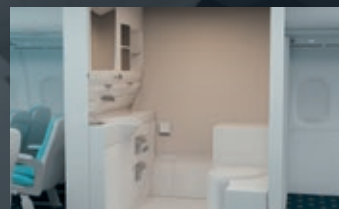
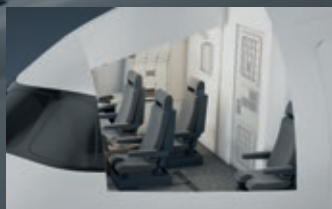
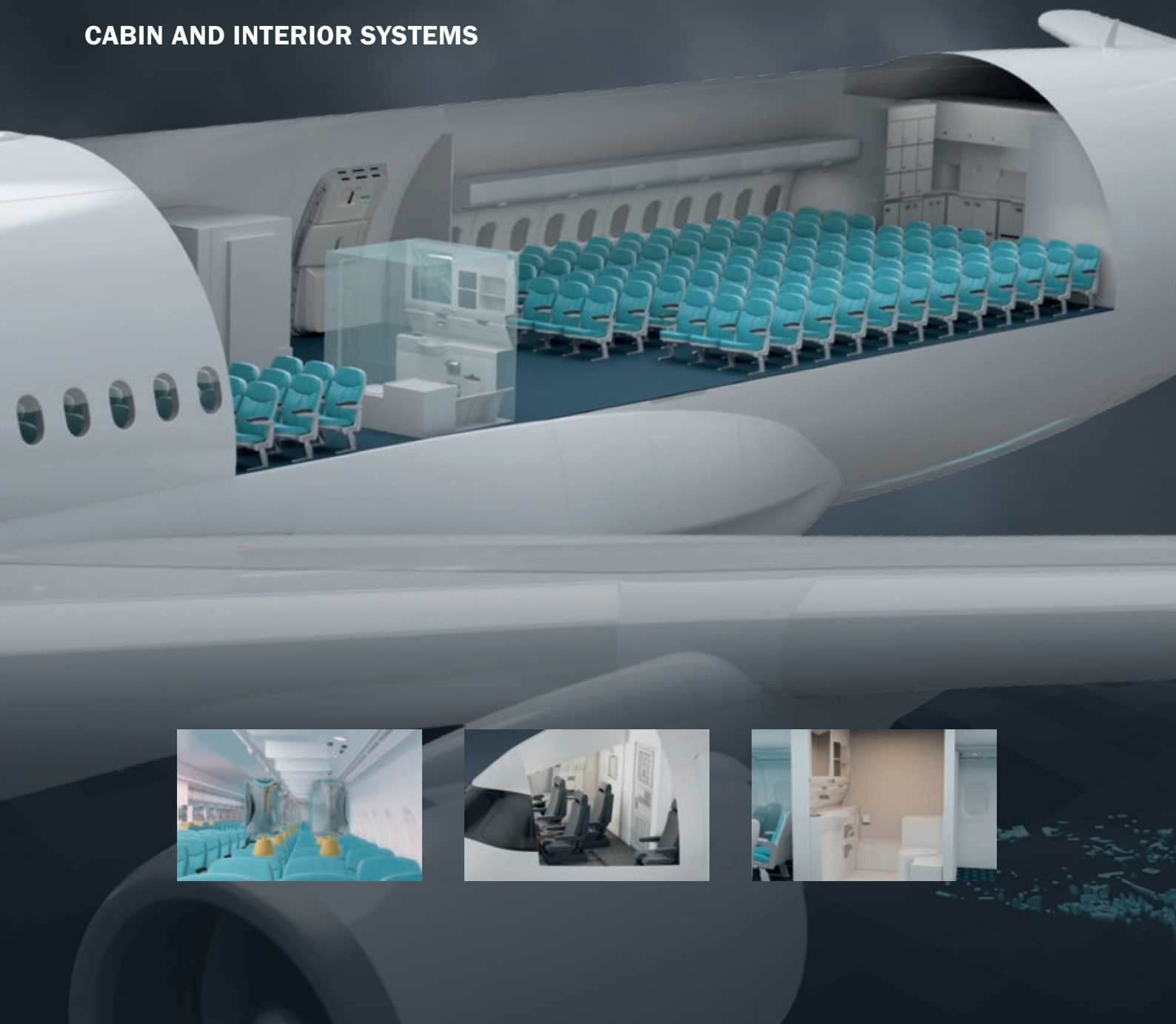


Onboard Systems

CABIN AND INTERIOR SYSTEMS



Ensuring safe and comfortable air travel

Your total polymer solutions provider in the air and on the ground

Trelleborg Aerospace has manufactured cutting-edge products that seal, damp and protect aircraft actuation systems, landing gear, airframes and engines for more than 60 years. Our products play a crucial role in ensuring flight safety and passenger comfort. Alongside extending the service life of the aircraft, they contribute to a reduction in aircraft weight that makes engines more efficient and enhances sustainability.

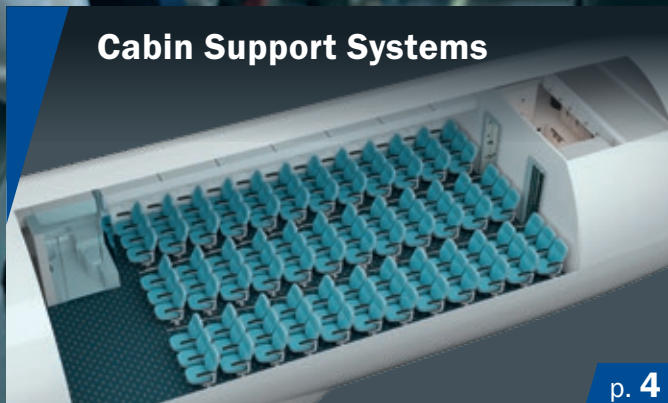
Reliable solutions for a relaxing flight

Trelleborg also designs, manufactures and supplies polymer products for a full range of onboard systems. These include the systems that manage the environment and water supply within an aircraft, as well as components for interior equipment. While some of the systems are flight-critical, they primarily exist to enhance the comfort and safety of passengers and crew.

Sealing components are vital in ensuring a constant flow of clean air throughout the cabin at an agreeable temperature. Trelleborg's seals support the preparation of meals in the aircraft galley and ensure the water on board the aircraft is safe to drink, even on the longest flights. In the cabin, bearings enable seats, doors and overhead bins to move smoothly, while polymer components offer protection by closing gaps, supporting air distribution and enhancing passenger comfort.

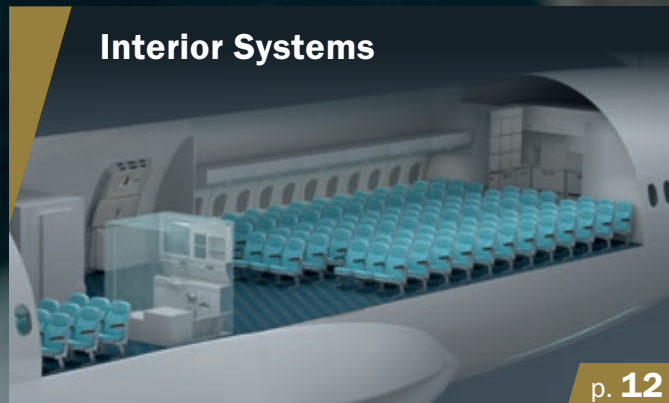


Cabin Support Systems



p. 4

Interior Systems



p. 12

Cabin Support Systems



**Emergency
Oxygen Systems**



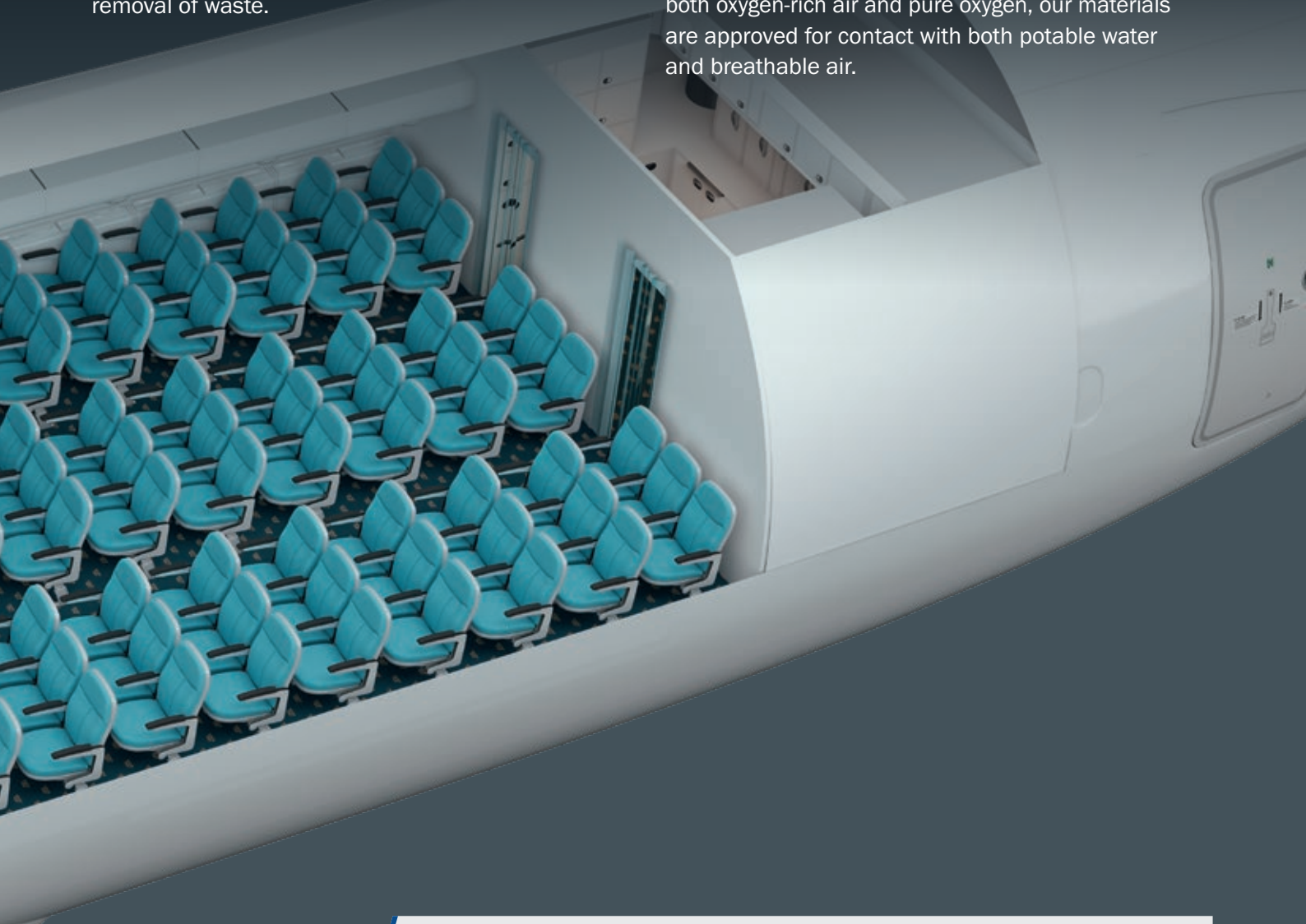
p. 6

All aircraft contain systems designed to ensure the comfort and safety of both passengers and crew by maintaining clean air and water, as well as a consistent climate.

- In the case of cabin depressurization, emergency oxygen systems store and generate a supply of pure oxygen ready to distribute to crew and passengers.

- The environmental control system (ECS) regulates the supply and distribution of air, while controlling the cabin temperature and air pressure.
- Water and wastewater systems provide galleys and lavatories with clean water and ensure efficient removal of waste.

Expertly designed, components from Trelleborg Aerospace meet the unique needs of each application, from performance at extreme temperatures to exhibiting an optimum strength-to-weight ratio. Capable of high performance in both oxygen-rich air and pure oxygen, our materials are approved for contact with both potable water and breathable air.



Environmental Control Systems (ECS)

Water & Wastewater Systems



p. 7

Bleed Air Systems



p. 9

Air Conditioning Systems



p. 10

Cabin Pressurization Systems



p. 11

Emergency Oxygen Systems

In the event of cabin depressurization, oxygen systems provide emergency oxygen to passengers and crew. Designed to store and generate a supply of pure oxygen and to regulate and dilute as required, they distribute oxygen throughout the cabin and cockpit. Conforming to industry requirements outlined in the Federal Aviation Administration (FAA) Title 14 Code of Federal Regulations (CFR), Part 25, Trelleborg products ensure the flow of and access to oxygen throughout the aircraft.



● Liquid Silicone Rubber (LSR) Components

LSR molding technology allows breathing masks to fit facial contours and cover the airways of the nose and mouth, providing oxygen to passengers in the event of an emergency.



● Static Seals

Static seals prevent leakage throughout the oxygen system. Specified to meet your unique requirements, solutions range from multifunctional O-Rings to seals with more complex geometries, including custom-molded designs and bonded products.



● Engineered Molded Thermoplastic Components

In compliance with fire testing requirements, including FAR 25.853, engineered molded thermoplastic components are available in a wide range of geometries. Within the passenger service unit (PSU), they form air nozzles and panel support bracket components.



● Thermoplastic & Elastomer Clamps

Thermoplastic clamps attach and guide tubing components for optimal storage and easy access. Manufactured to custom specifications, Trelleborg clamp blocks hold pipes and wires in place to minimize vibration.



● Tubing & Hose

Tubing and hose products for aircraft oxygen systems made from silicone, PTFE, and PVC and multiple layers.



Mask Regulators

Trelleborg custom-molded components ensure a constant flow of oxygen in critical situations.

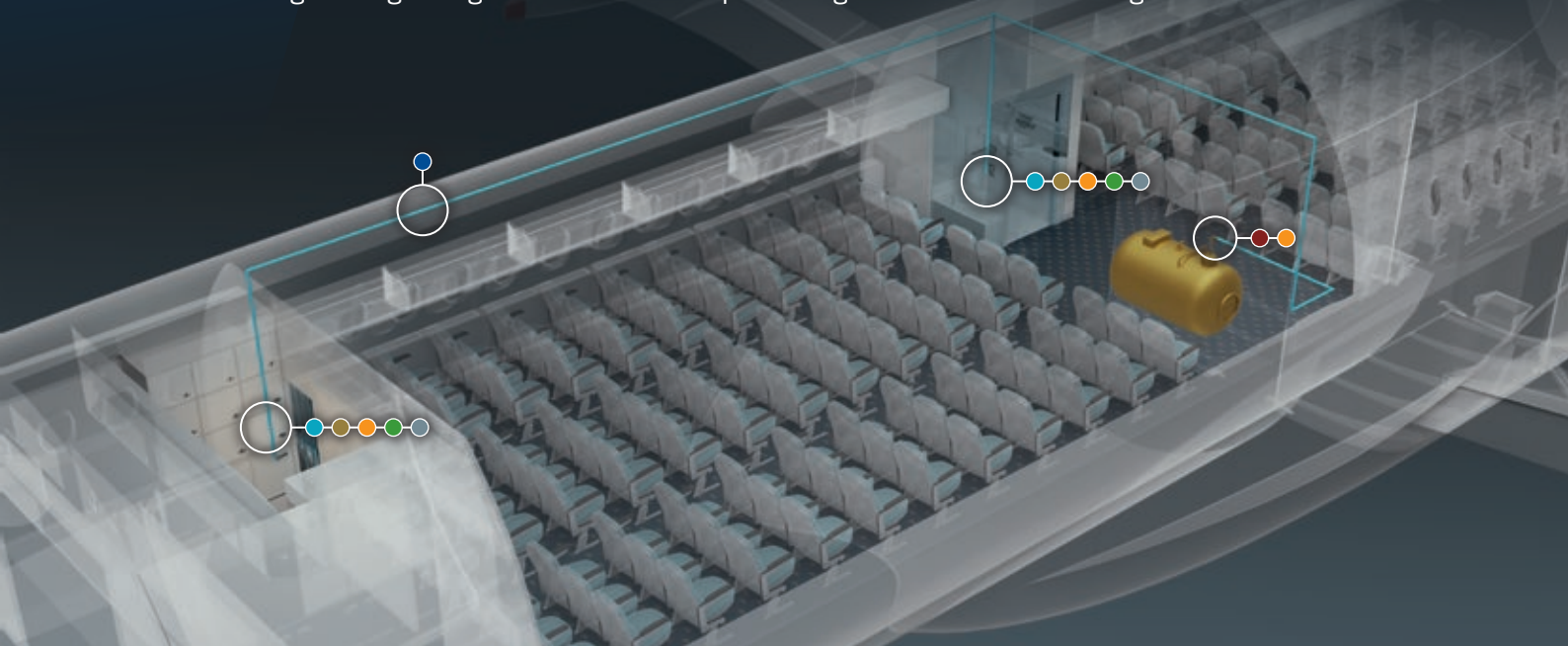


CERTIFICATIONS & COMPLIANCE

- AS 9100
- ISO 14001
- NADCAP
- FAR 25.853
- 14 CFR Part 25
- Mil-DTL-81581

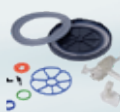
Water & Wastewater Systems

Water and wastewater systems provide galleys and lavatories with clean water and ensure efficient removal of waste. Seals perform numerous critical functions in the areas of potable water and sanitation on the aircraft, from conserving and regulating the flow of water to preventing contamination or leakage.



● Diaphragms

Diaphragms for use in faucets and flow sensors are available in a wide range of shapes, sizes and materials, designed to meet application requirements. Multicomponent technology, can be utilized, to create one-piece plastic- or metal-to-rubber bonded parts.



● LSR Components

Advanced injection-molding techniques, including micro-size, delicate part and thin section capabilities, produce high-precision LSR parts for faucets and water flow distribution.



● Hoses & Tubing

Hoses and tubing for water distribution and drainage are available in a wide range of materials, including silicone and PTFE, and can be composed of multiple layers when the application requires chemical compatibility and high strength.



● Gaskets

Typically used to prevent leakage of two joined pieces in waste tanks, potable water tanks, drain masts and fittings, gaskets are designed and manufactured to meet customer specifications.



● O-Rings

O-Rings are in fittings, valves, faucets, sensors, water heaters and water filters. They are available in EPDM, FKM, NBR, HNBR, and our proprietary FFKM, Isolast®, to supply water without leakage to lavatories and galley equipment.



● Custom-Molded Components

Advanced design and tooling technology creates lightweight, custom-molded components for a range of uses, including heating technology, fittings, faucets, and sensors.



● Drain Couplings & Adaptors

Using advanced thermoplastic technology, Trelleborg custom-designs and manufactures a wide range of drain couplings and adaptors found in valves, faucets, and housing adaptors.



CERTIFICATIONS & COMPLIANCE

- AS 9100
- ISO 14001
- NADCAP
- NSF 61
- FDA

Environmental Control Systems (ECS)

The average commercial aircraft spends 80 to 90 percent of its flight time in the upper atmosphere, where the air is too cold for humans to survive. The aircraft's ECS provides vital comfort and safety for everyone onboard, regulating air supply and filtration, as well as cabin temperature and pressurization.

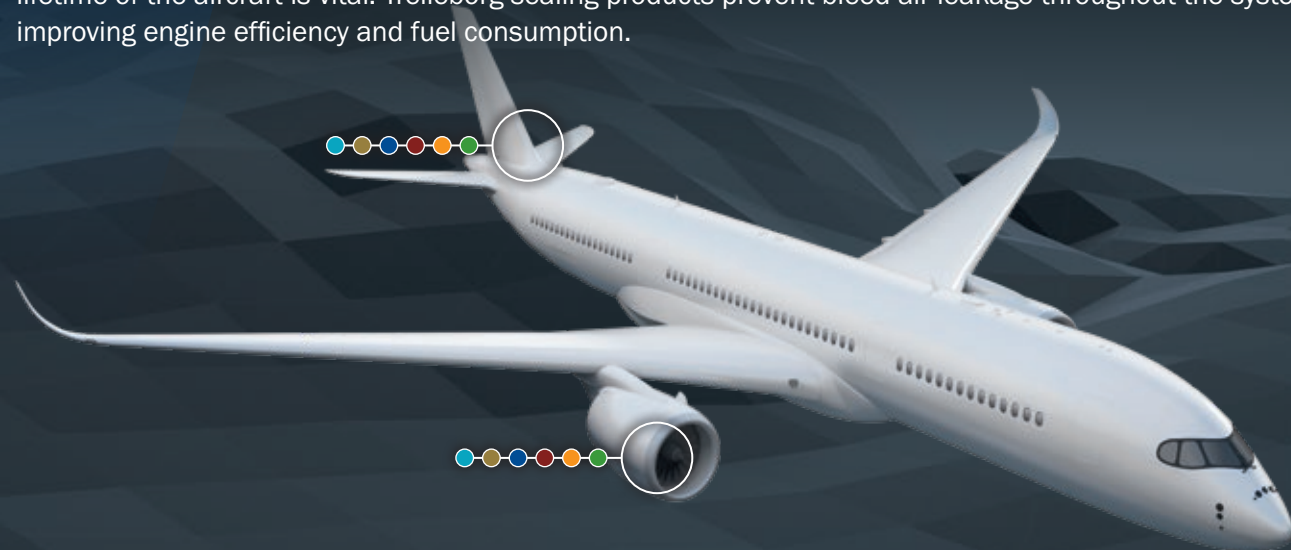
Next-generation carbon-composite fuselages support higher air pressure within the cabin and when this pressure is accurately controlled, the climate inside the aircraft improves greatly.

With the ECS being responsible for the comfort of both passengers and crew, it is important that materials for seals, ducts, diaphragms, and other components are approved for this use. With extensive experience in the healthcare and medical industry, Trelleborg has a wide range of such materials.



Bleed Air Systems

Bleed air systems operate in the aircraft's high-temperature zones, and so reliable performance for the lifetime of the aircraft is vital. Trelleborg sealing products prevent bleed air leakage throughout the system, improving engine efficiency and fuel consumption.



● Seals for Air Valves

Trelleborg manufactures seals for air valves for use within the bleed and cabin air stream. These high-quality products operate continuously at temperatures up to +260 °C / +500 °F. In ball, butterfly, regulating and high-pressure valves, they provide consistent low friction performance to meet opening and closing requirements.



● Plate Seals & Gaskets

Gaskets and plate seals within the engine bleed air system reduce leakage, withstand elevated temperatures and high vibration. These seals typically consist of two components joined together, for example, in motors and gearboxes, ducts, manifolds, engines and auxiliary power units (APUs).



● Hot Air Fire Seals

Usually manufactured from fabric-reinforced silicone to accommodate movement in all directions and located between rigid ducts of various shapes, fire seals, including duct seals and kiss seals, require stringent fire testing.



● Ducting Seals

Seals in the ducting guide hot bleed air from the aircraft's engines or APU toward the anti-ice and ECS. Trelleborg's Turcon® Variseal® solutions are available in standard geometries and as 'trombone' ducting.



● Routing & Clipping

To protect and guide bleed air, ducting incorporating thermoplastic components including P-Clamps and Band Clamps to prevent damage due to abrasion and vibration.



● Diaphragms

We have extensive experience manufacturing elastomeric diaphragms both with and without fabric reinforcement. Inserts can be used to eliminate secondary operations.

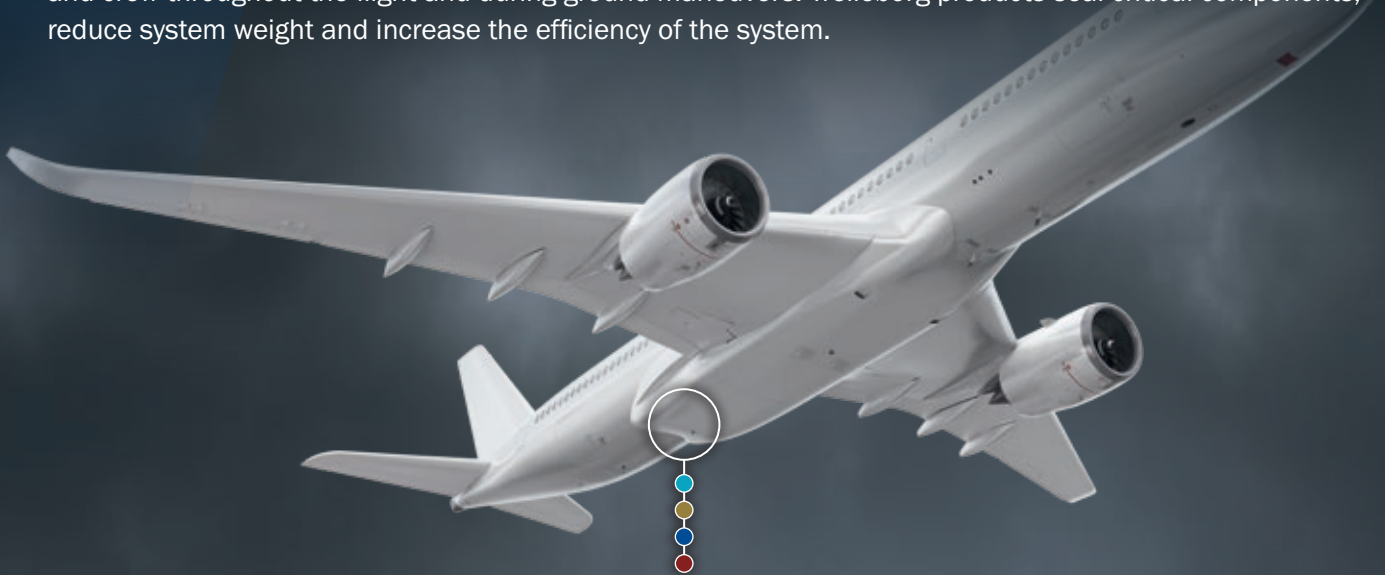


CERTIFICATIONS & COMPLIANCE

- AS 9100
- 14CFR Part 25
- AC20-135
- ISO 2685
- NADCAP
- Airbus Approvals
- Boeing Approvals

Air Conditioning Systems

An aircraft's environmental control and conditioning system provides a clean and constant airflow to the cabin and crew throughout the flight and during ground maneuvers. Trelleborg products seal critical components, reduce system weight and increase the efficiency of the system.



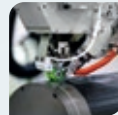
● **Static Seals**

Elastomer static seals, manufactured in a wide range of materials, including EPDM, FKM, NBR, HNBR and our proprietary FFKM, Isolast®, are suitable for HEPA filters, access door seals and valves. As well as offering a standard range of seals, we also design and manufacture custom components in non-standard shapes and sizes.



● **Turcon® Seals & Components**

Operating in a wide range of temperatures and demonstrating high chemical resistance, Turcon® PTFE material is also non-toxic and has high fungal resistance, making it ideal for seals and components in the ACS. Turcon® is used in Variseal® spring-energized seals, Varilip® lip seals and custom designs, such as valve seats and diaphragms.



● **Composite Structures**

Manufactured from resins and carrier materials, custom lightweight composite structures are suitable for use in plenums, ducts and resonators.



● **Turcon® Spring-Energized Seals**

Suitable for use in hot air ducting and pipes, Turcon® spring-energized seals can operate in applications with temperatures up to +300 °C / +572 °F. These seals prevent air from escaping the bleed air ducts used, for example, in bleed valves, anti-icing systems and air conditioning systems. We can supply seals qualified to several Airbus ABS specifications.

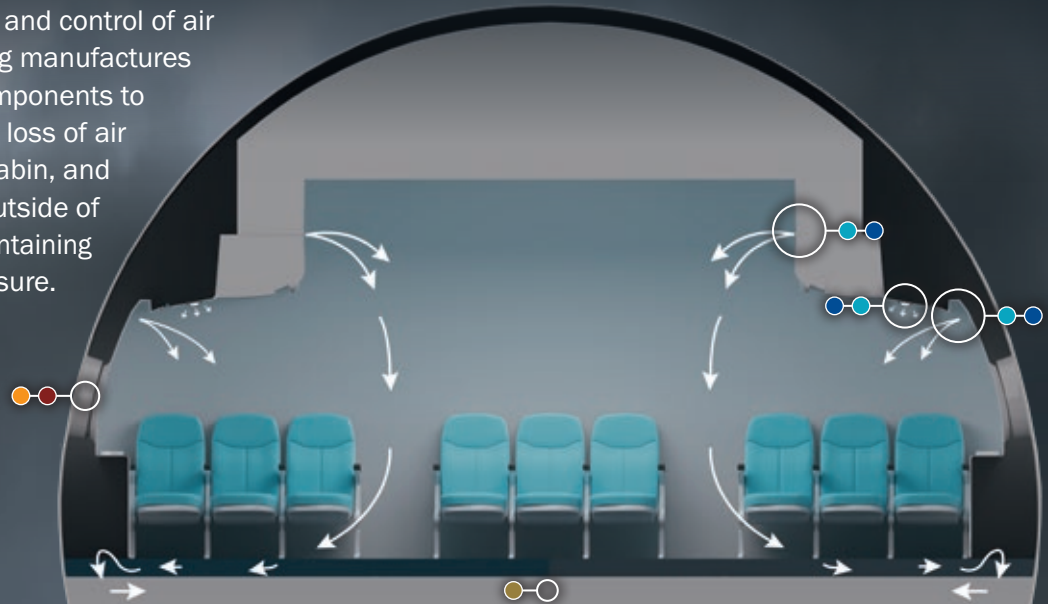


CERTIFICATIONS & COMPLIANCE

- AS 9100
- NADCAP
- Airbus Approvals
- ISO 14001
- FAR 25.853
- Boeing Approvals

Cabin Pressurization Systems

A safe and comfortable environment for the pilots, crew, and passengers at high altitudes results from the pressurization and control of air in the aircraft. Trelleborg manufactures interior and exterior components to guide and minimize the loss of air from the ECS into the cabin, and from the cabin to the outside of the aircraft, thereby maintaining constant cabin air pressure.



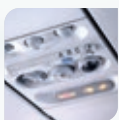
● Custom-Molded Components

Customer specific custom-molded thermoplastics, used in air nozzles, support brackets, air grills, vents and other air delivery components, comply with fire testing requirements (including FAR 25.853). Components can be color matched to meet aircraft interior design requirements.



● Static & Dynamic Seals

In outflow air valves, static and dynamic seals, ranging from multifunctional O-Rings to components with more complex geometries, help maintain constant aircraft cabin pressure throughout the duration of a flight.



● Cabin Air Outlets

Manufactured in lightweight materials, individual air outlets are compliant to fire testing requirements (including FAR 25.853) and offer easy and precise adjustment, to control the flow of ambient air. To enhance aesthetics, they are color matched to the cabin interior style of the airline.



● Clamps

Designed to connect and route components throughout the aircrafts ACS and cabin pressurization systems. Clamps come in a variety of sizes and materials, including all metal, elastomer and metal, and thermoplastic. Band clamps are available for routing larger ducting systems, while various cushion type clamps are available to route, support, and minimize vibration within flexible hosing and tubing.



● Flexible Ducting

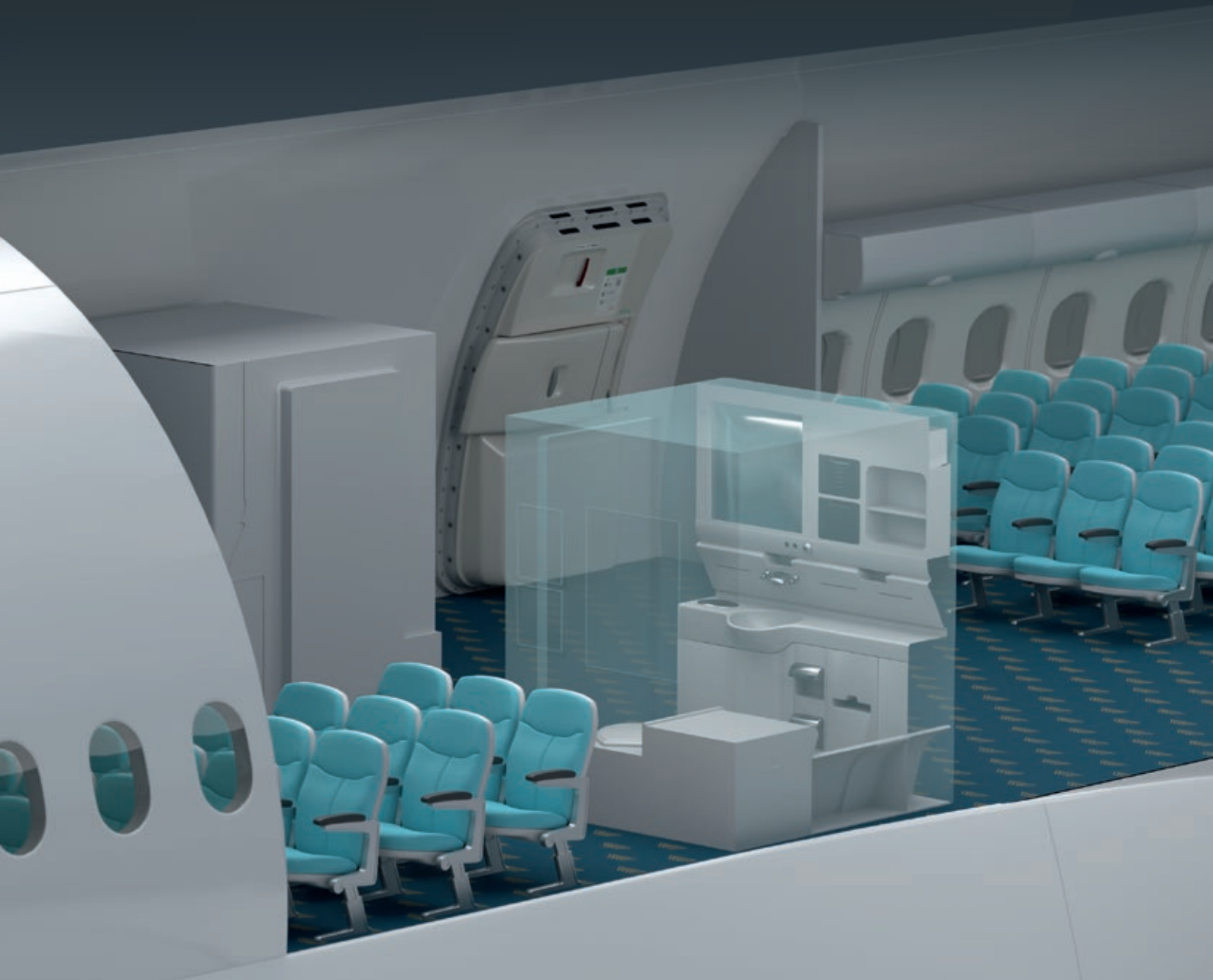
Customer specific hosing, ducting, flexible coupling, and routing components guide low-pressure cool air from the ECS to pressurize the cabin.



CERTIFICATIONS & COMPLIANCE

- AS 9100
- NADCAP
- Airbus Approvals
- ISO 14001
- FAR 25.853
- Boeing Approvals

Interior Systems



The interior of the aircraft is where passengers and crew pass the time during the flight, and comfort, safety and convenience are vital.

- Systems and hardware in the main cabin offer comfortable places to sit and securely stow luggage, enable safe movement around the aircraft and provide clean, fresh air to all onboard.
- Cockpit and crew systems must incorporate shielding against electromagnetic interference (EMI) and radio-frequency interference (RFI) to protect the aircraft's sensitive communication systems.
- The aircraft galley is designed for crew to efficiently prepare refreshments and meals, while equipment and components play a vital role in ensuring food safety and a clean supply of potable water.

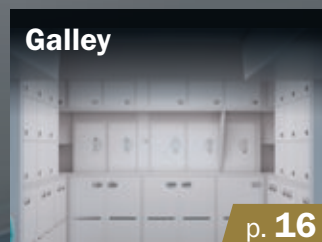
- Lavatories offer passengers and crew a place to freshen up. Systems must ensure a stable supply of clean water, efficient removal of waste and make cleaning easy and efficient.

Trelleborg Aerospace designs and manufactures components in collaboration with customers to optimize the in-flight experience and meet the stringent airline needs.

We utilize advanced materials and state-of-the-art manufacturing technology to produce seals and bearings, EMI-shielding components and custom molded / extruded polymer components, which improve passenger comfort and safety and enable pilots and crew to efficiently perform their tasks, while meeting interior design guidelines.



Watch the WEBINAR!



Main Cabin System

Trelleborg Aerospace products can be found throughout the main cabin. Produced from different polymer compounds, these parts contribute to passenger comfort and safety and meet stringent airline requirements regarding color and surface texture. In addition, all products are compliant with fire, smoke and toxicity regulations, applicable to components that are installed in cabins.



● Injection Molded Thermoplastics

Trelleborg's injection-molded thermoplastic parts are a lightweight alternative to metal components, for use in storage bins, monuments and dividers, Bezel end caps and air vents. Custom-made parts, used as decorative or structural components throughout the cabin and cockpit, provide functional or protective benefits.



● Custom-Molded Elastomers

Trelleborg elastomer components, including bumpers, grommets, housing seals, gaskets and cushions, have numerous applications within the aircraft cabin and are used to seal housings, damp vibration and protect cabin components from damage. Products, which pass CFR25.853 testing, can be formulated and color-matched to an airline's branding.



● Thermoplastic Bearings

Used in seats and overhead bins, our rotary and linear bearings enable smooth and noiseless movement, to optimize handling, even when supporting heavy loads.



● Thermoformed Components

Aesthetic and durable polymer components, used within assemblies in tray tables, arm rest covers and service cart components, improve safety and comfort. Our products are uniformly textured and color-matched to customer specifications.



● Extruded Profiles

Thermoplastic and elastomer extrusions seal unsightly gaps and protect the cabin structure from damage. Extruded profiles can be used as seat track covers, bump/rub strips, gap seals and carpet and floor transitions and help to ensure safe movement throughout the cabin and cockpit. Trelleborg manufactures semi-finished and finished extrusions, which can incorporate secondary operations such as machining, forming, notching.



CERTIFICATIONS & COMPLIANCE

- AS 9100
- ISO 14001
- NADCAP
- CFR25.853 & JAR25.853
- FAA CFR 21
- NSF 61

Cockpit & Crew Systems

The aircraft cockpit serves as the base of operations. Here the pilot, copilot and crew manage the flight and carry out all necessary functions to ensure a safe and secure flight. Trelleborg Aerospace components perform critical functions, ensuring the pilot and crew can perform their jobs. Our products can help prevent electronic disturbances and malfunctions in the aircraft's communication and electrical systems and in mechanical devices.



● EMI/RFI Shielding Gaskets & Seals

Manufactured from specially formulated elastomer materials, our EMI/RFI shielding gaskets and seals protect critical electronic equipment, such as computers, avionics systems and communications systems.



● Routing & Clipping

To protect the large volume of cockpit cable and wiring, thermoplastic components, including grommets, P-clamps and line blocks, hold wires and tubing in place to prevent damage from abrasion and vibration.



● Static Seals

Used in the auxiliary oxygen system, static seals prevent leakage and contamination. Solutions range from multifunctional O-Rings to seals with more complex geometries, including custom-molded designs and bonded products.



● Liquid Silicone Rubber (LSR) Components & Tubing

LSR components and tubing are used throughout the auxiliary oxygen system and electronic and communication systems.



● Injection Molded or Formed Thermoplastic Components

Used as panel covers, injection molded or formed thermoplastic components can be used as a lightweight, cost-effective alternative to metal components, offer exterior protection, weight reduction and aesthetic value.

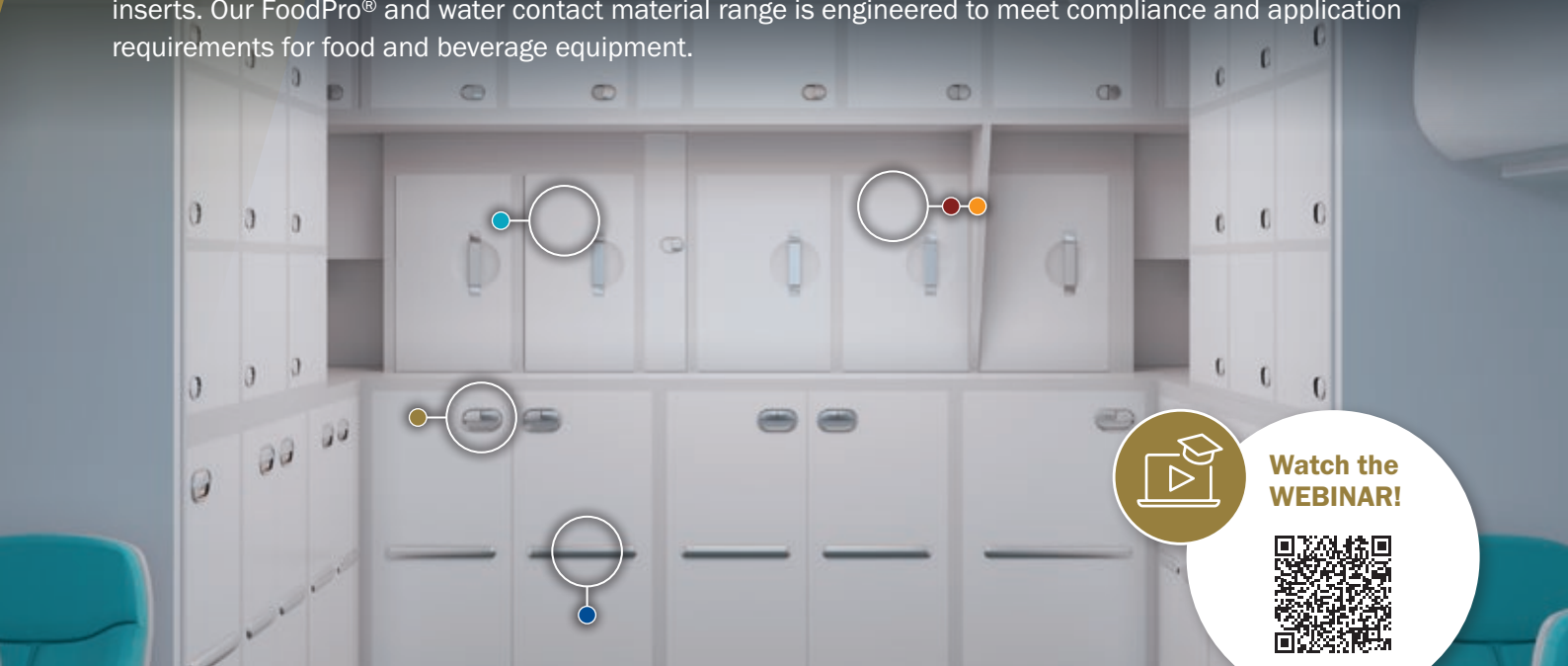


CERTIFICATIONS & COMPLIANCE

- AS 9100
- CFR25.853

Galley

The galley must enable the efficient preparation of food and drinks. Our molded and extruded thermoplastics protect surfaces from damage, and seals keep heat in ovens and prevent leakage and contamination of galley inserts. Our FoodPro® and water contact material range is engineered to meet compliance and application requirements for food and beverage equipment.



Watch the WEBINAR!



● **FoodPro® Static & Dynamic Seals**

Complying with the most relevant food contact regulations globally, the FoodPro® material range is specially engineered for food and beverage applications. These materials can be manufactured into a wide range of static seals, dynamic seals and gaskets.



● **LSR Components & Grommets**

LSR components are used to seal and protect galley inserts, where complex geometries or compliance with food or water contact regulations is required. High precision parts can be manufactured with thin sections or undercuts. When needed, Trelleborg Sealing Solutions utilizes advanced manufacturing technology, including overmolding and multicomponent technology, with which multiple components are replaced by one, uniquely engineered piece.



● **Engineered Molded Parts**

Galley inserts rely on unique sealing solutions to ensure safe and efficient storage and preparation of food and beverages. Trelleborg manufactures custom molded thermoplastics and elastomers designed and manufactured to meet customer requirements. These can be used in a wide range of applications, including coffee machines, boilers, liquid containers, refrigeration units, ovens and warming devices, service carts and trash receptacles.



● **Tubing & Hose**

Available in a wide range of materials, tubing and hose products, including silicone, reinforced, corrugated and thin wall tubing, are specified to meet application requirements. They are typically found in coffee machines, boilers, liquid containers and refrigeration units.



● **Extruded Profiles**

Commonly used as bump/rub strips or to cover unsightly gaps, extruded thermoplastic and elastomer profiles are used throughout the galley to protect surfaces from damage, for example, by carts or spilled beverages.

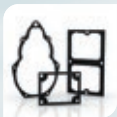


CERTIFICATIONS & COMPLIANCE

- AS 9100
- ISO 14001
- NADCAP
- FDA 21
- NSF 61
- CFR25.853
- JAR25.853
- Country-specific food and beverage regulations

Lavatory Systems

Lavatories systems must ensure a stable supply of clean water and efficient removal of waste. Our standard and custom-designed seals, hoses, valves and other assemblies, made of plastic and elastomer materials, play a vital part in ensuring the safe handling of potable and wastewater in the aircraft. Sealing materials comply with global water regulations, including FDA, NSF, KTW, WRAS and EGL.



● Static Seals & Gaskets

Elastomer static seals prevent contamination of potable water and leakage of water and wastewater. In the sink drain and toilet flushing mechanism, these seals protect the aircraft structure from aggressive chemicals and waste.



● Tubing & Fittings

Found in the flushing mechanism of toilet and sink systems, tubing and hose is manufactured according to customer specifications and can be supplied as an assembly with sanitary fittings.



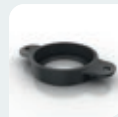
● Extruded Profiles

Extruded rubber and thermoplastic products, such as bump/rub strips, gap seals and carpet transitions, provide a seamless transition between trim and flooring.



● EMI-Shielding Components

Our EMI-shielding gaskets and injection-molded thermoplastics with specialty coatings are designed for components that require electromagnetic shielding, such as fused connection unit (FCU) covers and housings.



● Injection Molded Components

We design and produce custom components to meet your aesthetic demands, with color and texture matching. Our materials meet all CFR 25.853 requirements and are suitable for use in bezels, brackets, panels, latches, shelves, air nozzles and light housings.



● Custom-Molded Elastomers

Used to seal housings, damp vibration or protect lavatory components from damage, custom-molded elastomer components, including bumpers, grommets and housing seals, can be color-matched to airline colors and manufactured to pass CFR25.853 requirements.



CERTIFICATIONS & COMPLIANCE

- AS 9100
- ISO 14001
- NADCAP
- ADD JAR
- CRF certs
- FDA
- NSF
- KTW
- WRAS
- EGL
- NSF 61/ ANSI Materials

Trelleborg Sealing Solutions Market Presence

Trelleborg Aerospace offers a full portfolio of solutions and services for nearly any aerospace application. Materials and products can be used in any type of aircraft and our products are designed to provide maximum efficiency to customers. In addition to our experience in the aerospace industry, we are also able to offer solutions based on industrial technology where full aerospace certification is not required.



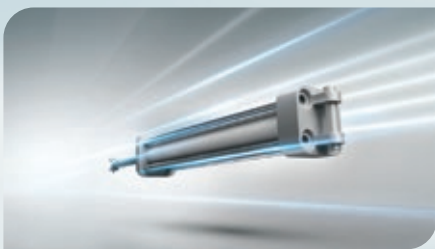
Advanced Air Mobility



Aerospace



Automotive



Fluid Power – Pneumatics



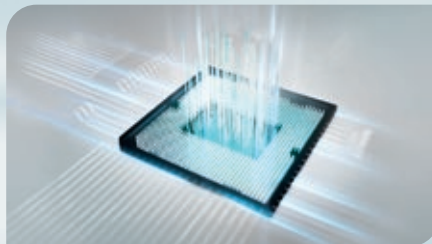
Manufacturing & Machine Tools



Material Handling



Construction & Mining Equipment



Semiconductor

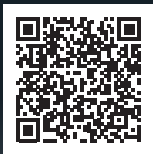


Oil & Gas

OUR AEROSPACE LITERATURE



Explore our website, industry-specific brochures and product catalogs to get an overview of the solutions that are suitable for your application. You can order directly or contact us for engineering assistance to select the most suitable product. We offer free-of-charge engineering services for seal selection and can develop custom products if our standard range does not meet your requirements.



Go to:
trelleborg.com/seals/literature



Airframe and Engine Sealing Capabilities



Aerospace Sealing Systems



Engineered Thermoplastic Aerospace Solutions



Conductive and Shielding Solutions



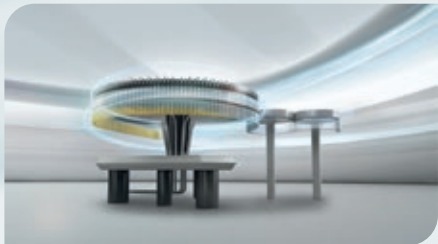
Advanced Air Mobility



Ground Support Equipment



Space Applications



Food & Beverage



Processing Equipment



Fluid Power - Hydraulics



Renewable Energy & Power Generation



Healthcare & Medical



Agriculture



Marine Equipment & Construction



Water & Sanitary



Robotics

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Sealing Solutions is a leading developer, manufacturer and supplier of precision seals, bearings and custom-molded polymer components. It focuses on meeting the most demanding needs of aerospace, automotive and general industrial customers with innovative solutions.

WWW.TRELLEBORG.COM/SEALS



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