



■ Sulzer Metco, Switzerland

## Quality Turbines

For the first time, Sinumerik 840D ensures consistently reliable process control in the thermal coating of turbine blades under vacuum.

**B**ased in the Swiss town of Wohlen, Sulzer Metco develops and manufactures customized equipment for the thermal coating of engineering components. Its latest project is a system for a manufacturer of aircraft engine turbine blades. For this project, the company successfully used Sinumerik 840D for the first time.

Plasma coating of turbine blades takes place under extreme environmental conditions. In a vacuum chamber, a plasma jet is directed onto the workpiece to make it glow. As Sulzer Metco's project engineer Erich Huber explains, "These temperatures alone make it virtually impossible to use reliable measuring equipment in the coating chamber. In addition, the powdered coating material is applied in a gas and the excess powder is deposited onto parts of the equipment, which can have a detrimental effect on their function."

The workpiece to be coated is mounted on a solid support in the preparation chamber. Then a vacuum

is generated. Once clearance for the start of the process has been given, control is handed over to the CNC controller. An absolute position measuring system records the exact position of the workpiece at any given moment and transmits the information to the controller. The controller initiates recipe changes in terms of electrical current, gases and powders according to the movements of the workpiece and the progress of the coating process. During this phase, the process control system has a monitoring role. Even if a fault occurs, the current position of the axes is retained, and once the fault has been cleared, coating can continue immediately with no need for additional referencing.

### Opting for Sinumerik

Erich Huber had to take a number of important factors into account when designing this coating system. A system of this type has at least eight axes, so the

controller has to have multi-channel capability. In addition, the customer wanted the supplier of the controller to have a local presence for servicing purposes. What's more, a new drive system for manipulating the parts to be coated had to be specified.

The chosen controller was Sinumerik 840D, which as a modular multi-axis and multi-channel controller most closely satisfied the above requirements. "With Sinumerik 840D, we opted for the highest possible level, as this controller can be scaled to the required number of axes and channels. This enabled us to significantly reduce the engineering work involved, and existing software modules can be reused for other systems," says Erich Huber.

The company also decided on a Simodrive drive system: "Along with the Sinumerik 840D control system, we are also using the associated motors and controllers. From an engineering point of view, this offers clear advantages. We still have just the one point of contact and much more drive information. The configuration work is less complex because the data for drives, controllers and CNC can be stored in the same location. This significantly reduces the commissioning time."

Erich Huber is impressed by the absolute position measuring system included in the Simodrive drive system: "The axes no longer have to be referenced and repositioned with the controller whenever the equipment is switched on or after a fault. Given the long travel distances of the axes, these reference runs always took up a lot of time."

### Impressive functionality

Although this was his first system using Sinumerik and Simodrive, Erich Huber did not encounter any major obstacles: "The documentation is excellent, and the controller comes with an extensive library. In addition, Guido Staubli, our contact at Siemens, was on hand to offer expert advice and support whenever we needed it."

For Erich Huber, the many integrated functions in the controller and in the drive system represent a simplification: "The range of functions has been developed on the basis of earlier solutions, which is very apparent." The fact that this brings a further advantage

**At the heart of the coating plant control system: Sinumerik 840D records the exact position of the workpiece to be coated at all times. As well as saving time by avoiding the need for referencing runs, process reliability is also significantly improved**



in the shape of a cost reduction of 20 to 30 percent in terms of the controller is a welcome knock-on effect. But the end customer benefits, too. When the system is started up after a fault, there is no need to reference the axes again because with Simodrive, the exact position of the workpiece is available at all times.

"Not every system is as complex as this one," says Erich Huber, "but there is certainly a trend toward even more axes. For that reason, we carried out our evaluation on the basis of ten axes." The multi-channel capability of the controller was also taken into consideration for that reason, and this will be an important factor in future projects. ■

**Plasma Coating at a Glance**

- ▶ Thermal coating plant
- ▶ Vacuum: 35 Torr
- ▶ Gas stream temperature: 20,000°C
- ▶ Object temperature: 600°C
- ▶ Ambient temperature: 300°C
- ▶ Coating material: powder in carrier gas
- ▶ Process controller: Sinumerik 840D
- ▶ Drives: Simodrive 611D

<b>info</b>	<a href="http://www.siemens.com/sinumerik">www.siemens.com/sinumerik</a> <a href="http://www.sulzermetco.com">www.sulzermetco.com</a>
-------------	------------------------------------------------------------------------------------------------------------------------------------------