

# Aerospace sealing capabilities



**Your Partner for Sealing Technology**

## Total Aircraft Sealing Technology Capabilities

Trelleborg Sealing Solutions offers its customers a wide range of aircraft sealing capabilities along with an extensive product portfolio for both military and civil programmes. This includes:

- aerodynamic wing sealing components
- window seals
- fire sealing technology
- inflatable canopy seals
- door seals
- hydraulic sealing systems
- gas sealing

Due to the increasingly stringent requirements of the aerospace market, Trelleborg Sealing Solutions places strong emphasis on its ability to globally service, support and supply its customers through their international network of manufacturing facilities and support teams.

## Technical and Engineering Expertise

Trelleborg Sealing Solutions is uniquely placed to offer a dedicated seal design and development service to the Aerospace market. With years of experience in sealing all areas of aircraft systems, their engineering personnel are able to contribute their knowledge of this specialised technology directly to customers; from the efficient handling of enquiries to complete project management of design, prototyping, production, test and installation of sealing systems.

To compliment their expertise, Trelleborg Sealing Solutions employs state-of-the-art design tools, fully customer-compatible CAD systems and leading edge Finite Element Analysis (FEA).

The aim of Trelleborg Sealing Solutions is to facilitate customers in the achievement of cost effective, durable solutions that match their specific business requirements and needs.

## Specialists in Polymer Technology

For decades, Trelleborg Sealing Solutions has been a world-leader in the development of new polymeric compounds for use in Aerospace applications.

Not only does Trelleborg Sealing Solutions develop and formulate its Aerospace materials in-house, it has also acquired significant skills in the field of applied materials technology. Seals can be individually hand fabricated, automatically moulded, fabric-reinforced or bonded to metallic components.

A full range of Aerospace grade Turel® elastomers is available, specifically engineered to withstand the extremes of temperature and aggressive chemicals encountered in today's aircraft. To complement these materials, many proprietary blends of premium-grade Turcon® Fluoropolymer resins and high-performance, high-modulus Zurcon® thermoplastics are available to provide a one-stop-shop of engineered solutions for aerospace sealing challenges.

## Quality and Manufacturing Capability

Trelleborg Sealing Solutions manufacturing sites are strategically located to provide global coverage and have succeeded in delivering cost effective sealing solutions, whilst maintaining the highest standards of international airworthiness, quality control and meeting the latest environmental legislation.

Both the FAA, EASA and leading aerospace manufacturers are regular visitors to Trelleborg Sealing Solutions facilities worldwide and they continue to work with them to enhance their reputation for quality and to maintain their key position in the Aerospace supply chain.



## Serving the world's commercial and military aerospace industries

The extensive product portfolio, service capability, materials development and engineering expertise of Trelleborg Sealing Solutions, confirms their position as a leading sealing force in the aerospace market, bringing together the best of foremost global specialist aerospace sealing brands; Shamban, Dowty Seals, Dowty Woodville Polymer, Impervia and Palmer-Chenard.

Trelleborg Sealing Solutions products are used in virtually every major commercial and military aircraft programme and are commonly specified by leading aircraft manufacturers and OEM customers as sealing solutions on a wide range of critical applications, such as:

- airframes
- engines
- flight controls and actuation
- landing gears
- wheel and brakes

With a strong commitment to excellent customer service, Trelleborg Sealing Solutions offers round-the-clock product assistance, combined with direct line feed, kitting and subassembly capabilities.

### World leading reputation

Trelleborg Sealing Solutions uses its 50-year experience as the basis for development and application of engineered dynamic sealing systems and world class customer support. As a principal manufacturer of airframe, hydraulic, fuel systems and engine seals, Trelleborg Sealing Solutions provides innovative and functional solutions for complex applications.

Specialist in the design, development and manufacture of reinforced elastomer components, Trelleborg Sealing Solutions is the sole source supplier of inflatable fuselage fairings to B1-B, Tornado and F-111.

Trelleborg Sealing Solutions are experts in elastomer materials, high performance O-Rings, gaskets and custom designed sealing solutions, as well as fabric reinforced elastomeric diaphragms for environmental control in valves and pumps.

The first company to realise the huge potential of PTFE in aerospace sealing applications, Trelleborg Sealing Solutions remains at the forefront of this technology with its unique Turcon® material range.



### The competitive edge

- A complete polymer sealing range for the aerospace industry
- Full service provision – design concept to aftermarket support
- 24-hour worldwide support
- Industry-leading design and materials expertise
- Best practice manufacturing
- Customised distribution capabilities – direct line feed, subassembly and kitting
- Aftermarket expertise
- Proven-engineering excellence – servicing all major aerospace programmes

### Global manufacturing and customer support

Trelleborg Sealing Solutions is the global sales organisation of Trelleborg Sealing Solutions, one of the world's leading experts in polymer sealing technology for the aerospace, industrial, and automotive industries. Its worldwide resources include:

- Over 80 facilities in Europe, Asia, North America and Latin America
- More than 30 manufacturing sites - ISO 9000, AS 9100, QS9000, ISO 14001, EASA 21 subpart G
- 11 materials and development laboratories
- 17 design and application facilities



## Complete aerospace sealing capabilities



### Actuation

High integrity piston and gland seals are specified to meet the high usage, long-life demands of aircraft actuators. These can be designed for a variety of configurations up to 55 MPa (8000 psi). With its vast experience in this field, Trelleborg Sealing Solutions can also assist with actuator design by recommending component tolerances, surface finishes and coatings and seal groove geometries.



### Flight controls

A wide range of both elastomer and spring energised PTFE solutions, offer zero leakage and long life performance, in an environment characterised by high frequency oscillation. For rotary shaft seal applications, Trelleborg Sealing Solutions provides conventional radial oil seals through to high performance PTFE lip seals.





### **Airframe**

With a focus on aerodynamic efficiency, Busak+Shamban offers a range of standard and customised designs, developed for reliability in service and efficiency in assembly and maintenance. The Trelleborg Sealing Solutions range includes seals for wing and moving surfaces such as complex aerodynamic shrouds for hydraulic jacks, extrusions and fabricated seals for doors and hatches, interior couplings, inflatable cockpit canopy seals and fabricated swing-wing fuselage fairings.



### **Engine systems**

A wide range of sealing systems for engine and engine management applications including fan blade annulus fillers, fan cowl and thrust reverser doors, heat exchangers, drive shafts, air intakes, fairings and coupling systems. Materials are selected for high temperature performance and include silicones up to +270°C and Isolast<sup>®</sup>, the high performance perfluoroelastomer specially developed by Trelleborg Sealing Solutions, which will operate at up to +320°C. Reinforced engine seals and ducts are available that can provide fire control at tested temperatures of +1100°C.



### **Landing gear**

A complete sealing system for all landing gear applications, ranging from light aircraft to long-range commercial airliners. Trelleborg Sealing Solutions has the expertise and resources to offer the most advanced elastomeric and PTFE technologies, ensuring ultimate reliability in high pressure and side load applications.



### **Wheel and brake**

Designed for superior performance in harsh environments, the Trelleborg Sealing Solutions portfolio provides a complete range of static and dynamic sealing systems including steel reinforced bearing grease retainers, large O-Ring wheel hub seals and high temperature brake seals.



**Contact your local marketing company for further information:**

<b>Europe</b>	<b>Telephone</b>	<b>Americas</b>	<b>Telephone</b>
<b>AUSTRIA - Vienna</b> <small>(ALBANIA, BOSNIA AND HERZEGOVINA, MACEDONIA, SERBIA AND MONTENEGRO, SLOVENIA)</small>	+43 (0) 1 406 47 33	<b>AMERICAS - REGIONAL</b>	+1 260 749 9631
<b>BELGIUM - Dion-Valmont</b> <small>(LUXEMBOURG)</small>	+32 (0) 10 22 57 50	<b>BRAZIL - São Paulo</b>	+55 11 3372 4500
<b>BULGARIA - Sofia</b> <small>(ROMANIA)</small>	+359 (0)2 969 95 99	<b>CANADA - Etobicoke, ON</b>	+1 416 213 9444
<b>CROATIA - Zagreb</b>	+385 (0) 1 24 56 387	<b>MEXICO - Mexico City</b>	+52 55 57 19 50 05
<b>CZECH REPUBLIC - Rakovník</b> <small>(SLOVAKIA)</small>	+420 313 529 111	<b>USA, East - Conshohocken, PA</b>	+1 610 828 3209
<b>DENMARK - Hillerød</b>	+45 48 22 80 80	<b>USA, Great Lakes - Fort Wayne, IN</b>	+1 260 482 4050
<b>FINLAND - Vantaa</b> <small>(ESTONIA, LATVIA)</small>	+358 (0) 207 12 13 50	<b>USA, Midwest - Lombard, IL</b>	+1 630 268 9915
<b>FRANCE - Maisons-Laffitte</b>	+33 (0) 1 30 86 56 00	<b>USA, Mountain - Broomfield, CO</b>	+1 303 469 1357
<b>GERMANY - Stuttgart</b>	+49 (0) 711 7864 0	<b>USA, Northern California - Fresno, CA</b>	+1 559 449 6070
<b>GREECE</b>	+41 (0) 21 631 41 11	<b>USA, Northwest - Portland, OR</b>	+1 503 595 6565
<b>HUNGARY - Budaörs</b>	+36 (06) 23 50 21 21	<b>USA, South - N. Charleston, SC</b>	+1 843 747 7656
<b>ITALY - Livorno</b>	+39 0586 22 6111	<b>USA, Southwest - Houston, TX</b>	+1 713 461 3495
<b>THE NETHERLANDS - Barendrecht</b>	+31 (0) 10 29 22 111	<b>USA, West - Torrance, CA</b>	+1 310 371 1025
<b>NORWAY - Oslo</b>	+47 22 64 60 80		
<b>POLAND - Warsaw</b> <small>(LITHUANIA, UKRAINE, BELARUS)</small>	+48 (0) 22 863 30 11	<b>Asia Pacific</b>	<b>Telephone</b>
<b>RUSSIA - Moscow</b>	+7 495 982 39 21	<b>ASIA PACIFIC REGIONAL</b>	+65 6 577 1778
<b>SPAIN - Madrid</b> <small>(PORTUGAL)</small>	+34 (0) 91 71057 30	<b>CHINA - Hong Kong</b>	+852 2366 9165
<b>SWEDEN - Jönköping</b>	+46 (0) 36 34 15 00	<b>CHINA - Shanghai</b>	+86 (0) 21 6145 1830
<b>SWITZERLAND - Crissier</b>	+41 (0) 21 631 41 11	<b>INDIA - Bangalore</b>	+91 (0) 80 2245 5157
<b>TURKEY</b>	+41 (0) 21 631 41 11	<b>JAPAN - Tokyo</b>	+81 (0) 3 5633 8008
<b>UNITED KINGDOM - Solihull</b> <small>(EIRE)</small>	+44 (0) 121 744 1221	<b>KOREA - Anyang</b>	+82 (0) 31 386 3283
<b>AFRICA REGIONAL</b>	+41 (0) 21 631 41 11	<b>MALAYSIA - Kuala Lumpur</b>	+60 (0) 3 9059 6388
<b>MIDDLE EAST REGIONAL</b>	+41 (0) 21 631 41 11	<b>TAIWAN - Taichung</b>	+886 4 2382 8886
		<b>THAILAND - Bangkok</b>	+66 (0) 2732-2861
		<b>SINGAPORE</b>	
		<b>and all other countries in Asia</b>	+65 6 577 1778

[www.tss.trelleborg.com](http://www.tss.trelleborg.com)

