

PolCycleTime - Price and demand calculations

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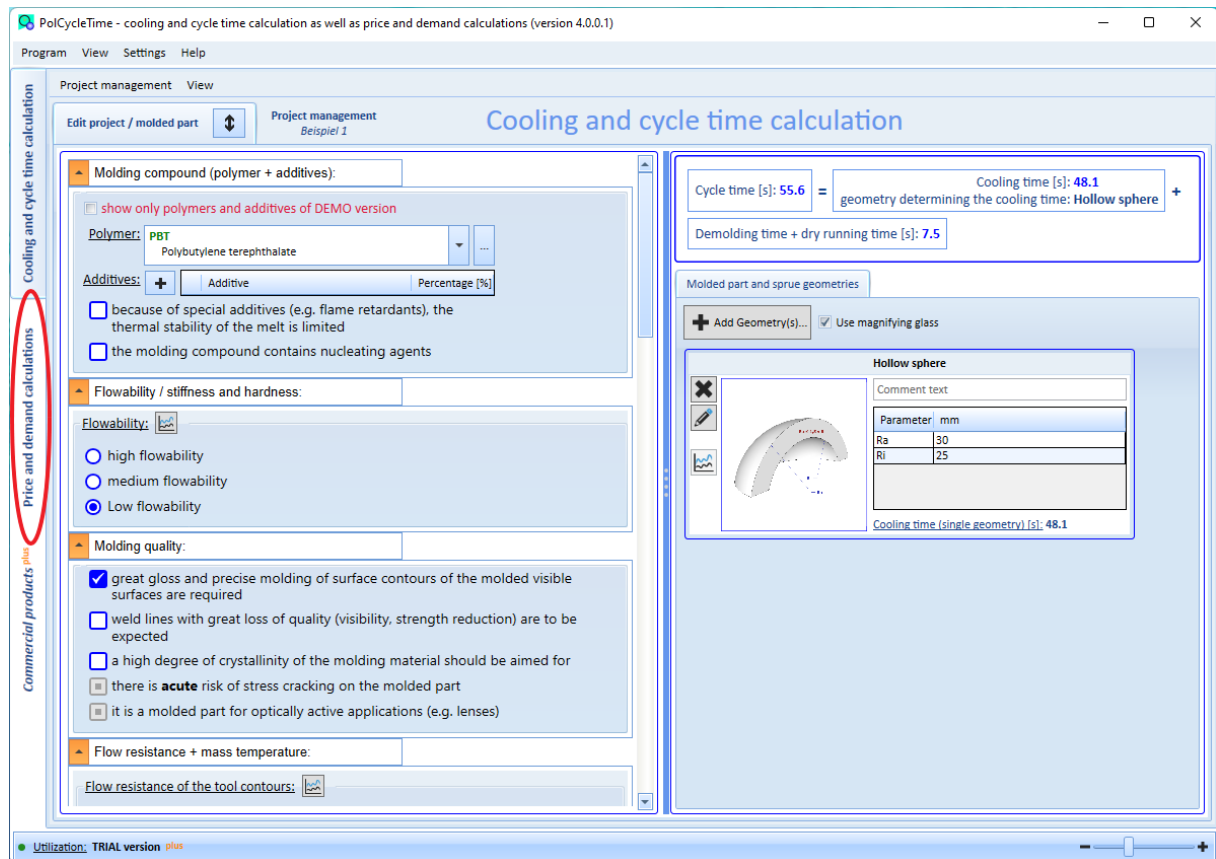
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Introduction

In the following the operation of the software module "*Price and demand calculations*" is described.

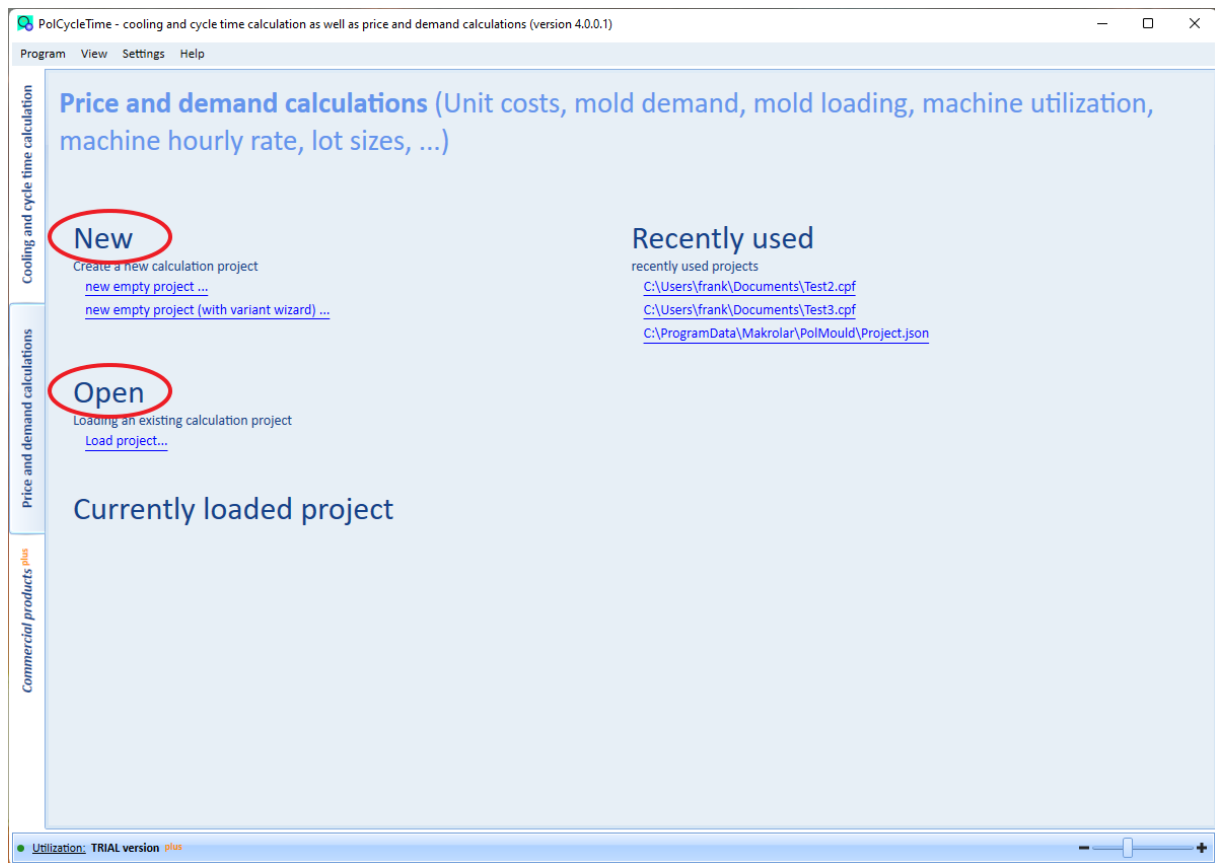
The module is part of the *PolCycleTime* software and can be called/started from the main window.

To do this, switch to the *Price and demand calculations* tab.



In the tab you can then ...

- create a new project
- load an existing project



Main functions of the software module are:

- Calculation of piece costs
- Calculation of mold requirements
- Determination of the optimal mold equipment
- Determination of machine utilization
- Calculation of machine hourly rates and
- Determination of economic (profit-optimal) lot sizes

You can also find further information on our **homepage**.

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Operation

[Quick start](#)

[Projects](#)

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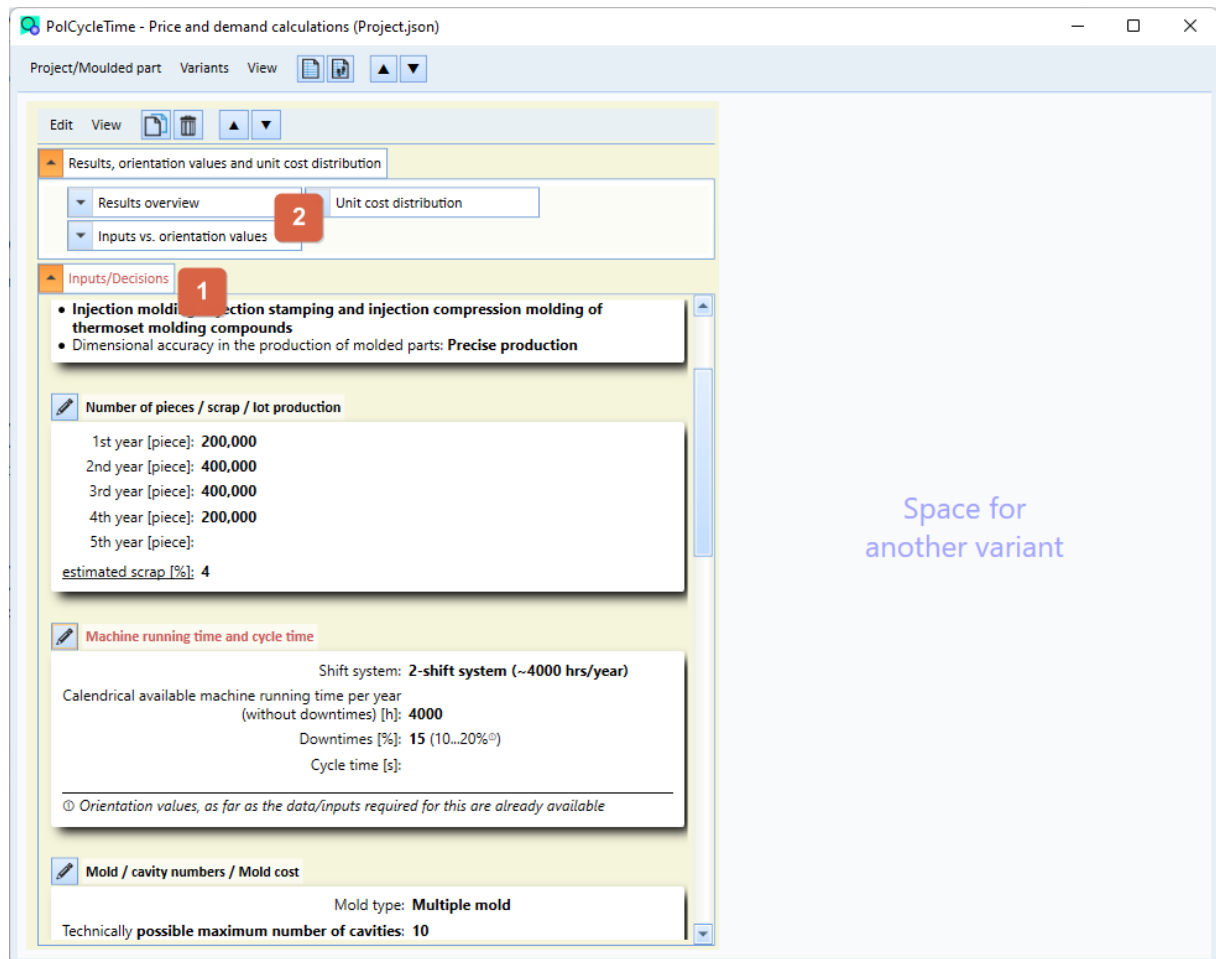
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Quick start

1. After starting **PolCycleTime**, switch to the **Price and demand calculations** tab.
2. In the tab select new empty project (with variants wizard)
3. Then you must first specify where the new project (the project file) should be saved
4. Now you will be navigated through the individual inputs/decisions one after the other (wizard)

pages). **Note:** You can also "leave open" the following inputs/decisions and then edit them later. The sequence of the inputs/decisions also leads, among other things, to the fact that corresponding orientation values are calculated at the corresponding points and offered for selection/acceptance. If corresponding inputs are missing, no orientation values may be displayed.

- 1) Page 1: enter a designation for the first variant and select the background color (this is for a better overview if you want to edit more than one variant in a project)
 - 2) Page 2: enter the inputs/decisions for production method and production precision
 - 3) Page 3: enter the inputs/decisions on quantities and scrap
 - 4) Page 4: enter the inputs/decisions for machine running time and cycle time
 - 5) Page 5: enter the inputs/decisions for mold, cavity numbers and mold costs
 - 6) Page 6: enter the inputs/decisions on wear
 - 7) last, a note appears that the inputs/decisions for production, material and QA costs are not entered within the wizard. You can then edit this data.
5. The variant is now added to the project and the project window opens. Your inputs as well as the results (if already possible) are displayed



6. If necessary, edit the inputs and decisions that are still open. Text **1** is marked in red as long as inputs are still missing or incorrect.

In the area **2** the results are to be seen these can be shown/hidden individually or together.

Further information can also be found on our **homepage**.

Projects

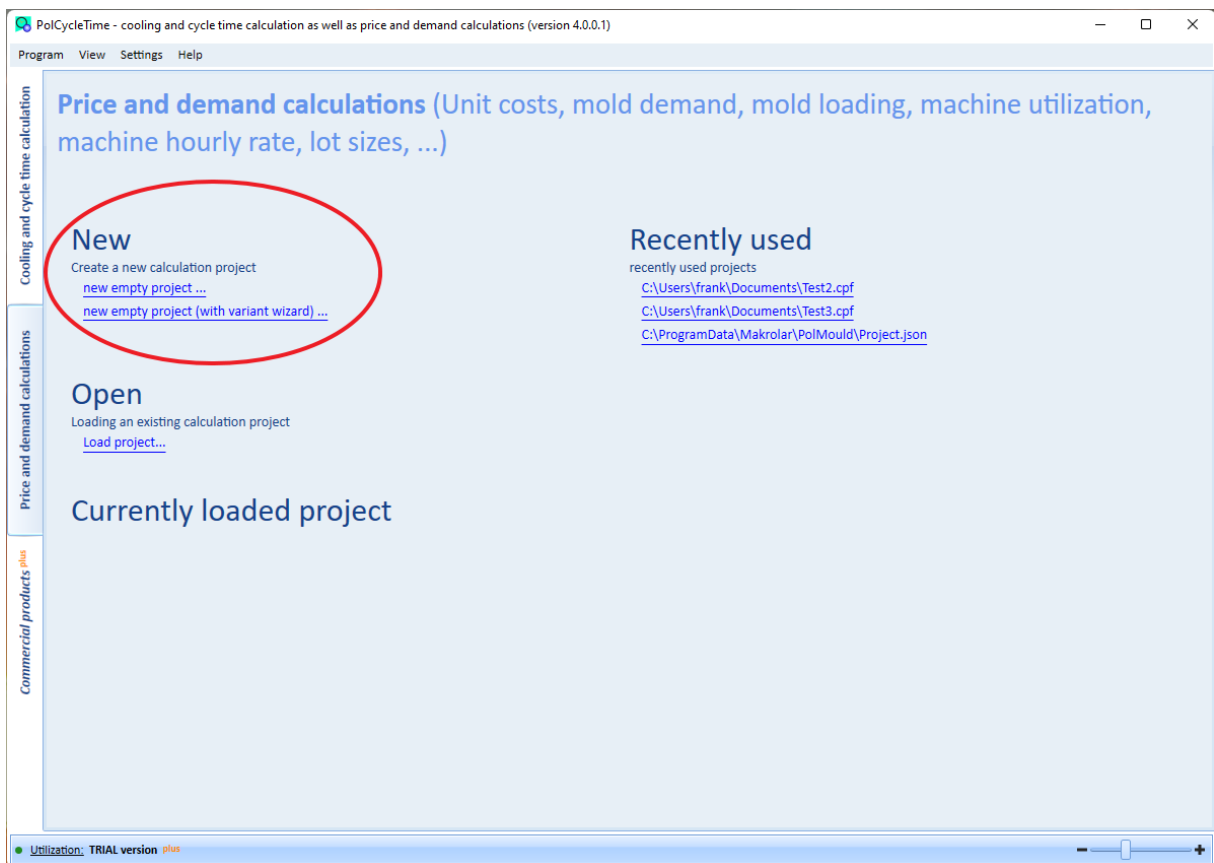
Projects are stored in one project file each.

Up to 10 variants can be managed in a project. In the [project main window](#), the variants are displayed side by side to easily compare their results, inputs and decisions.

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Create a new project

Switch back to the main window of *PolCycleTime* to the corresponding tab.



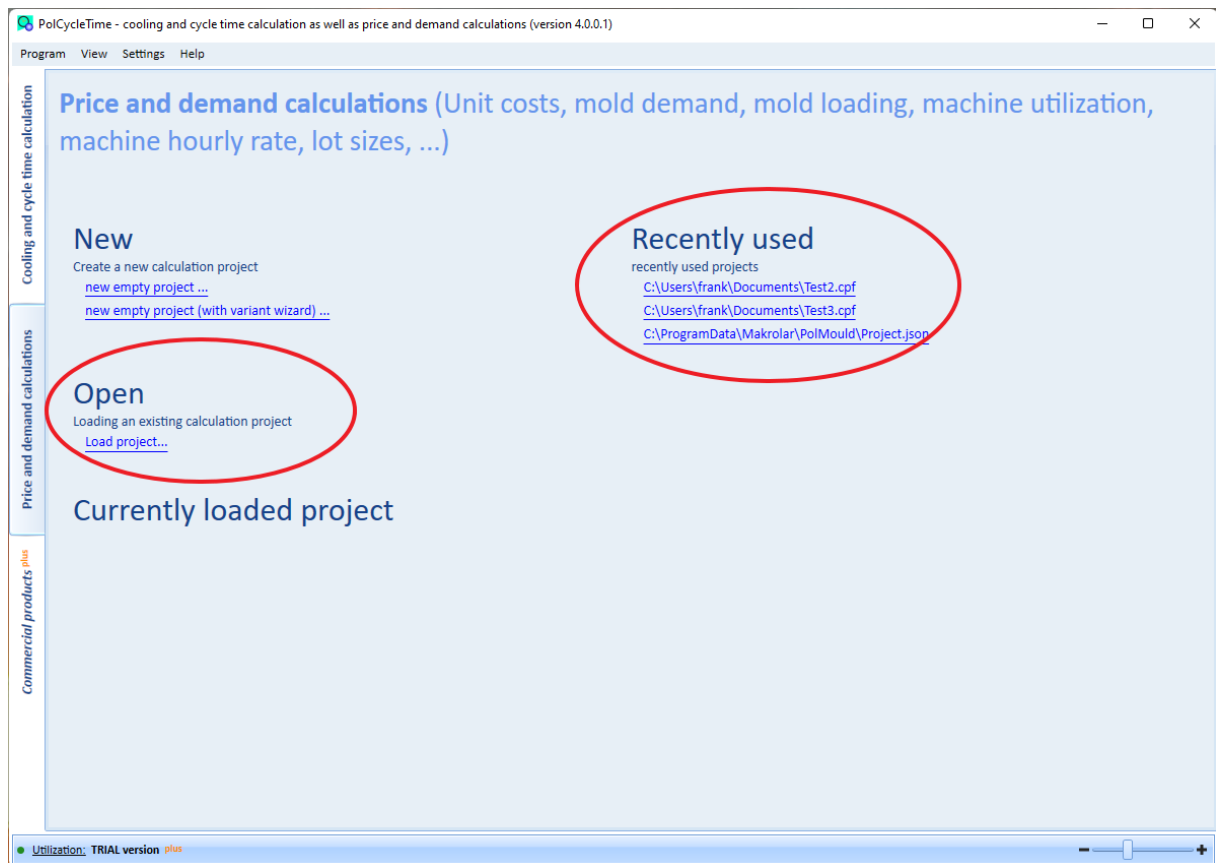
You can either create an empty project without any input or use the wizard. The wizard will guide you through the inputs/decisions for the first variant.

After completion, the main project window is opened and the initially created variant is displayed.

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Load an existing project

Switch back to the main window of *PolCycleTime* to the corresponding tab.



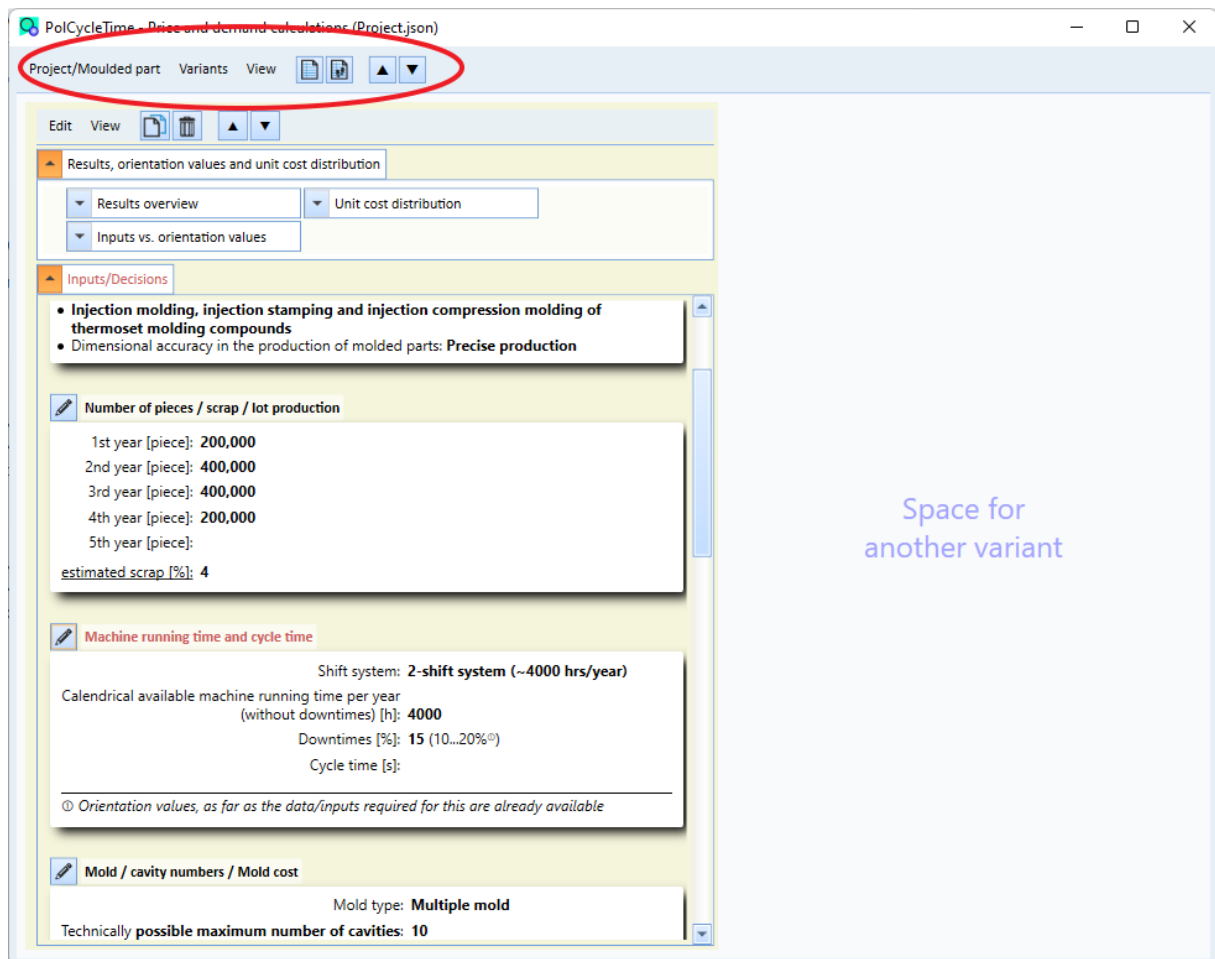
You can click on Load project in the **"Open"** area. Afterwards a corresponding window will be opened where you can select the file. After that the project main window opens.

Or, if a project has already been loaded, it will appear in the list in the **"Recently used"** area. Simply click on an entry in the list to load the project and display the main project window. Only the last five projects are displayed in the list.

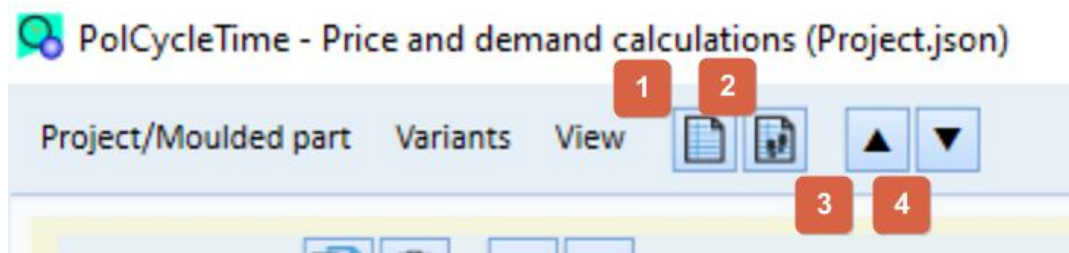
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Project main window

In the main project window, individual variants are arranged horizontally. For each variant the results and the inputs/decisions can be seen.



Various functions can be called up via the main menu or the buttons of the main window.



- Edit project basic data (name, editor, description) (via the menu Project/Mold Part)
- call the print/print preview window (via the Project/Mold Part menu)
- add a new empty variant **1**
- add a new empty variant (wizard) **2**
- close/hide all groups (results and inputs) of all variants **3**
- open/show all groups (results and inputs) of all variants **4**

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Variants of a project

[Manage variants](#)

[Create a copy of an existing variant](#)

[Delete variant](#)

[Edit variant](#)

[Display results](#)

[Print and print preview](#)

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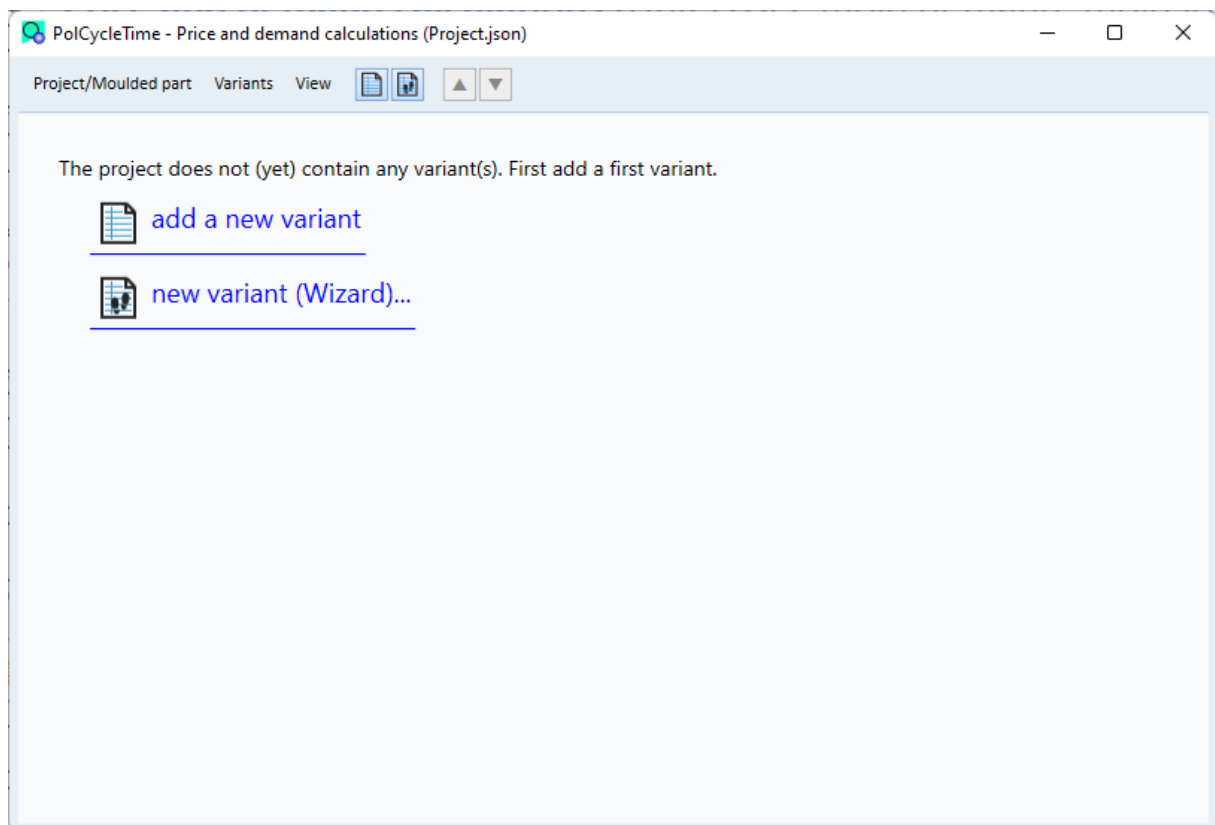
Management

Up to 10 different variants can be managed per project

The following options are available to add a new/additional variant:

- new empty variant (no inputs/decisions given)
- new variant via wizard (you will be guided step by step through the entries)
- a [copy of an existing variant](#) (all data of the variant to be copied will be taken over)

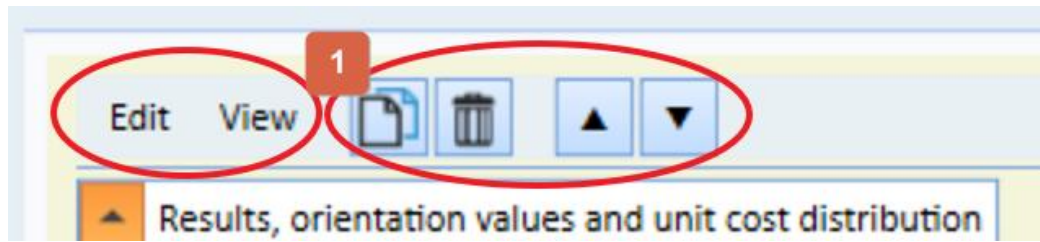
You can remove variants from the project at any time. If there are no more variants, the following view appears in the project main window. Here you can add a new variant again. Or you can use the functions of the Variants menu.



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Add a copy of an existing variant

Each variant has its own menu and button bar in the main project window.



Either you click **1** or you select the corresponding menu item in the *Edit* menu.

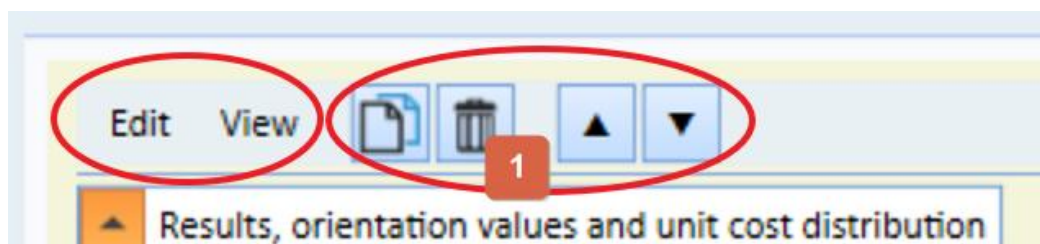
A new variant is immediately created as a copy. The copy contains all the inputs/decisions of the variant to be copied up to that point.

We recommend that you edit at least the name and background color of the new variant immediately afterwards.

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Delete variant

Each variant has its own menu and button bar in the main project window.



Either you click **1** or you select the corresponding menu item in the *Edit* menu.

After a confirmation prompt, the variant is deleted from the current project.

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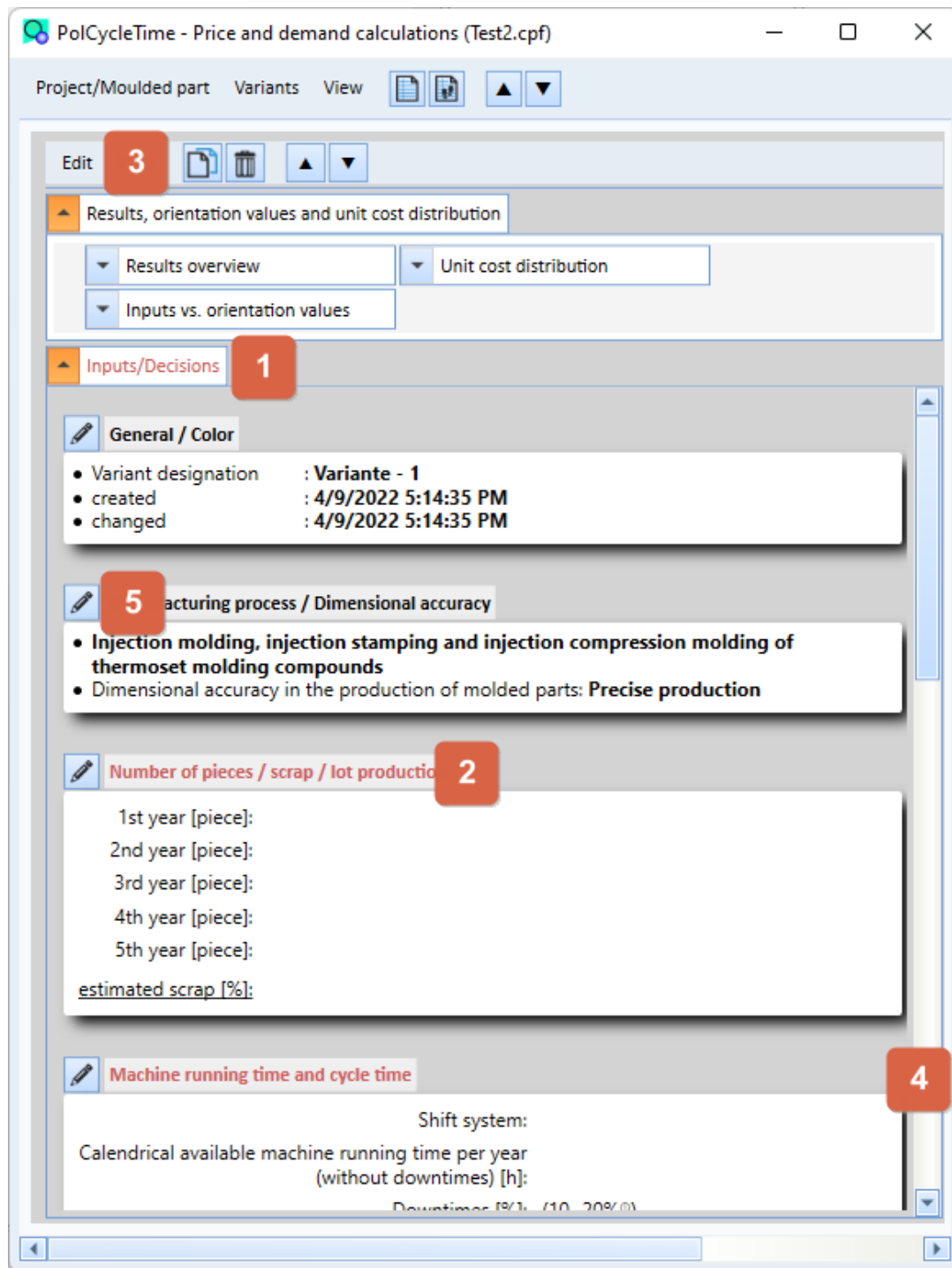
Edit variant

Each variant has its own area in the main project window, as well as its own menu and button bar.

The different inputs/decisions have been grouped logically. Each group has a heading (**2**) and a button for editing the corresponding inputs/decisions (**5**). If the heading text of the group is marked red, then either inputs/decisions are missing or they are incorrect.

All input groups are again combined in a parent group (**1**). If the heading text is marked red, then inputs/decisions are missing in any child group or these are incorrect.

To enter or change certain inputs, click on the button of the corresponding group or select the corresponding entry in the *Edit* menu (**3**). The corresponding input window will be opened.



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Orientation values

In some windows for editing inputs/decisions, corresponding orientation values appear next to the respective input field.

These orientation values usually require previous input and decisions in order to be able to calculate them. Which dependencies these are is shown in a corresponding tooltip (1) next to the orientation value (move the mouse cursor over the orientation value to display the tooltip).

To accept the orientation value as an input value, click the corresponding button on the left with the arrow symbol (←).

Wear

- complicated ejector and demolding system with moving demolding aids (jaws, sliders, de-spindle, collapsible cores, etc.)
- technically sophisticated insert, outsert and multi-component technology molds

Mechanical mold stress - Injection pressure:

☐ below 600 bar and/or very rigid (solid) mold design
☒ 600 to 1200 bar and usual mold stiffness
☐ over 1200 bar 'lighter' and 'softer' mold buildup.

Wear resistance of the mould contour parts (hardness condition of the steel contours (HV = Vickers hardness)):

☐ soft: HV ≥ 200 N/mm²
☐ quenched and tempered: HV ≥ 400 N/mm²
☒ hardened: HV ≥ 700 N/mm²
☐ Nitride hardened or chrome plated: HV $\geq 1,000$ N/mm²
☐ hard coated (e.g. TiN): HV $\geq 1,800$ N/mm²

Abrasion wear due to polymer melting:

☒ Polymer without solid additives.

Condition of the contour surfaces:

☐ technically rough (without fine machining): Ra $\geq 3\mu\text{m}$
☐ smooth (with fine machining [e.g. grinding]): Ra = 0.8...1.6 μm
☐ glossy (coarse polish): Ra = 0.2...0.4 μm
☒ high gloss (fine polish): Ra = 0.05...0.10 μm
☐ mirror-like (fine polish): Ra = 0.012...0.025 μm
☐ structured (rough structure)
☐ structured (fine structure)

Wear resistance number ~610,000 ⓘ

Other:

Number of pieces for depreciation of mold costs [pcs]: ~610,000 ⓘ 1

Orientation value(s) dependent on:
Cavity number; Wear resistance number

ⓘ Orientation value(s), if the required data/inputs are already available. If necessary, click on the button to accept it as an input value.

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Results

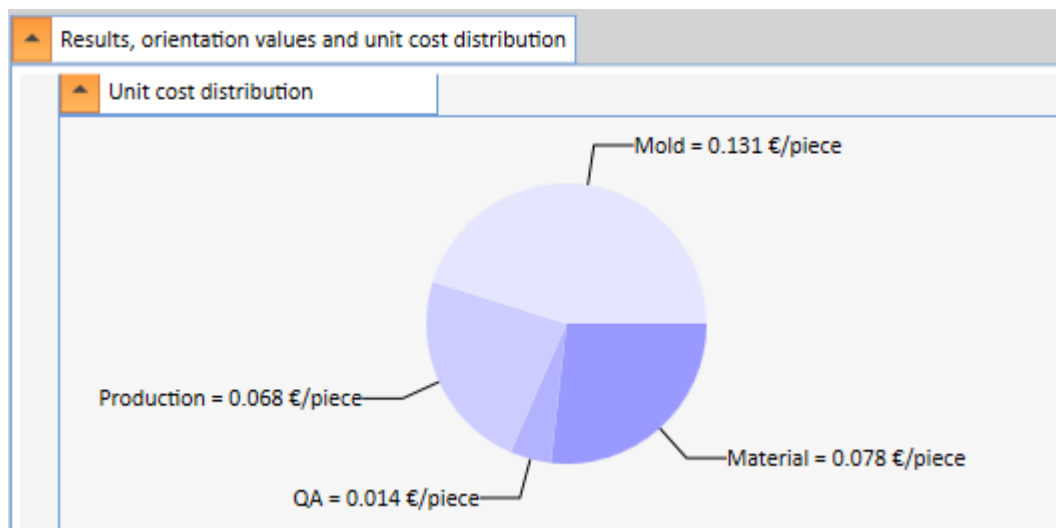
As soon as the first inputs/decisions lead to the fact that results or orientation values can be calculated, these are displayed among other things in the result overview.

The results are shown as:

- Results overview
- Piece cost distribution
- Inputs vs. orientation values

grouped. The groups can be displayed and hidden individually by clicking in the text of the group.

Results, orientation values and unit cost distribution	
Results overview	
available annual machine running time [h]:	3400
Number of cavities (including the optimum number of cavities):	<ul style="list-style-type: none"> • optimal = 3 • due to wear = 3 • due to production = 1 • economic = 3 • for calculation used = 4
Machine occupancy times [h]:	1. year: 364 2. year: 729 3. year: 729 4. year: 364 5. year:
use-related wear piece count:	1,920,000
Total mold demand for the series:	1
Machine hourly rate [€/h]:	17.12 (Calculation)
Material costs [€/piece]:	0.078
Production costs [€/piece]:	0.068
Additional QA costs [€/piece]:	0.014
Mold cost [€/piece]:	0.131
Total unit cost [€/piece]:	0.291



In the *Inputs vs. Orientation Values* view, entries are highlighted in red if they differ from your inputs.

Inputs vs. orientation values		
	Input	Orientation values
Downtime [%]	15	10...20%
Wear resistance number	480,000	~480,000
(Wear) quantity for mold depreciation	2,000,000	~1,920,000
Overhead cost supplement factor for working time costs	4	4
Material loss supplement [%]	3	3
Quality assurance supplement [%]	5	5
Annual depreciation rate [a ⁻¹]	0.14	0.14
Annual billing rate (maintenance, repair and servicing costs) [a ⁻¹]	0.04	0.04
Cavity number vs. optimum cavity number	4	3

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Print/Print Preview

All variants of a project can be displayed and printed with all inputs, decisions values and results as a print preview.

The function for printing/print preview can be found in the project main window and the menu **Project/Mould part** **1**.

Space for another variant

Another window is opened in which the first variant is displayed as a print preview. If you want to

print another variant, select the corresponding variant via the selection list **1**. Click on the printer icon to print the selected variant.

Print/Print Preview

Variant: Variante - 1 **1**

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Project details:

Project/Model part designation: _____

Processor: 1/1/2001 12:00:00 AM

Created: 4/9/2022 4:14:35 PM

Modified: 4/10/2022 7:57:17 AM

Variant:

- Variant designation: Variante - 1
- Created: 4/9/2022 4:14:35 PM
- Changed: 4/10/2022 7:57:17 AM

Results:

Production = 0.068 C/piece

QA = 0.014 C/piece

Material = 0.078 C/piece

Mold = 0.126 C/piece

Input	Orientation values
available annual machine running time [h]: 5400	
Number of cavities (including the optimum number of cavities):	• optimal = 3
• due to wear = 3	
• due to production = 1	
• economic = 3	
• for calculation used = 4	
Machine occupancy times [h]:	
1. year: 264	
2. year: 728	
3. year: 728	
4. year: 564	
5. year: 564	
6. year: 564	
use-related wear piece count:	
2,000,000	
Total mold demand for the series:	
1	
Machine hourly rate [€]:	17.12 (Calculation)
Material costs [€/piece]:	0.078
Production costs [€/piece]:	0.080
Additional QA costs [€/piece]:	0.014
Mold cost [€/piece]:	0.126
Total unit cost [€/piece]:	0.295

Inputs/Decisions:

- Injection molding, injection stamping and injection compression molding of thermoset molding compounds
- Dimensional accuracy in the production of molded parts: Precision production

1st year (piece): 200,000

2nd year (piece): 400,000

3rd year (piece): 400,000

4th year (piece): 200,000

5th year (piece): 200,000

6th year (piece): 200,000

estimated scrap [%]: 6

Shift system: 2-shift system (=4000 hrs/year)

Calendrical available machine running time per year (without downtime) [h]: 4000

Downtime [%]: 18 (18...20%⁽¹⁾)

Cycle time [s]: 25

Mold type: Mold multiple (pair-wise arrangement of the number of cavities)

Technically possible maximum number of cavities: 10

Technical required minimum number of cavities: 1

Cavity number for calculation: 4

Mold cost (cavity number for calculation) [€]: 150,000

Mold cost (minimum cavity number) [€]: 60,000

Mold cost (maximum cavity number) [€]: 40,000

Complexity of the mold design: Uncomplicated mold

Mechanical stress on the mold: 800 to 1200 bar and usual mold stiffness

Wear resistance of the mould contour parts: hardened: HV 2 700 N/mm²

Abrasion wear due to polymer melting: Polymer without any solid additives

Contour surface texture: high gloss (fine polish): Ra = 0.06...0.10 µm

Number of places for mold depreciation (pieces): 2,000,000 (=1,000,000⁽¹⁾)

Machine operation: Multi-machine operation

5 Machines(s) are operated/monitored by one person

Machine hourly rate [€]:

Calculation

- Acquisition/replacement value of the machine [€]: 166,000
- Imputed annual interest rate for return on capital [%]: 2
- Annual depreciation rate [a⁻¹]: 0.14
- Annual billing rate (maintenance, repair and servicing costs) [a⁻¹]: 0.04
- Operating material cost share [%]: 2
- Floor area of the machine and peripheral equipment [m²]: 8
- Total installed drive power [kW]: 12
- Total installed heating capacity [kW]: 10
- Electric energy transfer price [€/kWh]: 0.30
- Annual floor area cost rate for workshops [€/m² a]: 180

Moulded part mass [g/piece]: 46

Material allocation price [€/kg]: 1.89

Proportionate sprue waste [g/piece]: 0 (no sprue waste)

Material loss supplement [%]: 6 (3%)

Quality assurance supplement rate [%]: 4 (3%)

Overhead cost supplement factor for working time costs: 4 (4%)

time costs.

Orientation values, as far as the data/inputs required for this are already available

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Settings

The displayed [orientation values](#) are rounded to the nearest integer.

Via the **Settings/Options** menu, the potencies of 10 can be defined for the orientation values shown **1**.

Options ✕

Cooling and cycle time calculation (Print / Print Preview):

Size of geometry graphics: 100 ▲▼

Price and demand calculation:

1

Rounds (Orientation values):

Wear resistance number [10^(x)]: 4 ▲▼

Number of pieces for mold depreciation [10^(x)]: 4 ▲▼

Mold contour costs [10^(x)]: 3 ▲▼

Apply Cancel