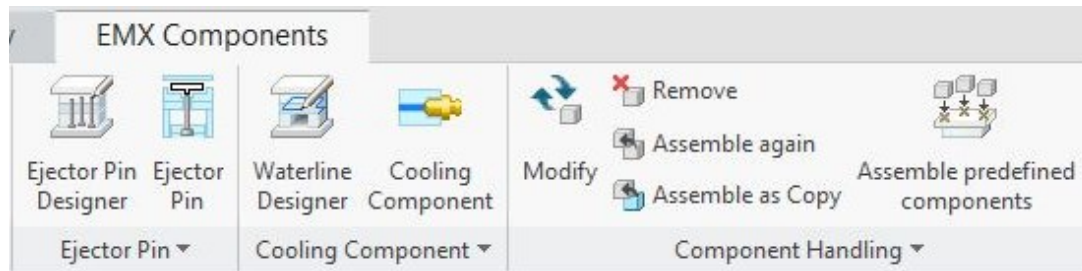
3.

4.

1. Datums und Measure (**NEW**)
2. Mold Base Definition und Component Status (**NEW**)
3. Assemble Components: All Types in 1 Group
4. Library Parts

1. Improved Workflow

EMX Components Part 2



1.

2.

3.

1. Ejector Pins: Definition via Component Dialog or Ejector Pin Designer (**NEW**)
2. Cooling: Definition vis Component Dialog or Waterline Designer
3. Component Handling (**NEW**) , Predefined Components

2. Identify Trim Faces

In EMX 9:

Hidden in EMX Components → Ejector Pin

Now:

Ribbon Group EMX Assembly → Preparation

Function:

Mark Surface Quilt as Trim Surfaces for Ejector Pins and Lifters

Effect:

Don't trim via TDO Feature

Use Solidify instead



➡ More stable. Trimming is also possible when ejector cross-section exceeds the model volume

3. Enhanced Sub Assemblies

New in EMX 10:

Assign function to subassembly

Subassembly

123234324

Subassembly Data

Name: 1232343_SUB_01

Prefix: 1232343

Postfix: 456

subasm_function: Assembly

Templates

Copy Drawings

Copy Reports

Parameter

Parameter Name	Value	Default Value
POS	?	?
QTY	1	1
PARTNAME	1232343_SUB_01	1232343_SUB_01
PARTID	1	1
BOM_NAME	Subassembly	Subassembly
SUPPLIER	-	-

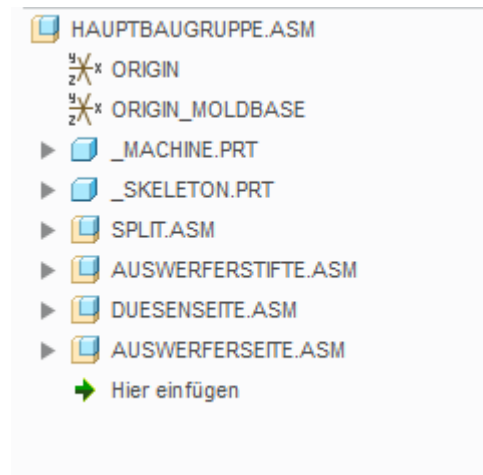
OK Cancel

1. Moving Half
2. Fix Half
3. Ejector Pins

3. Enhanced Subassemblies

Main assembly with 3 subasms and assigned functions

1. Moving Half
2. Fix Half
3. Ejector Pin

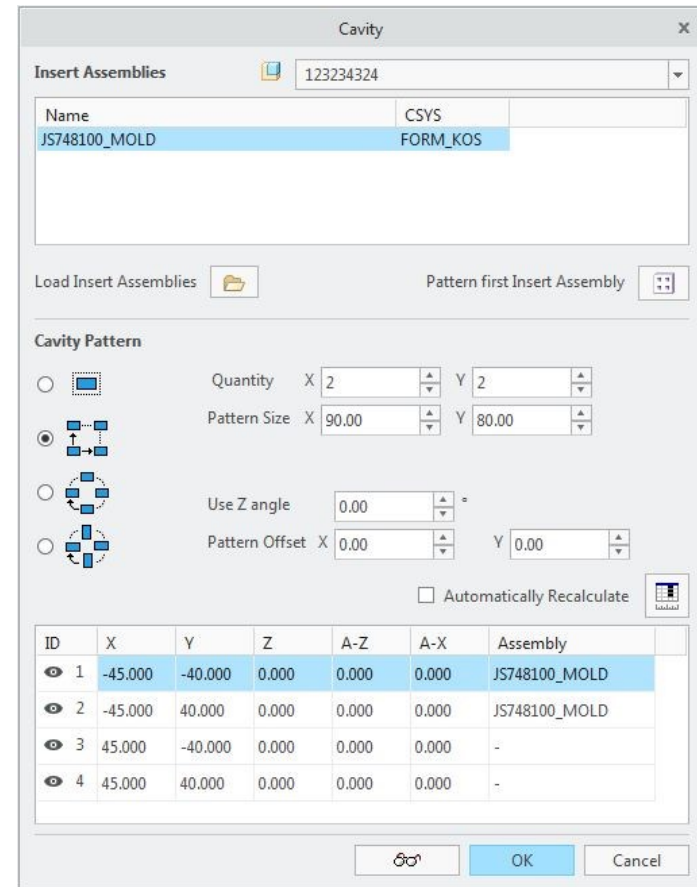


- Automatic pre-selection of MH/FH subasms when assembling from Mold Base Definition Dialog
- Automatic pre-selection for ejector pins

4. Cavity Layout Dialog

Simplified Placement of Insert Assemblies

- Define cavity pattern
- Load multiple insert assemblies
- Individual placement to cavity coordinate systems
- Assemble to main and sub assemblies
- Pattern insert assemblies
- 3D Preview



5. Cavity Cutout Dialog

Individual Dialog for Cavity Cutouts

- Functionality as known
- Cutout Types as known

New: 3D Preview

Cavity

Cavity Size

+X 45.000

-X 45.000

+Y 30.000

-Y 30.000

+Z 20.000

-Z 35.000

Cavity Cutout

Cut Depth MH 35.000

Cut Length MH 90.000

Cut Width MH 60.000

Cut Depth FH 20.000

Cut Length FH 90.000

Cut Width FH 60.000

With Mouse Ear


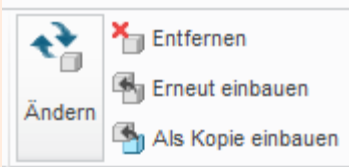

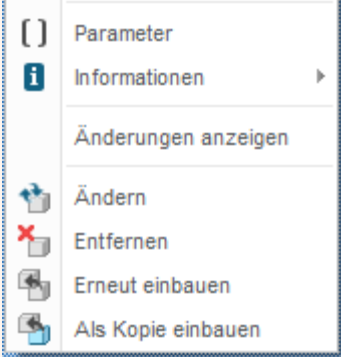
Cut Radius 0.000

OK Cancel

6. New Component Handling

	EMX 9	EMX 10
Ribbon	Delete Modify As Copy Reassemble For each Component Type → Redundant	Delete Modify As Copy Reassemble 1x for all Component Type → Looks much better
RMB	Only Delete Modify	All Functions Delete Modify As Copy Reassemble

6. New Component Handling

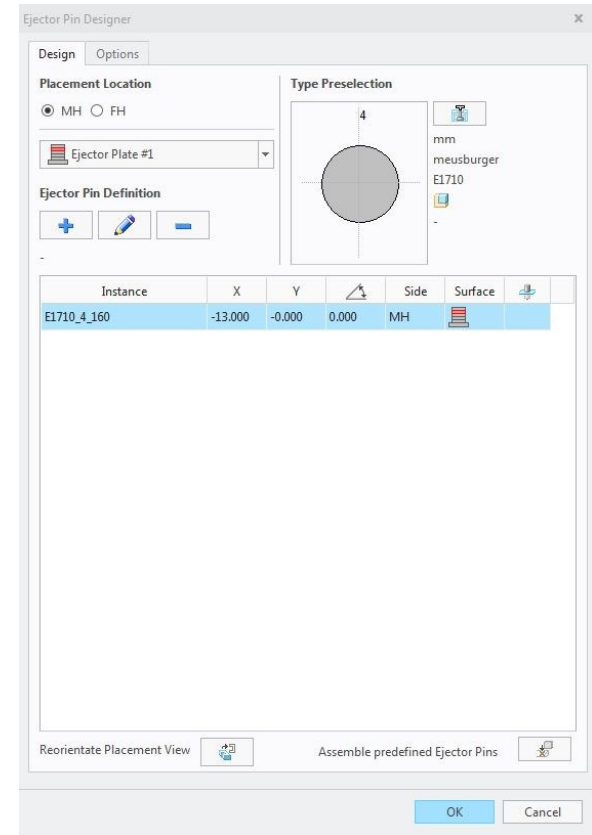
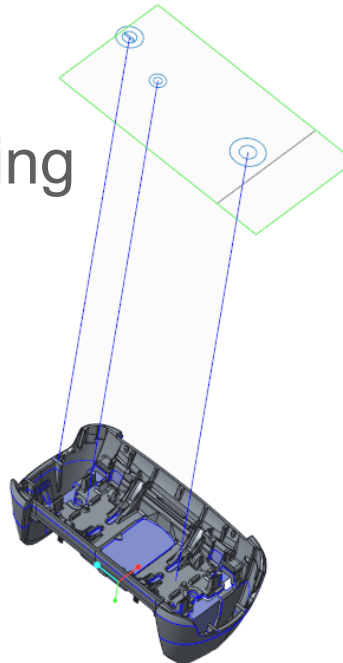
	EMX 9	EMX 10
<p>Ribbon</p>	 <p>The EMX 9 ribbon interface features a grid of icons for defining components. Each icon is accompanied by a 'Definieren' button. The components shown include various types of pipes, valves, and a 'Kühlkanal-Designer' (cooling channel designer). The 'Definieren' buttons are consistently placed below each icon.</p>	 <p>The EMX 10 ribbon interface shows a context menu for component handling. The menu includes the following options: 'Ändern' (Change), 'Entfernen' (Remove), 'Erneut einbauen' (Reinstall), and 'Als Kopie einbauen' (Install as copy). The 'Entfernen' option is marked with a red 'X' icon.</p>
<p>Rechte Maus</p>	 <p>The EMX 9 right-click context menu includes the following options: 'Parameter', 'Informationen' (with a right-pointing arrow), 'Änderungen anzeigen', 'Komponente ändern', and 'Komponente entfernen'. The 'Komponente ändern' and 'Komponente entfernen' options are accompanied by icons showing a component being moved or removed.</p>	 <p>The EMX 10 right-click context menu includes the following options: 'Parameter', 'Informationen' (with a right-pointing arrow), 'Änderungen anzeigen', 'Ändern', 'Entfernen', 'Erneut einbauen', and 'Als Kopie einbauen'. The 'Entfernen' option is marked with a red 'X' icon.</p>

7. Ejector Pin Designer

➔ Dynamic Definition of Ejector Pins

New Main Feature in EMX 10

1. Place Ejectors with 2D Preview
 2. Place to Fix Half and Moving Half
1. Supports 2nd ejector package
 2. Assemble to all sub asms

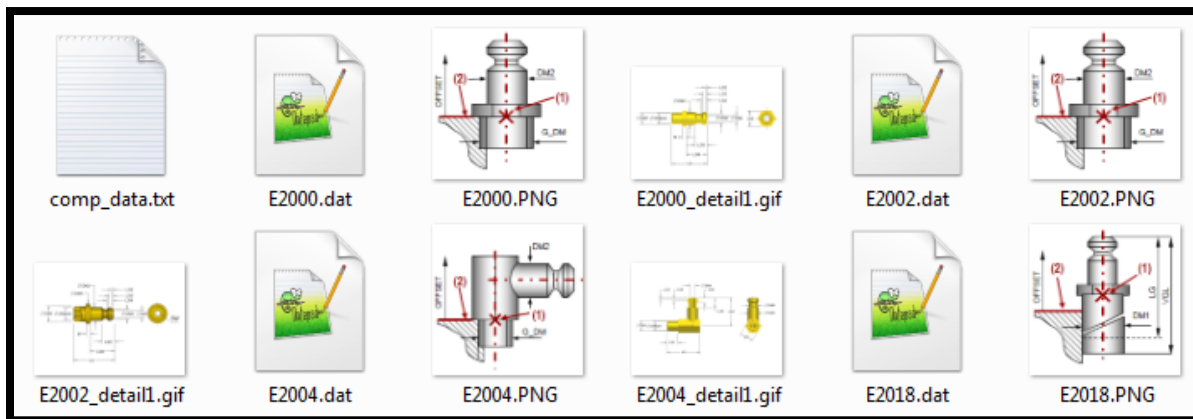


8. New Data Structure

Migration from **comp_data.txt** & **udf_data.txt** to ***.dat** Files

In **EMX 10** each component an individual ***.dat** file will be shipped. This file contains all required information to handle:

- a) The component data (assembly constraints, nominal values, instances, etc.)
- b) The entire cut-information (UDFs , UDF options, etc.)



9. Convert to EMX 10 Data Structure

Conversion of old comp_data.txt files can be done **step by step**

- Open EMX → Administrator Tools
→ **Component Editor**

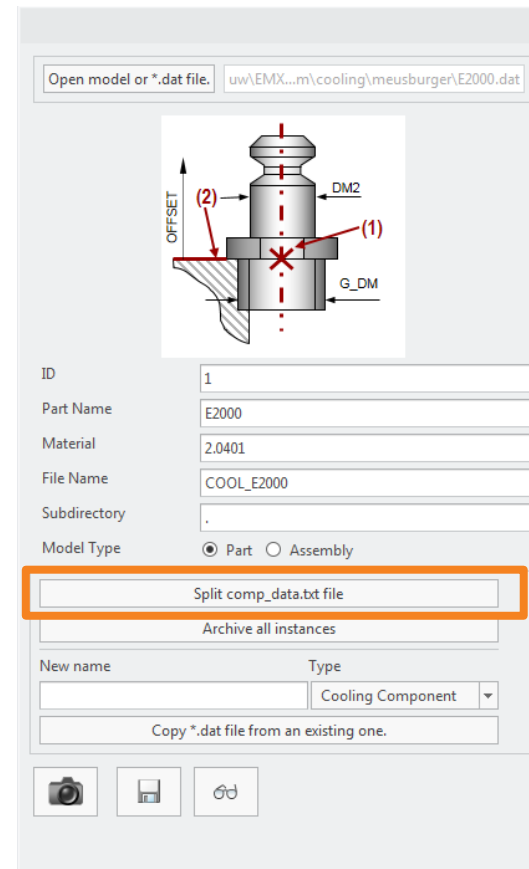


- Select Button **Split comp_data.txt file**

- Select a EMX 9 formatted **comp_data.txt** file in File Open Dialog

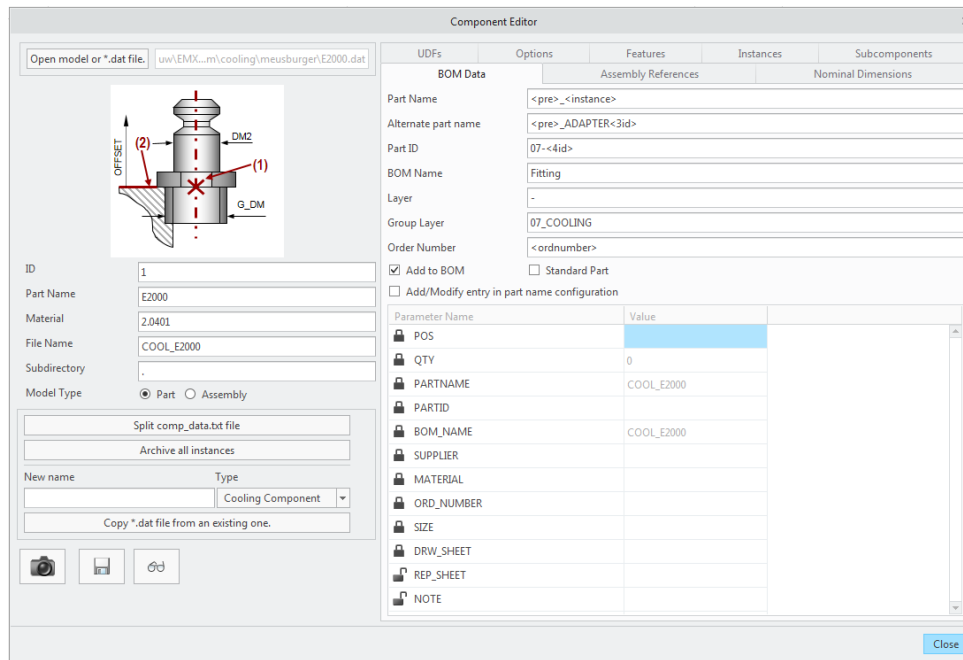


Splitting process is triggered



10. Facelift for new Component Editor

Conversion of old comp_data.txt files can be done **step by step**

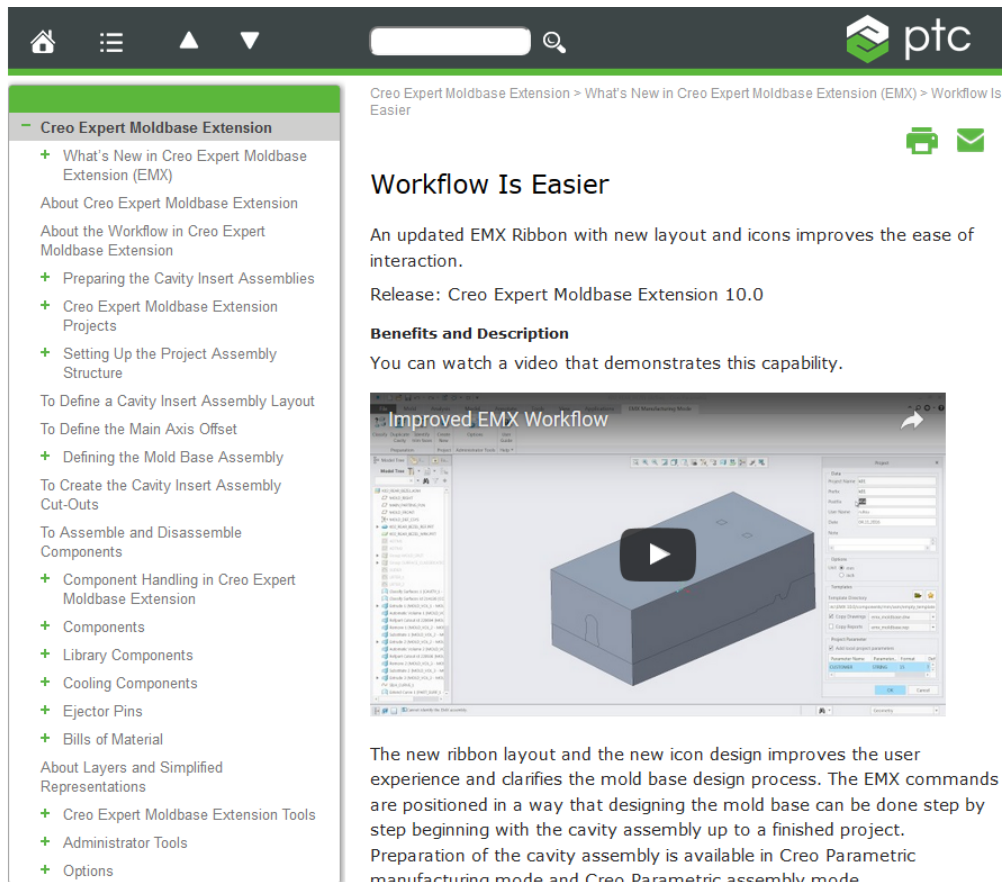


New Features:

- Copy Component from existing template
- Work on UDF cutout information
- Archive all instances from a component

10. New EMX Help Center

EMX 10 comes with the **new EMX Help Center**



Creo Expert Moldbase Extension > What's New in Creo Expert Moldbase Extension (EMX) > Workflow Is Easier

Workflow Is Easier

An updated EMX Ribbon with new layout and icons improves the ease of interaction.

Release: Creo Expert Moldbase Extension 10.0

Benefits and Description

You can watch a video that demonstrates this capability.

Improved EMX Workflow

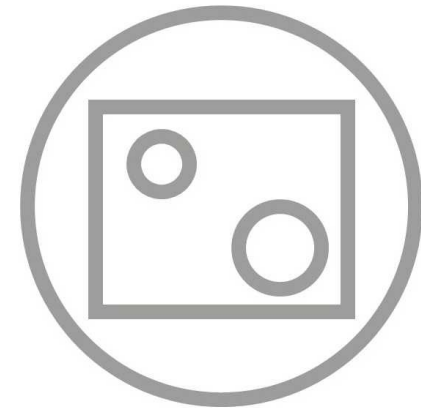
The new ribbon layout and the new icon design improves the user experience and clarifies the mold base design process. The EMX commands are positioned in a way that designing the mold base can be done step by step beginning with the cavity assembly up to a finished project. Preparation of the cavity assembly is available in Creo Parametric manufacturing mode and Creo Parametric assembly mode.

- Handy Search functionality
- What's new Videos

11. Smart Holechart 10.0

Integrated new Version in EMX 10

- Collision Tables
- easy UDF Recognition
- Replace existing Tables
- Adapt Number of Table Columns during Refresh
- Direction-depended Bore Definition
- Automatic creation of Point/Axis in Bore Center
- Use Tolerances (e.g. H7) as criteria for bore types
- Man more Options



11. Smart Holechart 10.0

SHC – Default EMX Configuration

- Smart Holechart 10 comes with a default EMX - adapted configuration
- UDFs and Holes created by EMX can be recognized easily



12. Placement of BOM Balloons

Improvements

- Functions to RMB
- Multiple Selection and Placement in a Loop
- Place Balloon multiple times for summarized components
- New Design

The image shows a BOM table titled 'Stückliste' and a technical drawing of a mechanical assembly with balloons numbered 1 through 6.

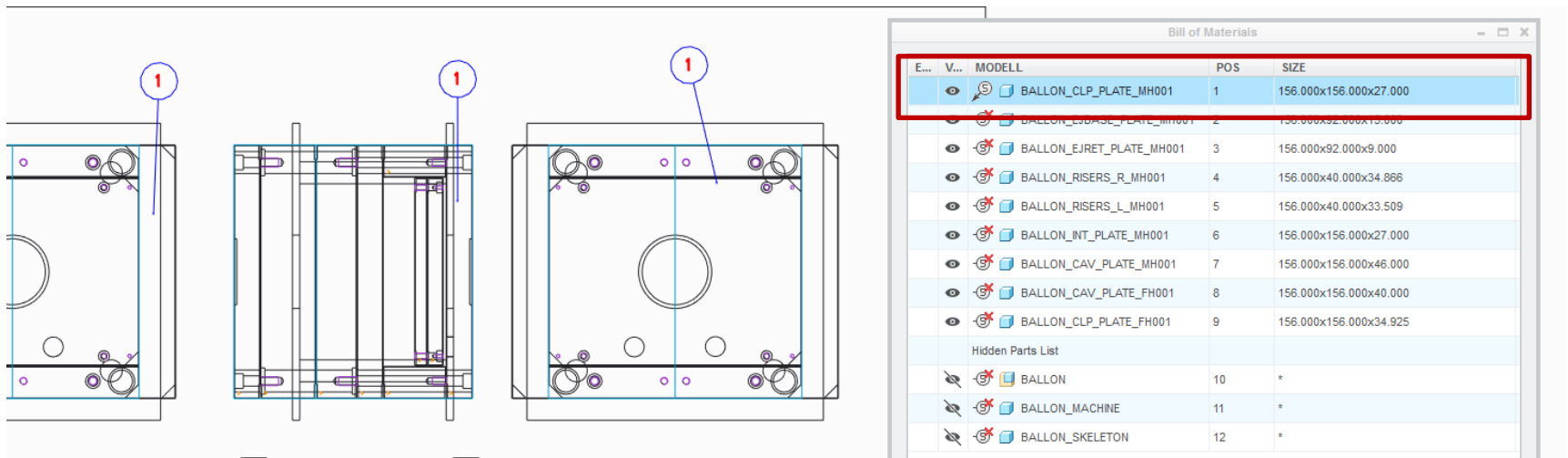
E...	V...	MODELL	POS	QTY	(V) PARTNAME
		BALL_CAV_PLATE_FH001	1	1	BALL_CAV_PLATE_FH001
		B...		1	BALL_CAV_PLATE_MH001
		B...		1	BALL_RISERS_R_MH001
		B...		1	BALL_RISERS_L_MH001
		B...		1	BALL_CLP_PLATE_MH001
		B...		1	BALL_CLP_PLATE_FH001
		B...		1	BALL_EJRET_PLATE_MH001
		BALL_EJBASE_PLATE_MH001	8	1	BALL_EJBASE_PLATE_MH001
		BALL_E1000_22_56_35	9	4	BALL_E1000_22_56_35
		BALL_E1160_30_80	10	4	BALL_E1160_30_80
		BALL_E1100_22_56	11	4	BALL_E1100_22_56
		BALLON_PLACEMENT	12	1	BALLON_PLACEMENT
		BALL_MACHINE	13	1	BALL_MACHINE
		BALL_SKELETON	14	1	BALL_SKELETON

The technical drawing below the table shows a cross-section of a mechanical assembly. Six balloons are placed on the drawing, numbered 1 through 6, pointing to various components. Balloons 1, 2, 3, and 5 are placed on the top part of the assembly, while balloons 4 and 6 are placed on the bottom part.

12. Placement of BOM Balloons

Improvements

- Place same balloon of component multiple times in different views



Bill of Materials

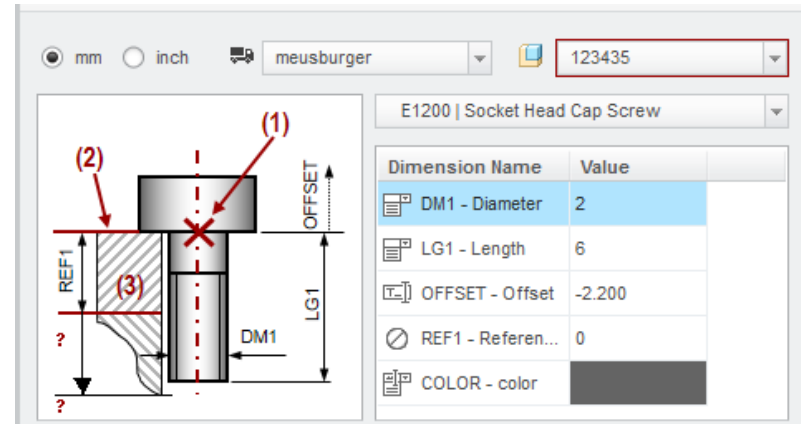
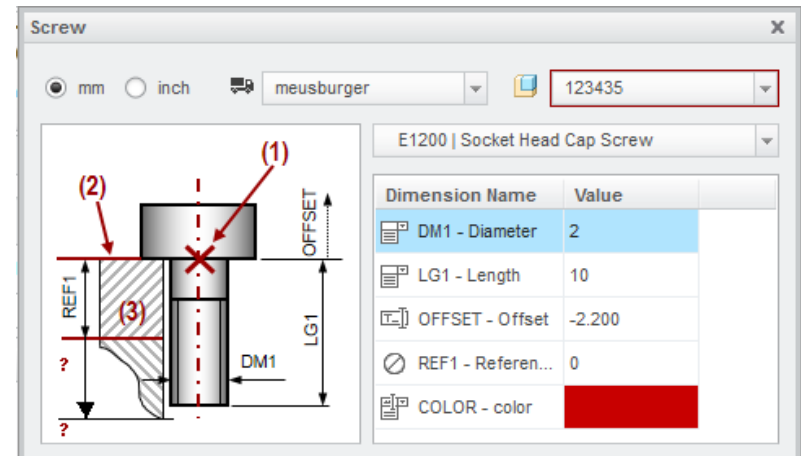
E...	V...	MODELL	POS	SIZE
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_CLP_PLATE_MH001	1	156.000x156.000x27.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_ESBASE_PLATE_MH001	2	156.000x92.000x13.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_EJRET_PLATE_MH001	3	156.000x92.000x9.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_RISERS_R_MH001	4	156.000x40.000x34.866
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_RISERS_L_MH001	5	156.000x40.000x33.509
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_INT_PLATE_MH001	6	156.000x156.000x27.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_CAV_PLATE_MH001	7	156.000x156.000x46.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_CAV_PLATE_FH001	8	156.000x156.000x40.000
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_CLP_PLATE_FH001	9	156.000x156.000x34.925
Hidden Parts List				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON	10	*
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_MACHINE	11	*
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	BALLON_SKELETON	12	*

13. Enable Cell Colors in Comp Dialog

Improvements

```
!listing of nominal dimensions
!NAME      DISPLAY_NAME  DIM_NAME  TYPE
EMX NOM_VALUES
E1200      diameter     DM1       PULLDOWN
E1200      length       LG1       PULLDOWN    >REF1
E1200      offset       OFFSET    EDIT
E1200      distance     REF1      DISABLED
E1200      color        COLOR     COLOR
EMX NOM_VALUES END
```

INSTANCE	ORD_NUMBER	USER_NUMBER	PRICE	COLOR
E1200_2_6	E1200/2x6	-	0	100,100,100
E1200_2_8	E1200/2x8	-	0	GREEN
E1200_2_10	E1200/2x10	-	0	RED
E1200_2_12	E1200/2x12	-	0	YELLOW
E1200_2_16	E1200/2x16	-	0	BLUE
E1200_2_20	E1200/2x20	-	0	ORANGE
E1200_2_5_12	E1200/2,5x12	-	0	RED
E1200_3_6	E1200/3x6	-	0	RED
E1200_3_8	E1200/3x8	-	0	RED
E1200_3_10	E1200/3x10	-	0	RED
E1200_3_12	E1200/3x12	-	0	RED
E1200_3_14	E1200/3x14	-	0	RED
E1200_3_16	E1200/3x16	-	0	RED
E1200_3_20	E1200/3x20	-	0	RED
E1200_3_25	E1200/3x25	-	0	RED
E1200_3_30	E1200/3x30	-	0	RED
E1200_3_35	E1200/3x35	-	0	RED
E1200_3_40	E1200/3x40	-	0	RED
E1200_4_6	E1200/4x6	-	0	RED
E1200_4_8	E1200/4x8	-	0	RED
E1200_4_10	E1200/4x10	-	0	RED
E1200_4_12	E1200/4x12	-	0	RED

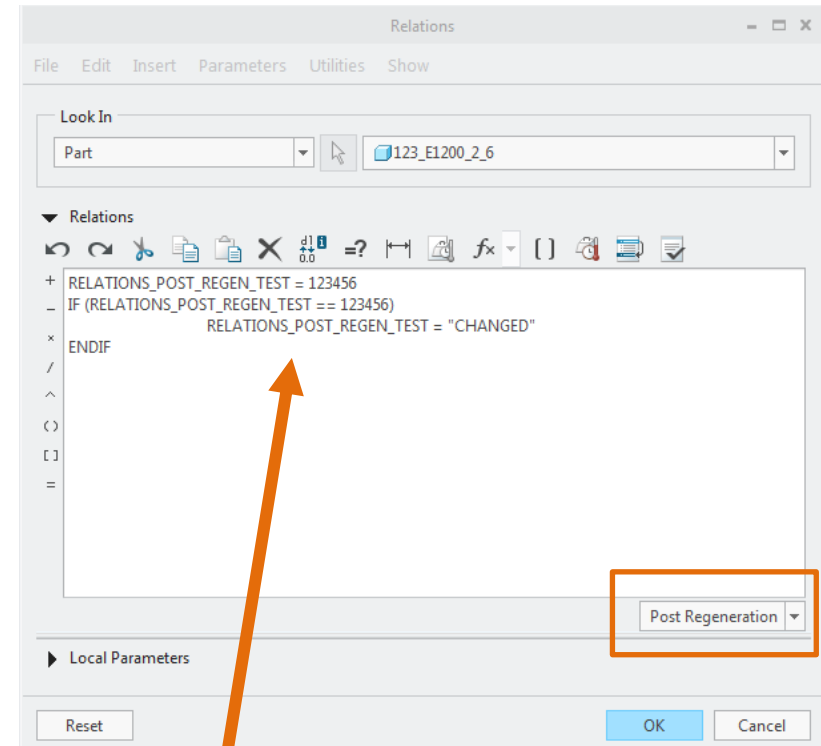


14. Add Relations to Post Regen Area

Improvements

- Add Relations to Post Regeneration Area with specified files
1. emx_comp_post_regen.rel
 2. plate_post_regen.rel
 3. etc.

Name	Änderungsdatum	Typ	Grö
emx_bom.xls	06.04.2016 09:44	Microsoft Excel 97...	
emx_bom_adv.xls	25.08.2016 13:28	Microsoft Excel 97...	
emx_comp.rel	09.09.2016 08:58	REL-Datei	
inactive_emx_comp.rel	06.04.2016 09:44	REL-Datei	
inactive_ref_feat_udf.gph	06.04.2016 09:44	Creo User defined ...	
insert_asm.asm	25.08.2016 13:28	Creo Assembly File	
insert_asm_inch.asm	06.04.2016 09:44	Creo Assembly File	
insert_comp.prt	06.04.2016 09:44	Creo Part File	
insert_comp_inch.prt	06.04.2016 09:44	Creo Part File	
view_layer_template_german.prt	25.08.2016 13:28	Creo Part File	
view_layer_template_usascii.prt	25.08.2016 13:28	Creo Part File	
emx_comp_post_regen.rel	09.09.2016 10:40	REL-Datei	



```

1 RELATIONS_POST_REGEN_TEST = 123456
2 IF (RELATIONS_POST_REGEN_TEST == 123456)
3     RELATIONS_POST_REGEN_TEST = "CHANGED"
4 ENDIF
    
```


15. Windchill Autonumber Renaming

Improvements

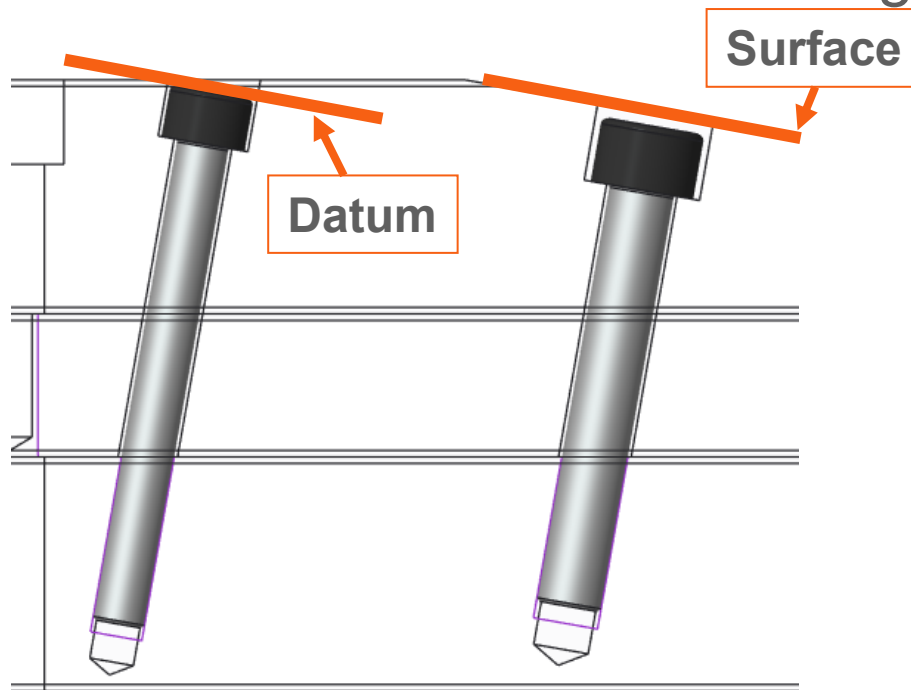
- New Option WINDCHILL_AUTONUMBER
- When working with Windchill and option is set to YES EMX uses next valid name in Windchill for renaming
- Windchill Common Name is set by standard naming mechanism defined in partnames.cfg
- Use keyword WINDCHILL_AUTONUMBER as rule in partnames.cfg to apply auto renaming for individual components

16. Angular Cutouts for Guides and Screws

Enhancement

Screws and Guides can now be placed on Axis/Points and Planes which are not orthogonal to each other.

→ Cutouts will be created with given angle.



Note

Works with EMX standard configuration.

If you use a custom configuration following UDFs need to be added to custom config:

```
"<emx_install>\components\mm\screw\udf
1. screw_straight_hole_coax.gph
2. screw_thread_bore_coax.gph
"<emx_install>\components\mm\guides\udf
1. guide_straight_hole_coax.gph
2. guide_blind_hole_coax.gph
```

17. Ignore Subcomps of ASMs in BOM

Enhancement

Purchased assemblies can be marked in BOM
 → All subassemblies and sub components will be ignored in BOM

	HOT_12MATRIX001	20
	HOT_12MATRIX001	21
	123_BI-METALLIC_C-SPRUE002	22
	123_SEAL2002	23
	123_HOTSPRUE2	24
	123_SEAL1002	25
Hidden Parts List		
	HOTRUNNER	26
	HOT_MACHINE	27
	HOT_SKELETON	28

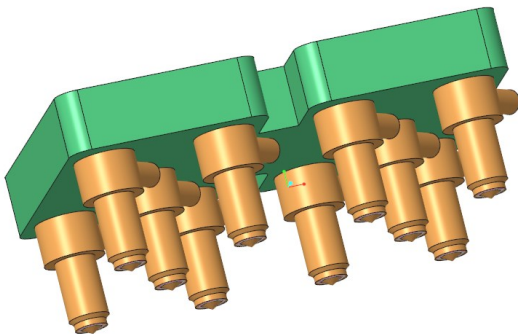
Default: All parts and subassemblies are listed in BOM.

	HOT_E1010_22_56_75	17
	HOT_E1100_24_76	18
	HOT_E1100_22_76	19
	HOT_12MATRIX001	20
Hidden Parts List		
	HOTRUNNER	21
	HOT_MACHINE	22
	HOT_SKELETON	23

Mark assembly as purchased part with RMB functionality.



Status displayed with Icon.



18. Cut and Paste with Ctrl+X / Ctrl+V in BOM

Enhancement

Cut and Paste can now be done with keyboard shortcuts Ctrl+X and Ctrl+V.

→ Quick repositioning of BOM entries.

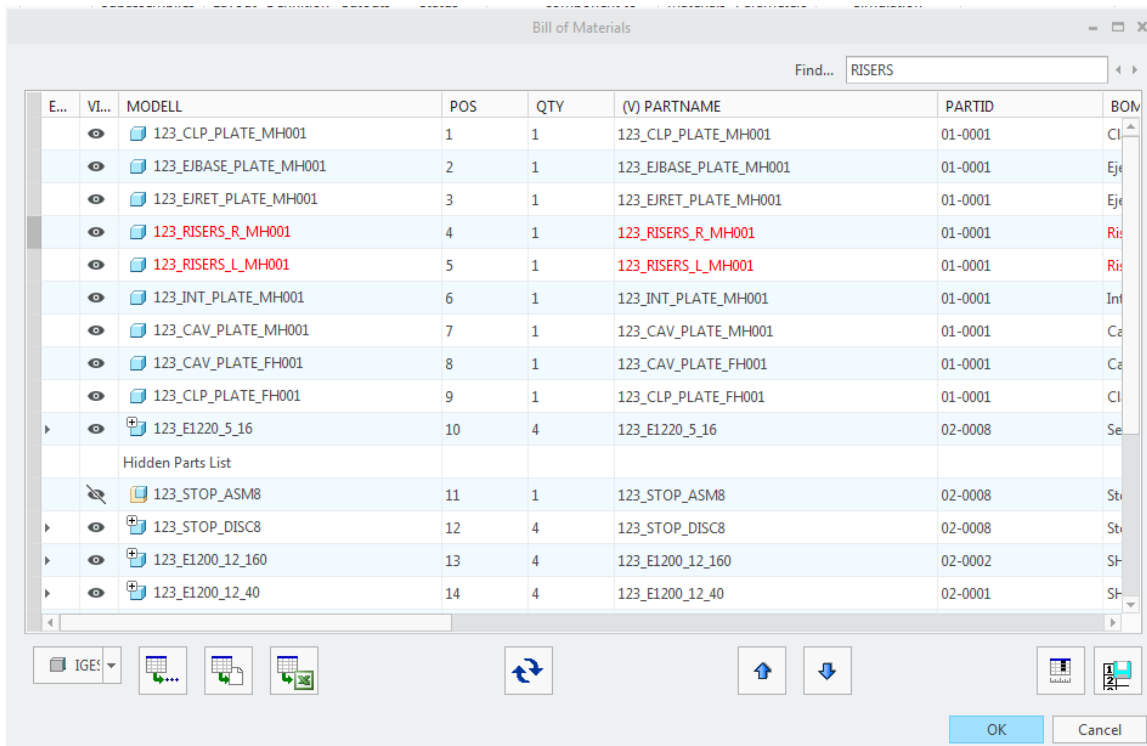
		HOT_CAV_PLATE_FH001	9	1	HOT_CAV	
		HOT_CLP_PLATE_FH001	10	1	HOT_CLP	
			HOT_STOP_DISC		STO	
			HOT_STOP_ASM		STO	
			HOT_E1200_12_1		E120	
			HOT_E1200_12_4		E120	
			HOT_E1200_8_25		E120	
			HOT E1010 24 56 75	16	3	HOT E101

- Edit BOM Parameters
- Cut
- Paste
- Show/Hide Items
- Mark/Unmark a purchased Part/Assembly

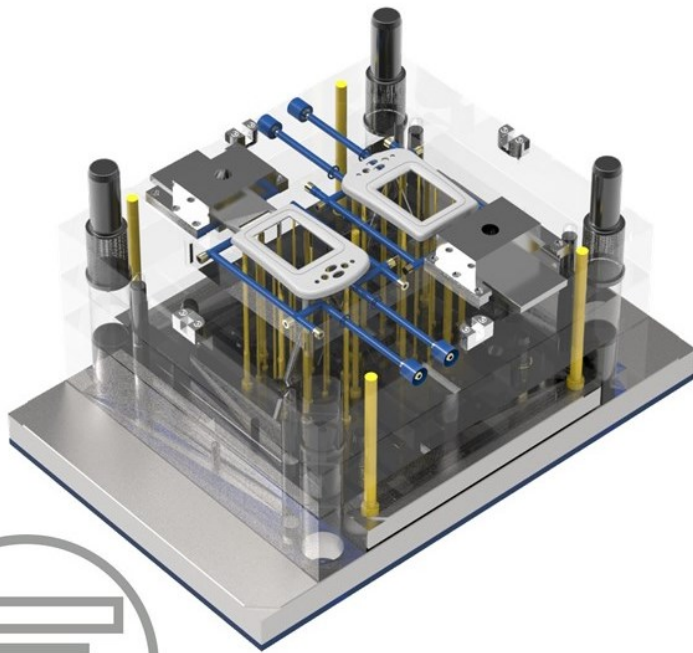
19. Search Feature in BOM Dialog

Enhancement

Search for Keywords in BOM to find entries.
 Found entries are highlighted in list.



EMX 10 F000



What's New?

- New Features
- Components




Components

New Components

- Misumi – Cooling NPW and M-KOC
 - Misumi – Top Lock TPN
 - Misumi – Flat Ejector Pin ESHJ, ERZF and ERVB
 - Meusburger – Guide E10025
 - Meusburger – Ejector Pin E10125 (DLC Coated)
 - Meusburger – Spring E1546
 - Hasco – Guide Z040
 - Hasco – Locating Ring K107, K501, K506, K1000
 - Knarr – Ejector Pin 37999
 - Strack - Z17, Z18 Locating Rings
 - Strack - Z45 side interlock components
- 
- A decorative graphic element in the bottom right corner consisting of a thick grey curved line and a thin orange curved line below it.

Components

New Components

- Meusburger – Guide E1032: Inclined Pin
 - Meusburger – Locating Ring E1362
 - Meusburger – Screw E1514: Threaded Bolt
 - Meusburger – Cooling E2800: Stäubli Connector
 - Knarr – Ejector Pin 36555
 - Knarr – Ejector Pin 36599
 - Knarr – Ejector Pin 37414
 - Knarr – Ejector Pin 37555
 - Knarr – Ejector Pin 37888
 - WEMA – Cooling S3102: Sealing Plug
 - WEMA – Cooling S3105: Diverting Plug
 - WEMA – Cooling S3111: Core Cooling Element
 - WEMA – Cooling S3113: Core Cooling Element
 - WEMA – Cooling S3115: Baffle Cooling Element
 - WEMA – Cooling S3117: Spiral Baffle Cooling Element
- 
- A decorative graphic element consisting of a thick grey curved line with a thin orange line underneath it, starting from the bottom right and curving towards the center.

Components

Updated Components:

- Hasco – Locating Ring K100
 - Hasco - Side Interlock Z18/19
 - Hasco – Cooling O-Ring Z98
 - LKM – Side interlocks
 - Meusburger - Insulation Plates E1402 E1403 E1407 E1408
 - Meusburger – Top Interlock E1310
 - PCS – Ejector Pins: All Types Verify and Updated
 - PCS – Support Pillars
 - PCS – Locating Rings
 - Hasco – Locating Ring K100
 - Hasco - Side Interlock Z18/19
 - Hasco – Cooling O-Ring Z98
 - LKM – Side interlocks
 - Meusburger - Insulation Plates E1402 E1403 E1407 E1408
- 
- A decorative graphic element consisting of a thick grey curved line with a thin orange line underneath it, located in the bottom right corner of the slide.

Components

Updated Components:

- Misumi – Ejector Pins Type Verified
- Meusburger - Ejectors E1712 add Rotation Fixtures option
- Meusburger – Top Interlock E1310
- PCS – Ejector Pins: All Types Verify and Updated
- PCS – Support Pillars
- PCS – Locating Rings

Components

Updated Plates:

- Futaba - Catalog – All sizes checked and updated
- Meusburger - Plates updated
- Meusburger - E2071 Add option Counter/Second Bore