CROWN INDUSTRIAL SERVICES INC. **CLEANLINESS TESTING LABORATORY**

We test to ISO 16232

Component Cleanliness Testing:
Fluid Extraction by Pressure Rinsing

Fluid extraction tends to be the most widely used method when it comes to component cleanliness testing in the Automotive Industry as explained in specifications like ISO 16232 and VDA 19. Since many components come in contact with fluids during operation, it only makes sense to extract them with such. Once it has been decided to proceed with a fluid extraction to measure the cleanliness of a component and an appropriate, compatible solvent has been selected, the next step is to determine the means by which the extraction fluid will be administered to the component's clean surfaces.

As mentioned in Component Cleanliness Testing: Methods of Extraction pressure rinsing is typically the default method of fluid extraction unless otherwise noted in a component's cleanliness specification or deemed impractical to conduct on said component. Pressure rinsing involves the washing of a component's surfaces with the extraction fluid dispensed from a vessel through a spray nozzle at a consistent pressure and flow rate. This could be as simple as rinsing a component with a solvent from a squeeze bottle to using a larger more complex vessel pressurized by a compressed gas through which the extraction fluid flows through a tube and is dispensed through the nozzle of a spray gun. The latter example tends to be much more practical as maintaining a constant pressure and flow rate with use of a squeeze bottle is highly improbable. The practice of pressurizing the vessel by means of compressed gas can also allow for further filtration of the extraction fluid while it is being dispensed through the tubing and spray gun via filter housings to safeguard against unintended environmental contaminants during the extraction procedure.

Pressure rinsing is ideal for extracting components with easily accessible surfaces. The procedure is fairly simple and can be easily modified to suit the component under inspection. Naturally, for components with a more complex design in which the clean surfaces are not easily accessible and disassembly is not an option, pressure rinsing would not be the superlative method of extraction, but the equipment could be used as a medium to administer the extraction fluid when methods like agitation or a function test bench would be more practical procedures. Pressure rinsing can also be used to clean equipment such as containers used to collect the extraction fluid and apparatuses by which the sample is filtered from the fluid for analysis.

Certainly, fluid extraction by pressure rinsing has its quirks as well as perks. If the procedure is conducted manually, which it often is, the results can be heavily influenced by the inspector. That is why it is important to have a validated extraction procedure documented in full detail so anyone responsible for conducting the test can be as

consistent as possible in replicating the work of their colleagues. Depending on the pressure at which the solvent is administered as well as the nozzle shape and size from which it is dispensed, extracted contaminants can cover large areas adding excessive rinsing to the extraction zone to ensure all the contamination is included in the sample for analysis. In turn, this excessive rinsing can cause for a higher blank value as well as the inclusion of environmental contaminants not originating from the component under inspection that may impact the test results. Making sure the sample collection container is large enough to contain "splash back" will assist in controlling the dispersion and/or loss of particulates.

When conducting cleanliness testing, fluid extraction by pressure rinsing is an easy, effective, ubiquitous technique. As long as the component's design is suitable for an extraction by means of pressure rinsing, the task is objectively routine which will produce accurate and repeatable outcomes. Much of the equipment used to conduct a pressure rinse extraction also has value in the cleaning of other instruments used for sample collection and preparation. Since the other primary methods of fluid extraction typically call for a final rinsing of the component, sample container, and other equipment used to prepare the sample for analysis, it only makes sense to execute the extraction procedure using a rinsing technique unless the method is incapable of reaching the clean surfaces and removing contamination.

So…what's to be done when fluid extraction by pressure rinsing is not a viable technique? Next up in the Component Cleanliness Testing series: Fluid Extraction by Agitation

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Please feel free to give us a call – we do a lot of ISO 16232 based testing for a wide array of customers here at the Crown Cleanliness Testing Laboratory in Jackson, Michigan USA. Do not hesitate to contact us when you have a question about cleanliness testing or need cleanliness testing done. We offer Standard Turnaround for scheduled cyclical cleanliness testing and Expedited Turnaround when you need results ASAP. We also sell Lab kits and can train your personnel to do cleanliness testing if your customer insists you do the testing in-house.

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