

all to thin sheets, with which extrusion reaches the limits of feasibility. "Thin sheets are our specialty, beginning at 0.08 mm," he says. In this range the most delicate profiles only a few millimetres wide and thick are produced. In tool technology terms folding in this range of dimensions is, as it were, the masterpiece.

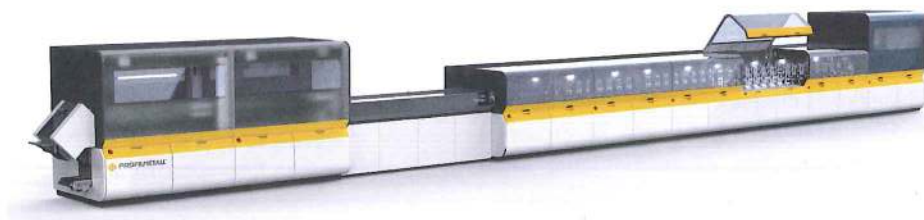
A frequently occurring thin-sheet application with large production runs are glass spacers for insulating glass panes. If one looks between the individual panes of a modern window, one will see an all-round, silvery and shiny profile. "Previously, those profiles were usually extruded," says the Profilmittel ex-

pert, "but the manufacturers are increasingly calling for particularly thin material in order to reduce cold bridges. So our technology is more and more sought after for that purpose." However, tool technology is not the only challenge. For top-of-the-range, high-tech applications, feather-light profiles are also needed because they can be welded by laser on the profiling machine itself.

Even though extrusion in that dimensional range is still technically possible, the yield lags far behind that of roll forming. Moreover, in extrusion the die wear is very severe. In roll forming, although it is true that initial tool-

ing costs are higher, the wear is minimal. And there is still more potential for savings: "Roll forming is very material-efficient, so in many cases material costs and weight are lower," explains Roth. The extrusion of hollow profiles often demands an additional supporting web, and that increases the material needed.

A further example cited by Profilmittel as a replacement for extrusion is a profile of 1.5 mm thick AlMg3 sheet for the roll-up cassette of a storage space roller blind in a passenger car. The component is around one metre long. Before deformation it is cut to length, so this is a plate forming process. "In plate forming we have the advantage that we can produce complex final trimming cuts", says Roth. "For this, it is important to be in control of the behaviour of the material, since there is a tendency for it to bend at the ends." But in the context of this example that is not all. The tool design – and ultimately the measurement technique as well – were also required for another reason: "The profile was designed 100% as a freeform contour, entirely without straight surfaces – a design one does not come across every day," observes the expert from Profilmittel in conclusion. ■



Profiling unit of the latest generation. The profiling units are of modular design so that they can be refitted easily and are 'servicing-friendly', fully encapsulated and safe to operate, ergonomically optimized and with state-of-the-art digital features.

## A step forward in the flexibility of Properzi lines

It is always difficult for an aluminium smelter to adapt the production of semis to the market volatility. Billets, rod, ingots and other products are subject to fluctuations in price and demand. Continuus-Properzi, which supplied the vast majority of aluminium rod lines to smelters worldwide, has recently developed a combined line capable of producing two different products – rod and ingots – from the same line.

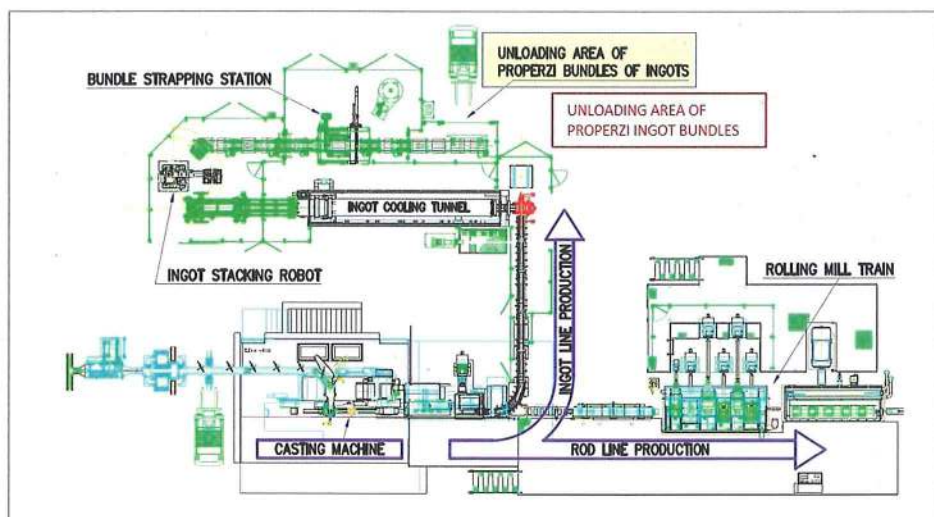
One high production rod caster (10-15 t/hr) solidifies a continuous bar that can enter the rolling mill to produce wire rod or be sheared by the rotary shear to produce 10 kg, 700 mm long ingots. The resulting Properzi ingots are far superior to those produced with a traditional open-top system, says the company.

Properzi ingots are continuously cooled, stacked and strapped into bundles of around one tonne. Switching from rod to ingot production and vice versa is simple and requires no major changes.

As shown in the layout example, the ingot line is close to the rod line, with the advantage that the space utilization in the casthouse is

optimized. The required area is almost half the area required for the installation of two separate lines, one for rod production and one

Pure aluminium ingots, especially primary foundry alloys (Al-Si ingots), are the alternative product for a different market segment.



Layout of the Combo Lines

for ingot production. Furthermore, since the caster is the same for both products (produced in campaigns), it is not necessary to install two separate furnace sets. This leads to significant savings in investment and area.

Two Combo Lines, as they are called, are currently in the commissioning phase and expected to go into full operation in the second quarter of 2019. ■