

## **Drying filter membranes in the drying oven**

**The technical cleanliness of functionally relevant components is a central factor in quality management in the automotive industry. For standard-compliant testing of residual contamination, a Memmert drying oven in the mobile laboratory is in use almost constantly.**

Where there's work there's dirt. In the manufacture of functionally relevant parts for the automotive industry such as gears, transmissions or injectors for diesel engines, tiny metal particles and other residual dirt stick to the components. The components therefore have to be cleaned in costly cleaning units prior to delivery. However, where safety in the vehicle is concerned, trust is good but control is certainly better, which is why the VDFA guideline volume 19, ISO 16232 and numerous factory standards specify how engine manufacturers and other suppliers from the automotive industry must test and document technical cleanliness, that is, residual contamination. At the [Kreisel](#)



In the examination of the technical cleanliness of components, the easily cleanable Memmert drying oven made of stainless steel is of great help

laboratory and consulting service, the Memmert drying oven has become a fixture in the elaborate testing process.

## Residual contamination analysis on the component on site

Markus Kreisel, the owner, supports the suppliers of components and the manufacturers of cleaning units in their quality management. With his ISO-certified laboratory trailer, he travels all over Germany and neighbouring countries, performing residual contamination analyses right next to production facilities.

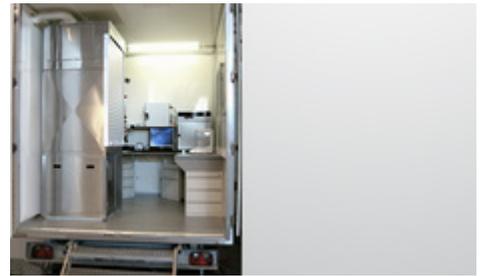
The diameter of a human hair is about 70  $\mu\text{m}$  on average (1 micrometer equals 1 thousandth of a millimeter). The maximum size of a particle of dirt that does not impair the function of the component from a technical perspective is, depending on customer requirements, also in the 2 to 3 figure micrometer range. Determining particle sizes is truly no small matter for Markus Kreisel. Elaborate laboratory appliances and analyses in the cleanroom are a matter of course, also in the mobile laboratory.

## Exactly defined drying in the drying oven

For the measurement, particles are captured on a filter membrane that, prior to analysis, Markus Kreisel dries in a Memmert UNB 400 drying oven at 85 °C for exactly 45 minutes, and after cooling down, weighs it on laboratory scales.

In the particle-free analysis device, the components are then rinsed with a predefined pure liquid, after which the dirt particles under vacuum, together with the rinsing fluid, are drawn over the filter membrane. When this has been dried again for 45 minutes at 85 °C in the drying oven, it is cooled off in a desiccator and weighed once more. The difference between the two weighings results in the overall weight of the residual contamination. A further analysis step is the measurement of particles through an automatic microscopic counting of metallic and non-metallic particles.

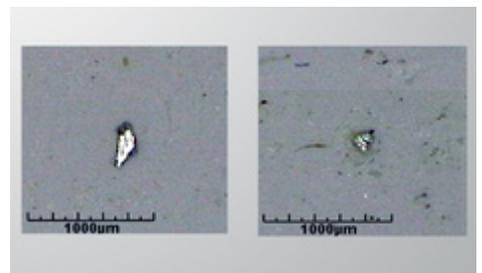
## Stainless steel for maximum hygiene



Mobile laboratory for the residual contamination analysis of components



Filter membrane for the residual contamination analysis of components



Results of particle size measurement

Since cross contamination of samples must be avoided under all circumstances, purity and hygiene are also the highest priority in the drying oven. This is why Markus Kreisel particularly appreciates the surfaces of stainless steel of his Memmert drying oven and the smooth, easy-to-clean interior. “Cleanliness as a competitive factor” – this applies for the Kreisel laboratory service, for customers from the automotive industry and also for Memmert.  
[www.laborservice-kreisel.de](http://www.laborservice-kreisel.de)

#### **An overview of focus topics**

- Drying oven
- Universal oven
- Component cleanliness
- Residual contamination analysis
- Filter membrane
- VDA volume 19
- ISO 16232
- Laboratory appliances
- Cleanroom
- Determining the dry weight
- Test laboratory

Picture credits:

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Kreisel Labor- und Beratungsservice

Autor: Memmert GmbH + Co. KG

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[www.atmosafe.net](http://www.atmosafe.net) > [Applications](#) > [Dry content](#) > [Technical Cleanliness](#)

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#### **Laboratory equipment for drying**

[Oven \(drying oven\) U](#)

[Vacuum drying oven VO](#)

[Cleanroom drying oven](#)

#### **Stainless steel versus copper**

The study demonstrates: in terms of hygiene and cleanliness, the surface properties of stainless steel is ideal in a temperature control oven.

[more information](#)



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Experts in Thermostatics