*Application note A212*

# Cleanliness inspection of aluminium die cast

**Product:** SITA CleanoSpector, SITA clean line CI
**Industry:** Automotive, electronics
**Measuring principle:** Fluorescence measurement

In the automotive industry, die-cast aluminium housings are used in a wide variety of applications: for engine control units and computer electronics for autonomous driving, for power electronics in hybrid and electric cars, and for pumps, motors and trans-missions. The joint between the two housing parts as well as the tightness against environmental and media influences are ensured by bonding with a liquid sealant.

Release agents are essential for the die-casting process of aluminium housings. Residues of the release agents and of cooling lubricants from machining have an interfering effect on the bonding and must be removed by cleaning. Fluorescence measurement is a suitable method for checking the cleanliness of the surrounding sealing groove.

## Quality assurance by fluorescence measurement


*Figure 1: Manual measurement with SITA CleanoSpector and spacer directly on the adhesive groove*

Fluorescence measurement is used for non-destructive testing of the cleanliness of bonding surfaces prior to the seal-bonding process. This ensures sufficient adhesion and tightness. In practice, it has been shown that the deeper sealing grooves are much more difficult to clean than the rest of the housing. In addition, a larger quantity of release agent is partially applied to improve mould separation at these areas. Both of these factors usually lead to a significantly higher level of contamination compared to free surfaces.

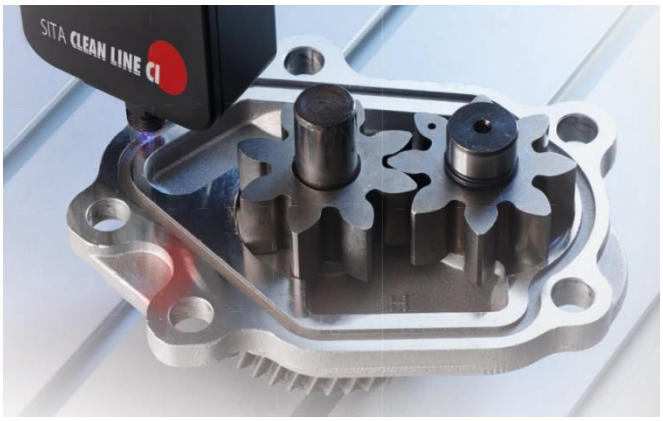


*Figure 2: In-line cleanliness inspection of the sealing groove*

By recording a large number of measuring points directly on the functional surface of the sealing groove to be bonded, cleanliness can be reliably checked and the quality of the bonded joint can be ensured. It has proven to be effective to determine process-specific limit values for sufficient cleanliness depending on the achieved quality of the bonding either based on experience or by correlation with destructive test methods such as pull-off tests.

## Device use

The handheld measuring device SITA CleanoSpector is well proven to perform random sample checks directly in the production, in the laboratory as well as for setting up the pilot production. Multiple automated in-line measuring systems SITA clean line CI are implemented in manufacturing lines worldwide for in-line inspection of the complete sealing groove using robotics.

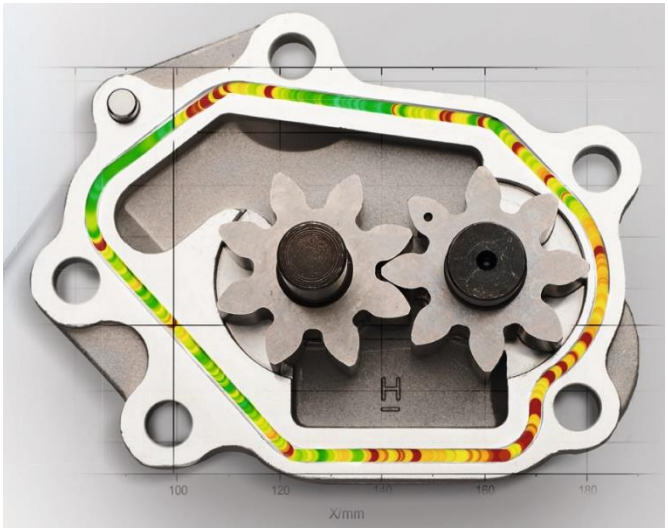


*Figure 3: Colour-coded visualisation of the in-line inspection results*



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