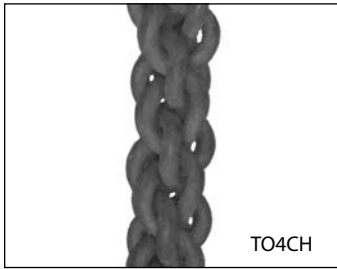
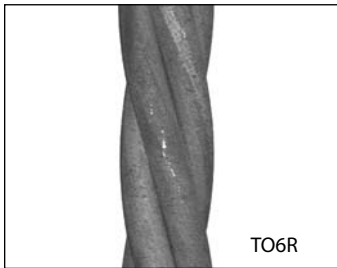




METAL BASICS



TO4CH



TO6R



TO8A

Iron is in our name. Steel, stainless steel, aluminum, brass, copper, and iron are in our products. Pure iron metal is not often used in commercial applications, but is usually alloyed with carbon or other metals. The pure metal is very reactive chemically and rapidly corrodes, especially in moist air or at elevated temperatures. The most common metal we use at Custom Iron is a carbon steel alloy.

Steel

Carbon steel is a non-magnetic alloy of iron with small amounts of Manganese, Sulfur, Phosphorus, and Silicon. The foundry process for steel varies widely and many different steel products are available. Custom Iron uses American furniture grade steel and other plain carbon steels for the majority of our products.

Many of Custom Iron's forged balusters and newels begin with a basic square steel bar from 1/2 to 1".

Other interesting alternative materials in steel are available such as these steel profiles (TO4CH, TO6R, TO8A), available in 20' lengths.

Stainless Steel

Stainless steels are corrosion resistant iron alloys. Stainless steel resists ordinary rusting in most architectural applications. The corrosion resistance of stainless steel arises from a "passive," chromium-rich, oxide film that forms naturally on the surface of the steel. Special care must be taken during the fabrication process to maintain corrosion resistant properties.

Aluminum

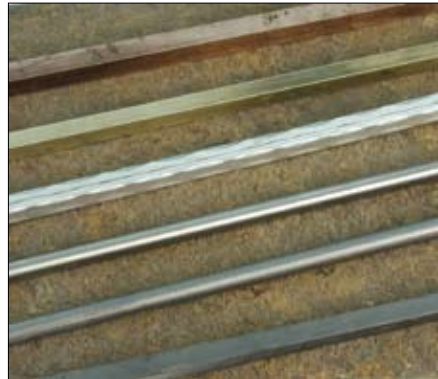
Aluminum is a light weight non-ferrous metal. Custom Iron uses high grade aluminum alloys for our aluminum products. We recommend aluminum for exterior installations.

Brass

Brass is a relatively soft alloy of copper and other metals. Brass alloys vary greatly and are sometimes referred to as a type of bronze. Custom Iron uses brass and bronze alloys that are highly similar in color to each other. We refer to all yellow-tinted copper alloys in the brass or bronze family as "brass". The price and availability of the alloys Custom Iron uses for our products might vary. If the specifications for these alloys are critical to your application, please inquire at the time you place your order.

Copper

Custom Iron uses copper in ornamentation such as embossed copper handrails or copper baskets on a steel baluster.



Cast Products

Cast metal products are special alloys that are liquefied and then poured into a mold or "cast." Cast products direct from the foundry exhibit imperfect surface texture

and visible casting lines. Many Custom Iron baluster ornaments (such as collars and medallions) and bases are a cast metal material.

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DETAILS & PROCESSES

Material details

Surface variations in the metal are a natural result of metalworking. The surface texture, color, and uniformity affect the finished appearance of the metal piece that will also vary depending on the coating selection.

The three main categories of steel and iron material that we use at Custom Iron are: hot-rolled steel, cold-rolled steel, and malleable iron.

Hot-rolled (or "mild") steel is formed in the foundry using heat and pressure. Hot-rolled steel is more easily bent than cold-rolled steel and therefore, many of Custom Iron's products use hot-rolled steel. When the hot-rolled steel used to create panels and railing systems arrives from the foundry, it is covered in mill scale, a scaly oxidized surface on the steel that results from heating and hot rolling. Additional handling at the factory (twisting, bending, heating, etc.) removes the mill scale from the handled areas, producing mill scale variations on the surface.

Cold-rolled steel is formed without heat, using intense pressure. Cold-rolled steel does not have mill scale and the material therefore has a smoother and more uniform surface. However, cold-rolled steel is not easily formed and it is not used for twists, scrolls, and other bent and embossed products that Custom Iron produces.

Malleable iron is a sand cast annealed iron purchased from a casting foundry. The malleable iron alloy is melted and cast in forms. Once cast, malleable iron loses some of its malleable characteristics. Malleable cast iron is stronger and less brittle than traditional cast iron. Custom Iron offers malleable iron balusters in custom lengths and with various levels of finish grades.

Metal processes

Custom Iron offers embossed surface textures for most sizes of square bar, rectangular bar, square tubing, and round bar.



Hand-forged embossing is done the old-fashioned way with hammer and anvil. Hand-forging is a time consuming operation that produces the classic irregularities associated with traditional iron products.

Most Custom Iron product textures are produced with special dies. Embossing with a die produces fairly uniform patterns or textures in the raw material. The appearance of the embossing differs depending on the type, size, and shape of the raw material. Power hammering is an alternative to hand-forging and it most closely resembles hand-forged material. When power hammering, the hammer operator initiates the hammer drop with a foot pedal for the length of the bar.

For more information about Custom Iron's embossing options, see the Options tab.

Polished surfaces reveal a brilliant glossy finish through a tumbled and mechanical process. Custom Iron's brass baskets are most often polished in this way. Brushed surfaces have a matte finish that shows the "sanding" marks.



Mill scale on twist baluster



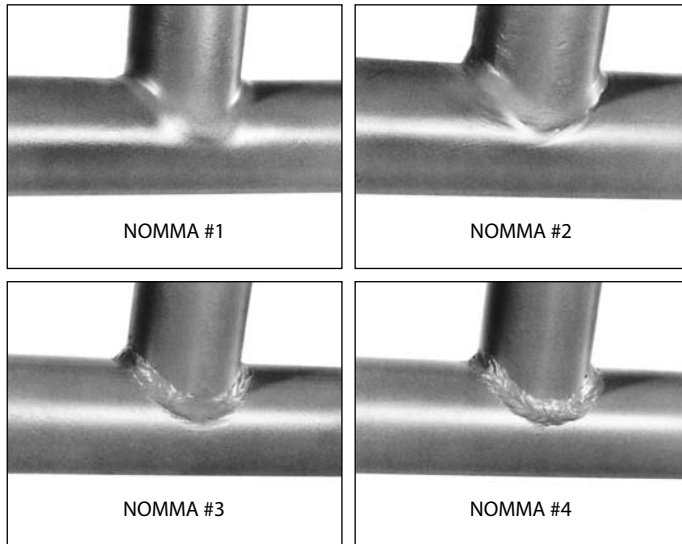
Hot rolled steel with one cold rolled round bar



Brushed and polished bases



DETAILS & PROCESSES



Photos © NOMMA. Used with permission.

Welds

Custom Iron “wrote the book” on weld standards. Our expert metalsmiths worked with the National Ornamental and Miscellaneous Metals Association (NOMMA) to create the NOMMA standards that exist today. The majority of Custom Iron products are fabricated to a NOMMA #2 weld standard. Please inquire about other weld standards.

Fabrication Finish Options for Malleable Iron

Malleable iron direct from the foundry has an irregular rough textured surface overall that reveals casting lines, voids, and other imperfections. As Custom Iron works with the material to lengthen or add ornamentation for a specific job, we add marks to the piece. Lengthening a malleable iron baluster produces irregular flat or smooth areas on the piece. Custom Iron offers three finish grades for our malleable iron products:

Foundry Grade (FG) – As received direct from the foundry. High level of surface texture variations and high level of variation from piece to piece. Not recommended for most applications.

Commercial Grade (CG) – Pieces from the foundry are selected for job uniformity and the largest variations are cleaned up. Cast lines are still evident.

Architectural Grade (AG) – Commercial grade malleable iron that is cleaned up to a higher degree and sandblasted to minimize the surface texture variations.

Because of the irregularities that will be evident with any of the finish grades, we recommend a painted finish for all malleable iron products. Custom Iron takes special care in handling sandblasted products. Any residue (such as skin oils or fabric threads) must be removed before the paint coating is applied.



Foundry grade

FG primed

Commercial grade

CG primed

Architectural grade

AG primed



DETAILS & PROCESSES

Fabrication and Finish Options for Clear Coated Metal Railing Parts

Welds, tool, dye, and grind marks are part of the fabrication process. Those who enjoy the rugged look of handmade metalwork will want to display these “as fabricated” marks of the craft. Other customers will want to minimize the appearance of these marks. For customers ordering a Clear Coat finish on balusters or panels, Custom Iron offers two grades of fabrication for Clear Coat preparation: Clear Prep 2 and Clear Prep 1. Clear Prep 2 is the standard fabrication for Custom Iron products. A painted finish covers the color distinction of grind and tool marks, but will still leave some metal surface variations.

Clear Prep 2 is Custom Iron’s “as fabricated” product. The mill scale from the foundry is left intact in areas where no additional process occurred, and it is absent from the worked areas. These mill scale variations along with the tool and grind marks are left “as fabricated” and the piece is clear coated in our Clear Coat 2 finish.

Clear Prep 1 is an upgrade to prepare for clear coating. The piece is specially fabricated to conceal tool and grind marks and is then lightly sanded over raised surfaces to highlight the texture variations before the clear coating is applied. This method works best where the basic metal of the piece has a varied topography such as with hammered and chiseled bar or with any of the twisted or scrolled balusters.



Clear Coat on Clear Prep 2



Uncoated Clear Prep 2 (left), Uncoated Clear Prep 1, (right)



Clear Coat on Clear Prep 1



DETAILS & PROCESSES



Spiral Antique Natural finish

Fabrication and Finish Options for Clear Coated Spiral Stairs

The materials and methods used to fabricate Custom Iron spiral stairs differ from the balusters and panels of our metal railing systems. Due to the dissimilar materials used in fabrication of steel spiral stairs, we do not sell spiral stairs with either of our Clear Coat finishes. For spiral stairs and the companion railings, we offer an “antiqued iron” finish: Spiral Antique Natural.

First, the edges of the square tubing are lightly sanded. Then, using a mixture of clear coating and black pigment, sanding and grinding marks are covered on the flat surfaces. Finally, the entire stair and companion rail are sprayed with a clear top coat. Spiral Antique Natural finish is best suited for use on spiral stairs with textured balusters.

