

# DLR Cologne Exhaust system for the future of gas turbines

G+H Schallschutz develops and constructs a compact exhaust system for a test rig for the German Aerospace Centre in Cologne.



## Insulation

## Fire Protection

## Noise Control

At its Cologne facility, the German Aerospace Centre (DLR) operates several high-pressure combustion chamber test rigs for different applications. The previous exhaust system of the high-pressure combustion chamber test rig 2 (HBK2), for research on low-emission gas turbines, no longer met the increasingly stringent requirements.

In 2019, G+H Schallschutz therefore took on the development and construction of a new exhaust system consisting of a horizontal duct and a stack with silencer.

### CUSTOMER

German Aerospace Centre (DLR)

### PROJECT

Design and implementation of a new exhaust system for the DLR HBK2 test rig.

### COMPLETION PERIOD

07/2019–12/2019

### SOLUTIONS

Exhaust duct  
Stack with silencer



G+H Schallschutz had already developed an exhaust gas stack and silencer for a DLR test rig back in 2014. The new project posed several challenges: the work had to be completed within five and a half months, the outlet height of the old silencer could not be exceeded, and the existing foundation could not be altered. In addition, the exhaust system and silencer of the HBK2 had to be designed to cope with flow velocities of the exhaust gas core jet of more than 1,000 metres per second, and temperatures of more than

1,300 degrees Celsius at the outlet of the combustion chamber throttle, while at the same time complying with the acoustic requirements. In order to divert the exhaust gas flow through 90 degrees, from the horizontal duct into the stack, G+H developed a prototype that was specially tailored to the test rig: a cylindrical body made of perforated sheet metal directs the exhaust flow into the vertical exhaust tract, maintaining a homogeneous flow profile.



## TASK

- Construction and development of an exhaust system for a high-pressure combustion chamber test rig
- Design of the exhaust system and exhaust silencer for flow velocities in the core stream of > 1,000 m/s and exhaust gas temperatures of > 1,300 °C
- Achievement of required acoustic values

## SOLUTION

- Exhaust system comprising a horizontal exhaust duct and a stack with silencer
- Development of a prototype for an exhaust system tailored to the test rig

## ADVANTAGES

- Compliance with the acoustic requirements
- Tailor-made solution
- Development and construction of the exhaust system within 5.5 months