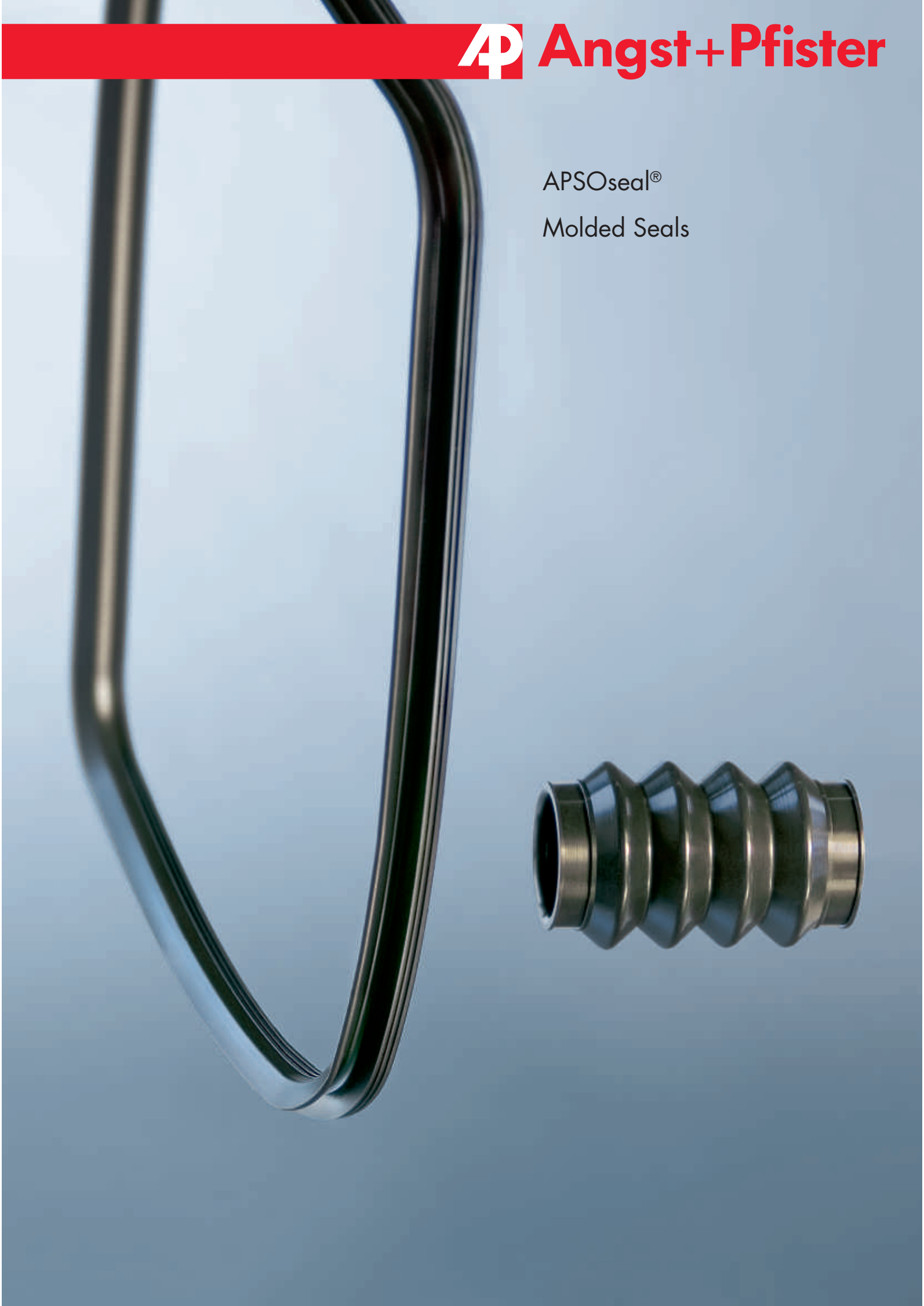
Angst+Pfister

APSOseal®

Molded Seals



Molded seals – customized solutions from a single source

Special sealing applications require special solutions. Custom-fabricated molded seals are called for in situations where deployment or basic operating conditions push standard sealing elements to their limits. These custom-molded seals are precisely tailored to the specific application at hand and, as their name implies, are manufactured using special forming molds and dies. Optimal shaping of the sealing lip and the right choice of material and hardness are crucial prerequisites for a reliably functioning molded seal. The natural resilience of elastomeric sealing materials provides a virtually constant sealing force.

Engineering – across-the-board expertise

Angst + Pfister places its extensive experience in developing application-specific molded seals entirely at the service of its customers. Expert consulting services that range from choosing the right material to designing the seal geometry and defining possible surface treatments form the basis for customized solutions. In addition to taking all application parameters into account, Angst + Pfister naturally also takes aspects such as cost effectiveness and easy assembly and installation into consideration. Alongside CAD/CAM design services, finite elements method (FEM) simulation is available during the development process to simulate especially challenging tasks. Angst + Pfister's engineering expertise results in perfect molded seals that optimally meet customer-specific requirements and custom application specifications.

Fabrication – quality down to the tiniest detail

Optimum molded seals are the result of the fabrication method best suited for the sealing application involved. Injection-, compression- or transfer-molding techniques are employed depending on the geometry, unit production volume and material. Angst + Pfister also provides a wide array of surface treatments.

Logistics – fast-track procurement routes

Angst + Pfister offers its customers fastest possible product availability also for custom-fabricated molded seals. Our worldwide procurement network ensures relatively short delivery times. Blanket purchase agreements can be combined with rolling planning, just-in-time or kanban deliveries. A state-of-the-art logistics center warehousing approximately 120,000 different stock-keeping units is the linchpin of Angst + Pfister's logistical services. Our ISO 9001:2008-certified complete quality assurance system greatly simplifies incoming goods inspection procedures for customers. EDI integration or purchasing through Angst + Pfister's APSOparts® online shop present additional ways to optimize logistics costs.

Customized solutions with molded seals

Molded seals: The better solution for customer-specific applications
Molded seals perfectly adapted to specific deployment purposes offer a variety of advantages over standard sealing elements and deliver an unparalleled degree of leak-tightness. In direct collaboration with customers, Angst+Pfister's expert engineering team devises customized solutions for a vast array of different sealing tasks.

Application examples: Innovative advances based on molded seals (I)
Profile seals from Angst+Pfister cover a virtually limitless range of applications: a special rotary seal for bulk solids, for example, ensures that nary a grain gets lost in the production of food, while a specially developed static lip seal produces optimum sealing action against pneumatic air pressure in a flow control valve.

Application examples: Innovative advances based on molded seals (II)
The deployment spectrum is especially pertinent to many areas of everyday life: a molded static seal for drainage applications meets exacting plumbing technology demands for effectiveness and durability, while a special capsule sealing element for coffee machines stays absolutely leak-tight at hot drinking water temperatures of up to 90°C.

Seals for every application: Materials and compliance certifications
The wide range of specially certified materials meets international as well as country-specific standards. Regardless of whether the application involves contact with drinking water, food or pharmaceutical products, Angst+Pfister ensures customers safety in all sealing situations.

Material designation		Hardness	Temperature range	Resistances/main properties
		Shore A	–300 –200 –100 0 +100 +200 +300	
NBR	**Acrylonitrile-butadiene elastomer**	40–90		Mineral and vegetable oils and greases, alkalis, water, glycols, alcohols, saline solutions
HNBR	**Hydrated NBR elastomer**	40–90		Oils and fuels; excellent mechanical properties
CR	**Chloroprene elastomer**	20–90		Alkalis, alcohols, lubricants, glycols, ozone, coolants; only limited resistance to mineral oil and grease; resistant to aging and weathering
VMQ	**Silicone elastomer**	30–80		Broad temperature range, animal and vegetable oils and greases, water, diluted saline solutions; not for silicone oil and grease; resistant to ozone and weathering
FVMQ	**Fluorosilicone elastomer**	30–80		Fuels, mineral and synthetic oils and greases; resistant to ozone and weathering
FKM	**Fluoroelastomer**	65–90		High temperatures, chemicals, oils, aliphatic hydrocarbons (fuels), non-flammable hydraulic fluids
FFKM	**Perfluoroelastomer** (Kalrez®)	60–90		Exceptional chemical resistance and thermal stability; longest service life with superior sealing reliability in critical applications
EPDM	**Ethylene-propylene-diene monomer elastomer**	30–90		Hot water and steam, glycol-based brake fluids, many organic and inorganic acids and bases; not suitable for mineral oils and greases; good resistance to aging and weathering

Molded seals – the better solution for customer-specific applications

A molded seal specially designed for a specific deployment purpose offers substantial advantages over standard seals: optimized shaping and material selection that are precisely tailored to the custom specifications guarantee maximum leak-tightness as well as longer service life. Use of molded seals can simplify the construction of equipment components, which can largely offset the tooling costs required to manufacture the molded parts.

Advantages of using customized molded seals

- Optimum functionality because the seal geometry is adapted to fit the equipment or part design.
- Good adaptability under low compression forces.
- Minimized space requirements and simple groove design.
- Easy and durable groove fixation by means of special retaining ribs.
- Simple installation and easy handling.
- Molded seals are superior to standard seals when it comes to bridging large installation tolerances, especially when plastic parts are involved.
- Potential solution for large compression travel by means of specifically designed lip seals and advantageous force/displacement ratios (versus compact seals like O-rings).
- In dynamic deployment, optimization of sliding and static friction as well as breakaway torque through the shaping of the seal.
- Use of specially designed lip seals for slow rotational or swiveling motion.
- High-performance materials optimally suited for the specific deployment application.
- Very good value proposition for medium and large series orders.

With Angst+Pfister from the task formulation to the custom solution

1. Mutual formulation of the application problem to be addressed in an early development phase.
2. Designing of the seal environment (receiving groove/seal contact area) together with the user.
3. Designing of the seal executed by Angst+Pfister, during which CAD-supported seal proposals are discussed with the customer and FEM simulations of functionality are possible.
4. Fabrication of prototypes from pilot mold for deployment tests, as well as lathe-cut molded seal prototypes where required in the case of rotationally symmetric geometries.
5. Approval or optimization of the prototype and seal geometry.
6. Fabrication of the series mold and delivery of first samples with initial sample test report.
7. Approval of the series mold and fabrication and deployment of the series seals.

Optimal configuring of the geometry is the alpha and omega of a molded seal. Getting the experience and creativity of the Angst+Pfister engineering team involved early on is the foundation for mutual project success.

Application example

Molded seal for water meter

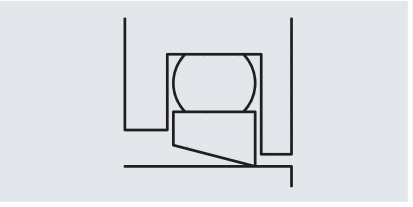
Application examples:
Innovative advances based on molded seals (I)

Rotary seals for slowly turning deployment in the food industry

Task: To seal against powdery bulk solids with abrasive properties.

Requirements placed on the sealing element: Low coefficients of friction, good cleanability, FDA approval, absolute leak-tightness, installation in existing receiving groove.

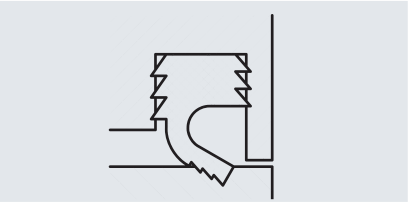
Special rotary seal



PTFE rotary seal with elastomeric O-ring energizer

– two-piece PTFE/elastomer seal
– high friction loss, little compression travel
– sensitive to abrasive media
– not wear-resistant
– expensive seal because it is manufactured from lathe-cut PTFE

Molded seal



Seal with flexible sealing lip and sealing ridges

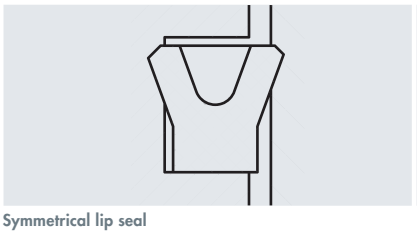
+ one-piece elastomer seal
+ very low compression forces and coefficients of friction
+ large compression travel
+ good price/performance proposition thanks to simple shape design

Static lip seal in pneumatic flow control valve with double-action function

Task: To seal against pneumatic air pressure with desired overflow in presence of minimal counterpressure.

Requirements placed on the sealing element: Tiniest installation spaces, absolute static tightness, flexible sealing lip for counterpressurization.

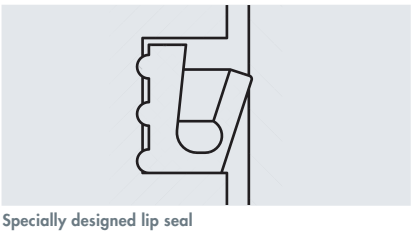
Standard seal



Symmetrical lip seal

– inflexible sealing lips
– standard seal not dimensioned properly for the installation space (too big)
– only single-acting without overflow
– standard materials not tailored to the specific deployment purpose

Molded seal



Specially designed lip seal

+ flexible sealing lips thanks to optimized geometry
+ dimensions designed for the specific deployment purpose
+ requires only the tiniest installation spaces
+ double-acting by allowing desired overflow in the presence of minimal counterpressure
+ optimized material tailored to the specific deployment purpose

Application example

Molded seal for high-performance valve

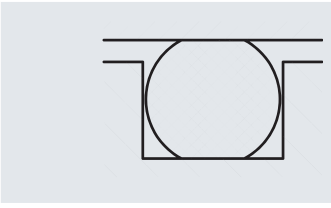
Application examples:
Innovative advances based on molded seals (II)

Molded static seal for plastic drain in the field of plumbing technology

Task: To seal against wastewater with long service life.

Requirements placed on the sealing element: Absolute static leak-tightness, flexible sealing lip with minimal compression forces, compensation of large plastic component tolerances, easy installation and low friction forces, various material compliance certifications for drinking water and sewage applications.

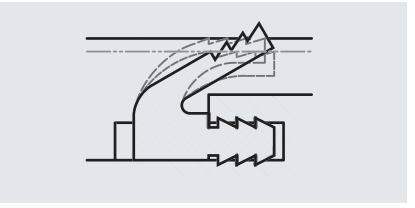
Standard seal



O-ring

- – unfavorable force/displacement ratio
- – limited compression, no compensation of component tolerances
- – high press-insertion force causes warping of plastic components
- – leak-tightness only under ideal circumstances (installation tolerances, low material hardness)

Molded seal



Lip seal for frame installation

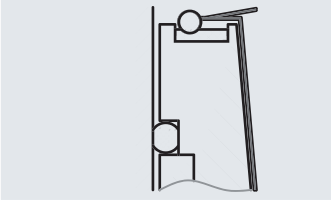
- + very good force/displacement ratio
- + can compensate large plastic tolerances
- + no warping of plastic components due to low compression forces
- + easy installation and very low friction forces during installation-related positioning
- + absolutely leak-tight
- + optimum choice of material

Molded seals for capsule sealing in coffee machines

Task: To seal dynamically or statically against drinking water at temperatures up to +90°C and at pressures up to 18 bars.

Requirements placed on the sealing element: Absolute static and dynamic tightness, flexible sealing lip with minimal compression forces, large compression travel, high tolerance compensation, various compliance certifications for drinking water applications.

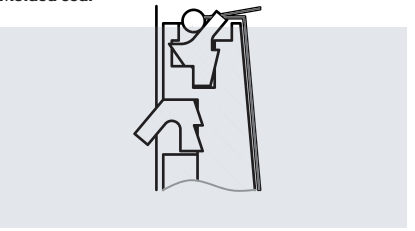
Standard seal



O-ring/flat gasket

- – compression possible only with a large exertion of force
- – high friction with a tendency to stick
- – limited compensation of installation tolerances
- – not suitable for plastic constructions
- – limited leak-tightness

Molded seal



Molded seal

- + large compression travel under minimal exertion of force
- + no friction, no sticking
- + high tolerance compensation thanks to lip geometry
- + good suitability for lightweight plastic constructions
- + static and dynamic sealing function
- + absolutely leak-tight

Application example

Molded seal for high-performance valve

Seals for every application: Materials and compliance certifications

Certified safety: Requirements placed on elastomers

All elastomers have deployment constraints with regard to exposure to hot and cold temperatures, moisture, weather influences and certain contact substances. Special approval and compliance certifications establish clarity about the suitability of a given material: they indicate, for example, whether the material meets compliance specifications for the food and medical industry (also for applications involving non-black rubber compounds), for the drinking-water sector or for fire protection in rail vehicle construction (e.g. DIN 5510, part 2). Angst+Pfister profile seals also give customers this certified safety.

In principle, an elastomer material can be dyed with a color additive, though that can have an adverse effect on its physical and mechanical properties, except in the case of silicone.

Broad spectrum of approval and conformity certifications

Sealing elements that come in contact with food and beverages, pharmaceuticals or drinking water are increasingly being manufactured from materials with corresponding approval certifications and regulatory clearances. Angst+Pfister is attuned to this trend and, especially in the area of molded seals, can source a wide array of elastomer compounds with a variety of different compliance certifications:

- KTW certification for drinking water in Germany
- WRAS certification for drinking water in the UK
- NSF 61 certification for drinking water in the USA
- NSF 51 certification for food in the USA
- ACS certification for drinking water in France
- AWQC certification for drinking water in Australia and New Zealand
- ÖVGW certification for drinking water in Austria
- KIWA certification for drinking water in the Netherlands
- FDA conformity for pharmaceuticals and food in the USA
- USP Class VI certification United States Pharmacopeia
- BfR conformity for food in Germany
- DIN EN 681-1 certification for water supply and drainage
- DVGW W 534 certification for water supply
- DVGW W 270 certification according to work sheet on microbiological growth on materials for drinking water applications
- DVGW DIN EN 549 certification for use in gas applications
- 3-A Sanitary certification for food applications in the USA

Application example

Molded seal for diaphragm valve

Angst+Pfister

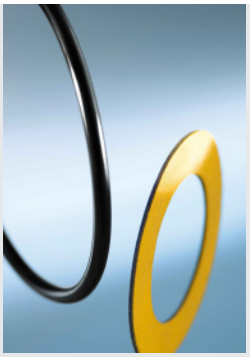
Services from Angst+Pfister Group

Angst+Pfister – Your supply and solutions partner

The Angst+Pfister Group is a leading international technical manufacturer and service provider for high-end industrial components. As a supply and solutions partner for engineering plastics, sealing, fluid handling, drive, and antivibration technology as well as sensors, Angst+Pfister combines efficient logistics concept with comprehensive product application engineering services. Besides providing customer-specific parts, the Group offers a product range consisting of approximately 100,000 standard items.

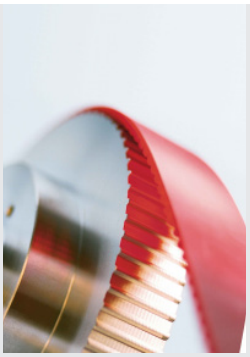
Our core product divisions

APSOplast®
Engineering Plastics
Technology

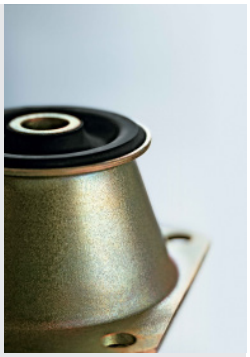


APSOseal®
Sealing
Technology

APSOfluid®
Fluid Handling
Technology



APSOdrive®
Drive
Technology



APSOvib®
Antivibration
Technology

Switzerland
Angst+Pfister AG
Thurgauerstrasse 66, Postfach, CH-8052 Zürich
Phone +41 (0)44 306 61 11
www.angst-pfister.com, ch@angst-pfister.com

Angst+Pfister SA
Chemin de la Papeterie 1, CH-1290 Versoix
Phone +41 (0)22 979 28 00
www.angst-pfister.com, ch@angst-pfister.com

Germany
Angst+Pfister GmbH
Siemensstraße 5, DE-70736 Fellbach
Phone +49 (0)711 48 999 2-0
www.angst-pfister.com, de@angst-pfister.com

France
Angst+Pfister SAS
Immeuble DELTAPARC
93, avenue des Nations, FR-93420 Villepinte
Phone +33 (0)1 48 63 20 80
Fax +33 (0)1 48 63 26 90
www.angst-pfister.com, fr@angst-pfister.com

Austria
Angst+Pfister Ges.m.b.H.
Floridsdorfer Hauptstrasse 1/E, AT-1210 Wien
Phone +43 (0)1 258 46 01-0
Fax +43 (0)1 258 46 01-98
www.angst-pfister.com, at@angst-pfister.com

Italy
Angst+Pfister S.p.A.
Via Montefeltro 4, IT-20156 Milano
Phone +39 (0)2 8295 9700
www.angst-pfister.com, it@angst-pfister.com

Netherlands
Angst+Pfister B.V.
Afrikaweg 40, NL-2713 AW Zoetermeer
Phone +31 (0)79 320 3700
Fax +31 (0)79 320 3799
www.angst-pfister.com, nl@angst-pfister.com

Belgium
Angst+Pfister N.V. S.A.
Bedrijvencentrum Waasland Industriepark-West 75
BE-9100 Sint-Niklaas
Phone +32 (0)3 778 0128
Fax +32 (0)3 777 8398
www.angst-pfister.com, be@angst-pfister.com

China
Angst+Pfister Trade (Shanghai) Co. Ltd.
Rm 1803-1805, West Tower,
Zhong Rong Hengrui Building
No. 560 Zhangyang Road, CN-Shanghai 200122
Phone +86 21 5169 5005
Fax +86 21 5835 8618
www.angst-pfister.com, cn@angst-pfister.com

Turkey
Angst Pfister Advanced Technical Solutions A.Ş.
Akçalar Sanayi Bölgesi Kale Cd., No: 10,
TR-16225 Nilüfer/Bursa
Phone +90 224 280 69 00
Fax +90 224 484 25 96
www.angst-pfister.com/ats, ats@angst-pfister.com

Poland
Angst+Pfister Sp. z.o.o.
ul. Komorowicka 260, PL-43-346 Bielsko-Biała
Phone +48 33 443 29 70
Fax +48 33 443 29 71
www.angst-pfister.com, pl@angst-pfister.com

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the Online Shop of Angst+Pfister
www.apsoparts.com

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