



GX5CrNiMo19-11-2 (EN 1.4408) Austenitic Stainless Steel Casting Material

Introduction

GX5CrNiMo19-11-2 (EN 1.4408) 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

CF8M — ASTM A351 / ASTM A743 / ASTM A744^[1]

Notes

^[1] Chemical comparison (similar grade reference); Historical manual confirmation (similar grade reference).

Reference Standards

Standard	Standard Title	Edition	Specification	Identifier
EN 10213	Steel castings for pressure purposes	2007+A1:2016	GX5CrNiMo19-11-2	EN 1.4408
EN 10283	Corrosion resistant steel castings	2019	GX5CrNiMo19-11-2	EN 1.4408
ISO 11972	Corrosion-resistant cast steels for general applications	2023	GX5CrNiMo19-11-2	EN 1.4408

Physical Properties

EN 10213–2007+A1:2016

Property	Value	Note
Density	7.9 kg/dm ³	Test at 20 °C
Thermal Expansion	15.8 ×10 ⁻⁶ /K	Temperature range: 20–100 °C
Thermal Expansion	17 ×10 ⁻⁶ /K	Temperature range: 20–300 °C
Thermal Expansion	17.7 ×10 ⁻⁶ /K	Temperature range: 20–500 °C
Thermal Conductivity	14.5 W/(m·K)	Test at 50 °C
Thermal Conductivity	15.8 W/(m·K)	Test at 100 °C



Property	Value	Note
Specific Heat	530 J/(kg·K)	Test at 20 °C
Magnetic Property	Not or slightly magnetic	

EN 10283–2019

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Specific Heat	530 J/(kg·K)	Test at 20 °C
Thermal Conductivity	14.5 W/(m·K)	Test at 50 °C
Thermal Conductivity	15.8 W/(m·K)	Test at 100 °C
Thermal Expansion	15.8 ×10 ⁻⁶ /K	Temperature range: 20–100 °C
Thermal Expansion	17 ×10 ⁻⁶ /K	Temperature range: 20–300 °C
Thermal Expansion	17.7 ×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	ISO 11972 Edition 2023 · wt.%
C	≤ 0.07	≤ 0.07	≤ 0.07
Si	≤ 1.50	≤ 1.50	≤ 1.5
Mn	≤ 1.50	≤ 1.50	≤ 1.5
P	≤ 0.040	≤ 0.040	≤ 0.040
S	≤ 0.030	≤ 0.030	≤ 0.030
Cr	18.00–20.00	18.00–20.00	18.0–20.0
Ni	8.00–11.00	9.00–12.00	9.0–12.0
Mo	2.00–2.50	2.00–2.50	2.00–2.50
Cu	≤ 0.50	≤ 0.50 ^[1]	— / Not specified

Notes**EN 10283 · Edition 2019**

^[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	1080–1150 °C ^[1]	water quench

EN 10283–2019 · +AT

Step	Operation	Temperature	Cooling
1	solution annealing	1080–1150 °C	water

ISO 11972–2023 · Solution treated

Step	Operation	Temperature	Cooling
1	solution treatment	1080–1150 °C ^[2]	quench

Notes

EN 10213 · Edition 2007+A1:2016

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

ISO 11972 · Edition 2023

^[2] Solution treated: Depending on thickness, accelerated air cooling.

Mechanical Properties

Property	EN 10213 Edition 2007+A1:2016	EN 10283 Edition 2019 ^[1]	ISO 11972 Edition 2023 ^[2]
Yield Strength (Rp1.0)	>= 210 MPa ^[3] >= 170 MPa ^[4] >= 135 MPa ^[5] >= 115 MPa ^[6] >= 105 MPa ^[7]	>= 210 MPa	>= 210 MPa
Tensile Strength	440–640 MPa ^[3]	>= 440 MPa	>= 440 MPa
Elongation	>= 30 % ^[3]	>= 30 %	>= 30 %
Impact Energy	>= 60 J ^[3] >= 60 J ^[8]	>= 60 J ^[9]	>= 60 J ^[10]
Yield Strength (Rp0.2)	— / Not specified	>= 185 MPa	>= 185 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.

^[9] Impact Energy: KV2 as specified in

**ISO 11972 · Edition 2023**

^[2] All properties in this column: wall thickness $\leq$ 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.

^[10] Impact Energy: Verification of impact tests is required only when indicated by the customer.

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^[3] Yield Strength (Rp1.0)/Tensile Strength/Elongation/Impact Energy: wall thickness $\leq$ 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 (Rp1.0): Test at 100 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

^[5] Yield Strength (Rp1.0): Test at 200 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

^[6] Yield Strength (Rp1.0): Test at 300 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

^[7] Yield Strength (Rp1.0): Test at 400 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

^[8] 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	No preheat ^[1]
Interpass Temperature	At manufacturer discretion unless otherwise agreed ^[2]
Post-weld Heat Treatment	+AT (solution annealing), normally liquid quenching; air quenching may be agreed for very small, thin castings. May be omitted for high-temperature use. ^[3]

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Requirement	Value
Preheat	No preheat ^[4]
Interpass Temperature	At manufacturer discretion unless otherwise agreed
Post-weld Heat Treatment	Solution annealing followed by water quenching ^[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; Air quenching may be agreed for very small, thin castings according to corrosion conditions.

[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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