# CASE STUDY

**SITA CleanoSpector**
Surface cleanliness measurement instrument




**Our customer**

Ilmor Engineering Ltd.

**Customer benefits**

- Elimination of part failures due to contamination
- Confidence in part cleanliness
- Ability to set cleanliness threshold according to their own requirements

## Peace of mind for meeting component cleanliness standards in race car engine manufacturing

Dyne Testing Ltd supplied high performance F1 and Indy car race engine designer and manufacturer Ilmor Engineering Ltd with the revolutionary 'CleanoSpector' surface cleanliness measurement instrument. The **CleanoSpector** has helped Ilmor to further improve their already high quality standards.

Ilmor wanted to optimise their cleaning processes and have the quality assurance that their manufactured engine components were thoroughly "clean" prior to assembly into an engine to avoid any failures. The solution to ensuring this was to monitor the part's cleanliness after their cleaning process with the CleanoSpector, which quickly detects residual contamination on metal surfaces.

Poor cleaning is the most common single cause of defects or coating failures. Having the ability to measure the level of cleanliness during the cleaning process whether aqueous, solvent or semi-aqueous will give a good indication on how well parts will perform through the next surface treatment. The CleanoSpector is an easy-to-use robust measuring instrument which has been developed specifically for quality assurance in industrial cleaning processes and is used globally in the Automotive and Aerospace industries. A hand held fluorescence measuring instrument, it will detect organic contamination on metal, ceramic and glass and many other surfaces.

The CleanoSpector detects residual contamination such as oils or cooling lubricants due to their fluorescence which is excited by a UV light source. A photodiode in the sensor head measures the intensity of the emitted fluorescence radiation at a defined wavelength in the blue light range. The contact-free measurement is based on the characteristic of materials used in the production process such as oils, greases, cooling lubricants, preservatives as well as skin

grease to fluoresce when excited with UV light. The intensity of the fluorescence depends on the amount of contamination on the surface. The process allows measurements to be made regardless of the roughness of the surface and the intensity of the fluorescence is measured in RFU (relative fluorescence unit). According to the requirements of ISO 9001:2008, fluorescence measurement devices are calibrated using specially developed normals, which ensures that the measuring results of all devices are comparable.

Typical Application Examples for Metal Cleanliness Inspection:

- Automotive crank shafts, pistons, cam shafts and con-rods after cleaning
- Pistons for hydraulic pumps before hardening – residual contamination has an influence on the steel quality in the hardening furnace
- Stainless steel pipes before coating (vehicle construction)
- Gear case parts before coating or bonding
- Fluxing agent residues on gold bond pads on ceramic substrates
- Medical instruments and implants before delivering to the user
- Cleanliness of parts before vacuum or powder coating

The starting point for adapting the CleanoSpector measurement instrument to a particular application is the specification of the cleanliness level required for the surface of the part. This is often based on the experiences of the plant operator, who determines the connection between the results of the cleanliness inspection and the product quality during the monitoring phase. However, it is recommended to define the required part cleanliness by analysing the effect of different types of contamination on the follow up process. The instrument has a cleanliness measurement mode which shows the cleanliness of the part in percentage (%). It is calibrated on a part that is considered “clean” by the user, which corresponds to 100% cleanliness. In contrast, heavily contaminated parts are evaluated with under 10% cleanliness.

Since implementing the CleanoSpector into their quality process, Ilmor Engineering Ltd has the quality assurance that their cleaning process is successful. Tony Thain, Quality Manager at Ilmor worked very closely with the team at Dyne Testing:

> *“From initial trials at the Dyne Testing Laboratory it was clear to see the benefits of using the CleanoSpector for detecting contamination. Our application required the instrument to be delivered with a modified measurement head; the team at Dyne Testing were very helpful and supplied an instrument to suit our precise requirements. The CleanoSpector is now being used at our plant and is giving us perfect results”.*

**SITA CleanoSpector Surface Cleanliness Measurement Instrument**

- Mobile and robust measuring instrument for flexible use at the process and in the laboratory
- Intuitive operation: simple and fast measurement
- Automatic calibration on reference surface
- Highest product quality by monitoring limit values
- Documentation of slightest contamination on various shaped surfaces
- Efficiency by process optimisation

**Applications include:** Measuring organic contamination such as oil, grease and cleaning fluid on metal surfaces both during and after the cleaning process. Widely used in automotive and aerospace applications.

DYNE TESTING
an intertronics company

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