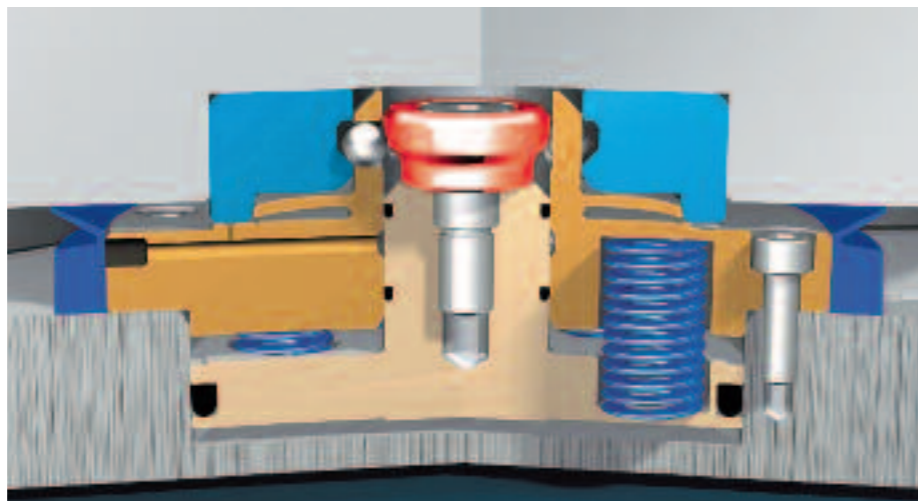


V-rings used for a new purpose

Hugo Keller, Senior Engineer

V-rings, which are normally used as axial shaft seals, have served as tried-and-tested sealing elements for years. The Flawil, Switzerland-based company Parotec uses V-rings from Angst+Pfister for a different purpose than the normal one – as hub seals for its Power-Grip pallet carriers. A pallet bearing workpieces is attached securely to a pallet carrier mounted on the table of a machine tool. The process involves using a high-precision ball-clamping mechanism, which is effectively protected from contamination by a V-ring. The V-ring, with its highly elastic sealing lip, excellently and enduringly meets all the requirements for this out-of-the-ordinary deployment.



Cross-section view of Power-Grip pallet carrier

Parotec's Power-Grip pallet carrier is an innovative modular clamping system that is patented worldwide and has already long since found its way into the machining rooms of many renowned companies. The Power-Grip system consists of a pallet carrier mounted securely to the table of a machine tool. Its second component is a pallet on which workpieces are positioned. The loaded pallets are fixed securely to the pallet carrier by means of a ball-clamping mechanism, thus firmly positioning the workpieces for subsequent precision machining. The Power-Grip pallet carrier is used with milling, drilling, turning and grinding machines, as well as with laser and spark erosion machines.

Increase in productivity

The special feature of Power-Grip pallet carriers is that the workpieces to be processed can be mounted and positioned on pallets away from the machine tool. The machine tool continues to work while the pallets are being loaded elsewhere. The pallets can be exchanged and replaced in seconds. Unproductive retooling downtimes are thus reduced to

a minimum, and the productive machine running time is increased by approximately 33 percent.

Trouble-free operation thanks to V-rings

Safe and trouble-free changing of pallets with the workpieces positioned on them is only possible if the clamping system connection with the pallet carrier is completely free from contamination. This is precisely where the V-rings from Angst+Pfister swing into action. When the Power-Grip pallet carrier is in the clamped position, the pallet is locked to the pallet carrier by means of the ball-clamping mechanism. To lock the pallet in place, pneumatic pressure lowers it 1.5 mm. The V-ring attached to the centering unit of the pallet carrier is activated during this procedure: the elastic sealing lip is compressed and seals the interface between the pallet and the carrier. Aggressive, synthetic cutting oil emulsions and dirt are not able to penetrate from outside. Air pressure simultaneously builds up inside the V-ring. If the air pressure exceeds 6 bars, forced ventilation takes place. The flow of air passing over the sealing lip of the V-ring ensures that the area around the ball-clamping mechanism remains clean.

This process is repeated each time a pallet is replaced. The sensitive interface between the pallet carrier and the pallet remains free from contamination and the pallets can be replaced at lightning speed – so processing of workpieces continues without interruption.



Exchangeable pallet with clamping mechanism



Pallet carrier with centering units

Advantages of the Angst+Pfister solution

The idea of "misusing" V-rings in the manner described above is both clever and simple, and has a number of advantages:

- Long axial deflection paths can be bridged: the V-ring's flexible sealing lip functions like an elastic "sealing hinge".
- The V-rings are very adaptable despite minimal deployment of force: it is the V-ring's elastic lip alone that is responsible for the sealing function.
- The rings ensure impermeability to contamination from outside and from air pressure from inside (at 6 bars, a flow of air is released and passes over the sealing lip).
- The V-rings stand out for their high restoring force and the good elastic behavior of the sealing lip.
- Assembly is simple and small installation areas are perfectly adequate: the V-ring is located directly on the pallet carrier centering unit. No location groove is required – the V-ring is positioned and fixed in place by expansion of the interior diameter.

V-rings from Angst+Pfister for more than a million clampings

Power-Grip pallet carriers are available in various models. Angst+Pfister standard V-rings VL 220, VL 250 and VL 350 are used for the Power-Grip 2x and 4x pallet carriers. These rings are made of NBR 60 Shore A. Specially dimensioned blue V-rings VAY Ø 124 x 139 x 20.5 mm made of NBR 80 Shore A are used for Power-Grip 1x pallet carriers.

Both the standard V-rings and the specially dimensioned V-rings deflect by 1.5 mm during each clamping procedure and perform flawlessly for more than one million compressions. It's the perfect seal of the ball-clamping mechanism that guarantees that the pallets can be positioned precisely with 0.002 mm repeat accuracy without calibration loss. Products from Angst+Pfister were selected not only for the V-rings, but also for all O-ring seals. HITEC® O-rings made of NBR 70.5/P5F are in deployment here.

Angst+Pfister – the right partner

The Parotec Power-Grip pallet carrier with its high performance and quality standards, as well as its compelling advantages, are renowned worldwide. The precision and operational safety of these clamping systems for CNC machinery are based on the reliability of the individual engineering components. With its solution of using a V-ring to seal the interface between the pallet carrier and the pallet, and through the deployment of O-rings, Angst+Pfister makes a key contribution to that precision, safety and reliability, and to ensuring trouble-free operation.

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