

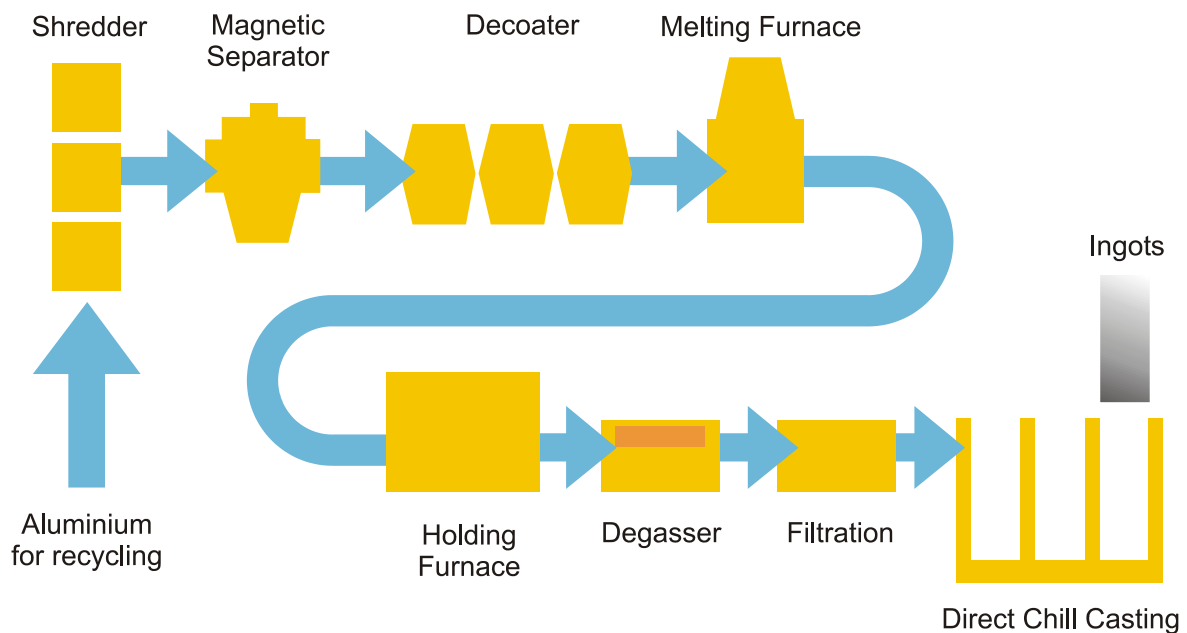
## Recycling processes



### Closed-loop aluminium drinks can recycling

Novelis Recycling (formerly Alcan) opened the first dedicated aluminium can recycling plant in Europe at Warrington, Cheshire, in 1991 with an investment of £28m. The plant remelts used beverage cans to produce ingots, which are rolled into sheet at another mill, and then supplied to canmakers to be made into cans again.

The Warrington plant employs the latest remelt technology to maximise yield and energy efficiency in the production of quality ingots, the largest of which weigh 27 tonnes and are nine metres long.



### Shredding

Aluminium cans arrive either in bales or loose and flattened, and are shredded into pieces the size of a walnut in a 1000 horsepower shredder with a capacity of 15 tonnes per hour. The shreds are then passed through a double magnetic drum separator to remove steel, which is a contaminant to the process.

## Decoating

Lacquer from the branded and decorated cans is removed by blowing hot air (around 500°C) through the shreds in a decoater, on a slowly-moving insulated conveyor. The hot exhaust from the de-coater is combusted in an after-burner, and the exhaust from the after-burner passes over a heat exchanger, which heats the fresh air going into the decoater. By recycling hot air in this way, the need for a separate fuel source for this part of the process is removed, maximising energy efficiency.

The recycling of aluminium cans is four stage process

Shredding the aluminium cans

Decoating the lacquer on the cans

Melting the aluminium

Casting the ingots

## Melting

The hot, shredded, decoated aluminium is fed into one of the two 90-tonne sidewall furnaces, which contain submerged stirrers that create a vortex in the pool of molten aluminium and drag the shreds quickly down into the melt. This process achieves rapid melting rates and high yields.

The furnaces have state of the art regenerative burners and a burner management system to reduce the amount of energy used. The jet pump stirrers alternate between applying positive and negative pressures, blowing out and sucking in the metal to achieve rapid melt and even temperatures.

Dross, which is a by-product of melting aluminium, is removed periodically from the furnaces, and cooled under a blanket of argon to prevent oxidation. This increases the amount of aluminium that can be recovered from the dross.

The now-molten metal is transferred into the 90-tonne holding furnace, where accurate temperature control is achieved, the alloy composition is checked and the metal is treated to remove non-metallic particles before casting.

## Casting

Ingots are cast by tilting the holding furnace and pouring the molten metal - via a two-stage process to remove any remaining minute non-metallic particles and gases - into a vertical casting unit. Chemical composition and metal cleanliness are then tested on each cast.

As the metal flows into the mould, it is chilled by jets of cool water being pumped around the mould, and a solidified outer shell is formed.

The base of the mould begins to lower hydraulically, the metal continues to flow into the mould and the shell is now directly cooled by a secondary water curtain as the ingot grows to a length of up to 9m.

The ingot solidifies gradually during the casting process, which takes approximately three hours. The ingots, which each contain around 1.6m used drinks cans, are then shipped on to a mill for rolling into the sheet from which canmakers subsequently produce new cans - and the whole process begins again.