G17CrMoV5-10 (EN 1.7706) Low-Alloy Steel Casting Material

Introduction

G17CrMoV5-10 (EN 1.7706) 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	G17CrMoV5-10	—

Physical Properties

EN 10213–2007+A1:2016

Property	Value	Note
Density	7.85 kg/dm3	Test at 20 °C
Thermal Expansion	12.4 ×10?6/K	Temperature range: 20–100 °C
Thermal Expansion	13.6 ×10?6/K	Temperature range: 20–300 °C
Thermal Expansion	14.5 ×10?6/K	Temperature range: 20–500 °C
Specific Heat	460 J/(kg·K)	Test at 20 °C
Magnetic Property	Magnetic	

Chemical Composition

Element	EN 10213 Edition 2007+A1:2016 · wt.% Cast analysis
C	0.15–0.20
Si	<= 0.60
Mn	0.50–0.90

Element	EN 10213 Edition 2007+A1:2016 · wt.% Cast analysis
P	<= 0.020
S	<= 0.015
Cr	1.20–1.50
Ni	<= 0.40
Mo	0.90–1.10
Cu	<= 0.30
V	0.20–0.30

Heat Treatment

EN 10213–2007+A1:2016 · +QT

Step	Operation	Temperature	Cooling
1	: quenching	920–960 °C[1]	air or liquid quench
2	: tempering	680–740 °C[1]	—

Notes

EN 10213 · Edition 2007+A1:2016

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

Mechanical Properties

Property	EN 10213 Edition 2007+A1:2016
Yield Strength (Rp0.2)	>= 440 MPa[1] >= 385 MPa[2] >= 365 MPa[3] >= 350 MPa[4] >= 335 MPa[5] >= 320 MPa[6] >= 300 MPa[7] >= 260 MPa[8]
Tensile Strength	590–780 MPa[1]
Elongation	>= 15 %[1]
Impact Energy	>= 27 J[1]

Notes

EN 10213 · Edition 2007+A1:2016

[1] 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

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

[3] Yield Strength (Rp0.2): Test at 300 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[4] Yield Strength (Rp0.2): Test at 350 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[5] Yield Strength (Rp0.2): Test at 400 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[6] Yield Strength (Rp0.2): Test at 450 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[7] Yield Strength (Rp0.2): Test at 500 °C; Verification of elevated-temperature yield values is subject to agreement at enquiry and order.

[8] Yield Strength (Rp0.2): Test at 550 °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	200–300 °C[1]
Interpass Temperature	<= 400 °C[2]
Post-weld Heat Treatment	>= 680 °C[3]

Notes

EN 10213 · Edition 2007+A1:2016

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

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

[3] 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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