

## METAL SOLUTIONS

# EOS ToolSteel 1.2709

## Material Data Sheet

## EOS TOOLSTEEL 1.2709

## Ultra High Strength Tool Steel for Demanding Molding Applications

EOS ToolSteel 1.2709 is an ultra high strength tooling grade maraging steel. Its excellent properties are enabled by forming intermetallic phases and precipitates in heat treatment. The properties enable successful use in diverse applications including injection molding and cold and hot working.

### MAIN CHARACTERISTICS

- Ultra high strength and hardness
- Properties adjustable with different heat treatment
- Excellent fatigue strength
- Good machinability

### TYPICAL APPLICATIONS

- Plastic injection molding
- Extrusion tools
- Hot pressing tools
- Die casting tools for aluminum and zinc alloys

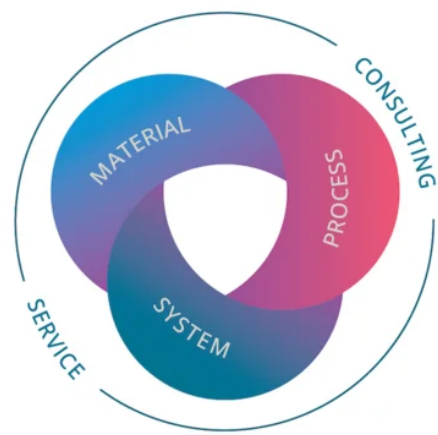
# The EOS Quality Triangle

EOS uses an approach that is unique in the AM industry, taking each of the three central technical elements of the production process into account: the system, the material and the process. The data resulting from each combination is assigned a Technology Readiness Level (TRL) which makes the expected performance and production capability of the solution transparent.

EOS incorporates these TRLs into the following two categories:

- Premium products (TRL 7-9): offer highly validated data, proven capability and reproducible part properties.
- Core products (TRL 3 and 5): enable early customer access to newest technology still under development and are therefore less mature with less data.

All of the data stated in this material data sheet is produced according to EOS Quality Management System and international standards



## POWDER PROPERTIES

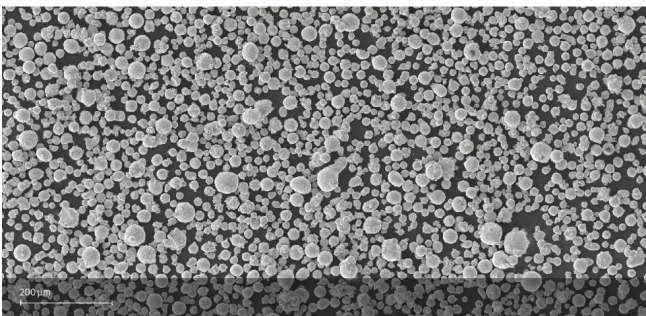
The chemical composition of EOS ToolSteel 1.2709 powder is in compliance with EN 1.2709

### Powder Chemical Composition (wt.-%)

Element	Min.	Max.
Fe		Balance
Ni	17	19
Co	8.5	10
Mo	4.5	5.2
Ti	0.8	1.2

### Powder Particle Size

GENERIC PARTICLE SIZE DISTRIBUTION	20 - 65 µm
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SEM micrograph of EOS ToolSteel 1.2709 powder

# HEAT TREATMENT

## Description

EOS ToolSteel 1.2709 can be heat treated to match various needs of different applications. The two step heat treatment can be performed under vacuum or inert gas atmosphere. First step is solution annealing to minimize amount of austenite in the martensitic matrix. The needed hardness and strength is achieved through aging treatment where hardening takes place through forming of intermetallic phases and precipitates.

## Steps

### Solution Annealing:

2 h at 940 °C ( $\pm 10$  °C) measured from the part followed by rapid air cooling to room temperature (below 32 °C). Cooling rate 10-60 °C/min. Reaching room temperature before starting aging treatment is required to achieve desired microstructure.

### Aging:

For peak hardness and strength 3-6 h at 510 °C ( $\pm 10$  °C) measured from the part followed by air cooling. Mechanical properties presented in this document achieved through this aging procedure. For bulky parts ensure uniformity of properties by increasing hold time up to 6 h. Also, to maximize fatigue strength, a hold time of 6 h is recommended.

## HEADQUARTERS

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This powder has not been developed, tested or certified as a medical device according to Directive 93/42/EEC (MDD) or Regulation (EU) 2017/745 (MDR) and is not intended to be used as a medical device, in particular for the purposes specified in Art. 2 No. 1 MDR. Insofar as you intend to use the powder as raw material for the manufacture of pharmaceutical products or medical devices (e.g. as raw material which as a material must meet the requirements of Annex 1, Chapter II MDR), the responsibility and liability for all analyses, tests, evaluations, procedures, risk assessments, conformity assessments, approval and certification procedures as well as for all other official and regulatory measures required for this purpose shall lie solely with you both with regard to the pharmaceutical product and/or medical device manufactured by you and with regard to the properties, suitability, testing, evaluation, risk assessment, other requirements for use of the powder as raw material. In this respect, the limitations of liability pursuant to our General Terms and Conditions and the system sales or material contracts shall apply.

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**The achievement of certain part properties as well as the assessment of the suitability of this material for a specific purpose is the sole responsibility of the user. Any information given herein is subject to change without notice.**

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Status as of 20.05.2024. Subject to technical modifications. EOS is certified according to ISO 9001.

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