Class 400 Grey Cast Iron Casting Material

Introduction

ASTM A48/A48M Class 400 is a gray iron casting grade. The metric series uses separately cast tensile bars to establish the class minimum. The specification covers general engineering castings where tensile strength is a major consideration.

Manufacturing Process

Sand Casting
Shell Molding Casting
Lost Foam Casting

Equivalent Materials

Not Available

Reference Standards

Standard	Standard Title	Edition	Specification
ASTM A48/A48M	Standard Specification for Gray Iron Castings	03	Class 400

Physical Properties

Not Available

Chemical Composition

No specified chemical composition limits in ASTM A48/A48M

Heat Treatment

ASTM A48/A48M–03

No heat treatment specified in ASTM A48/A48M

Mechanical Properties

Primary Mechanical Properties

ASTM A48/A48M — 03

Condition: Separately cast test bars (Metric)

Property	Requirement
Tensile Strength	>= 400 MPa

Class 400A: Test bar diameter: 20–22 mm; applicable casting wall thickness: 5–14 mm if no specific bar-to-casting correlation is established. As-cast bar: 22.4 mm nominal mid-length diameter, 21.6 mm minimum bottom diameter, 24.4 mm maximum top diameter; minimum length 125 mm (recommended maximum 150 mm). Specimen A, machined concentric with the test-bar axis. Minimum time from loading to fracture: 15 s.

Class 400B: Test bar diameter: 30 mm; applicable casting wall thickness: 15–25 mm if no specific bar-to-casting correlation is established. As-cast bar: 30.5 mm nominal mid-length diameter, 29.0 mm minimum bottom diameter, 33.5 mm maximum top diameter; minimum length 150 mm (recommended maximum 230 mm). Specimen B, machined concentric with the test-bar axis. Minimum time from loading to fracture: 20 s.

Class 400C: Test bar diameter: 50 mm; applicable casting wall thickness: 26–50 mm if no specific bar-to-casting correlation is established. As-cast bar: 50.8 mm nominal mid-length diameter, 48.3 mm minimum bottom diameter, 53.3 mm maximum top diameter; minimum length 175 mm (recommended maximum 255 mm). Specimen B or C, machined concentric with the test-bar axis. The manufacturer selects the type unless the purchaser specifies it in writing. Minimum time from loading to fracture: 20 s.

Class 400S: Applicable casting wall thickness: under 5 mm or over 50 mm if no specific bar-to-casting correlation is established. The manufacturer and purchaser agree on all test bar dimensions and on the nature and dimensions of the tensile specimen. No separate loading-to-fracture minimum is specified for S.

The minimum applies to separately cast test coupons. Tensile strength can vary across the section of a casting.

Apply the inch-pound and SI values independently. They are not exact equivalents.

Cast test bars separately from the same lot. Use dried, baked or chemically bonded silica-sand molds with suitable binders and similar sand grain size to the casting molds. The molds must be approximately at room temperature when poured, with surrounding sand at least one bar diameter thick.

When the casting is cooled in the mold below 480 °C before shakeout, cool the test bar in its mold below 480 °C before optional still-air cooling to room temperature. For castings shaken out above 480 °C, either follow that route or, by manufacturer–purchaser agreement, shake out the bar at about the casting temperature.

If insufficient separately cast test pieces are available, a specimen may be taken from a representative location on a casting by manufacturer–purchaser agreement.

Informative: If a casting-to-coupon correlation is needed, testing may establish it. If reliable correlation data are unavailable and testing is impracticable, select a test casting approximating the main or controlling casting section.

Apply the tensile load axially. The standard cites ASTM E 8 for the test method.

If a casting is stress-relieved, annealed, or otherwise heat-treated, give its representative test bars the same treatment alongside the castings.

If the first test shows that heat treatment is needed to meet the requirements, treat the entire casting lot and its representative test specimens together, then perform the required testing. After a valid nonconforming test, make two retests and reject the represented castings if either retest fails.

Welding Conditions

ASTM A48/A48M — 03 · Clause X1.5, X1.5 continuation / informative

Property	Value
Post-weld Heat Treatment	Informative: Where practical, suitable post-weld heat treatment may reduce adverse effects of welding on the casting.

Informative option after authorized welding repair; The standard prohibits repair by plugging or welding unless the purchaser gives written permission.

Applications

Gray iron ASTM A48M Class 400 belongs to the gray iron family used for machinery castings. Machine-tool heads and pump or compressor components illustrate common family uses. The required grade for each casting depends on the part design and acceptance 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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