

**ENGE SOLUTIONS**

◆ Experts in Technical Cleanliness ◆

# Technical Cleanliness **TRAINING**

*BASED ON ISO16232:2018 &  
VDA19.1:2026 STANDARDS*

OVER 200 TRAINING SESSIONS CONDUCTED

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# TECHNICAL CLEANLINESS TRAINING

## COURSE

Today, a growing number of automotive parts and components have specified requirements regarding contamination levels and cleanliness. Technical drawings now include, in addition to dimensional tolerances, codes such as CCC (Component Cleanliness Code) that components must comply with.

To ensure analyses are carried out safely and operational errors do not compromise test results, laboratory personnel qualification is essential, in accordance with ISO16232:2018 (Road Vehicles – Cleanliness of Components and Systems) and VDA19.1:2026 (Inspection of Technical Cleanliness – Particulate Contamination of Functionally Relevant Automotive Components).

There are countless details within the analysis process that may lead to inaccurate results. A single error can trigger a cascade of issues throughout the production environment, affecting suppliers and end customers.



*Enge Solutions Microscopy Laboratory*



*SEM/EDS – Enge Solutions*

## INSTRUCTOR QUALIFICATION

Engineer Fernando Dias was certified by Gläser GmbH in Germany and the Fraunhofer IPA Institute (Stuttgart – Germany) as an Inspector and Specialist in Technical Cleanliness.

He is an authorized trainer for Technical Cleanliness training based on VDA19.1:2026 and ISO16232:2018 standards, with over 15 years of experience in the Technical Cleanliness field.

## INFRASTRUCTURE

Enge Solutions is the only laboratory with a complete infrastructure to deliver both theoretical and practical training, meeting all client requirements and showcasing the most advanced equipment for contamination analysis.

Enge Solutions Microscopy Laboratory  
Particle extraction with extraction

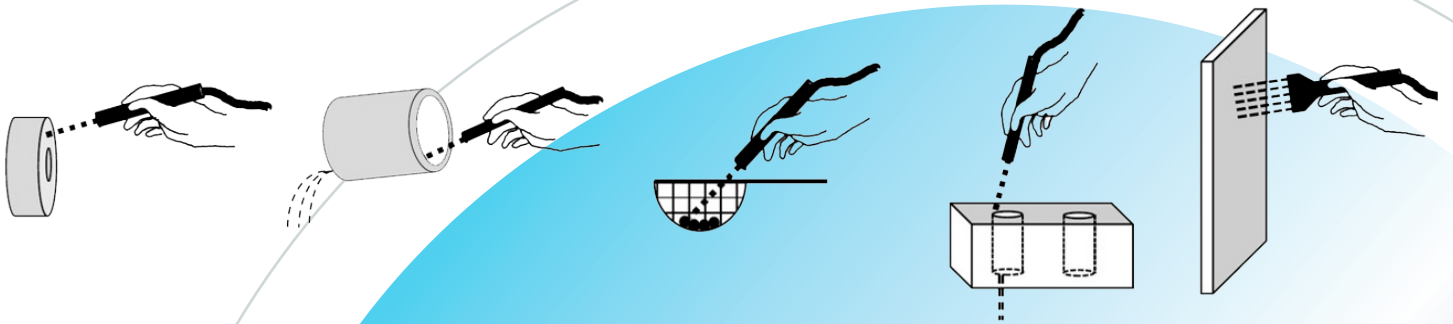


*Particle Extraction with Extraction Cabin*

# COURSE CONTENT

## VDA19.1: 2026

- Technical Cleanliness concepts;
- History of the VDA19.1:2004 standard;
- Revisions of VDA19.1 (2015 and 2026);
- ISO16232:2018 standard;
- Blank value and decay curve;
- Extraction methods according to VDA19.1:2026 and ISO16232:2018;
- Evolution of contamination analysis methods;
- Gravimetric analysis (mg) and particle extraction cabin;
- Stereo microscope – automatic particle counter;
- Metallic particles, non-metallic particles, and fibers;
- ISO16232:2018 and CCC (Component Cleanliness Code);
- Analysis environment, handling, and improvement practices;
- Cleanroom according to ISO14644-1;
- Chemical composition evaluation of particles using SEM/EDS;
- Cleanliness specification studies;
- Influence on final product, evaluation, and operational environment monitoring;
- Final report in accordance with ISO16232:2018 and VDA 19.1:2026.



*Extraction Process in Accordance with VDA19.1:2026 Standard*

For more information about the course, please contact our sales team and request a no-obligation quotation.

Course certificate issued.



Training materials included.



*Enge Solutions Particle Extraction Laboratory with Cleanroom*

How to maintain a standardized analysis?

How can we ensure components are clean enough?

How can we deliver reliable results?

The solution is simple: professional qualification in the VDA19.1 standard for component cleanliness inspection and the VDA19.2 standard for the further processing of cleaned individual components.



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