# CK3MCuN Austenitic Stainless Steel Casting Material

## Introduction

CK3MCuN is a austenitic stainless steel grade specified in ASTM A351, ASTM A743, ASTM A744 for pressure-containing cast 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

GX2CrNiMoCuN20-18-6 (1.4557) — EN 10283 / ISO 11972[1]

### Notes

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

## Reference Standards

| Standard | Standard Title | Edition | Specification | Identifier |
|---|---|---|---|---|
| ASTM A351 | Standard Specification for Castings, Austenitic, Austenitic-Ferritic (Duplex), for Pressure-Containing Parts | 03 | CK3MCuN | UNS J93254 |
| ASTM A743 | Standard Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, Corrosion Resistant, for General Application | 03 | CK3MCuN | UNS J93254 |
| ASTM A744 | Standard Specification for Castings, Iron-Chromium-Nickel, Corrosion Resistant, for Severe Service | 00e1 | CK3MCuN | UNS J93254 |

## Physical Properties

N/A

## Chemical Composition

| Element | ASTM A351 Edition 03 | ASTM A743 Edition 03 | ASTM A744 Edition 00e1 |
|---|---|---|---|
| **C** | <= 0.025 % | <= 0.025 % | <= 0.025 % |
| **Si** | <= 1.00 % | <= 1.00 % | <= 1.00 % |
| **Mn** | <= 1.20 % | <= 1.20 % | <= 1.20 % |
| **P** | <= 0.045 % | <= 0.045 % | <= 0.045 % |
| **S** | <= 0.010 % | <= 0.010 % | <= 0.010 % |

| Element | ASTM A351 Edition 03 | ASTM A743 Edition 03 | ASTM A744 Edition 00e1 |
|---|---|---|---|
| **Cr** | 19.5–20.5 % | 19.5–20.5 % | 19.5–20.5 % |
| **Ni** | 17.5–19.5 % | 17.5–19.5 % | 17.5–19.5 % |
| **Mo** | 6.0–7.0 % | 6.0–7.0 % | 6.0–7.0 % |
| **Cu** | 0.50–1.00 % | 0.50–1.00 % | 0.50–1.00 % |
| **N** | 0.18–0.24 % | 0.180–0.240 % | 0.180–0.240 % |

## Heat Treatment

### ASTM A351–03 · Heat treatment

| Step | Operation | Temperature | Cooling |
|---|---|---|---|
| 1 | Heat treat | >= 2100 °F / >= 1150 °C | — |
| 2 | Quench or rapid cool | — | water quench or rapid cooling by other means |

### ASTM A743–03 · Heat treatment

| Step | Operation | Temperature | Cooling |
|---|---|---|---|
| 1 | Heat | >= 2100 °F / >= 1150 °C[1] | — |
| 2 | Quench or rapid cool | — | water quench or rapid cooling by other means |

### ASTM A744–00e1 · Heat treatment

| Step | Operation | Temperature | Cooling |
|---|---|---|---|
| 1 | Heat | >= 2100 °F / >= 1150 °C[2] | — |
| 2 | Quench or rapid cool | — | water quench or rapid cooling by other means |

### Notes

#### ASTM A743 · Edition 03

[1] Heat treatment: sufficient time to heat casting to temperature

#### ASTM A744 · Edition 00e1

[2] Heat treatment: sufficient time to heat casting to temperature

## Mechanical Properties

| Property | ASTM A351<br>Edition 03 | ASTM A743<br>Edition 03 | ASTM A744<br>Edition 00e1 |
|---|---|---|---|
| **Tensile Strength** | >= 80 ksi<br>>= 550 MPa | >= 80 ksi[1]<br>>= 550 MPa[1] | >= 80 ksi[2]<br>>= 550 MPa[2] |
| **Yield Strength (Rp0.2)** | >= 38 ksi<br>>= 260 MPa | — / Not specified | — / Not specified |
| **Elongation** | >= 35 % | >= 35 %[1] | >= 35 %[2] |
| **Yield Strength** | — / Not specified | >= 38 ksi[1]<br>>= 260 MPa[1] | >= 38 ksi[2]<br>>= 260 MPa[2] |

### Notes

#### ASTM A743 · Edition 03

[1] Tensile Strength/Elongation/Yield Strength: Applies only when Supplementary Requirement S12 is specified; Condition: heat treatment per; separately cast keel block per S12.2 unless S12.3 agreement applies

#### ASTM A744 · Edition 00e1

[2] Tensile Strength/Elongation/Yield Strength: Applies only when Supplementary Requirement S22 is specified; Condition: heat treated to the same production procedure as the casting; separately cast keel block per S22.2

## Welding Conditions

N/A

## Applications

Typical casting applications include pressure-containing cast components such as valve bodies, flanges and fittings, subject to grade-specific service requirements.

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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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