



GX2CrNiMoN22-5-3 (EN 1.4470) Duplex Stainless Steel Casting Material

Introduction

GX2CrNiMoN22-5-3 (EN 1.4470) is a duplex 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

J92205 — UNS / ACI^[1]

Notes

^[1] Source: ISO 11972:2023, Table A.1 (similar grade reference).

Reference Standards

Standard	Standard Title	Edition	Specification	Identifier
EN 10213	Steel castings for pressure purposes	2007+A1:2016	GX2CrNiMoN22-5-3	EN 1.4470
EN 10283	Corrosion resistant steel castings	2019	GX2CrNiMoN22-5-3	EN 1.4470
ISO 11972	Corrosion-resistant cast steels for general applications	2023	GX2CrNiMoN22-5-3	EN 1.4470

Physical Properties

EN 10213–2007+A1:2016

Property	Value	Note
Density	7.7 kg/dm ³	Test at 20 °C
Thermal Expansion	13 ×10 ⁻⁶ /K	Temperature range: 20–100 °C
Thermal Expansion	14 ×10 ⁻⁶ /K	Temperature range: 20–300 °C
Thermal Conductivity	18 W/(m·K)	Test at 50 °C
Thermal Conductivity	18 W/(m·K)	Test at 100 °C
Specific Heat	450 J/(kg·K)	Test at 20 °C



EN 10283–2019

Property	Value	Note
Density	7.7 kg/dm ³	Test at 20 °C
Specific Heat	450 J/(kg·K)	Test at 20 °C
Thermal Conductivity	18 W/(m·K)	Test at 50 °C
Thermal Conductivity	19 W/(m·K)	Test at 100 °C
Thermal Expansion	13 ×10 ⁻⁶ /K	Temperature range: 20–100 °C
Thermal Expansion	14 ×10 ⁻⁶ /K	Temperature range: 20–300 °C

Chemical Composition

Element	EN 10213 Edition 2007+A1:2016 · wt.% Cast analysis	EN 10283 Edition 2019 · wt.% Cast analysis	ISO 11972 Edition 2023 · wt.%
C	≤ 0.030	≤ 0.030	≤ 0.03
Si	≤ 1.00	≤ 1.00	≤ 1.0
Mn	≤ 2.00	≤ 2.00	≤ 2.0
P	≤ 0.035	≤ 0.035	≤ 0.035
S	≤ 0.025	≤ 0.025	≤ 0.025
Cr	21.00–23.00	21.00–23.00	21.0–23.0
Ni	4.50–6.50	4.50–6.50	4.5–6.5
Mo	2.50–3.50	2.50–3.50	2.50–3.50
Cu	≤ 0.50	≤ 0.50 ^[1]	— / Not specified
N	0.12–0.20	0.12–0.20	0.12–0.20

Notes

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^[1] Cu: Applies unless otherwise agreed; unspecified elements shall not be intentionally added without purchaser agreement except for finishing the heat.

Heat Treatment

EN 10213–2007+A1:2016 · +AT

Step	Operation	Temperature	Cooling
1	: solution annealing	1120–1150 °C ^[1]	water quench

**EN 10283–2019 · +AT**

Step	Operation	Temperature	Cooling
1	solution annealing	1120–1150 °C	water

ISO 11972–2023 · Solution treated

Step	Operation	Temperature	Cooling
1	solution treatment	1120–1150 °C ^[2]	quench in water

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

^[1] +AT: Treatment temperatures are given for information; required delivery condition is specified separately.; After solution annealing, castings may be cooled to 1050–1010 °C before water quenching to improve corrosion resistance and prevent cracks in complex shapes.

ISO 11972 · Edition 2023

^[2] Solution treated: After high-temperature solution annealing, optional cooling from 1040 °C to 1010 °C before water quenching may prevent cracks in complex shapes.

Mechanical Properties

Property	EN 10213 Edition 2007+A1:2016	EN 10283 Edition 2019 ^[1]	ISO 11972 Edition 2023 ^[2]
Yield Strength (Rp0.2)	>= 420 MPa ^[3] >= 330 MPa ^[4] >= 280 MPa ^[5]	>= 420 MPa	>= 420 MPa
Tensile Strength	600–800 MPa ^[3]	>= 600 MPa	>= 600 MPa
Elongation	>= 20 % ^[3]	>= 20 %	>= 20 %
Impact Energy	>= 30 J ^[3]	>= 30 J ^[6]	>= 30 J ^[7]

Notes**EN 10283 · Edition 2019**

^[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.

^[6] Impact Energy: KV2 as specified in

ISO 11972 · Edition 2023

^[2] All properties in this column: wall thickness <= 150 mm; Room temperature; Test blocks used to verify mechanical properties shall not exceed 150 mm thickness. Properties for samples removed from castings shall be agreed between manufacturer and purchaser.

^[7] Impact Energy: Verification of impact tests is required only when indicated by the customer.

EN 10213 · Edition 2007+A1:2016



^[3] Yield Strength (Rp0.2)/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

^[4] Yield Strength (Rp0.2): Test at 100 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

^[5] Yield Strength (Rp0.2): Test at 200 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

Welding Conditions

EN 10213–2007+A1:2016

Requirement	Value
Preheat	20–100 °C ^[1]
Interpass Temperature	≤ 250 °C ^[2]
Post-weld Heat Treatment	Specified welding instruction ^{[3][4]}

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Requirement	Value
Preheat	20–100 °C ^[5]
Interpass Temperature	≤ 250 °C
Post-weld Heat Treatment	Solution annealing followed by water quenching ^[6]
Post-weld Heat Treatment	Solution annealing followed by water quenching ^[7]

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.

^[4] Post-weld Heat Treatment: +AT (solution annealing and water quenching); air quenching may be agreed for very small, thin castings. +AT may be omitted only with restricted welding heat input. Optional cooling to 1050–1010 °C before water quenching.

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^[5] Preheat: Preheat depends on casting geometry, thickness and climatic conditions.

^[6] Post-weld Heat Treatment: minor welds; Air quenching may be agreed for very small, thin castings according to corrosion conditions. With low preheat and interpass temperatures (≤150 °C), post-weld heat treatment may be suppressed by agreement.

^[7] 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.

Last Updated: 2026-10-16

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CAD Design

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Titanium and Cobalt Alloy Castings

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

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

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