Tomago Aluminium

Case Study:
Tomago Aluminum

Industry:
Manufacturing

Problem:
External contamination causing premature seal failure

Outcome:
A new sealing system providing a 250% increase in life over the previous seals

250%

increase in life over the original seals

www.hsa.com.au

About Tomago Aluminum

Based in the Hunter Region for more than 30 years, Tomago's success is built on the excellence, determination, and enthusiasm of their people, making them one of the industry's most dynamic and innovative manufacturers of aluminium.

Tomago Aluminium is Australia's largest aluminium smelter and has been operating 24 hours a day since 1983.

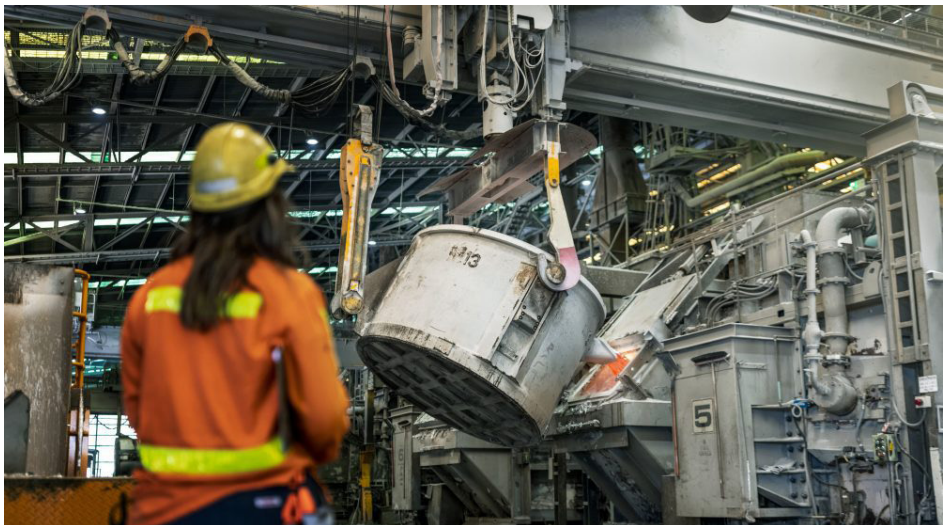

Photo courtesy of Tomago Aluminum

Using the right hydraulic seal for the job reduces wear and tear and minimises downtime. There are many factors to consider when choosing a seal, including temperature range, stroke speed and the fluid type used. Other factors like where the hydraulic system is installed, the environment and conditions will also impact on the life of the seal.

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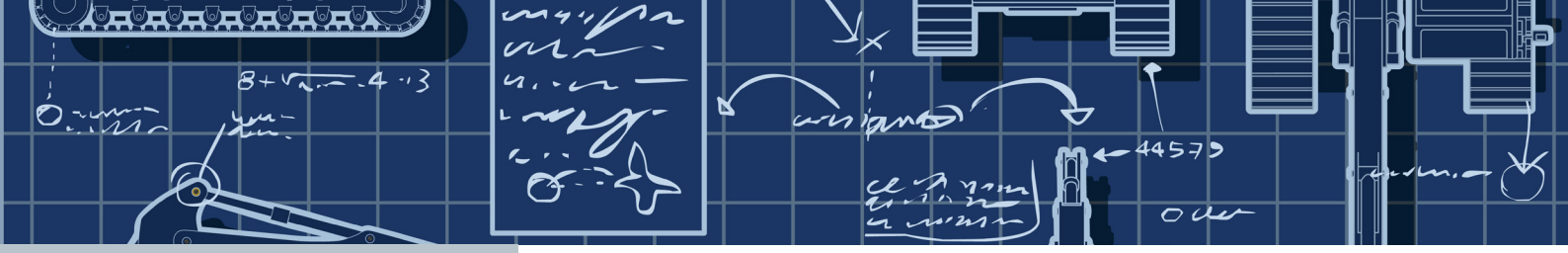
Hydraulic Seals Australia



SECTOR CREDENTIALS

Hydraulics are commonly used throughout the manufacturing industry in both light and heavy-duty machines. With varying conditions and a vast range of equipment in use, having access to a full range of hydraulic seals is a must.

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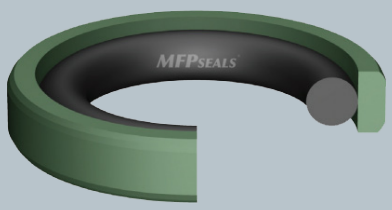
HSA have been providing expertise to the industry for almost twenty years. We can advise on the right product to meet your needs, with reliable, high-performance seal products. Our technical knowledge is backed up with fast ordering and delivery to keep your systems working.



Problem

Tomago's smelter extrudes aluminium into various shapes. As this happens, the extrusion must be cut into easy-to-handle lengths. This is performed during the extrusion with a flying saw which performs a cycle every 12 seconds.

The flying saw accelerates from a standstill to match the speed of the extrusion exiting the die. It docks the product then returns to its resting place. The saw uses fluid power, in the form of a cylinder with a 50 mm bore and a 28 mm rod, to move. The cylinder had a full bronze-filled PTFE sealing system typical of German equipment.

The original bronze-filled PTFE excluder was wearing out prematurely due to external contamination (dust and aluminium particles). The hard chrome plated rod was showing signs of scoring and the tandem rod seals were also wearing out. Once contamination enters the gland, the rod sealing system is doomed because PTFE has poor resistance to abrasion. The guide rings suffered a reduction in cross-section allowing metal-to-metal contact between rod and gland. From this point, total rod seal failure was swift and this was happening about every four months. Hydraulic oil leakage so close to hot extruded aluminium posed a significant safety threat and was not acceptable.

Strategy

The business required an excluder that would prevent the ingress of contaminants over a much longer period including tandem rod seals that would control the leakage significantly better than PTFE and an alternative guide ring material that would offer improvements in both load-carrying capacity and wear resistance.

Dust and abrasive particles mixed with hydraulic oil caused significant wear in the rod seal housings so the grooves had to be machined wider to provide flat and square surfaces on which the seals could sit. Wider grooves required custom-made seals and HSA used its exclusive XSL hard polyurethane material to make replacements for the excluder, the rod seals and the piston seal. The self-lubricating compound is very low friction yet incredibly tough and as an elastomer (unlike PTFE) it has far superior leakage control.

Results

The design of the excluder was altered to include an inner sealing lip and a flat wiping lip with increased surface contact. The extremely good abrasion resistance gave this new design extralong life and the ability to remove all contaminants from the rod. The guide rings were replaced with KT200B woven polyester material to increase their strength and provide longer service life. The new sealing system performed leak-free for fourteen months - providing a 250% increase in life over the original bronze-filled PTFE seals.