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SCREWS  
BARRELS



## **3S – WITH DIRECT COURSE TO SUCCESS**

Screws, barrels, feed sections – 3S is a production business with a focus on producing core parts for the extrusion industry. Founded in 1992, 3S counts about 50 members of staff today. The firm premises are located at Roitham near Gmunden (Upper Austria) and covers 3.500 m<sup>2</sup>. Currently about 250 tons of raw material can be stored there. The machine fleet has recently been extended for about 1.5 million Euros.

Another 3S location where twin screw barrels are produced is maintained in Wartberg im Mürtal.

## **PRODUCT OVERVIEW**

### **SINGLE SCREWS**

We manufacture screws for extrusion and injection moulding with lengths of up to 6000 mm and a diameter of 300 mm (single or multi-part). We offer a wide range of designs for all extrusion applications.

### **TWIN SCREWS**

Twin screws (co-rotating and counter-rotating) are of cylindrical or conical design.

### **BARRELS**

- ) Barrels for single screw extruders
- ) Barrels for twin screw extruders

### **GROOVED FEED BUSHES**

Groove feed bushes made of various materials with integrated cooling system or rolled-in cooling tubes.

### **REFURBISHING / REPAIR**

Wear of screws and barrels as resulting from various additives such as glass fibres, colouring pigments, fillers and flameproofing agents and as occurring in the ceramic industry is unavoidable. A lower output rate, in conjunction with poor quality, will substantially deteriorate the performance of these parts. You can increase the productivity of your equipment by refurbishing your process unit, and you can actually even extend its service life by improving protection against wear. We all know that downtimes involve high costs, so we make every effort to shorten delivery times.

### **CAD - SERVICE**

As an additional service, we prepare drawings of screws and barrels, for example during repair or, at short notice, on the customer's premises.

### **MACHINERY**

For a list of all machines please visit [www.3s-gmbh.at](http://www.3s-gmbh.at)

## **SERVICES**

## A TRULY NOVEL BARREL

So far the design of barrels for conical twin screw extruders had one major disadvantage: the heavy wear. In the last 50 years the design of the barrels – with surface-cured material – had hardly changed at all. Until now.

The team of developers of 3S has produced a world novelty in the world of barrels: A wear casing (bushing) made of hardened tool steel and located inside the barrels can be exchanged completely and as often as you like when it is worn out. This way the lifecycle of the barrels has become significantly longer. The new technology is produced at another 3S location in "Wartberg im Müritztal". In February 2010 the first barrels with wear protection casing already left the production plant.



- ) Longer service life of bushings due to consistent hardness.
- ) Bushings can be exchanged, the barrels casing remains the same.
- ) A wide spectrum of high-performance materials is available for special applications..
- ) Reduced standstill times of extruders due to longer service life of barrels.
- ) All provided by one supplier: optimal adjustment of the barrels and screw materials.

## MADE MEASURABLE WITH WISCEB

How do we make wear of twin screw systems measurable? With above-average visual judgement?

With more and more abrasive materials added to plastics we see increased wear, especially with conical twin screw systems but also with barrels walls. While measuring the state of wear of screws is rather simple, the entire process is considerably more complicated for conical barrel bores. Conventional measuring tools fail in trying to perform this task exactly. With the WISCEB (Wear Inspection System for Conical Extruder Barrels) newly developed by 3S, the state of wear of process units can be examined in time so that suitable action can be taken.

Wear is documented methodically. Measuring the state of wear is also offered as a service by 3S service technicians who use the in-house WISCEB. Software especially developed for this purpose logs the actual and predefined lines and provides exact analyses. The handling is simple – and what is more, the look is great: Visualisation is provided through a tablet PC that comes as a part of the complete system.



Sample Picture

## LASEX® - LASER ARMoured SCREWS FOR EXTRUSION

To date, state-of-the-art technology for armouring extruder screws has involved welding processes such as TIG (Tungsten Inert Gas) or PTA (Plasma Transfer Arc) in which the welding material is applied in powder form. A closely-associated process is laser CMB (Controlled Metal Buildup). This process uses a laser beam to melt the weld material instead of using an electric arc or plasma.

Working closely together with a research institute, 3S has now developed a laser CMB process for extruder screws. This process can be used to armour screws between 1 and 6 metres long and 50 to 500 mm in diameter.



Thanks to its unique technology, the LASEX process opens up a wide spectrum of materials that can be mated, which could not be realised using conventional welding processes.

This is because the laser creates a much smaller weld pool than other processes so that fusion with the base material is more focused. This enables a higher level of hardness to be achieved.

Using a weld material with a Rockwell hardness of 55 HRC, the PTA process achieves a hardness of 50 HRC in the armour when a single layer is applied, for example. LASEX achieves a hardness of up to 57 HRC using the same materials. As a result, the LASEX process leads to an extended service life of armoured screws.

An additional LASEX advantage is that there is a lower tendency for cracks to form. This is significant when changing colours, for example, because different coloured residues can become trapped in cracks causing discoloration of the new melt over a longer period, leading to the formation of streaks in the extruded material.



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