



GX2NiCrMo28-20-2 (EN 1.4458) Austenitic Stainless Steel Casting Material

Introduction

GX2NiCrMo28-20-2 (EN 1.4458) is an austenitic stainless 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	GX2NiCrMo28-20-2	EN 1.4458
EN 10283	Corrosion resistant steel castings	2019	GX2NiCrMo28-20-2	EN 1.4458

Physical Properties

EN 10213–2007+A1:2016

Property	Value	Note
Density	8.0 kg/dm ³	Test at 20 °C
Thermal Expansion	14.5 ×10 ⁻⁶ /K	Temperature range: 20–100 °C
Thermal Expansion	16.2 ×10 ⁻⁶ /K	Temperature range: 20–300 °C
Thermal Expansion	17 ×10 ⁻⁶ /K	Temperature range: 20–500 °C
Thermal Conductivity	16 W/(m·K)	Test at 50 °C
Thermal Conductivity	17 W/(m·K)	Test at 100 °C
Specific Heat	500 J/(kg·K)	Test at 20 °C
Magnetic Property	Not or slightly magnetic	



EN 10283–2019

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Thermal Conductivity	17 W/(m·K)	Test at 100 °C
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Thermal Expansion	17 ×10 ⁻⁶ /K	Temperature range: 20–500 °C

Chemical Composition

Element	EN 10213 Edition 2007+A1:2016 · wt.% Cast analysis	EN 10283 Edition 2019 · wt.% Cast analysis
C	≤ 0.030	≤ 0.030
Si	≤ 1.00	≤ 1.00
Mn	≤ 2.00	≤ 2.00
P	≤ 0.035	≤ 0.035
S	≤ 0.025	≤ 0.025
Cr	19.00–22.00	19.00–22.00
Ni	26.00–30.00	26.00–30.00
Mo	2.00–2.50	2.00–2.50
Cu	≤ 2.00	≤ 2.00
N	≤ 0.20	≤ 0.20

Heat Treatment

EN 10213–2007+A1:2016 · +AT

Step	Operation	Temperature	Cooling
1	: solution annealing	1100–1180 °C ^[1]	water quench

EN 10283–2019 · +AT

Step	Operation	Temperature	Cooling
1	solution annealing	1080–1180 °C	water



Notes

EN 10213 · Edition 2007+A1:2016

[1] +AT: Treatment temperatures are given for information; required delivery condition is specified separately.

Mechanical Properties

Property	EN 10213 Edition 2007+A1:2016	EN 10283 Edition 2019 ^[1]
Yield Strength (Rp1.0)	>= 190 MPa ^[2] >= 165 MPa ^[3] >= 135 MPa ^[4] >= 120 MPa ^[5] >= 110 MPa ^[6]	>= 190 MPa
Tensile Strength	430–630 MPa ^[2]	>= 430 MPa
Elongation	>= 30 % ^[2]	>= 30 %
Impact Energy	>= 60 J ^[2] >= 60 J ^[7]	>= 60 J ^[8]
Yield Strength (Rp0.2)	— / Not specified	>= 165 MPa

Notes

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[1] All properties in this column: wall thickness <= 150 mm; Test block; maximum thickness 150 mm; Room temperature; Yield and tensile strength also apply to the casting up to the maximum specified wall thickness.

[8] Impact Energy: KV2 as specified in

EN 10213 · Edition 2007+A1:2016

[2] Yield Strength (Rp1.0)/Tensile Strength/Elongation/Impact Energy: wall thickness <= 150 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

[3] Yield Strength (Rp1.0): Test at 100 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[4] Yield Strength (Rp1.0): Test at 200 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[5] Yield Strength (Rp1.0): Test at 300 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[6] Yield Strength (Rp1.0): Test at 400 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[7] Impact Energy: Test at -196 °C; Test block; maximum thickness 150 mm; Optional by agreement at enquiry and order

Welding Conditions

EN 10213–2007+A1:2016

Requirement	Value
Preheat	20–100 °C ^[1]



Requirement	Value
Interpass Temperature	$\leq 150\text{ }^{\circ}\text{C}^{[2]}$
Post-weld Heat Treatment	Minor welds: no heat treatment necessary, subject to agreed corrosion conditions. Major welds: +AT; may be omitted only with restricted heat input. ^[3]

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Requirement	Value
Preheat	20–100 $^{\circ}\text{C}^{[4]}$
Interpass Temperature	$\leq 200\text{ }^{\circ}\text{C}$
Post-weld Heat Treatment	No post-weld heat treatment necessary ^[5]
Post-weld Heat Treatment	Solution annealing followed by water quenching ^[6]

Notes**EN 10213 · Edition 2007+A1:2016**

^[1] Preheat: Production welding by the foundry; requirements for austenitic/austenitic-ferritic grades are normative.; Preheat temperature depends on casting geometry, thickness and climatic conditions.

^[2] Interpass Temperature: Production welding by the foundry; requirements for austenitic/austenitic-ferritic grades are normative.

^[3] Post-weld Heat Treatment: Production welding by the foundry; requirements for austenitic/austenitic-ferritic grades are normative.; In general, production welds are major when prepared cavity depth exceeds 40% of the wall thickness; minor weld corrosion conditions may require special agreement.

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^[4] Preheat: Preheat depends on casting geometry, thickness and climatic conditions.

^[5] Post-weld Heat Treatment: minor welds; Special arrangements may be agreed according to corrosion conditions. With low preheat and interpass temperatures ($\leq 150\text{ }^{\circ}\text{C}$), post-weld heat treatment may be suppressed by agreement.

^[6] Post-weld Heat Treatment: major welds; Air quenching may be agreed for very small, thin castings according to corrosion conditions.

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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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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