

# **HOW IS STAINLESS STEEL MADE?**



## Introduction

Stainless steel is one of the most versatile and widely used materials in the world. From kitchen appliances and cutlery, to skyscrapers, its durability, corrosion resistance and aesthetic appeal make it a popular metal across multiple industries. Whether you're cooking dinner, driving a car, or admiring a towering building, chances are stainless steel is playing a vital role. Its versatility and reliability make it a material that will continue to shape our everyday lives for years to come. This common metal goes through vigorous processes, from smelting and forging, to bending, shaping and finishing, to become the finished products you use at home.

# What is the **manufacturing process** for stainless steel products?

The creation of stainless steel begins with its raw materials: iron ore, chromium, silicon, nickel, carbon, nitrogen and manganese. The exact composition depends on the type of stainless steel being produced, but the key ingredient is chromium, which gives stainless steel its corrosion-resistant properties.

**1**

## **Smelting and casting:**

The raw materials are melted together in an electric arc furnace at extremely high temperatures. Once melted, the mixture is cast into semi-finished forms like slabs, billets or blooms.

**2**

## **Forming:**

The semi-finished steel is then heated and passed through rollers to form sheets, plates, bars, rods or wires. This process is known as hot rolling. For thinner sheets or more precise dimensions, cold rolling is used.

**3**

## **Heat treatment (annealing):**

After forming, the steel is annealed (heated and cooled under controlled conditions) to relieve internal stresses and improve its mechanical properties.

**4**

## **Descaling:**

During annealing, scale (a layer of oxide) forms on the surface. This is removed through processes like using acid baths or electro cleaning.

**5**

## **Cutting and shaping:**

The steel is then cut and shaped into the desired product using techniques like laser cutting, water jet cutting or mechanical cutting.

**6**

## **Finishing:**

Finally, the stainless steel is given a surface finish, which can range from matte to mirror-like, depending on its intended use.

# What do stainless steel fabricators do?

Stainless steel fabricators play a crucial role in transforming raw stainless steel into functional products. They specialise in cutting, bending, welding and assembling stainless steel components to meet specific design requirements. Fabricators work with architects, engineers and manufacturers to create everything from food processing equipment to digital signage.



## Key tasks performed by fabricators include:

**Cutting:** Using tools like laser cutters to achieve precise dimensions.

**Welding:** Joining pieces of stainless steel together using techniques like TIG and MIG welding.

**Bending and forming:** Shaping stainless steel into curves, angles, or complex shapes.

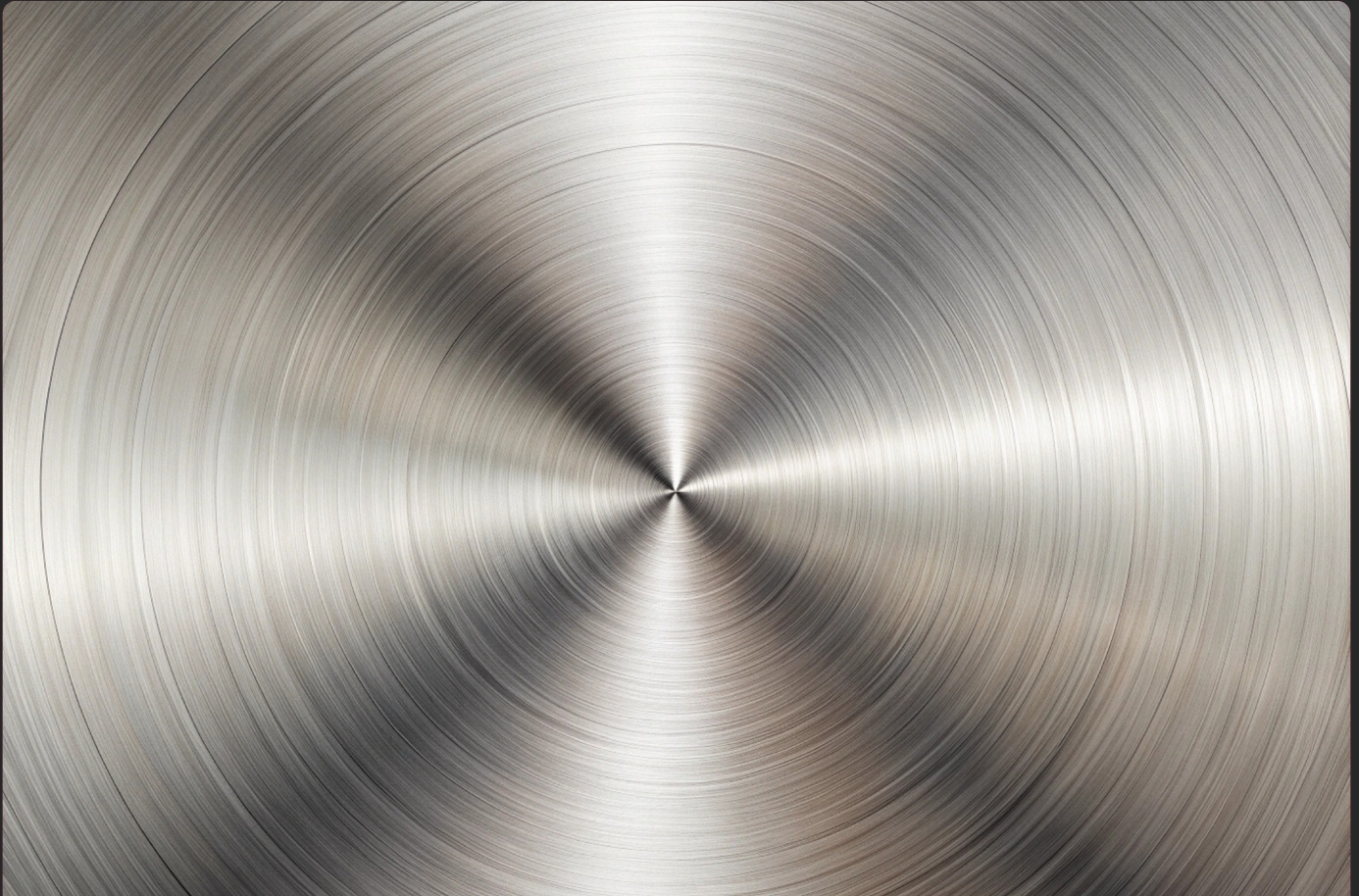
**Polishing and finishing:** Applying the desired surface finish to enhance appearance and functionality.

Fabricators must have a deep understanding of stainless steel's properties to ensure the final product meets the high quality and performance standards needed from the metal.



# The different types of finishes for stainless steel

The finish of stainless steel not only affects its appearance but also its performance and maintenance requirements. Some common surface finishes are:



**Matte finish:** A non-reflective, dull surface often used in industrial applications.

**Brushed finish:** Created by brushing the surface with abrasive materials, this finish has a satin-like appearance and is popular for appliances and architectural elements.

**Mirror finish:** A highly reflective, polished surface used for decorative purposes.

**Bead blast:** Achieved by blasting the surface with fine glass beads, resulting in a uniform, matte texture.

Each finish has its own unique benefits, making stainless steel suitable for a wide range of industries, such as the food processing industry and medical sector.

# The top uses for **stainless steel**

Stainless steel's unique properties make it indispensable in many industries. Its top uses include:

## **Construction and architecture:**

Stainless steel is used in building facades, roofing and structural components due to its strength and resistance to weathering.



## **Kitchenware and appliances:**

From cutlery to refrigerators, stainless steel is a staple in kitchens worldwide because of its hygiene and durability.



## **Medical equipment:**

Its corrosion resistance and ease of sterilisation make it ideal for surgical instruments and medical devices.



## **Automotive industry:**

Stainless steel is used in exhaust systems, grilles and trim for its durability and aesthetic appeal.



## **Energy sector:**

It plays a critical role in oil and gas pipelines, wind turbines and nuclear power plants due to its ability to withstand extreme conditions.

