Customer reference case

Plastics industry

Extrusion

Gearboxes for single screw extruders

SKF Explorer spherical roller thrust bearings

The Zambello brothers, Alessandro and Elio, implemented a Zambello/SKF teamwork solution that increased their customers' productivity.

Extruder gearbox upgraded by downsizing

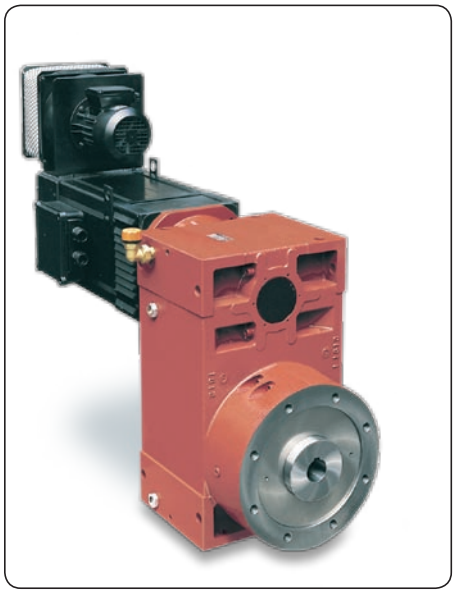
To meet the increasing demands on the productivity and reliability of single screw extruders, the Zambello Riduttori company took a fresh look at the gearboxes they supply to the plastics industry. The challenge was to downsize the gearbox without affecting reliability. This is where SKF came in – providing a package of products and technical recommendations.

Founded in 1957, Zambello Riduttori is a gearbox manufacturer with a reputation built on performance, innovation and continuous improvement. Today, the company is recognized as a leading supplier to the plastics industry.

The challenge

The gearbox used in a plastic extruder has to operate in very tough conditions. It must supply a huge amount of torque to the screw, while being able to handle the very heavy axial loads created by backpressure in the barrel and the viscosity of the plastic itself. This makes the selection and sizing of the thrust bearing normally fitted in the gearbox drive a difficult challenge.

In addition to high axial loads, the screw can experience un-predictable shock loads due to imperfect melting conditions in the barrel. These extreme shock loads can damage the bearing, screw and barrel and lead to catastrophic failures. What's more, the low rotational speeds mean very difficult lubrication conditions. No surprise then that the spherical roller thrust bearing at the end of the barrel screw is highly vulnerable.



A smaller size SKF Explorer spherical roller thrust bearing that enabled downsizing, combined with a new lubrication solution, was the answer to the extremely heavy axial loads and low rotational speeds in the Zambello Riduttori gearboxes.

The solution

The Zambello Riduttori/SKF team studied the behaviour of the forces within the barrel of an extruder, and the operating conditions of the bearing. With this knowledge, the team developed a package of products and suggestions that would enable downsizing and still accommodate the very heavy and fluctuating axial loads of the screw – while being able to maximize the effects of the lubricant. The solution: an SKF Explorer spherical roller thrust bearing and advanced engineering support. This support included tailoring a lubrication solution and accurately calculating preloads and advanced static safety factors.

SKF Explorer spherical roller thrust bearings feature extremely clean steel, containing a minimum of inclusions. SKF applies a unique heat treatment process that makes the steel even more resistant to wear and able to accommodate the heavy axial loads induced by the screw. In addition, the geometry of the rollers and raceways, combined with the surface finish of the contact surfaces, is designed to maximize the effects of the lubricant – even at very slow rotational speeds.

Customer satisfaction

Zambello Riduttori implemented the recommendations of the advanced engineering support team and changed to SKF Explorer spherical roller thrust bearings. Today, the bearings in the machines are operating to full satisfaction. In fact, end-users have reported an increase in output (kg/h) of up to 15 %. Not to mention a reduction in lost production by about 5 %, while reducing the costs of safety stock by as much as 10 %.

For more information, contact your local SKF sales organization.

Operating data

Extruder	
Melt pressure	450 to 500 bar
Screw rotational speed	50 to 300 r/min
Melting temperature	300 °C
Thrust bearing	
Bearing	SKF Explorer
types	29412 E to 29456 E
Oil viscosity	320 mm^2/s
κ value	0,1 to 0,3
C/P	2 to 4

Customer benefits

Zambello Riduttori
- Power density increase
- Stronger position on the market
- Higher market share

Extrusion plant
- Increased productivity
- Increased reliability
- Downtime costs reduced
- Safety stock costs reduced
- Higher flexibility

Commercial outcome

Zambello Riduttori
- Increased market share
- Expanded customer base

End-user
- Increased output by 15 % (kg/h)
- Production loss reduced by 5 %
- Safety stock costs reduced by 10 %

Publication **6083 EN**

Printed in Sweden.