



CHARACTERISTICS OF METALS

Through our experience of more than 30 years we have studied metals and know what works best. Here you will find a guide for metals such as: iron, bronze, aluminum and stainless steel and its behaviour with certain processes to achieve multiple appearances.

IRON/STEEL

Description

Steel: alloy of IRON and Carbon. (Pure IRON is an element and is not commercial any more). Steel contains more than 2% of carbon.

Wrought Iron: alloy containing less than 0.8% of carbon. Since wrought iron is no longer produced commercially, BELT uses Mild Steel; however is still commonly known as Wrought Iron.

Mild Steel or Carbon Steel: has up to 2.1% carbon and it maintains its ductility, malleability and toughness.

Material Processes

Hot Rolled Steel: Rolling process at temperatures over 1,000 degrees Fahrenheit. Material reconfigures itself during the cooling process, giving the finished product to loose tolerances than the original material. This process gives a blue-gray finish that feels rough to the touch. It is more malleable or ductile than cold rolled steel and has semi-rounded edges.

Cold Rolled Steel: rolling process at temperatures that are close to normal room temperature. It gives a gray finish that feels smooth to the touch. Stronger properties (20%) thus malleable or ductile hence harder to forge. It has sharper edges and more precise.

Galvanized Steel: there are two types: electroplated and hot-dip galvanized. The second is highly resistant to corrosion but adds a skin that is difficult to control and can affect the aesthetics of the products. It generates an additional cost since there are re-processes that need to happen to achieve the desired presentation. It is used where corrosion resistance is needed without the cost of stainless steel; it may be insufficient when exposed to extreme conditions such as acids exposure and acid rain.

Uses & Material Behaviour

Recommended mainly for interiors. Exteriors applications with limitations. Requires strong maintenance commitment to avoid oxidation. Maintenance instructions should be followed and additional touch-ups will be required after first signs of rust. Forge Wrought Iron pieces will show traces of calamine and texture due to the craftsmanship process and the iron composition. Smooth finishes in forged pieces require additional work. Brushed and Polished finishes are very labour intensive.

Finishes Recommended

Natural finishes are only recommended for interiors. Blackened steel patinas may vary slightly due to application temperature, exposure, material hardness and hand labour. Paint finishes are recommended for interiors and are mandatory for exteriors. In controlled moist and temperature environments finishes are practically maintenance free. Brushed or Polished finishes are available for products where forging is not involved. Intricate designs, even when there is no forging involved, may not be fully polished or brushed.

Important Remarks

Wrought Iron / Steel are the "real thing" for blacksmiths, forgers. Most historical Blacksmithing was done in either iron or bronze; or a combination of both.



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2.



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4.

- 1- Cold rolled steel railing during brushing process before applying patina.
- 2- Mild steel detail of handrail and finial with textured and natural finish.
- 3- Steel sheet with photo engraved and repoussé texture and patina finish.
- 4- Steel sheet with photo engraved and hammered texture and patina finish.



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BRONZE



Description

Bronze is an alloy of Copper and Tin (may have traces of zinc). Bronze forged pieces will show minor traces of the forging process; less noticeable than iron and more than aluminum. Smooth finishes in forged pieces require extra labour. Smooth finishes (Smooth, Brushed and Polish) are finishes that are labour intensive.

Uses & Material Behaviour

Bronze is recommended for interior and exterior (not all finishes can be used in exterior). Patinas can be used in exterior (See Patinas section in the Resources Tab of our website for details). Chrome or Nickel Plated may be used in exterior. Natural bronze, such as polished bronze that are exposed to the touch or manipulation (eg. handrails) require daily maintenance in exteriors and at least twice a week in interiors. When is used in exteriors and exposed to extreme humidity, acid rain or ocean front properties, clear coating is recommended on light patinas.

Finishes Recommended

Standard patinas in bronze are included in all items. Polished, Brushed or Light Patinas (01-03) will require clear coat and regular maintainance on pieces that are not exposed to the touch. (eg. sweat of hands 'attacks' the material). Dark patinas (04-06) in pieces with moist and temperature controlled environments are practically maintenance free. Polished bronze for exteriors is not recommend specially on big surfaces. On small surfaces such as handrails is sustainable only with regular cleaning and buffering. Polished bronze finish for an entire piece must be requested from the beginning of the proposal process. If the piece is not clear coated rigorously, before handed, constant maintenance is required. As well as, special preparation, cleaning and cost implications.

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- 1- Bronze cladding for kitchen drawers with natural brushed finish.
 - 2- Bronze gate with patina finish aged verdigriss naturally by the environment.
 - 3- Forged bronze bars of different callibers and finished with dark patina.
 - 4- Bronze handrail with natural polished finish.



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ALUMINUM



Description

Aluminum is a chemical element (Al). Commercial use main alloying agents are copper, zinc, magnesium, manganese, and silicon. Forged aluminum has minor traces of the forging process, however they are less noticeable than the iron pieces. Smooth finishes in forged pieces require extra work. Smooth finishes (Smooth, Brushed and Polished) are finishes that are labour intensive.

Uses & Material Behaviour

Interior and Exterior. Recommended for exteriors with to extreme humidity, acid rain or ocean front exposures. With the right coating aluminum stands well to moist, salt and other external agents. Regular cleaning is required to guarantee durability. Brushed or Polished finishes are available for products where forging is not involved. Intricate designs may be brushed or polished sometimes at considerably high cost.

Finishes Recommended

Natural finishes are only recommended for interior. Natural finishes on exteriors or interior surfaces exposed to manipulation a clear coat is recommended. Paint finishes behave well in both interiors and exteriors. To ensure durability recommended maintenance should be performed. In moist and temperature controlled environments finishes are practically maintenance free.

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- 1- Aluminum casted railing with paint finish.
 - 2- Aluminum casted driveway gate with paint finish.

STAINLESS STEEL

Description

Stainless Steel is the alloy of IRON and Carbon with a minimum of 10.5% of Chromium. Forged iron pieces will show traces of calamine and texture due to the craftsmanship process and the iron composition. Smooth finishes in forged pieces require extra work. Smooth finishes (Smooth, Brushed and Polished) are finishes that are labour intensive.

Uses & Material Behaviour

This material and its finishes have limitations. Due to material strength very ornate pieces that have forged components in stainless steel are complicated to make, their cost can be 2-4 times the cost of a regular piece.

Finishes Recommended

All finishes are recommended for interior and exterior. Blackened stainless steel patina may have brownish accents. Natural finishes are durable when not exposed to extreme weathers; in this situation regular cleaning and maintenance is required.



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- 1- Stainless steel dining table with brushed and polished natural finish.
 - 2- Stainless steel wine rack with brushed finish.