



HPT-Rig

Versatile High-Pressure and -Temperature Test Rig for Combustion Analysis under Realistic Gas Turbine Conditions

Motivation

- Reproduce experimentally combustion at realistic gas turbine conditions
- Versatility: low and middle-range pressure and temperature inlet conditions, mono- and multiphase reactive flow
- Focus: Unsteady combustion. Solutions towards combustion monitoring. New concepts.



3 MW Compressor facility

- Operational

compressor name	compressor type	volume flow [m3/h]	mass flow [kg/s]	pressure ratio	engine power single operation [kW]	engine power serial operation [kW]
SC20	turbo compressor	27500	9.0	2.9	1450	1350
SC14	turbo compressor	15500	5.1	2.9	900	1250
E1+E2	screw compressor	8000	2.6	3.1	400	1600

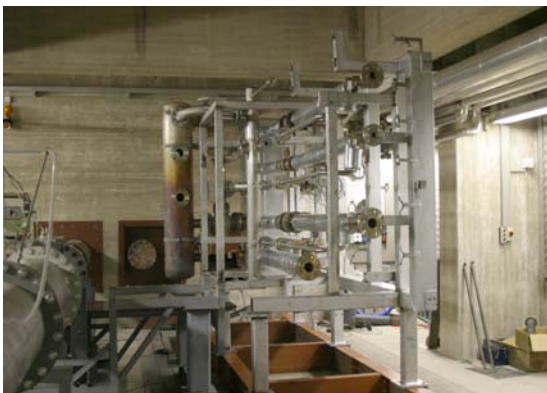


2 MW air heater

- Capacity: inlet conditions up to 5 kg/s air at 10 bars, outlet temperature up to 550 degrees C
- Under construction. Service planned autumn 2006.

Plus

- SIMATIC control unit
- Variable geometry exhaust nozzle (motorised + water-cooled)
- Water cooling unit for in-situ instrumentation
- Sound-damper, allowing overnight-operation



Versatile air system (operational spring 2006)

- Distribution function:
 - Main air (up to 6 feed lines for multi-injection sectors)
 - Secondary air (chamber wall cooling+ 2^{ary} mixing)
 - By-pass air (exhaust gases cooling + fixed flow conditions)
- Mixing function
 - Mixing hot/cool air
- Regulation
 - Steady state distribution
 - Transient modes
 - Unsteady injection (use of a resonator or siren)

