PolTolerances

Tolerances for plastic moulded parts according to DIN ISO 20457 / DIN 16742

User Manual

General, position and profile shape tolerances

Described using PolTolerances 3.5.6.1 · As of: October 2026

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1 Introduction

PolTolerances determines general tolerances for plastic moulded parts according to **DIN ISO 20457** or **DIN 16742**. From the manufacturing process, the moulding compound and its shrinkage behaviour, the program derives the tolerance group (TG) of the part. For every dimension you enter, it then shows the possible production deviation and whether it has to be agreed with the manufacturer of the moulded part.

Besides length (size) dimensions, PolTolerances covers position tolerances with cylindrical tolerance zones and profile shape tolerances. It also helps you choose a realizable tolerance series and checks under which conditions a required functional dimension can be achieved. You save the inputs for a moulded part as a project and print them as a report.

> **Note:** The **"Commercial products plus"** tab on the left edge of the window is not described in this manual. It has a manual of its own ("Commercial Products – User manual").
>
> **DEMO version:** The DEMO version only supports nominal dimensions in the range 5 … 55 mm. The program shows a corresponding message in the work area.

2 User interface

After start-up, PolTolerances opens the **"Edit project / moulding"** tab. On the left you describe the moulded part; on the right you enter the dimensions.

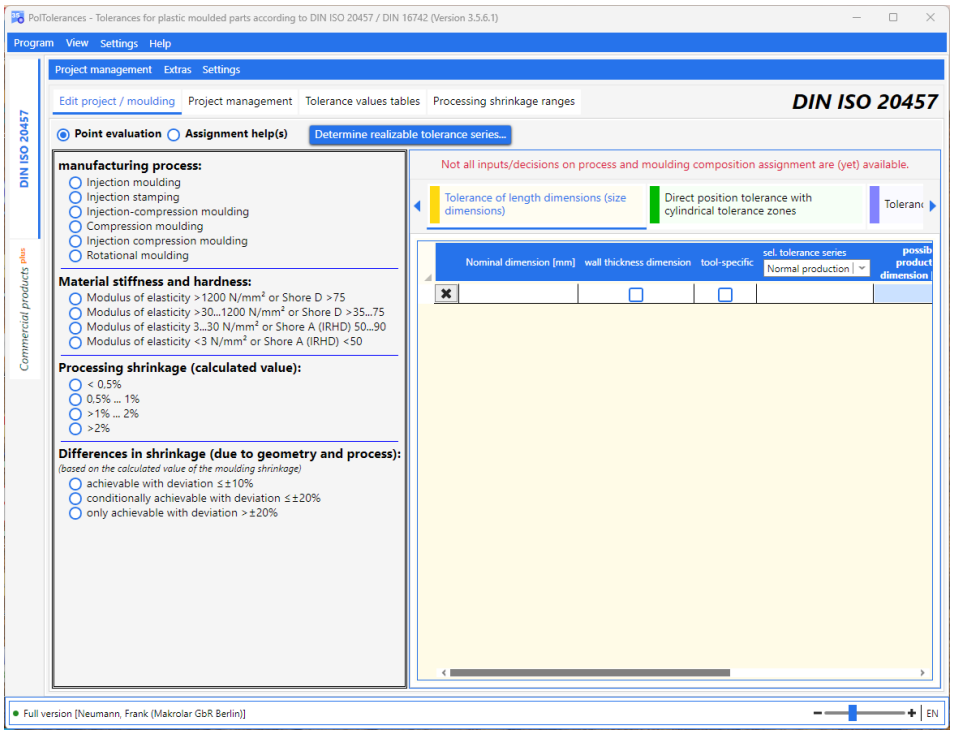

Figure 1: PolTolerances after start-up

Element	Purpose
Menu bar	**"Program"**, **"View"**, **"Settings"** and **"Help"** (chapter 8).
"DIN ISO 20457" tab (left, vertical)	Work area for determining tolerances. The label shows the selected standard (DIN ISO 20457 or DIN 16742).

Element	Purpose
“Commercial products plus” tab (left, vertical)	Database of commercial plastics, see its own manual.
Blue bar **“Project management · Extras · Settings”**	Project commands, additional tools and the choice of standard (sections 4.4, 4.5, chapters 5 and 7).
“Edit project / moulding” tab	Determine the tolerance group and tolerance dimensions (chapters 3 and 4).
“Project management” tab	Create, load, save and print projects (chapter 5).
“Tolerance values tables” tab	The tolerance tables of the standard for reference (section 6.1).
“Processing shrinkage ranges” tab	Shrinkage values of many moulding compounds (section 6.2).
Status bar	Licence status (e.g. “Full version”), zoom slider for the display size and the selected language (“EN”).

3 Determining the tolerance group

The tolerance group (TG) is the basis of all general tolerances. PolTolerances offers two ways to determine it. You choose the method at the top of the **“Edit project / moulding”** tab:

- **“Point evaluation”** – you rate manufacturing process, material stiffness, processing shrinkage and differences in shrinkage individually (section 3.1).
- **“Assignment help(s)”** – you select the moulding compound group and answer a few questions about the material (section 3.2).

As long as information is missing, the work area shows in red: **“Not all inputs/decisions on process and moulding composition assignment are (yet) available.”** Once everything is complete, this is replaced by **“General tolerances for length dimensions: Tolerance Group TG …”**.

3.1 Point evaluation

1. Select **“Point evaluation”**.
2. Under **“manufacturing process”**, select the process, e.g. **“Injection moulding”**.
3. Under **“Material stiffness and hardness”**, select the matching modulus of elasticity or hardness range.
4. Under **“Processing shrinkage (calculated value)”**, select the shrinkage range of the moulding compound. If needed, look the values up in the “Processing shrinkage ranges” tab (section 6.2).
5. Under **“Differences in shrinkage (due to geometry and process)”**, select how precisely the shrinkage can be predicted.

The tolerance group appears immediately at the top right. Hover over the **“i”** symbol next to it to see the individual point scores.

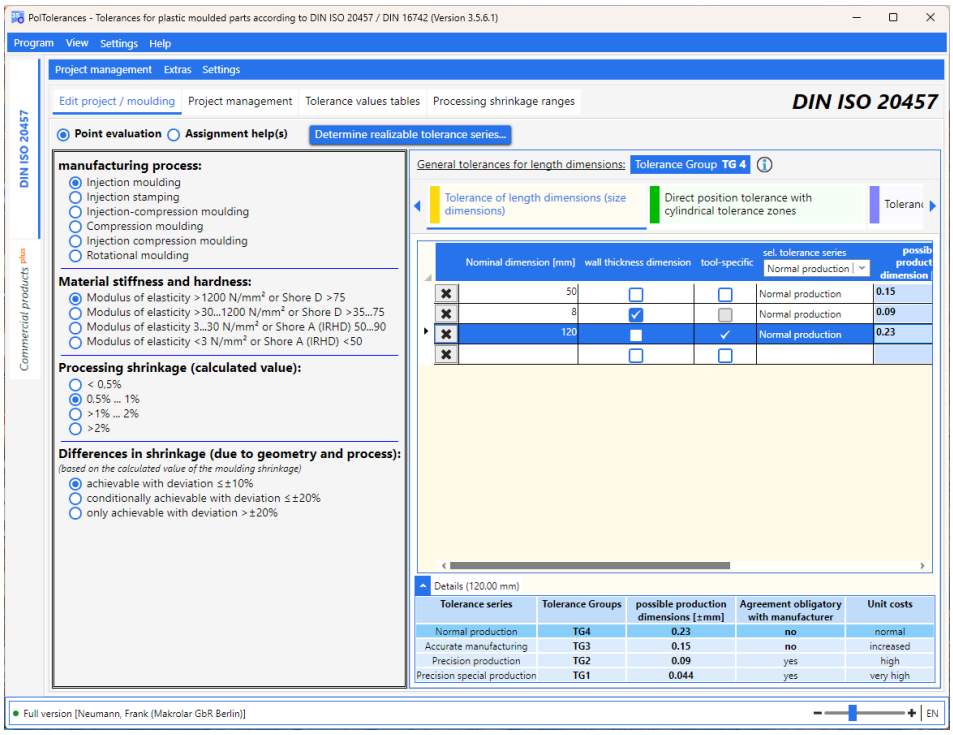

Figure 2: Point evaluation complete: tolerance group TG 4, with three length dimensions entered below

3.2 Assignment help(s)

The assignment help is useful when you know the moulding compound but not the individual evaluation criteria.

1. Select **“Assignment help(s)”**.
2. Under **“moulding compound groups”**, select the group of your compound, e.g. **“Semi-crystalline thermoplastics”**. Below each group name you find examples of the plastics it contains (e.g. PE, PP, PA6, POM).
3. In the lower area PolTolerances shows the matching manufacturing process and asks about fillers and reinforcing materials, modulus of elasticity, processing shrinkage and differences in shrinkage. Answer every question.

The check boxes in the lower area have three states: a filled box means “not decided yet”. Click the box until it shows the state you want (empty = no, tick = yes). The tolerance group only appears once all questions are decided.

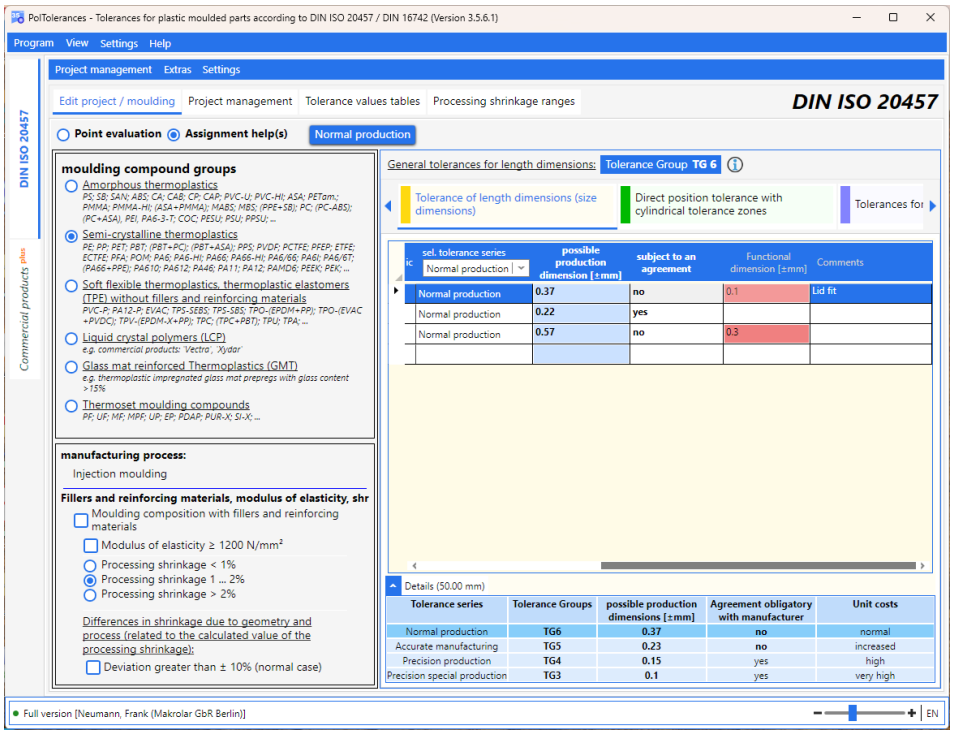

Figure 3: Assignment help for a semi-crystalline thermoplastic without fillers: tolerance group TG 6

4 Tolerancing dimensions

On the right of the **“Edit project / moulding”** tab there are three sub-tabs. If not all tab headers are visible, use the blue arrows to the left and right of the tabs.

Sub-tab	Content
“Tolerance of length dimensions (size dimensions)” (yellow)	General tolerances for length dimensions (section 4.1).
“Direct position tolerance with cylindrical tolerance zones” (green)	Position tolerances as the diameter of the tolerance zone (section 4.2).
“Tolerances for profile shape deviations” (violet)	Surface and line shape tolerances (section 4.3).

4.1 Length dimensions (size dimensions)

1. Double-click the **“Nominal dimension [mm]”** cell, enter the dimension and press Enter. A new empty row for the next dimension appears automatically below.
2. Tick **“wall thickness dimension”** if the dimension is a wall thickness, or **“tool-specific”** if the dimension is formed by one mould half only. For a wall thickness dimension, “tool-specific” cannot be selected.
3. Read the achievable tolerance in **“possible production dimension [±mm]”** and whether it has to be agreed with the manufacturer in **“subject to an agreement”**.
4. Optionally, enter a **“Functional dimension [±mm]”**, i.e. the tolerance the part needs to function, and a **“Comment”**.

The table is wider than the work area. Use the scroll bar below the table to reach the right-hand columns. The **“✕”** button at the start of a row deletes the dimension.

Column	Meaning
Nominal dimension [mm]	The nominal dimension from the drawing.
wall thickness dimension	Marks wall thicknesses.
tool-specific	Marks tool-specific dimensions (TS); otherwise the dimension counts as non-tool-specific (NTS).
sel. tolerance series	Selected tolerance series: Normal production, Accurate manufacturing, Precision production or Precision special production.
possible production dimension [±mm]	Achievable deviation in the selected tolerance series.
subject to an agreement	“yes”: the deviation has to be agreed with the manufacturer of the moulded part.
Functional dimension [±mm]	Optional. **Green** background: achievable. **Red** background: not achievable in the selected tolerance series.
Comments	Free text, e.g. the function of the dimension.

Below the table, the **“Details (… mm)”** area shows all four tolerance series for the selected dimension, with tolerance group, possible production deviation, whether an agreement with the manufacturer is obligatory, and relative unit costs.

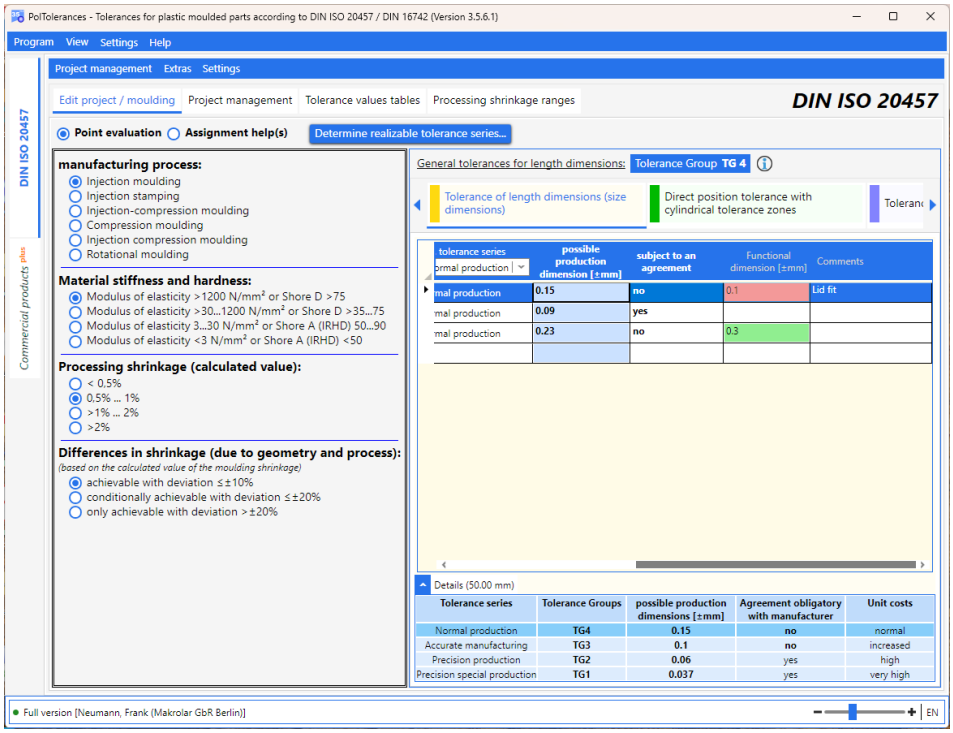

Figure 4: A functional dimension of ±0.1 mm at 50 mm is not achievable in normal production (red); the details show ±0.1 mm in accurate manufacturing

If a functional dimension is red, the details show which tolerance series achieves it. Use the drop-down list in the **“sel. tolerance series”** column to choose a different tolerance series for this dimension. Bear in mind that tighter tolerance series cause higher unit costs and may require an agreement (column “Agreement obligatory with manufacturer” in the details).

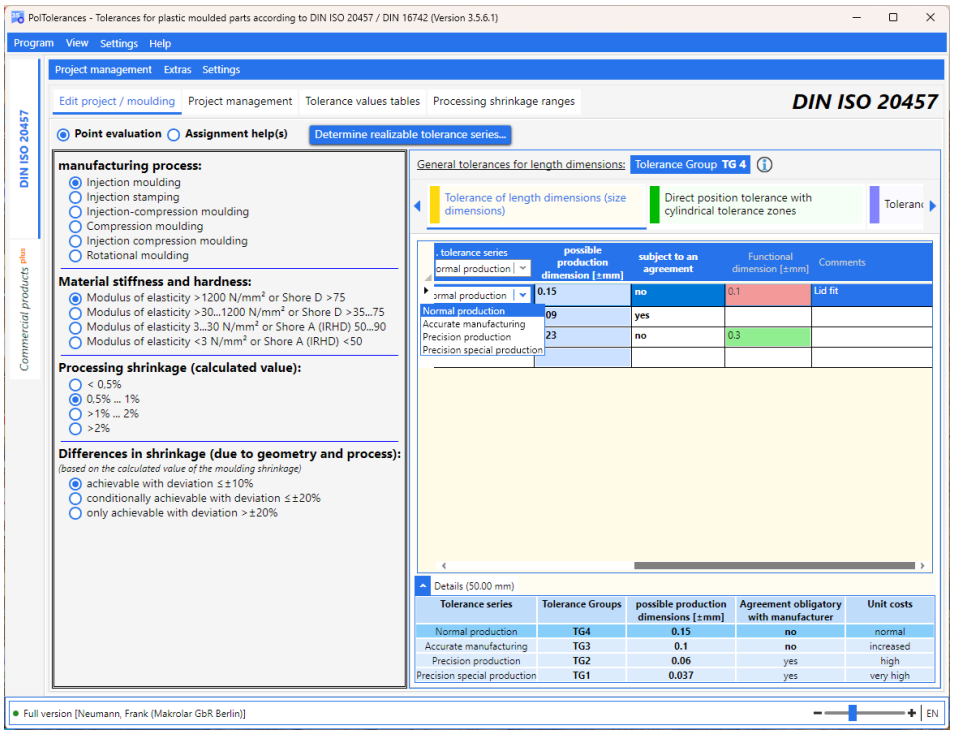

Figure 5: Selecting the tolerance series for a single dimension

4.2 Direct position tolerance

Here you determine position tolerances with a cylindrical tolerance zone, e.g. for the position of holes. The program points out that **directly tolerated position tolerances are to be agreed with the manufacturer of the moulded part**.

1. Open the **“Direct position tolerance with cylindrical tolerance zones”** sub-tab.
2. Double-click **“Nominal distance [mm]”** and enter the distance. Tick **“tool-specific”** if applicable.
3. Read the achievable diameter of the tolerance zone in **“possible tolerance Ø [mm]”**.
4. Optionally, enter the required diameter in **“necessary Tol-Ø [mm]”**. As with length dimensions, green means “achievable” and red “not achievable”.

Here too, the **“Details”** area shows all tolerance series for the selected distance.

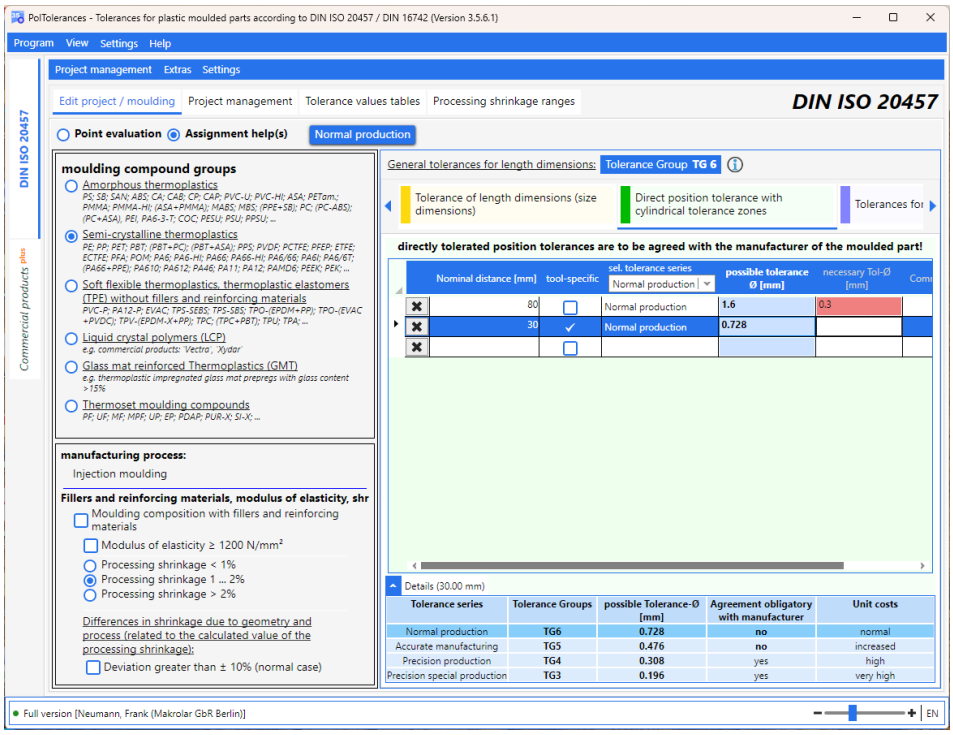

Figure 6: Position tolerances: the required Ø 0.3 mm at a distance of 80 mm is not achievable

4.3 Profile shape deviations

Here you determine tolerances for surface and line shapes. **Profile shape tolerances are also to be agreed with the manufacturer of the moulded part**.

1. Open the **“Tolerances for profile shape deviations”** sub-tab.
2. Double-click **“Nominal distance [mm]”** and enter the dimension. The general tolerance appears in **“tolerance value [mm]”**.
3. Choose whether it is a **“surface shape tolerance”** or a **“line shape tolerance”** and add a comment if needed.

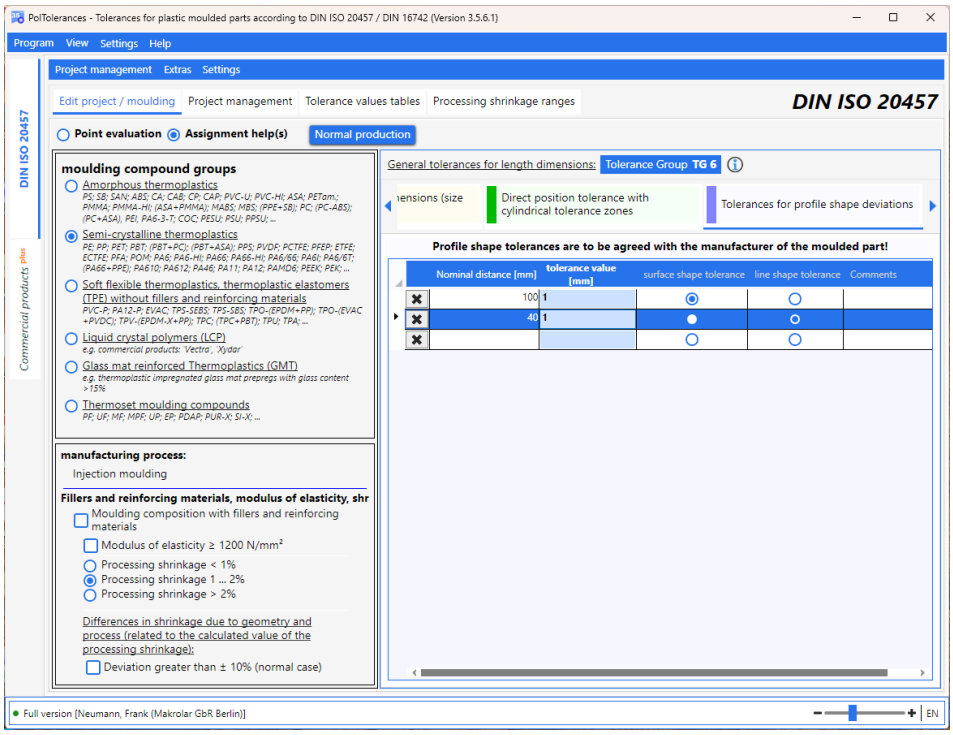

Figure 7: Profile shape tolerances for two nominal distances

4.4 Determining a realizable tolerance series

Which tolerance series a manufacturer can achieve depends on design, material, machines, personnel and quality assurance. The **“Realizable tolerance series”** checklist brings these conditions together.

1. Click **“Determine realizable tolerance series…”** (at the top of the tab) or choose **“Extras” › “Determine realizable tolerance series…”**.
2. Answer the questions in the eight sections: 1. Moulded part construction, 2. Moulding compound and recycled material usage, 3. Production conditions, 4. Personnel for machine operation, 5. Inserts and handling, 6. Tools, 7. Quality assurance, 8. Packing and transport. In each block with a red frame, select exactly one option.
3. As soon as all information is available, the dialog shows the **“Result”** at the top, e.g. “Normal production”.
4. Close the dialog. **“Reset inputs”** lets you start again.

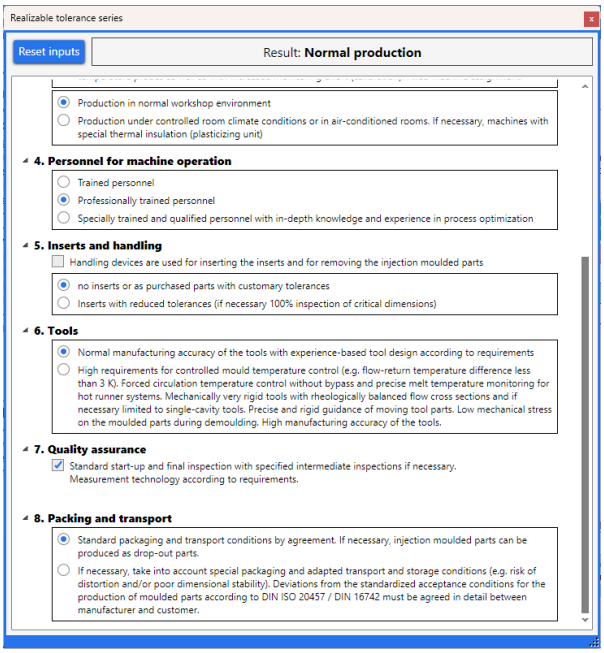

Figure 8: Checklist with the result "Normal production"

The result is then shown on the button at the top of the tab and is included in the project printout.

4.5 Realizability of functional dimensions

This tool answers the reverse question: **under which conditions** (manufacturing process, material stiffness, processing shrinkage, consideration of shrinkage differences and tolerance series) **can a required functional dimension be achieved?**

1. Choose **"Extras" › "Realizability of functional dimensions…"**.
2. Select the **"for linear dimensions"** or **"for position distance dimensions"** tab.
3. Enter **"Nominal dimension [mm]"** and **"necessary functional dimension [±mm]"**, and specify whether it is a **"wall thickness dimension"** or a **"Tool-specific dimension"**.
4. Click **"Find/Refresh"**. The table lists all combinations that achieve the functional dimension.
5. Narrow the list down at the top using **"manufacturing process"**, **"Material stiffness"** and **"Processing shrinkage"**. **"Reset filters"** removes the restriction.

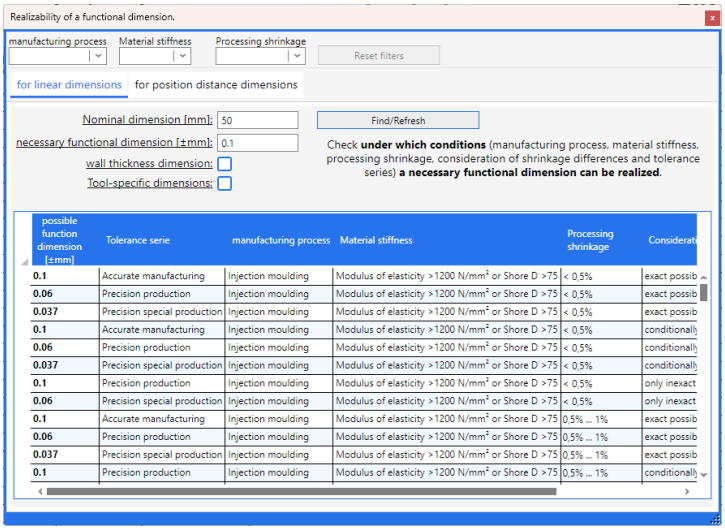

Figure 9: Conditions under which ±0.1 mm can be achieved at 50 mm

5 Managing and printing projects

5.1 “Project management” tab

A project contains all inputs for one moulded part: the tolerance group, the dimensions in all three sub-tabs and the checklist for the realizable tolerance series.

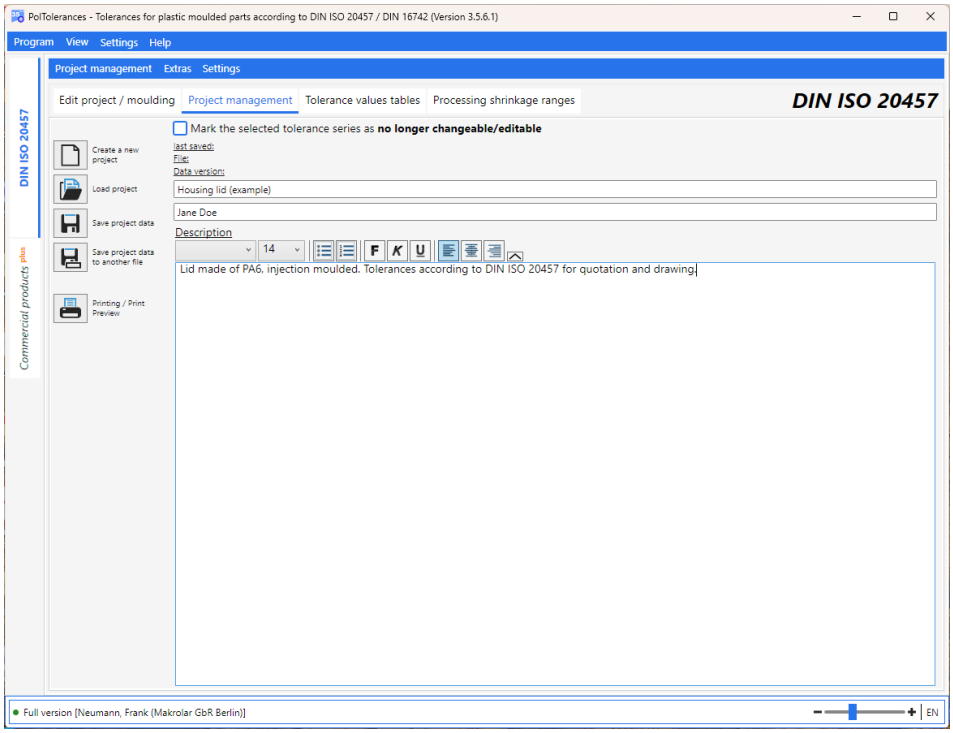

Figure 10: “Project management” tab with project name, processor and description

Button / field	Purpose
Create a new project	Starts an empty project.
Load project	Opens a saved project.
Save project data	Saves the project to the current file.
Save project data to another file	Saves the project under a new file name.
Printing / Print Preview	Opens the print preview of the project (section 5.2).
last saved / File / Data version	Information about the loaded project file.
Project name, Processor	Name of the moulded part or project and of the person working on it.
Description	Free text with simple formatting (font size, lists, bold, italic, underline, alignment).
Mark the selected tolerance series as no longer changeable/editable	Marks the selected tolerance series as no longer changeable.

The same commands are available in the blue bar under **“Project management”**.

5.2 Printing / Print Preview

Click **“Printing / Print Preview”**. The preview shows the project report: header data, the standard used, the assignment method with all inputs, the tables of length dimensions, position tolerances and profile shape deviations, and the checklist for the realizable tolerance series with its result.

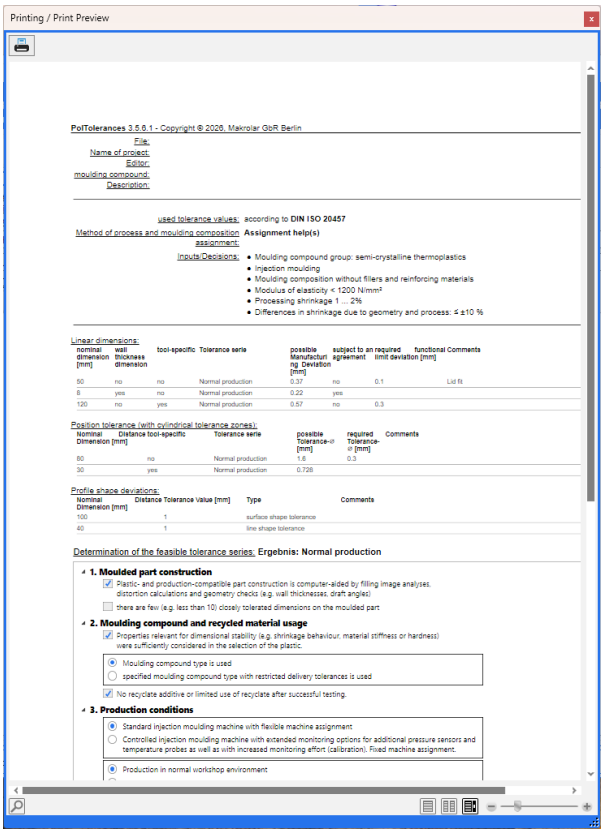

Figure 11: Print preview of a project

Use the printer symbol at the top left to print the report. At the bottom right you change the page view and the magnification.

6 Reference

6.1 Tolerance values tables

The **“Tolerance values tables”** tab shows the tables of the selected standard in three sub-tabs:

- **“Limit deviations for size dimensions”** – limit deviations per tolerance group, separately for non-tool-specific (NTS) and tool-specific (TS) dimensions, across the nominal size ranges.
- **“Ø cylindr. tolerance zones”** – diameters of the tolerance zones for position tolerances.
- **“Profile shape tolerances”** – general tolerances for profile shape deviations depending on the nominal dimension.

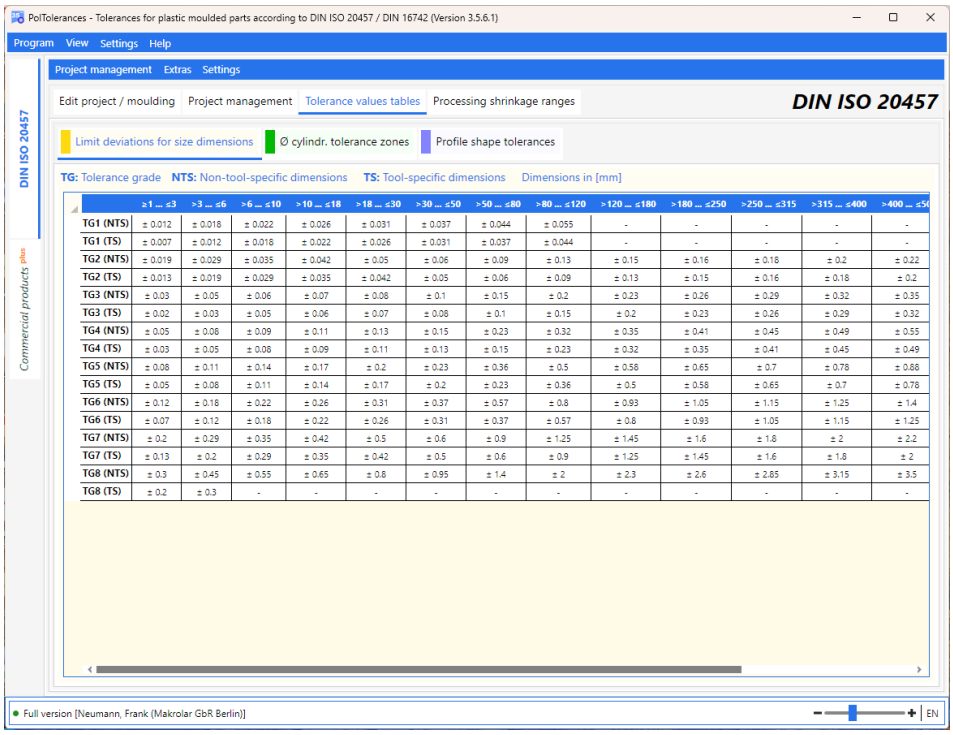

Figure 12: Limit deviations for size dimensions (dimensions in mm)

6.2 Processing shrinkage ranges

The **“Processing shrinkage ranges”** tab lists the processing shrinkage of many moulding compounds for each manufacturing process. It helps with the point evaluation (section 3.1).

1. Enter part of the abbreviation in the search field at the top left, e.g. **“PA6”**, and press Enter.
2. If needed, restrict the list using **“manufacturing process”**.

Notice: Not all combinations in the list with fillers and reinforcing materials are practically available.

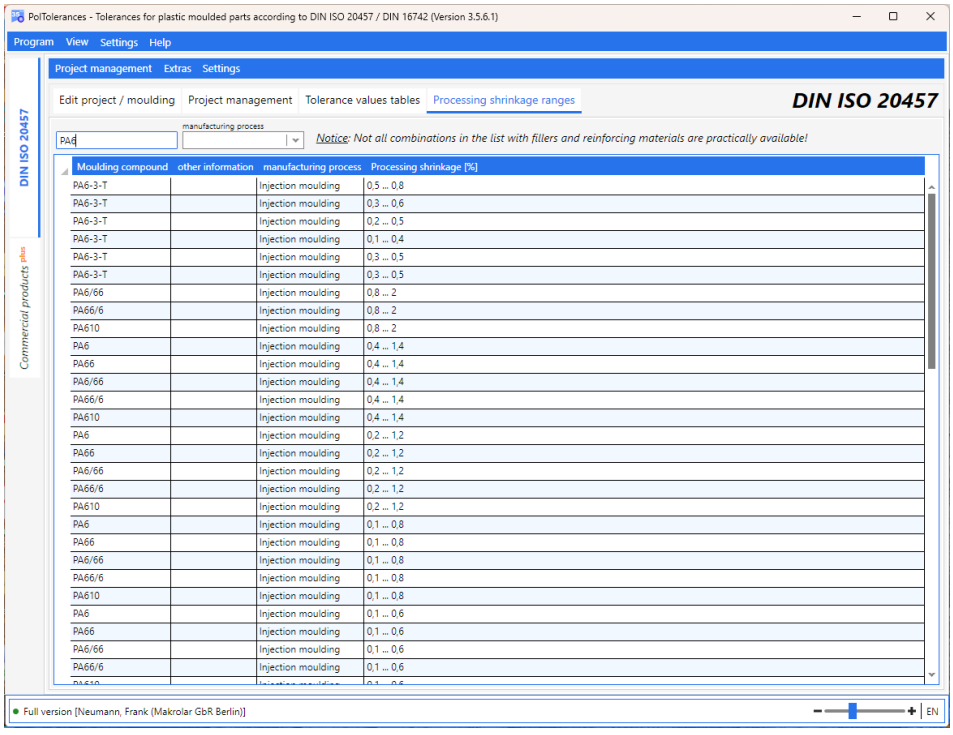

Figure 13: Processing shrinkage of moulding compounds with “PA6” in their abbreviation

7 Choosing the standard: DIN ISO 20457 or DIN 16742

PolTolerances calculates according to either DIN ISO 20457 or DIN 16742. In the blue bar, choose **“Settings”** and then **“Tolerance values according to DIN ISO 20457”** or **“Tolerance values according to DIN 16742”**. The selected standard is ticked and is shown at the top right of the work area and on the vertical tab on the left edge of the window.

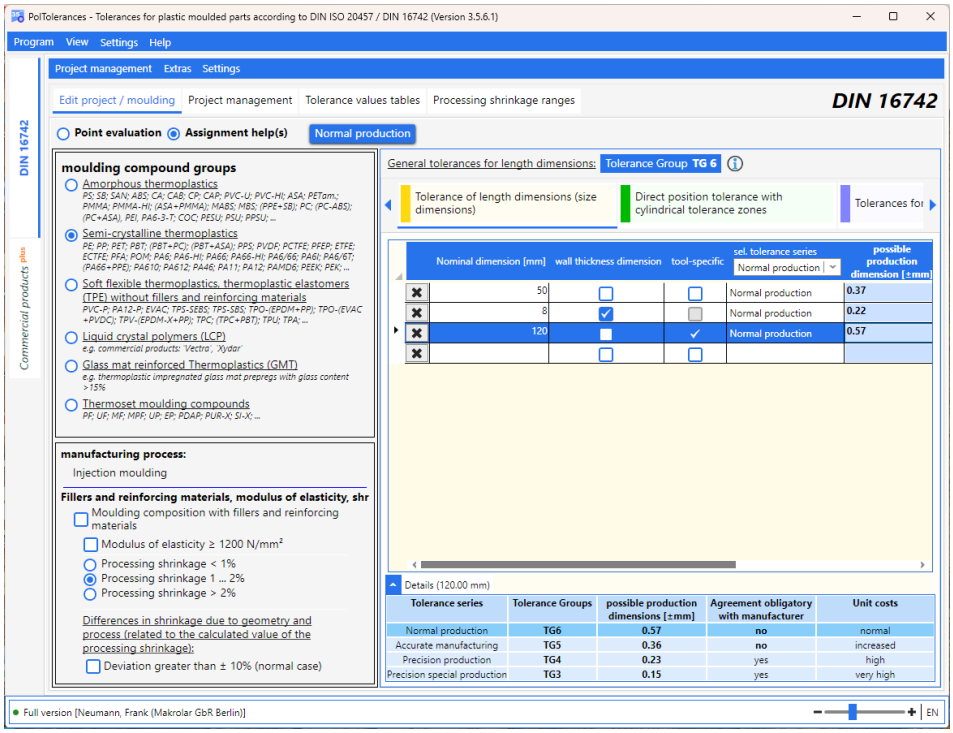

Figure 14: Work area with tolerance values according to DIN 16742

Your inputs are kept when you switch. The standard also appears in the printout under “used tolerance values”.

8 Menus

Menu	Commands
Program	**Exit**; **Info about…**
View	Switch between **“Tolerances for plastic moulded parts according to DIN ISO 20457 / DIN 16742”** and **“Commercial products”**; **Original size (100%)**.
Settings	**Server connection…**; **Activate the license…**; **Reset the license…**; **Language/Sprache…** (user interface language).
Help	**Check for software update…**; **To our homepage…**; **Register for the software…**; **View online help**; **View local help…** (F1 key); **View local Help (Commercial products database)…**
Project management (blue bar)	**Create a new project…**; **Load project…**; **Save project**; **Save Project As…**; **Print / print preview**.
Extras (blue bar)	**Determine realizable tolerance series…** (section 4.4); **Realizability of functional dimensions…** (section 4.5).
Settings (blue bar)	**Tolerance values according to DIN ISO 20457**; **Tolerance values according to DIN 16742** (chapter 7).

9 Tips and frequently asked questions

Question	Answer
No tolerance group appears, only a red message.	Information is missing. Select one option in every group of the point evaluation, or decide all questions in the assignment help (no filled check box left).
“tool-specific” cannot be ticked.	The dimension is marked as a wall thickness dimension. For wall thickness dimensions, “tool-specific” cannot be selected.
The functional dimension has a red background.	The deviation cannot be achieved in the selected tolerance series. Check in the details which tolerance series achieves it, or use “Realizability of functional dimensions” (section 4.5).
I cannot see all columns of the table.	Scroll to the right using the scroll bar below the table.
Larger dimensions are not calculated.	The DEMO version only supports nominal dimensions from 5 … 55 mm.
What shrinkage does my moulding compound have?	See the “Processing shrinkage ranges” tab (section 6.2) or the datasheet in the “Commercial products plus” module.