

## TOUGH TILE SEALS

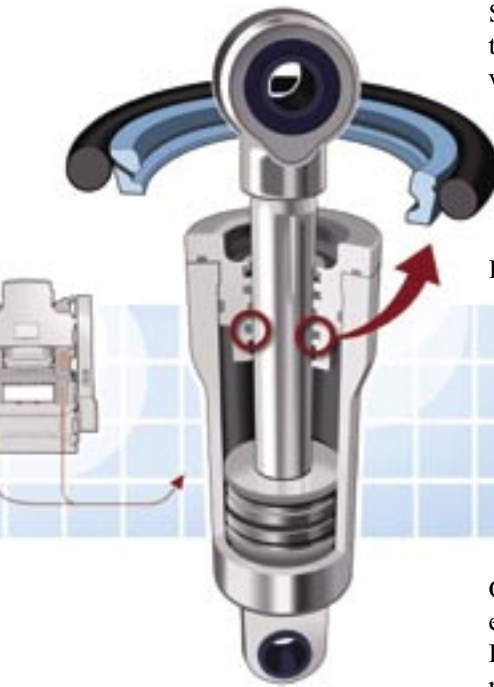
# PROVIDING EFFECTIVE SEALS FOR TILE MAKING MACHINES

**Ceramic tiles have been produced in the city of Foshan in Guangdong Province, China, for thousands of years, but the process has inevitably undergone huge changes since those first handmade examples. Today's tiles are mass produced by machines that can measure up to ten meters high and four meters wide, exerting a force measured in thousands of tons. Pistons and hydraulics systems lay at the heart of these huge machines.**

Hydraulic systems require seals that are strong and wear-resistant to enable them to handle pressure and temperature. "Our seals are critical components for these machines," says Elton He, Application Engineer with Trelleborg Sealing Solutions in southern China. "We supply all the seals used in the cylinders, and since these provide all the power used to press the tiles, they are of crucial importance to the functioning of these machines."

Tiles are produced by pressing a powder consisting mainly of clay and feldspar into a mold using a piston. Then, another piston pushes the tiles out of the mold and away for drying, glazing, and firing in a kiln. Today, Trelleborg provides the seals for about half of the ceramic presses built in China, and supplies all three of China's main ceramic press manufacturers. The largest of these is Foshan Henglitai Machinery (HLT), which was established in 1957 and produced China's first hydraulic ceramic press in 1988. The company currently exports to ten countries.

HLT's biggest ceramic press exerts a maximum pressing force of 72,000 kN and contains between 100 and 150 seals, ranging in size from just 50 mm to 1.6 m. These include many high-performance Turcon PTFE based seals – engineered thermoplastic compounds that offer very low friction to reduce power loss and minimize wear over a long life. Orkot wear rings are



also used, which are composite bearings that incorporate advanced polymer technologies.

High-tech materials, such as these, are crucial for the demanding conditions under which the presses must perform. "Most of the cylinders move at a rate of about ten or 15 cycles per minute and the machines normally operate about 20 hours a day," says Elton He. "They might only be shut down at the end of the year to perform maintenance, so these are very tough operating conditions."

### Creating movement everywhere

Hydraulic systems are used for movement in everything from the brakes in

a car to the large arms of excavators on construction sites. The basic concept for all hydraulic or fluid power systems is that force applied at one point is transmitted to another point using an incompressible fluid, usually oil. Generally, these systems consist of a number of cylinders, where through the force multiplication principle, cylinders of different sizes create greater power relative to force.

Sealing in such fluid power applications is no easy matter. A single seal will rarely suffice and usually a configuration of different types and profiles of sealing elements is required. Each seal works in harmony with the others to exclude harsh media from the system and keep in the oil.

Innovatively, they will also allow an accepted level of lubrication to be retained under some seals. This improves efficiency by making piston movement easier and preventing any damage to machines on start-up, even after extended shutdown periods.

### Seals for high pressures

Of the 100-plus Trelleborg seals in each of Chinese ceramic manufacturer Foshan Henglitai Machinery's ceramic presses, the majority comprise four basic types: piston seals, such as those installed on the groove of the pistons that press the actual tiles. Turcon seals, such as the patented products Glyd Ring T, Stepseal 2K and Excluder; Orkot and Turcite Wear Ring; Large-diameter O-Rings, which function as static seals on all the cylinders and flanges in the ceramic press. The seals must be durable – sealing in the mineral-oil-based hydraulic oil – as well as strong and wear-resistant and capable of handling pressures up to 35 Mpa while withstanding temperatures in the range of 60 to 80 °C. <<



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