WC11 Alloy Steel Casting Material

Introduction

ASTM A217/A217M Grade WC11 is a ferritic alloy steel casting grade for pressure-containing service. It is supplied normalized and tempered and has grade-specific chemistry and tensile limits.

Manufacturing Process

Investment Casting
Shell Molding Casting
Sand Casting

Equivalent Materials

Not Available

Reference Standards

Standard	Standard Title	Edition	Specification
ASTM A217/A217M	Steel Castings, Martensitic Stainless and Alloy, for Pressure-Containing Parts, Suitable for High-Temperature Service	02	WC11

Physical Properties

Not Available

Chemical Composition

Element	Requirement
C	0.15–0.21 %
Si	0.30–0.60 %
Mn	0.50–0.80 %
P	<= 0.020 %
S	<= 0.015 %
Cr	1.00–1.50 %
Ni	<= 0.50 %
Mo	0.45–0.65 %
Cu	<= 0.35 %
Al	<= 0.01 %
V	<= 0.03 %

Element	Requirement
Combined requirement	Other elements, total: Total of specified residual elements (Al, Cu, Ni, V) <= 1.00 % %

Heat Treatment

ASTM A217/A217M:02

Heat Treatment	Operation	Temperature
Normalized and tempered	heat treatment · Temper	>= 1250°F [675°C]

Normalize and temper after cooling below the transformation range.

Mechanical Properties

Primary Mechanical Properties

ASTM A217/A217M — 02

Property	Requirement
Tensile Strength	80–105 ksi [550–725 MPa]
Yield Strength	>= 50 ksi [345 MPa]
Elongation	>= 18 %
Reduction of Area	>= 45 %

Yield Strength: Determine yield strength by the 0.2% offset method or the 0.5% extension-under-load method.

Elongation: When using ICI test bars, the gauge length to reduced section diameter ratio shall be 4:1.

Elongation gauge length: 2 in. [50 mm]

Welding Conditions

ASTM A217/A217M — 02 · Table 3 / normative

Property	Requirement
Preheat	Minimum preheat for WC11 when removing discontinuities with high-temperature methods: 300°F [150°C] at all thicknesses.

Applies when discontinuities are removed by a high-temperature method.

Applications

Ferritic alloy steel ASTM A217/A217M Grade WC11 is covered for cast valves, flanges, fittings and other pressure-containing parts intended primarily for high-temperature or corrosive service. Selection depends on the application, required properties and construction code.

Last Updated: 2026-11-25

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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