

simrit® insight.

Special

The magazine for Simrit customers



30 Years in Aerospace

Simrit knows the Industry



A Soaring Partnership
with Pratt & Whitney



Simmerring® Radial Shaft
Seals for the Aerospace
Industry



Sealing Solution
saves redesign

www.simrit.com

Freudenberg and NOK Group



Stuart Campton,
Sales Director
Aerospace Europe



Vinay Nilkanth,
VP - Business Development
Aerospace Americas

Dear Readers,

Simrit welcomes you to Farnborough International Air show 2008 and wishes you a successful and enjoyable visit.

For many years Simrit has held a leading position for sealing and vibration control products in all of the very diverse market segments in which it operates. Simrit believe that our products are class leading in terms of performance and technology and that we can deliver comprehensive sealing solutions to the Aerospace Industry. So therefore we are very excited to tell you that earlier this year it was decided corporately that we would develop our position in the European Aerospace Segment to mirror our successes in North America. Simrit's product offering includes O-rings, Simmerring® radial shaft seals, PTFE seals, fire seals and aerodynamic seals in both standard and bespoke configurations. We have launched a medium term initiative to achieve a strong position within Europe and are currently moving forward with this strategy. It is our intention to focus and deploy the expertise and capability held within our organisation towards the Tier 1 and 2 suppliers within Europe.

If you have the opportunity please visit Simrit in Hall 4, Stand CC2. We look forward to meeting with you.

Best Regards

Stuart Campton
Sales Director
Aerospace Europe

Vinay Nilkanth,
VP - Business Development
Aerospace Americas

Trade fair dates

Date	Trade fair	Location	Hall / Booth
15.07. – 17.07.	Semicon West 2008	San Francisco – USA	North Hall / 6289
09.09. – 13.09.	Husum WindEnergy	Husum – Germany	H4 / 4025-4028
15.09. – 19.09.	MSV International Machine Tools Exhibition	Brno – Czech Republic	D1 / 5
24.09. – 25.09.	MEDTEC Ireland	Galway – Ireland	410

Further dates can be found in our calendar of events at www.simrit.com

Imprint

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Fluorosilicones for jet engines

Simrit has been designing and manufacturing materials, products and technologies for the aerospace industry for 30 years. As an example of the company's product and service commitment, Simrit has developed a family of PTFE (polytetrafluoroethylene) modified fluorosilicones.

Given the demanding requirements of the aerospace industry (resistance to jet fuel, low temperature at high altitude and pressure extrusion at high fuel pressures), current fluorosilicones are often too delicate, have poor low-temperature flexibility and poor high-pressure fuel extrusion resistance and are therefore prone to failure due to installation damage and dynamic conditions. As a solution, Simrit created its proprietary family of PTFE modified fluorosilicone materials. Simrit's F226 (a light brown 81 shore A material), F227 (a dark blue 75 shore A material) and F229 (a red 82 shore A material) compounds are optimised for the best balance of properties for these applications. The new materials offer high-temperature fuel resistance, high-temperature and pressure fuel extrusion resistance, low-temperature flexibility and dynamic wear – Simrit's proprietary modification system that provides the best overall balance of reinforcement, friction reduction

and compression set resistance. Additionally, the F229 compound meets the AMS3383 requirement for PTFE-modified fluorosilicone.

Fast material launch

All three of Simrit's PTFE-modified fluorosilicones are currently in use by major aerospace manufacturers. As an example, two major North American aerospace companies – an aircraft engine manufacturer and a fuel control manufacturer – switched to Simrit's F229 material after experiencing severe delivery problems with a competitive source. Working closely with the customers' engineering teams to gain source approval, Simrit's Santa Ana, Calif. facility completed the lean manufacturing conversions to deliver the product in less than two weeks (competition at 8 to 10 weeks delivery). The successful transition was a result of the collaborative effort of Simrit's product development and manufacturing processes

teams. Simrit utilised its DTPT process to assure manufacturing readiness and successful integration. This process utilises the "voice of the customer" in conjunction with process engineering to enable a successful material launch.

Providing smooth product flow

Additionally, an aerospace fuel controls and accessories company required the improved wear and dynamic performance properties of fluorosilicone along with prompt delivery of product. Competitive products suffered from manufacturing plant closures, long lead times and product performance issues. The company switched to Simrit and its F227 and F226 materials to solve the issues. Simrit's combination of superior product development and smooth transition to full-scale manufacturing solved the product performance and logistics issues for the customer. Simrit has continued providing smooth product flow for more than two years.

Simrit's family of PTFE modified fluorosilicones for fuel controls and jet engine fittings to meet the evolving needs of the industry.

In brief

- Proprietary family of PTFE modified fluorosilicone materials
- Two North American aerospace companies switched to the PTFE materials
- Aerospace companies appreciate Simrit's "voice of the customer" process
- Smooth transition from product development to full-scale manufacturing



For further questions,
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info@simrit.com



A Soaring Partnership

"Simrit as a Supplier to Pratt & Whitney Canada is a solid 9 out of 10 and should be commended for their work with us", says Mr. Benoit Beaudoin, Vice President of Supply Management, Pratt & Whitney Canada, in an exclusive interview with "Simrit insight". Below you will find the complete text.

Where do you see Pratt & Whitney Canada positioned in the aerospace market today?

Since 2003, our business has more than doubled and Pratt & Whitney Canada is positioned well for future growth. We serve three distinct segments: business and general aviation, regional aircraft and helicopters. We produce ten engine families, each designed for the needs of a particular segment. This strong product offering serves as the foundation for Pratt & Whitney Canada's continuing global expansion.

What are the keys to success in the future for Pratt & Whitney Canada?

In many ways, our past is also our future. Over the last 15 years, Pratt & Whitney Canada has invested more in Research and Development than any other Canadian aerospace company. This strong commitment to R&D has paid off in the launch of over 60 new applications in the last

twelve years. Technology is truly a differentiator in our industry. Our dedication to developing new technologies and new platforms continues to establish us a market leader in small to mid-sized aircraft propulsion. One example is Pratt & Whitney Canada's new generation PW810 engine recently selected for a large business jet.

In addition, we must execute implementation of new technologies flawlessly. This manifests itself in several different areas within our company. We must be exact in our engineering, design and production to build the highest quality engines available. Likewise, we must effectively manage our supply chain to deliver this quality at competitive prices.

What are some of the challenges facing Pratt & Whitney Canada in the next three to five years?

Well, from a supply chain perspective

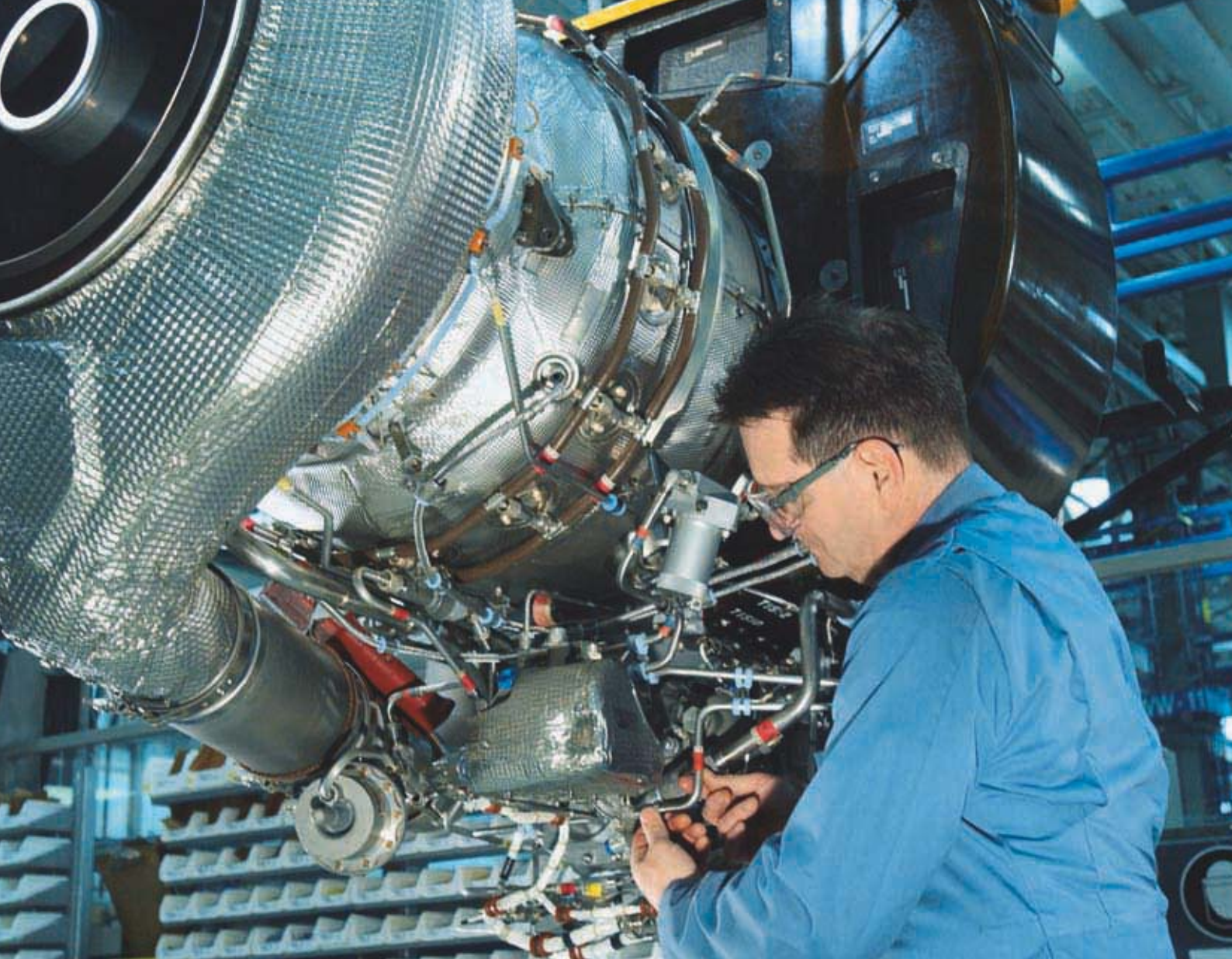
Pratt & Whitney must be exact in engineering, design and production to build the highest quality engines available.

Mr. Benoit Beaudoin,
Vice President of Supply
Management, Pratt &
Whitney Canada.



Pratt & Whitney
Canada's new
generation
PW810 engine.

there are several challenges. Of course, each new aircraft OEM is looking for an increase in the value/price ratio. What new technologies can provide a competitive advantage in the marketplace? How can these technologies provide a higher value to our customers? Likewise, how can costs be taken out of the product or processes in the face of the continuing rise in raw material costs? The challenge is to collectively come up with innovation in all areas of our processes that will provide more value to our customers. Another important aspect is ensuring we have a supply chain that can continue to grow as we grow. As Pratt & Whitney Canada continues to expand, our suppliers must be able to increase capacity to meet the increasing demand. We require suppliers who embrace lean practices and can quickly respond as our needs change. We also plan to move to fewer suppliers who each provide expanded



*Picture courtesy of Pratt & Whitney Canada

value-added services. Vendors who can provide kits or modules directly to our line while managing Tier 2 and Tier 3 suppliers will simplify our supply chain and carry us into the future.

When looking at seal suppliers, what criteria do you consider critical to meeting these challenges?

There are five distinct areas in which we will measure all vendors:

1. Capability to step up and perform to the UTC supplier Gold programme. This includes the areas of quality, on-time delivery and cost-competitiveness. We look for world-class performance in each of these areas.
2. Ability to provide more value-added services. This simplifies the supply chain and increases efficiency.
3. Global presence. As Pratt & Whitney Canada expands to fast developing regions of the world, we need suppli-

ers who can provide local support and globally cost-competitive products.

4. Risk acceptance. Growth does not occur without some degree of risk, whether due to exchange rates or expansion into new regions and we expect our suppliers to bet on long-term success in partnership with us.
5. Embracement of lean concepts. The practice of lean concepts reaches beyond one company to span the entire supply chain. This is where the real power of lean is demonstrated and our suppliers must be committed to converting lean practices into action.

How would you rate Simrit as a supplier to Pratt & Whitney Canada?

Simrit is a solid 9 out of 10 and should be commended for their work with us. Our volume increased dramatically from 2007 to 2008 and Simrit seamlessly met the challenge of the higher volumes. Si-

multaneously, they flawlessly launched production on 200 part numbers through the use of 3P and other lean systems. Their close collaboration with our entire team and excellent customer service make Simrit a valued supplier to Pratt & Whitney Canada.

How will seal suppliers be evaluated in the future?

The price-of-entry for seal suppliers will be excellence in quality and on-time delivery. We also require vendors who can generate ideas as to how we can save money together while providing greater value to our customers. Lastly, global presence is crucial. As our customer base expands around the world, so must our supplier support. From what I have seen so far, Simrit is well positioned to perform as an important supplier to Pratt & Whitney Canada as we move into the future.

Simmerring® Radial Shaft Seals for the Aerospace Industry

Two examples of Simrit's pioneering design solutions are detailed below. Both of these innovative seal designs are appropriate for applications with high shaft surface speeds and with full or partial lubrication conditions.



PTFE seal in a non-conventional orientation.

The different applications of the two seals range from actuators to transmissions to gearboxes for fixed wing or rotor aircrafts. One of these pioneering radial shaft seals is a patented design that uniquely positions the polytetrafluorethylene (PTFE) seal in a non-conventional orientation, the other is a combination seal. Given that PTFE does not inherently possess the pumping ability that is typically associated with standard spring-energized elastomer sealing lips, one must incorporate a dynamic pumping feature. The traditional PTFE seals must have fluid leak past the static sealing area before the hydrodynamic pumping features are functional. This fluid becomes trapped and begins to degrade and solidify, eventually compromising performance and, ultimately, the seal's integrity.

Reverse orientation seal

The Simrit design incorporates triple start hydrodynamic geometry to move fluid

more effectively. Radial grooves connect the hydrodynamic features at the edge of the continuous / static sealing geometry to provide a flow of fresh fluid and facilitate system balance. A low-temperature FKM (fluoroelastomer) backing assists in maintaining shaft loading to reduce bell-mouthing and improve shaft followability. Simrit's reverse orientation seal is compatible with applied system pressurisation less than 100 kPa. With non-conventional orientation, system pressure reduces the sealing lip loading, thus reducing frictional heat that is generated, as well as wear.

Combination seal

The second innovative solution concerning radial shaft seals is the uniquely designed "combination seal" – which utilises a lightly loaded elastomer sealing lip, a PTFE sealing lip and a non-woven excluder lip – is used primarily in helicopter applications. The primary elastomer sealing lip incorporates a unidirectional helix and has

a finger shape to reduce loading, with less frictional heat being generated. An elastomer-backed unidirectional PTFE sealing member is used as back-up, as the elastomer backing assists in maintaining sealing lip loads.

Specialised in honed surfaces

The design was originally developed for an application with a super finished or honed sealing surface. In addition, the shaft surface speed was high and lubrication was sparse. Honed surfaces are typically extremely difficult to seal with a conventional spring-energised elastomer seal because the surface will not support a fluid film and the seal is literally subjected to dry running conditions.

A PTFE impregnated non-woven material can be substituted/utilised in place of the standard non-woven material, as the impregnated material can be used where exposure/exclusion of external fluids is required.



Combination seal using an elastomer sealing lip, a PTFE sealing lip and a non-woven excluder lip.

In brief



- With Simmerring® PTFE radial shaft seals installed in a non-conventional orientation, Simrit reduces frictional heat by making fluid move more effectively
- The combination seal uses two sealing lips and a non-woven excluder lip. It is primarily used in helicopter applications
- The combination seal is especially appropriate for super finished or honed sealing surfaces



For further questions,
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Sealing Solution saves redesign

Employing a hybrid design that incorporates the best features of flat gaskets and O-rings, while eliminating the drawbacks that are associated with each of those sealing methods, Simrit's plate seals have gained a reliable reputation in the aerospace industry.

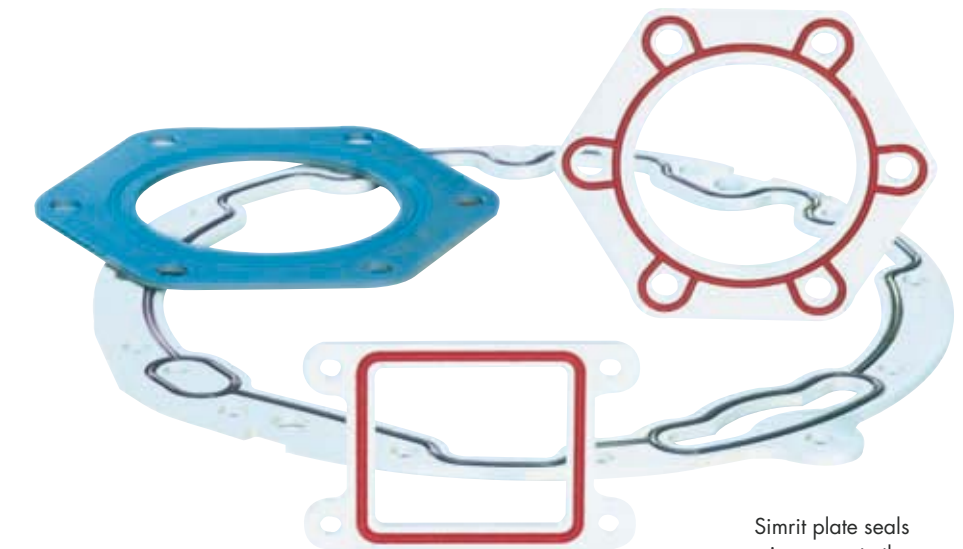
In late 2007, Simrit was urgently approached by a European aerospace manufacturer that had a failing composite gasket (leaking after 100 operating cycles) on a bearing chamber. The flanges had already been cast and machined, and the manufacturer feared a costly chamber redesign was imminent. Without a sealing solution, the chamber redesign would have delayed production that was scheduled to start in January. Due to its expertise and reputation for sealing compounds, the manufacturer turned to Simrit for an efficient, customised solution.

Customised plate seals

Simrit engineers proposed a plate seal for the application. Used in JP fuels, hydraulic, transmission and bleed air applications, plate seals are rapidly gaining acceptance in both new and retrofit aerospace applications. Simrit plate seals have an elastomeric seal permanently moulded into an aluminium retainer and their advantages in assembly, performance and retrofitting make them the finest static seals currently available.

Simrit designed a plate seal that uniquely addressed the three major concerns of the manufacturer, including:

- The existing composite gasket was experiencing fatigue due to the thermal cycling and axial relaxation of the flange – Simrit recognised that the metal-to-metal contact established between the mating surfaces when a plate seal is installed would eliminate this premature seal degradation. As they do with all plate seals, the engineers designed a controlled squeeze of the elastomeric sealing element. In addition, the Simrit engineers recommended a torque value to slightly stretch the bolts to compensate for any stress relaxation.



Simrit plate seals incorporate the best of flat gaskets and O-rings.

- The manufacturer was also concerned that its flange design would not allow changes to some limited land areas around an oil scavenge hole – to address this challenge, Simrit uniquely designed the plate seal within this constraint, using materials that had sufficient “hoop strength” in the radial dimension to accommodate the design without adding additional weight.
- Lastly, the manufacturer had a stack up of tolerances that only allowed for maximum (2 mm) thickness for the replacement seal – Simrit's custom plate seal design was constructed within this constraint.

No costly redesign

The final result was a plate seal that eliminated the need for a costly redesign. In addition, there were a few surprise benefits to the customer, including a slight weight reduction and an ease of installation due to the rigidity of the plate seal.

Simrit is still supplying its plate seals for this application and the customer is currently looking at plate seals for other retrofit applications.

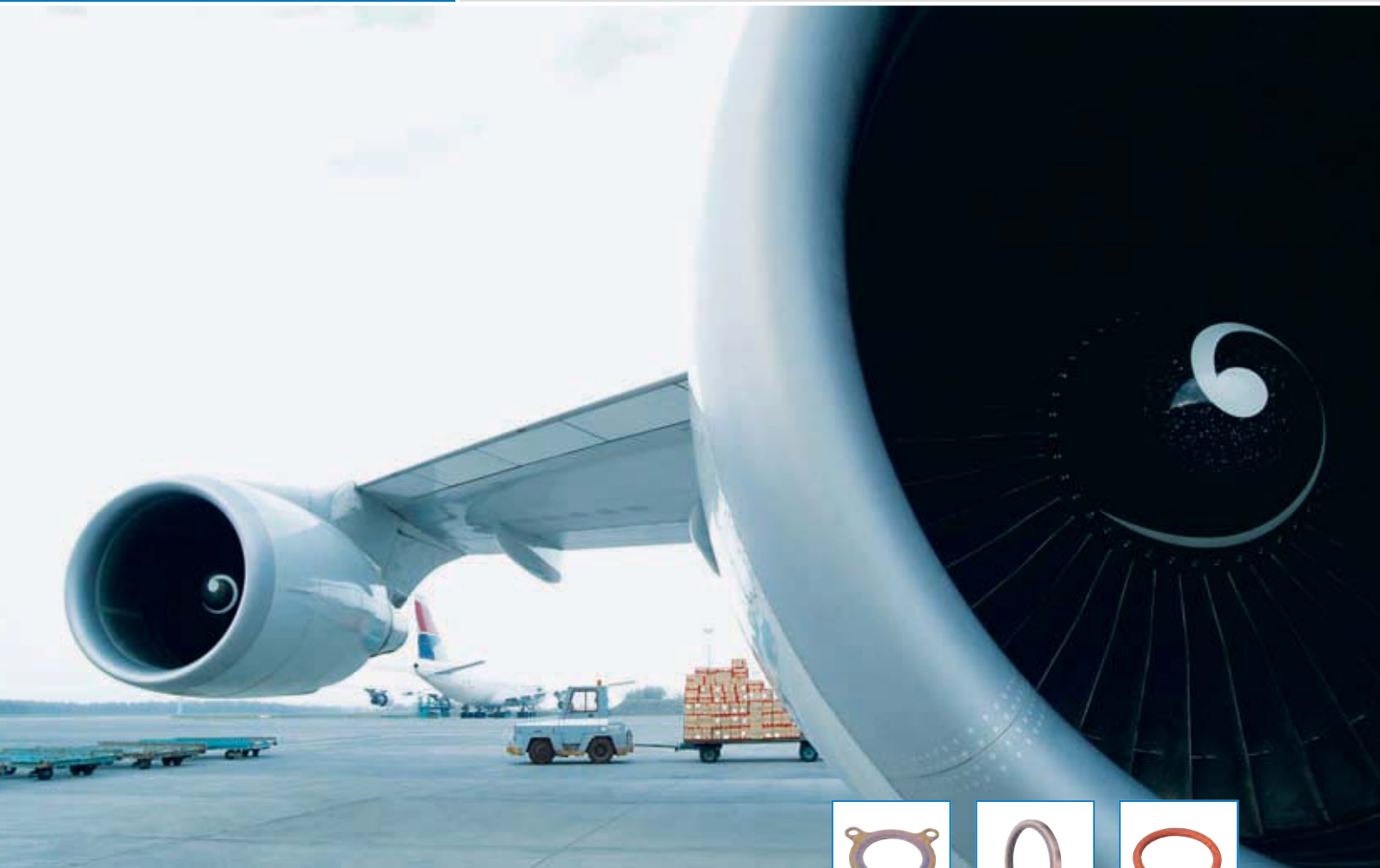
In brief



- Plate seals are suitable in both new and retrofit aerospace applications.
- Simrit designed a sealing solution which compensates for any stress relaxation
- The plate seal was constructed within the rigid weight and space constraints of the aerospace manufacturer



For further questions,
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Ready for take off

Dependable sealing technology for the Aerospace Industry

In aerospace, extreme thermal ranges, pressure, ozone as well as UV effects place great demands on sealing components. Simrit offers you a unique product range developed for these conditions from materials

approved for air and space travel. These products are offered for all essential aircraft systems including airframes, control and undercarriage systems and engines, all custom made to meet your needs.

Would you like more information? Contact us:
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