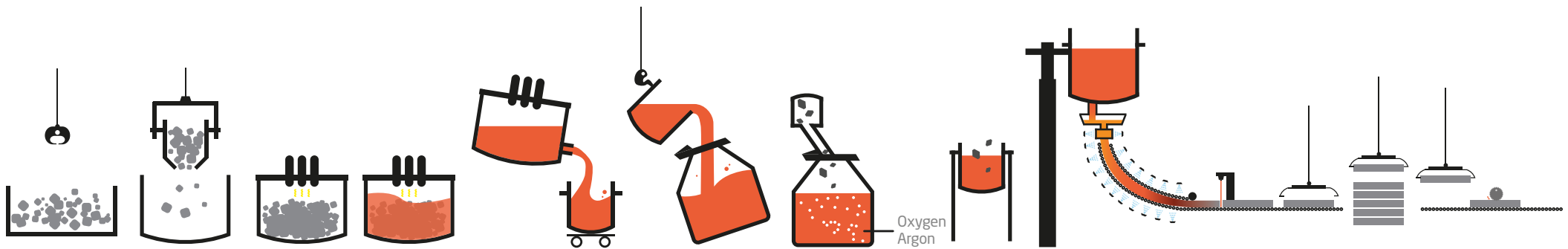
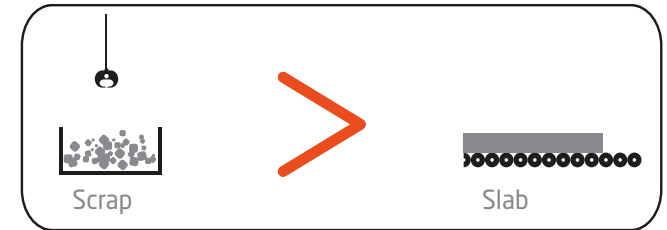


# Manufacturing process

## Stage 1 - the melt shop

Recognised as a reference for **sustainable development**, the production of steel starts with the **melting of scrap**. At the **melt shop**, the chemical composition of the stainless steel grade is determined. With a capacity of **2 million tonnes**, Stainless Europe's plants have a competitive advantage.



Using an electric arc furnace with a **melting capacity of up to 160 tonnes**, the **raw material** (recycled stainless and ferro alloys) is transformed into **molten metal**.

The molten metal is then transferred to the **converter**.

To obtain the correct chemical composition, alloying elements are added in the converter. **We can produce all of the standard grades.**

The ladle metallurgy process involves adding some alloying elements to obtain **the exact chemical composition** and the correct temperature before the continuous casting process.

The liquid steel is then cooled and solidified during the **continuous casting process**.

At this stage the maximum width is determined. Using an oxygen flame, the solid steel is cut into **slabs of up to 30 tonnes in weight, up to 12 m long, 200 mm thick and up to 2 m wide.**

Some slabs are then ground to remove surface defects before everything is shipped to the hot rolling mill.

### Information

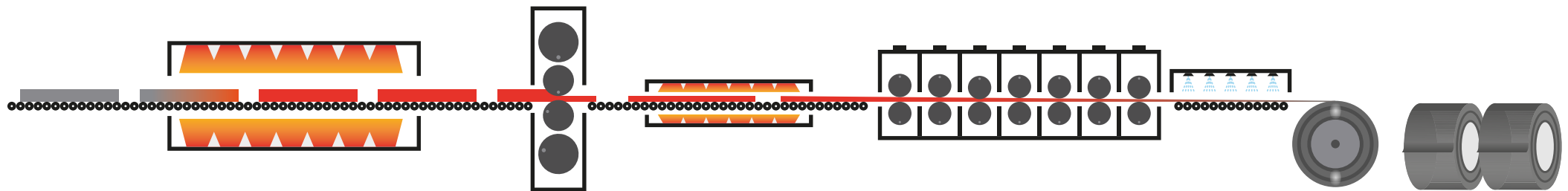
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# Manufacturing process

## Stage 2 - hot rolling mill

Aperam Stainless Europe's **hot rolling mill** has a rolling capability up to **2 metres wide**. This is the first step in reducing the slab's thickness from **200 to 3 mm**, in the form of a "**black coil**".



This process takes place at **Aperam Châtelet** and involves reheating the slab in a furnace at an average temperature of **1250 °C**.

An initial reduction in thickness, from **200 to 40 mm**, is achieved through several passes on the roughing mill.

The thermal tunnel maintains the temperature of the slab even as its thickness is reduced.

Then the slab passes through a series of 7 rolling stands to reach approximately **3 mm in thickness** (1.2 min / max 13 mm). The metal is cooled down and wound to form coils, also called "**black coils**" due to their oxidized surface.

The coils are then shipped to the annealing and pickling plant. **We also sell black coils.**

### Information

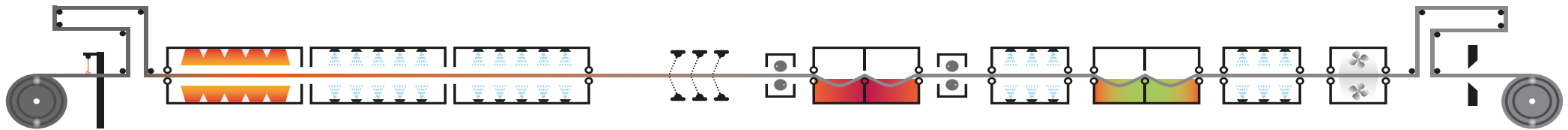
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# Manufacturing process

## Stage 3 - first annealing and pickling

This stage recovers the **mechanical properties** of our stainless steels. It also produces coils with an **HRAP finish**, and a **minimum thickness of 1.2 mm and maximum 13 mm**. These coils are sold for applications with minimal aesthetic requirement, such as industrial applications.



Black coils are heated in the **annealing furnace**.

This step recovers the mechanical properties of our stainless steels.

The oxides on the surface are broken down by **shot blasting**.

The **pickling process**, which takes place in acid baths, is followed by water cleaning and air drying.

This results in white coils with no surface oxide, also known as the **HRAP finish**.

At this point, the white HRAP coils can be sold without cold rolling or further surface finishing.

### Information

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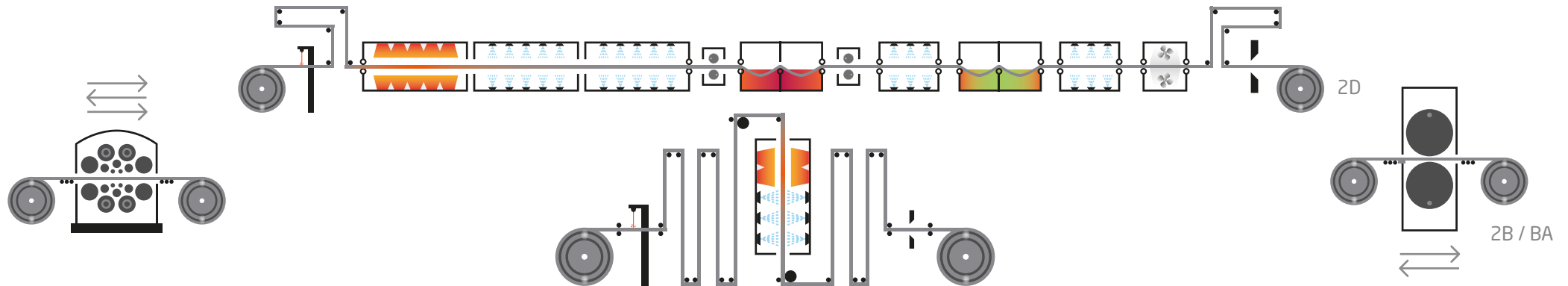
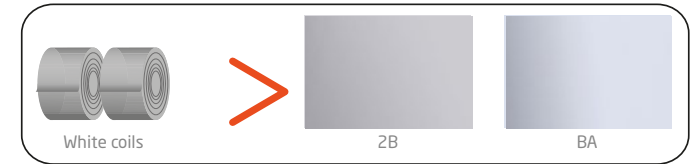
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# Manufacturing process

## Stage 4 - cold rolling and final annealing

This stage reduces the thickness of the strip down to a minimum of **0.3 mm**. A **final annealing** ensures that the properties meet the customer's exact requirements.

The cold rolling process gives our stainless steels the required **flatness**, and a **surface finish** makes them suitable for such visible applications as household appliances.



The thickness of white coils – around 3 mm – is further reduced during the **cold rolling mill process**.

By rolling the strip several times in the reversible cold rolling mill, we can achieve a minimum thickness of **0.3 mm**, thus meeting the customer's requirements and the necessary **surface quality** for final use.

After cold rolling, the **annealing operation** recovers the mechanical properties of our stainless steels.

A **final pickling** then removes the annealing oxide and gives the stainless steel a **mat aspect** (2D).

Another option is to anneal under a protective atmosphere, thus retaining the cold rolled appearance for applications requiring **bright annealed finishes (BA)**.

The annealing process recovers the **ductility and formability** required by customers for processing.

In this case, no oxide is created and no pickling is necessary. **The strip is very bright.**

The **skinpass operation** guarantees the **flatness** and the **coil surface**.

One, two or three passes may be necessary.

By selecting different skinpass rolls, a surface finish suitable for visible applications, such as **household appliances**, can be produced (2B or BA).

### Information

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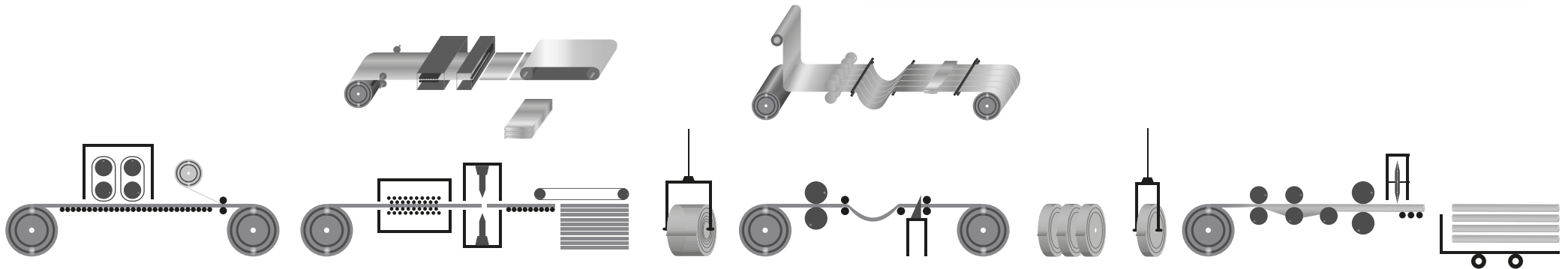
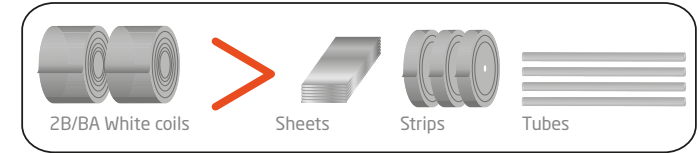
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# Manufacturing process

## Stage 5 - metal finishing

The final product is **slit to width** and **cut to length**. Some specific **surface finishes** can also be made. These metal finishing operations are carried out in our production sites and through our network of service centres.

Our materials are **100% recyclable** at the end of their life.



During finishing, the material is given its **final surface finish** appearance, as required by the customer's order. There are different operations, including **polishing, brushing or other special processes**.

The last operation is where the **final form of the material** is achieved. Coils can be **cut to length** to obtain **sheets**, blanks or discs.

Coils can also be **slit to width** in strip, **narrow strip** and blanks.

Using other processes, we can also produce a range of other finished products, such as **tubes**, which are made by **forming** and then **welding** the flat products.

### Information

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