Series Cleaning of Investment Cast Parts

Dual Tank System for Complex Geometries

Around 25,000 parts made of high-alloyed steel and nickel-based material are cleaned every week at a manufacturer of investment cast parts. These are sensitive components with complex geometries that need to be reliably cleaned. For that reason, the company chose a system that fulfils their cleanliness specifications under series production conditions.

A conventional cleaning process is not sufficient for the cast parts manufacturer Feinguss Blank to clean its produced parts according to specifications. The company supplies complete components for all sectors of the metalworking industry, using all types of investment casting, from steel and vacuum investment casting right through to aluminium and copper-based investment casting. The workpieces made of high-alloyed steel show no visible signs of dirt residues after aqueous cleaning. However, the company's cleanliness specifications require a second cleaning process.

For this application, Feinguss Blank decided to install a new cleaning system. They chose an "Elba" dual tank system from Mafac. "The system was the only one that fulfilled our specifications under series production conditions," said Technical Director Torsten Wolf. The decision-making process in favour of the system took two-and-a-half years. "In spite of the many requirements, this system achieved very good results under production conditions and proved to be far superior to systems from other suppliers," said Alexander Augustin, Head of Operating Materials Planning.

The unit for the second cleaning stage is installed in a separate room and cleans components made of high-alloyed steel and nickel-based material

Cleaning sensitive components

The new system cleans machined parts made of high-alloyed steel and nickel-based materials. This is not the first cleaning process that the workpieces go through, but it is the decisive one. As the workpieces have already been cleaned, they only have minor residues such as dust and oil. But these must also be completely removed, as the parts will be subsequently further machined in a sensitive production process.

A total of three programs are stored in the system. These can be activated by the "Maviatic" touchscreen operating concept. All three programs work with spray cleaning processes. The basket system rotates in the opposite direction to the rotating spray system, which is fitted with solid stream nozzles. Sensitive parts with complex geometries are fixed with special frames into a basket system, while less sensitive parts are placed into the basket as bulk material.

The entire cleaning process takes around seven minutes. Around two thirds of this time is taken up by the wet phase, which includes a cleaning and rinsing process. Between the cleaning and rinsing processes, the spray system is blown through to prevent carryover of the cleaning agent. The cleaning phase is followed by a drying phase, which is a key component of the entire process.

Drying takes place using an air pulse system. The components are dried with pulses of warm compressed air and then exposed to heated air. The basket system rotates in the opposite direction to the rotating drying system.

The two tanks with the cleaning agents are first used for cleaning and then for rinsing. The cleaning agent in the first tank, which has a capacity of 475 litres, includes a corrosion protection additive, while the cleaning agent in the second 300-litre tank has no additives.

With a weekly throughput of around 25,000 cleaned parts, the baths have a service life of around ten working days. Coarse and fine contamination that can be skimmed off is removed using a coalescense separator with a surface skimmer. The oil and grease which is removed is collected in a separate container. Both cleaning tanks have a single-stage prefiltration unit.

A separate tank is used to store demineralised water for the cleaning process. Additional modules allow a tank with demineralised water to be connected to the cleaning machine and to be used as a second rinsing bath as required. “We don’t know what requirements our customers will have in the future. Therefore we have equipped our cleaning system to enable us to activate the water tank as a second rinsing bath at any time,” said Technical Director Torsten Wolf.

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