MTU Aero Engines: A technology leader in brush seals

* **Pratt & Whitney uses the innovative seal components in its Geared TurbofanTM engines**
* Technology proves its worth in a variety of mechanical engineering applications

Munich, March 20, 2014 – It’s a simple concept with a big impact: More than 30 years ago, MTU Aero Engines set out to develop its first brush seal. The innovative components are suitable for use not only in aircraft engines – as, for example, in Pratt & Whitney’s successful family of PurePower® geared turbofans –, but also in steam and gas turbines, pumps and a variety of other mechanical engineering applications. MTU has established itself as a global leader in the field.

The idea behind the technology of brush seals is as simple as it is brilliant: “The construction typically includes thousands of thin bristles forming a very flexible seal which continuously adapts to the moving surface to be sealed,” explains Benjamin Großkurth, who heads up brush seal production at MTU. This way, brush seals clearly outperform conventional sealing systems, such as labyrinth seals. Says Großkurth: “MTU’s brush seals reduce leakages by up to 90 percent, which boosts the performance of the engine or gas turbine.” Every increase in efficiency improves the eco-efficiency of a propulsion system, resulting in lower fuel consumption and reduced CO2 emissions. Take a single-aisle aircraft, for example. The innovative seals will save around one percent of the, say, 20,000 tons of kerosene the jet typically burns every year – and that is the equivalent of the amount of fuel carried by ten tank trucks with a capacity of 20 tons each. Moreover, CO2 emissions are reduced by the same percentage as fuel consumption.

MTU’s brush seals have still more advantages to offer: They are suitable for a wide variety of applications, maintain stable operating behavior, and are capable of withstanding extreme service conditions. They are easy to install, have a long life and a compact design which takes up less space than conventional models that have the same sealing effect. On top of that, they are easy to maintain and to replace. All of these benefits help appreciably reduce operating costs.

The latest example of applications that highlight MTU’s capabilities in the field of brush seals is the successful PurePower®PW1000G series of geared turbofan (GTF) engines: MTU already contributes three brush seals each to the GTF engines to power Bombardier’s CSeries, Mitsubishi’s MRJ regional jet and Embraer’s E-Jets. Now the company has been selected to also supply its seals for the two additional GTF engine models: both the PW1100G-JM engine to power the A320neo aircraft and the PW1400G engine to power the Irkut MC-21 aircraft will incorporate a total of four MTU brush seals.

MTU’s innovative sealing systems were originally designed for use in military engines. Back in 1983, MTU launched initial tests with brush seal components and soon filed for a patent for its new concept. The first brush seal ever developed at MTU was intended for installation on the RB199 engine powering the Tornado. “6.3 bar, 550 degrees Celsius, 170 meters of sliding speed per second - these were the parameters when we first went about the job. Nowadays, that would be considered anything but a tough operating environment for a brush seal,” according to Großkurth. Today, the seals are exposed to temperatures as high as 700 degrees Celsius and surface speeds of 500 meters per second when in service. Engine applications include the EJ200 powering the Eurofighter Typhoon, the PW6000 powering the Airbus A318, and the TP400-D6 powering the Airbus A400M military airlifter.

Brush seals have long ceased to be a product tailored to the needs of a specific niche market. New fields of application include industrial plants, such as gas and steam turbines for power generation, compressors and water pumps. About two thirds of the brush seals produced at MTU go to this market.

**About MTU Aero Engines**

MTU Aero Engines, Germany's leading and the country's only independent engine manufacturer, is an established glo­bal player in the industry. It engages in the development, manufacture, marketing and support of commercial and mili­tary aircraft engines and industrial gas turbines. The compa­ny is a technological leader in low-pressure turbines, high-pressure compressors, manufacturing processes, and repair techniques. In the commercial maintenance area, MTU Main­te­nance is the world's largest independent provider of engine maintenance services. In the military arena, MTU Aero Engines is Germany's industrial lead company for practically all engines flown by the country's military. MTU operates affiliates around the globe; Munich is home to its corporate headquarters.

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