355.0 Aluminum-Silicon Alloy Casting Material

Introduction

355.0 is a casting grade in the Aluminum-Silicon Alloy family, specified in ASTM B26/B26M. The specification defines its chemical composition and mechanical requirements for the applicable sand-casting tempers. Casting process options include Sand Casting, subject to the applicable specification and component requirements.

Manufacturing Process

Sand Casting

Equivalent Grades

N/A

Reference Standards

Standard	Standard Title	Edition	Specification	Identifier
ASTM B26/B26M	Standard Specification for Aluminum-Alloy Sand Castings	05	355.0	UNS A03550

Physical Properties

N/A

Chemical Composition

Element	ASTM B26/B26M Edition 05 · wt.%
Si	4.5–5.5
Fe	<= 0.6[1]
Cu	1.0–1.5
Mn	<= 0.50[1]
Mg	0.40–0.6
Cr	<= 0.25
Zn	<= 0.35
Ti	<= 0.25
Al	remainder

Chemical requirements[2][3]

Notes

ASTM B26/B26M · Edition 05

[1] Fe/Mn: If iron exceeds 0.45 %, manganese content shall not be less than one half of the iron content.

[2] Chemical composition: Other elements, each: <= 0.05 wt.%

[3] Chemical composition: Other elements, total: <= 0.15 wt.%

Heat Treatment

ASTM B26/B26M–05 · Sand Casting · T51 · Recommended heat treatment

Step	Operation	Temperature / holding time	Cooling
1	Recommended: Precipitation heat treatment	440 °F / 225 °C; Holding time: 7–9 h[1]	Still air outside furnace

ASTM B26/B26M–05 · Sand Casting · T6 · Recommended heat treatment

Step	Operation	Temperature / holding time	Cooling
1	Recommended: Solution heat treatment	980 °F / 525 °C; Holding time: 6–12 h[2]	Water quench
2	Recommended: Precipitation heat treatment	310 °F / 155 °C; Holding time: 3–5 h[3]	Still air outside furnace

ASTM B26/B26M–05 · Sand Casting · T71 · Recommended heat treatment

Step	Operation	Temperature / holding time	Cooling
1	Recommended: Solution heat treatment	980 °F / 525 °C; Holding time: 6–12 h[4]	Water quench
2	Recommended: Precipitation heat treatment	475 °F / 245 °C; Holding time: 4–6 h[5]	Still air outside furnace

Notes

ASTM B26/B26M · Edition 05

[1] T51, T51 · Recommended heat treatment: Source: ASTM B917/B917M–25 (Recommended; when specified by the material specification or purchase order).; ±10°F; Use suitable metal-temperature measurement; sections/microstructure affect soak time selection (7.2).; No quenching required. Cool in still air outside the furnace.; ±5°C

[2] T6, T6 · Recommended heat treatment: Source: ASTM B917/B917M–25 (Recommended; when specified by the material specification or purchase order).; ±10°F; Use suitable metal-temperature measurement; sections/microstructure affect soak time selection (7.2).; Quench in water at 150 to 212°F except as noted.; Time at solution temperature may be increased for section thickness over 1 in.; ±5°C; Quench in water at 65 to 100°C except as noted.; Time at solution temperature may be increased for section thickness over 25 mm.

[3] T6, T6 · Recommended heat treatment: Source: ASTM B917/B917M–25 (Recommended; when specified by the material specification or purchase order).; ±10°F; Use suitable metal-temperature measurement; sections/microstructure affect soak time selection (7.2).; No quenching required. Cool in still air outside the furnace.; ±5°C

[4] T71, T71 · Recommended heat treatment: Source: ASTM B917/B917M–25 (Recommended; when specified by the material specification or purchase order).; ±10°F; Use suitable metal-temperature measurement; sections/microstructure affect soak time selection (7.2).; Quench in water at 150 to 212°F except as noted.; Time at solution temperature may be increased for section thickness over 1 in.; ±5°C; Quench in water at 65 to 100°C except as noted.; Time at solution temperature may be increased for section thickness over 25 mm.

[5] T71, T71 · Recommended heat treatment: Source: ASTM B917/B917M–25 (Recommended; when specified by the material specification or purchase order).; ±10°F; Use suitable metal-temperature measurement; sections/microstructure affect soak time selection (7.2).; No quenching required. Cool in still air outside the furnace.; ±5°C

Mechanical Properties

Conditions are not identical. Compare each stated condition and applicability separately.

Property	ASTM B26/B26M Edition 05 T51	ASTM B26/B26M Edition 05 T6	ASTM B26/B26M Edition 05 T71
Elongation	Not Applicable Not Applicable	>= 2.0 %[1]	Not Applicable Not Applicable
Tensile Strength	>= 25.0 ksi / >= 170 MPa[2]	>= 32.0 ksi / >= 220 MPa[1]	>= 30.0 ksi / >= 205 MPa[3]
Yield Strength (Rp0.2)	>= 18.0 ksi / >= 125 MPa[2]	>= 20.0 ksi / >= 140 MPa[1]	>= 22.0 ksi / >= 150 MPa[3]
Brinell Hardness	65 HB[4]	80 HB[5]	75 HB[6]

Notes

ASTM B26/B26M · Edition 05

[1] Elongation/Tensile Strength/Yield Strength (Rp0.2); T6: inch-pound; 2 in. or 4 x diameter / SI; 5 x diameter

[2] Tensile Strength/Yield Strength (Rp0.2); T51: inch-pound; 2 in. or 4 x diameter / SI; 5 x diameter

[3] Tensile Strength/Yield Strength (Rp0.2); T71: inch-pound; 2 in. or 4 x diameter / SI; 5 x diameter

[4] Brinell Hardness; T51: inch-pound; 2 in. or 4 x diameter; 500 kgf; 10 mm; Typical hardness is for information only, not required for acceptance / SI; 5 x diameter; Typical hardness is for information only, not required for acceptance

[5] Brinell Hardness; T6: inch-pound; 2 in. or 4 x diameter; 500 kgf; 10 mm; Typical hardness is for information only, not required for acceptance / SI; 5 x diameter; Typical hardness is for information only, not required for acceptance

[6] Brinell Hardness; T71: inch-pound; 2 in. or 4 x diameter; 500 kgf; 10 mm; Typical hardness is for information only, not required for acceptance / SI; 5 x diameter; Typical hardness is for information only, not required for acceptance

Welding Conditions

N/A

Applications

At the material-family level, typical applications include custom, shaped aluminum sand-cast components for non-aerospace use. ASTM B26/B26M excludes aerospace applications; suitability of this grade must be checked against the component requirements and specified temper.

Last Updated: 2026-10-13

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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