High-temperature furnaces

High-temperature furnaces (Fig. 4) must withstand high temperatures that melt materials, such as titanium, without damage. Usually made of graphite, these furnaces frequently cause contamination with reactive carbon which can cause damage to the manufactured products. Fully metallic furnaces and heating elements made of suitable materials on the other hand are a clean solution. Tungsten for example is one of the few materials that causes no contamination in a suitable atmosphere. With a melting point of 3,400°C, temperatures up to 2,800°C can be reached in the high-temperature furnace with tungsten. The material is dimensionally stable, creep-resistance and durable. Only because tungsten is difficult to process has this material not long since become the accepted standard. The company has specialised in the processing and tailor-made delivery of heating elements made of tungsten and also molybdenum according to the specifications of the respective furnace manufacturers. In addition, the characteristics of the heating elements can be adapted to individual requirements through nonsag doping and the addition of rare earths. The properties of tungsten and molybdenum heating elements can also be adapted to individual requirements through nonsag doping and the addition of rare earths. The company offers special forms as well as all metal and hybrid versions. All products distinguish themselves with the highest purity. (Gesellschaft für Wolfram Industrie mbH, Permanederstraße 34, 83278 Traunstein/Germany; www.wolfram-industrie.de)

Fig. 4

Fig. 5

Evolving efficiencies in actuation

The "Smart Hydraulic Actuator" (SHA) (Fig. 5) is fully engineered as a standard modular product, rendering it inherently more cost effective as it leverages standard, off-the-shelf components. This all-in-one system combines the key benefits of an electronic servo system with the power density of hydraulics. The flexible system can be oriented in any position and features a compact footprint – combining the power to weight ratio advantage of hydraulic technology with the versatility, ease of installation, and control of electric servo technology. The configuration also features a servo drive controller, actuator, manifold, and built-in transducers, providing essential closed-loop precision force and position control. Fieldbus capabilities include Ethernet, CAN and Serial. A notable key benefit of the system is the way the differential volume is accounted for between a cylinder's cap and rod ends. To compensate for this differential, the hydraulic cylinder includes an outer low-pressure cylinder with a second inner high-pressure cylinder – creating a chamber between the two. Ultimately, the uniquely engineered product delivers high force density in a small footprint with precision, while offering superior "power-on-demand" energy efficiency – only running when needed. "SHA" is leading the way for advanced actuation for wide-ranging applications and markets including: special machines, automotive, aerospace, medical equipment, metal bending/forming, defense, material handling, testing stands, steel mills, lift tables, and many others. (Kyntronics, 34700 Lakeland Blvd., Eastlake, OH 44095/USA; www.kyntronics.com)

Tungsten carbide technique

Although the knowledge has existed for more than a hundred years, the spindle manufacturers seem to ignore the possibility of hardening with tungsten carbide. The company comes up with a remedy and increases the hardness of a spindle's cone. The advantage lies in less abrasion and a longer service life of the spindle. Of course the technique is extensively proven in practice – with a remarkable success. The technique consists of stabilising the spindle's cone through powdered tungsten by using a 2,000 W strong diode laser. Through a thermic process which takes up to 11 hours, a layer of 0.6 mm thickness is created. After that the layer is finished by a high-grade diamond grinding pencil, which takes another 8 hours. The result is a hardness of 86 HRC which has not yet been received in the field of spindles. The manufacturer's hardness value lies in the range between 58 and 64 HRC. The advantage of an increased hardness lies in a comprehensive protection against damage or abrasion (Fig. 6). The machine's HSK/SK interface in particular won't be affected in a crash or even in daily work. Furthermore, the control of the system mount works better and micro oscillations will be damped, especially in grinding processes. The amazing hardness of tungsten carbide is especially useful, when the machining tool changes frequently. The inherent exposure will be minimised through the hardness of the material. Tungsten carbide or rather mono tungsten carbide consists of tungsten and carbon and has the chemical formula WC. The production is carried out by carburisation where tungsten and carbon is heated up to a temperature of 2,800°C. The result is an especially hard crystal which can be processed and for example serve to coat. The hardness is close to a diamond's value. (Spindeldoctor, Henschelstraße 8, 34311 Naumburg/Germany; www.spindeldoctor.com)

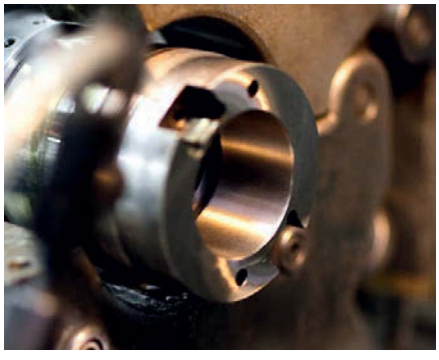

Fig. 6