

BI 1 - 7 Over-speed test stands



- Centrifuging rotors to the point of bursting
- Disruptive resistant over-speed production with comprehensive safety concept
- Drive with regenerative brakes
- Implementation of tests with elevated or reduced temperature
- Compact design, reduced installation expenditure
- Flexibility due to modular drives
- Unbalanced measurement for pre-balancing the test specimens

Area of application

In over-speed test stands, rotating components are tested in centrifugal force fields. These are proven test stands, which are indispensable for the development and production, as well as the quality assurance of jet engines, gas turbines, turbo-compressors, turbo-chargers, ventilators, commutators, automotive couplings, wood-processing tools and HSG grinding bodies.

Main areas of application are: Material solidification by acceleration of the test specimen up to the flow area of the material, Solidification test with rotations above the operating speed within the scope of quality assurance, Acceleration of the test specimen up to the intended rupture within the scope of new and further developments, Creep test (LCF tests) for the creation of Wöhler curves.

CAST


CAST is the central system, which collects, analyses, and monitors the data and all parameters. It supports 16 analogue measuring channels, for example, for speed, shaft vibration, vacuum, temperature. Furthermore, CAST enables the automatic operation control of over-speed tests and test cycles. CASTView offers the comfortable visualisation of all values in on and off operation. **Mechanical Structure**

The test stand contains a vacuum-sealed container with integrated burst protection. It is so dimensioned that it absorbs the expected fragment energy while the during the burst of a rotor. Up to size 4, the container stands on a base in a room. As of size 5, the container is partially embedded in

the floor, so as to enable a better handling with the test specimen. The covering lid of the container is designed for very high internal pressures and provided with an automatic locking device. It thus is secured against axially acting fracture energy or dust explosion. The complete mechanical drive is mounted on the container cover. The three-phase servomotor with frequency inverter and planetary gear or a precision roller-bearing spindle, which is driven via a low-swing, flat belt. If, due to an extensive rotary spectrum a large weight/speed range must be covered, there is the possibility of using several mechanical drives. A simple, timesaving replacement of individual drive units can be ensured by using speed plug connections.

Safety

The test system of the overspeed test stand always is provided with an extensive safety concept in order to provide maximum safety in all situations. In addition to an extensive mechanical safety component such as burst protection, an effective cover lock protection or the clamping protection, all systems are equipped with a comprehensive electronic monitoring and error diagnostics system. During the test run, this system monitors permanently all relevant data such as speed, pressure, vibrations and temperature and compares it with preset values. If these values exceed the thresholds, the brake procedure is instantly initiated. Generally, the shock sensor monitors the test run in order to initiate a breakage with maximum torque in the case of a burst. **Energy efficiency** With extensive creep tests, the energy consumption for the drive of the test body is very high – especially when

A photograph of a large industrial test stand, likely a Schenck RoTec model, showing a large rotating drum and various mechanical components. The stand is white and blue, with a red horizontal bar across the top.

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ventilation losses occur. When using AC servomotors in the drive, during the brake operation, the energy can be re-fed into the network so that in comparison to other types of drives considerable advantages result from the costs of operation. The reduction normally is approx. 85%, with favourable conditions, they may be as high as 95%.

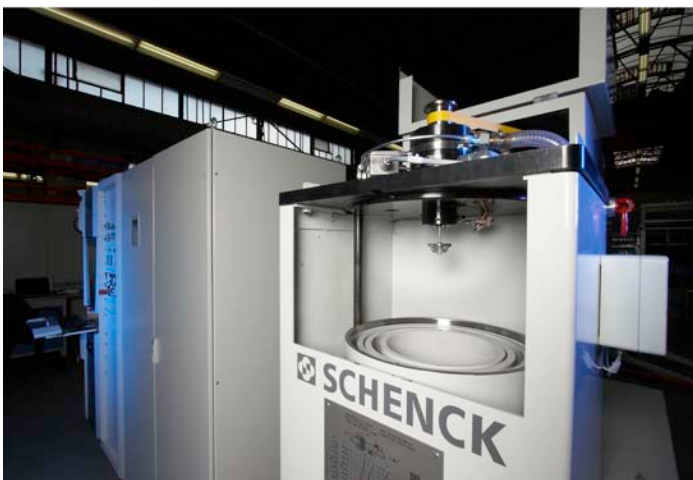
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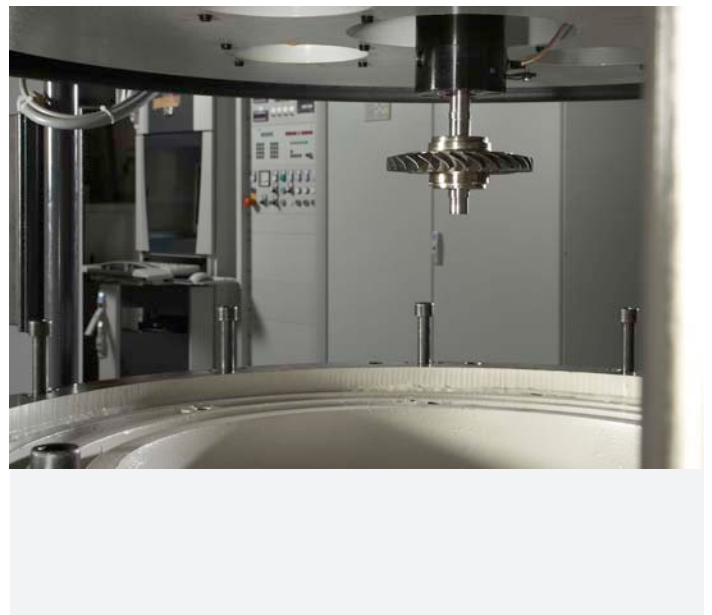
Fatigue strength test in a driving mechanism level



Cryogenic overspeed test stand for tests with temperatures close to absolute zero



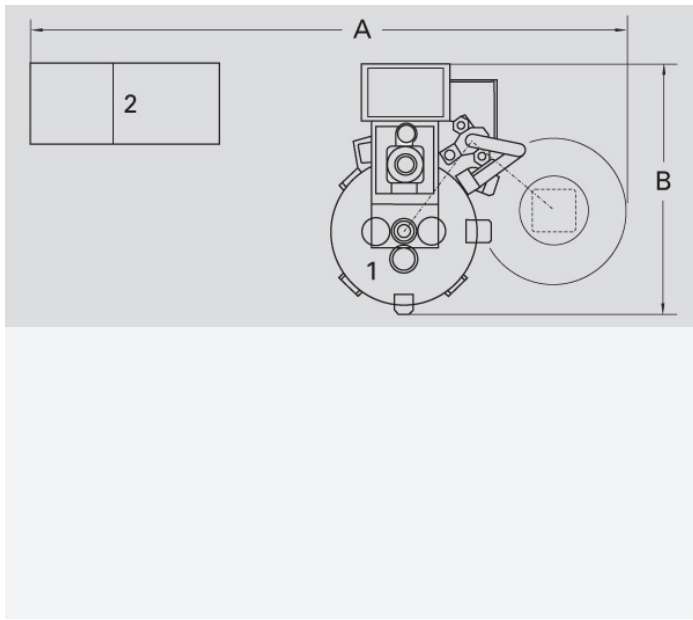
Overspeed test stand of construction size BI 1 for rotor diameter of up to 200mm diameter



Power plant Blisk in test area

BI 1 - 7

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1 Overspeed test stand 2 Switch cabinet

Plan view (non-binding example: dimensions depend on the relevant application)

BI 1 - 7

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Technical data at a glance		BI 1	BI 2	BI 3	BI 4	BI 5	BI 6	BI 7
Rotor weight (max.)	[kg]	10	50	400	800	1600	3150	6300
Diameter (max.)	[mm]	200	500	710	1000	1500	2000	2700
Speed (max.)	[min ⁻¹]	3,000 to 250,000 (depending on drive)						
Drive power	[kW]	7.5	15	30	55	90	160	250

Machine

Width A	[mm]	3500	4600	4800	5500	6000	6600	8000
Depth	[mm]	3500	1900	2200	3025	4600	5400	7300
Height C	[mm]	2000	3000	3000	3500	2500	2850	3800

Order No.	R0900100.01	R0900200.01	R0900300.01	R0900400.01	R0900500.01	R0900600.01	R0900700.01
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