



Metal Casting Alloys

Gray Iron

General Characteristics	Applications & Specifications
<ul style="list-style-type: none"> ➤ Relatively low mechanical strength ➤ Good vibration dampening ➤ Typically, used as-cast (i.e. not heat treated) ➤ Sand and investment casting 	<ul style="list-style-type: none"> ➤ Brake & engine components, general machinery ➤ Classified by U.T.S. ➤ ASTM A48 <ul style="list-style-type: none"> ➤ Grades: Class 20, 25, 30, 35 & 40

Ductile Iron

General Characteristics	Applications & Specifications
<ul style="list-style-type: none"> ➤ Moderate mechanical strength ➤ Ductility comparable to that of some lower grade steels ➤ Commonly as-cast, but can be heat treated ➤ Sand casting 	<ul style="list-style-type: none"> ➤ Widely used in many industrial & commercial applications ➤ Classified by tensile, yield strength and elongation ➤ ASTM A536 <ul style="list-style-type: none"> ➤ Grades: 60-40-18, 65-45-12, 80-55-06 & 100-70-03

Austempered Ductile Iron

General Characteristics	Applications & Specifications
<ul style="list-style-type: none"> ➤ Produced by heat treating as-cast ductile iron ➤ Superior mechanical strength and ductility comparable to higher strength steels ➤ Good impact strength and wear resistance ➤ Sand casting 	<ul style="list-style-type: none"> ➤ Automotive, agriculture, light truck and railroad ➤ Classified by tensile, yield strength and elongation ➤ ASTM A897 - Grades: 110-70-11, 130-90-09, 150-110-07, 175-125-04, 200-155-02 and 230-185-01



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Austenitic Ductile Iron (Ni-resist)

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Austenitic family of ductile irons➤ High temperature service, high wear properties➤ Non-magnetic properties available➤ Sand casting	<ul style="list-style-type: none">➤ Military and specialty application➤ Classified by chemistry and tensile properties➤ ASTM A439<ul style="list-style-type: none">➤ Grades: D2, D2B, D2C, D3, D3A, D4, D5, D5B & D5S

Solution Strengthened Ferritic Ductile Iron (SSFDI)

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Elevated mechanical strength without loss of ductility➤ Mechanical properties comparable to that of some cast steels➤ Sand casting	<ul style="list-style-type: none">➤ Drivetrain components➤ Classified by tensile properties➤ EN1653<ul style="list-style-type: none">➤ Grades: EN-GJS 450-18, EN-GJS 500-14 & EN-GJS 600-10

Silicon-Molybdenum Ductile Iron (Si-Mo)

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ 4-6% Silicon, .50 to 2.0% Molybdenum➤ High temperature service; excellent hot strength, thermal fatigue, creep strength, and resistance to oxidation➤ Sand casting	<ul style="list-style-type: none">➤ Manifolds, turbochargers➤ Classified by level of Moly addition➤ ASTM A1095



Metal Casting Alloys

Aluminum

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Tensile strengths ranging from 19 ksi to over 60+ ksi➤ Heat treated to achieve desired mechanical properties➤ Variety of processes used to manufacture parts<ul style="list-style-type: none">➤ Sand, investment, permanent mold & die casting	<ul style="list-style-type: none">➤ Widely used in many industrial & commercial applications➤ Classified by chemical and mechanical properties➤ ASTM B26<ul style="list-style-type: none">➤ 201, 206, 319, 336, 355, 356, 357 & 535 aluminum alloys➤ F, T4, T5, T6 & T7 tempers

Zinc & Copper Base

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Excellent corrosion resistance➤ Easily alloyed to modify properties➤ Variety of processes used to manufacture parts<ul style="list-style-type: none">➤ Sand, investment & die casting	<ul style="list-style-type: none">➤ Pumping system and saltwater marine applications➤ Classified primarily by chemical properties<ul style="list-style-type: none">➤ Brass & Bronze➤ Zinc ZA3, ZA12 and ZA27 are most common



Metal Casting Alloys

Carbon Steels

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Wide variety of applications➤ Tensile/yield strengths ranging from 60/30 ksi up to 260/210 ksi are possible, exceptional high/low temperature and impact strength properties possible➤ Typically heat treated to achieve mechanical properties➤ Sand and casting	<ul style="list-style-type: none">➤ Classified by chemical AND/OR mechanical properties<ul style="list-style-type: none">➤ ASTM A27 (Low alloy, general application)➤ ASTM A148 (High strength castings)➤ ASTM A216 (Castings that will be welded)➤ ASTM A352 (Low temperature service)➤ ASTM A732 (Investment castings)➤ ASTM A915 (Chemical specification for alloys similar to wrought grades)

Stainless Steels

General Characteristics	Applications & Specifications
<ul style="list-style-type: none">➤ Best suited for corrosive environments.➤ Tensile/yield strengths ranging from 60/30 ksi up to 260/210 ksi are possible, exceptional high/low temperature and impact strength properties➤ Typically heat treated to achieve mechanical properties➤ Expensive alloying materials➤ Sand and investment casting	<ul style="list-style-type: none">➤ Classified by chemical AND/OR mechanical properties<ul style="list-style-type: none">➤ ASTM A217 (High temperature & pressure applications)➤ ASTM A297 (Heat resistant, general application)➤ ASTM A351 (High pressure service)➤ ASTM A352 (Low temperature service)➤ ASTM A743 (General application)➤ ASTM A744 (Severe corrosion conditions)➤ ASTM A747 (High strength)