

# JMatPro

PRACTICAL SOFTWARE FOR MATERIALS PROPERTIES

**MPO version 1.0 – March 2022**

**MPO version 1.0.1 – January 2023**

**MPO version 2.0 – September 2024**

**MPO version 2.1 – November 2024**

**MPO version 3.0 – September 2026**

## **VERSION 3.0 (September 2026)**

- Improved robustness of room-temperature strength calculations for aluminium alloys in the T5 and T6 conditions.
- Improved description of thermodynamic and physical properties for cast aluminium alloys in the T5 and T6 conditions.
- Implemented calculation of high-temperature yield stress for aluminium alloys, general steels, and Ni- and NiFe-based superalloys.
- Added a heat treatment route for the calculation of thermodynamic, physical, and mechanical properties of general steels.
- Extended design space to include tempering temperature and tempering time as processing variables in the case of general steels (heat treatment route).
- Extended objective space to include stacking fault energy (for steels, Co, and Ni alloys) and gamma/gamma' mismatch (for Ni alloys only).
- Extended custom properties to allow expressions defined as a function of built-in properties.
- Added resizable data viewer window supporting multiple plots for side-by-side comparison.
- Added support for plotting constraints in addition to objective values.
- Added the ability to select multiple points in display charts.
- Added dialog to display key statistics for either the full dataset or a selection of points.
- Extended export functionality to allow output of data in tabular format.
- Removed check on element costs to allow for negative values.
- Updated default element costs with more recent values sourced from Wikipedia.
- Updated the thermodynamic and properties databases to match those included in JMatPro v16.0.
- Fixed calculation of single crystal stiffness coefficients and anisotropic Young's modulus via casting route.
- Fixed incomplete export caused by encoding of special characters when saving chart as image file using PDF, PS, and EPS formats.

## **VERSION 2.1 (November 2024)**

- Fixed casting route calculations for stainless steels.
- Added check to prevent running calculations for pure elements.
- Updated terms and conditions.



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## **VERSION 2.0 (September 2024)**

- Extended design space to include processing variables: heat treatment temperature, austenitisation temperature, cooling rate, and holding temperature/time
- Implemented calculation of mechanical properties for aluminium alloys, general steels, and Ni- and NiFe-based superalloys
- Added a casting route for the calculation of thermodynamic and physical properties
- Added new module "Cast Iron"
- Extended objective space to include many more properties: average expansion coefficient, solidification range, hot cracking susceptibility, growth restriction factor, room-temperature yield stress, tensile stress, and hardness, rupture stress/life, average bond order and orbital energy level
- Further extended objective space to include user-defined properties as a function of temperature and alloy composition
- Updated the thermodynamic and properties databases to match those included in JMatPro v14.0
- Fixed a minor bug preventing some popup components from working properly

## **VERSION 1.0.1 (January 2023)**

- Fixed a minor initialisation bug

## **MPO released (v1.0) (March 2022)**

