A rotor’s balance essentially contributes to the service life of rotating machines. Unbalanced masses cause radial forces that strain bearings, casings, base plates, and not least foundations as well as building structures. Therefore, balancing of new and refitted rotors is an inherent part of the production and revision process.

In this context we offer balancing solutions for a wide spectrum of rotors. Especially the potential of performing electrical measurements on rotors of electric machines during the balancing process considerably shortens throughput time.

**Essen balancing pit**

Requirements for a balancing pit as to geometry, weight, and speed of rotors are very different. In order to optimally meet the requirements for turborotors (figure 1) and for rotors of electric machines (figure 2) in industrial applications, the Essen balancing pit (figure 3) was developed for rotors with the following specifications:

**Rotor**

- maximum weight: approx. 32 t\(^1\)
- maximum diameter: approx. 3.1 m
- maximum length: approx. 10.5 m\(^2\)
- maximum speed: 16,000 U/min
- maximum oil flow/bearing: 375 l/min\(^3\)
- maximum bearing journal diameter: 400 mm
- maximum number of bearings: 4

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1) Higher weights after technical release  
2) Longer rotors after technical release  
3) Higher oil flows after technical release
**Driver unit (figure 4)**

DC motor
- maximum power/speed: 1.35 MW / 1,300 U / min
- direction of rotation: left/right

**Gear ratios:**
- shift gear transmission: 1:1/1:4
- turbo gear transmission: 1:3,5

**Shifting steps:**
- low-speed: 1:1/1:3.5
- high-speed: 1:4/1:3.5
- range: 0 - 4,550 U / min
- range: 0 - 16,000 U / min

**Main control room**

The main control room of the balancing pit (figure 5) comprises three operator terminals:
- vibration measurements and control
- process control
- electric measurements

For the vibration measurement the Schenck-Systems CAB690 and Cabflex++ are used ensuring the following standards are met:
- International ISO 1940, ISO 11342 Standard Organization
- American Petroleum API 617 Institute

In order to simulate realistic conditions, balancing at operating temperature may be carried out for rotors of electric machines by means of electric heating.

For a final inspection, documents of
- frequency analyses,
- amplitude/phase diagrams,
- shaft vibration measurements
are compiled in accordance with the respective guidelines.