



## G9Ni10 (EN 1.5636) Low-Alloy Steel Casting Material

### Introduction

G9Ni10 (EN 1.5636) is a low-alloy steel casting grade specified in EN 10213. The standard defines delivery conditions and engineering requirements for pressure-containing components. Casting process options include Investment Casting, Shell Molding Casting and Sand Casting, subject to the applicable specification and component requirements.

### Manufacturing Process

Investment Casting  
Shell Molding Casting  
Sand Casting

### Equivalent Grades

N/A

### Reference Standards

| Standard | Standard Title                       | Edition      | Specification | Identifier |
|----------|--------------------------------------|--------------|---------------|------------|
| EN 10213 | Steel castings for pressure purposes | 2007+A1:2016 | G9Ni10        | —          |

### Physical Properties

#### EN 10213–2007+A1:2016

| Property             | Value                     | Note                         |
|----------------------|---------------------------|------------------------------|
| Density              | 7.85 kg/dm <sup>3</sup>   | Test at 20 °C                |
| Thermal Expansion    | 11.8 ×10 <sup>-6</sup> /K | Temperature range: 20–100 °C |
| Thermal Expansion    | 12.4 ×10 <sup>-6</sup> /K | Temperature range: 20–300 °C |
| Thermal Expansion    | 13.6 ×10 <sup>-6</sup> /K | Temperature range: 20–500 °C |
| Thermal Conductivity | 36 W/(m·K)                | Test at 50 °C                |
| Specific Heat        | 460 J/(kg·K)              | Test at 20 °C                |
| Magnetic Property    | Magnetic                  |                              |

### Chemical Composition

| Element | EN 10213<br>Edition 2007+A1:2016 · wt.%<br>Cast analysis |
|---------|----------------------------------------------------------|
| C       | 0.06–0.12                                                |
| Si      | ≤ 0.60                                                   |



| Element | EN 10213<br>Edition 2007+A1:2016 · wt.%<br>Cast analysis |
|---------|----------------------------------------------------------|
| Mn      | 0.50–0.80                                                |
| P       | <= 0.020                                                 |
| S       | <= 0.015                                                 |
| Cr      | <= 0.30                                                  |
| Ni      | 2.00–3.00                                                |
| Mo      | <= 0.20                                                  |
| Cu      | <= 0.30                                                  |
| V       | <= 0.05                                                  |

## Heat Treatment

### EN 10213–2007+A1:2016 · +QT

| Step | Operation   | Temperature               | Cooling              |
|------|-------------|---------------------------|----------------------|
| 1    | : quenching | 830–890 °C <sup>[1]</sup> | air or liquid quench |
| 2    | : tempering | 600–650 °C <sup>[1]</sup> | —                    |

## Notes

### EN 10213 · Edition 2007+A1:2016

<sup>[1]</sup> +QT: Treatment temperatures are given for information; required delivery condition is specified separately.

## Mechanical Properties

| Property               | EN 10213<br>Edition 2007+A1:2016 |
|------------------------|----------------------------------|
| Yield Strength (Rp0.2) | >= 280 MPa <sup>[1]</sup>        |
| Tensile Strength       | 480–630 MPa <sup>[1]</sup>       |
| Elongation             | >= 24 % <sup>[1]</sup>           |
| Impact Energy          | >= 27 J <sup>[2]</sup>           |

## Notes

### EN 10213 · Edition 2007+A1:2016

<sup>[1]</sup> Yield Strength (Rp0.2)/Tensile Strength/Elongation: wall thickness <= 35 mm; Properties verified on test blocks of thickness up to 150 mm; applicability to casting wall thickness as stated. Larger governing thickness requires agreement.; Room temperature

<sup>[2]</sup> Impact Energy: Test at -70 °C; Test block; maximum thickness 150 mm; Specified low-temperature impact requirement



## Welding Conditions

### EN 10213–2007+A1:2016

| Requirement              | Value                    |
|--------------------------|--------------------------|
| Preheat                  | 20–150 °C <sup>[1]</sup> |
| Interpass Temperature    | <= 350 °C <sup>[2]</sup> |
| Post-weld Heat Treatment | >= 570 °C <sup>[3]</sup> |

### Notes

#### EN 10213 · Edition 2007+A1:2016

<sup>[1]</sup> Preheat: Production welding by the foundry; ferritic/martensitic guidance is informative.; Preheat temperature depends on casting geometry, thickness and climatic conditions.

<sup>[2]</sup> Interpass Temperature: Production welding by the foundry; ferritic/martensitic guidance is informative.

<sup>[3]</sup> Post-weld Heat Treatment: Production welding by the foundry; ferritic/martensitic guidance is informative.; In general, production welds are major when prepared cavity depth exceeds 40% of the wall thickness; minor weld corrosion conditions may require special agreement.

## Applications

At the casting-family level, typical applications include valve bodies, pump casings and other pressure-containing components. Material selection should account for service temperature, loading and the specified delivery condition.

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## Casting Quality Industrial

As a professional manufacturer in China, We Casting Quality focus on Metal Parts OEM industry, and provide solutions and services in Metal Casting field as following:

Sand Casting

Investment Casting, Lost Wax process

Shell Casting

Lost Form Casting

Permanent Mold Casting

CNC Machining

CAD Design

Tools/Mold Design

### Material Supplied

Cast Iron Castings (Grey Iron, Malleable Iron, Ductile Iron)

Carbon Steel and Alloy Steel Castings

Stainless Steel and Duplex Stainless Steel Castings

Aluminum Castings

Bronze and Brass Castings

Titanium and Cobalt Alloy Castings

### What We Can Do

#### Design Ability

Our engineers will help you to improve the designs based on casting technology, then The simulation software will be processed to verify the casting pouring system. Pro/E, Solidworks, AutoCAD and ProCast are available in Casting Quality Industrial.

#### Saving Cost

Some manufacture processes may lead high cost. We will analyses the designs and advise the suitable methods to our customers. The best solution will be adopted.

#### Quality Control

From the raw material selecting to bulk production processing, all procedures will follow PPAP program if necessary. The certificates will be provided including chemistry, hardness, mechanical property or NDT testing.

#### Production Capacity

The max iron/steel castings can reach 30tons in weight, meanwhile the minus casting is around 1gram only.

We also have prototyping and 3D scanning ability for sample plan.

#### Logistic Service

The products will be delivered directly to customer's workshop, which will save plenty of work for clients.

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