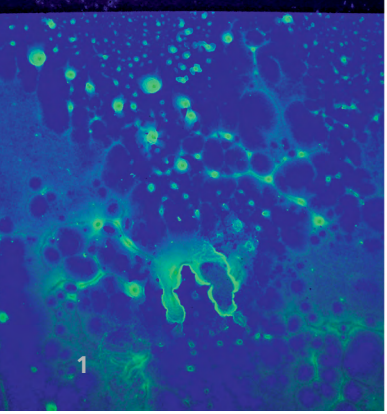
Fraunhofer IPA

FRAUNHOFER INSTITUTE FOR MANUFACTURING ENGINEERING AND AUTOMATION IPA

CSM – CLEANROOM SUITABLE MATERIALS



Initial situation

An increasing number of products need to be manufactured under exceptionally clean conditions. Since the tiniest amounts of contamination in production processes can cause major faults and losses, the demand for cleanroom-suitable materials is constantly rising.

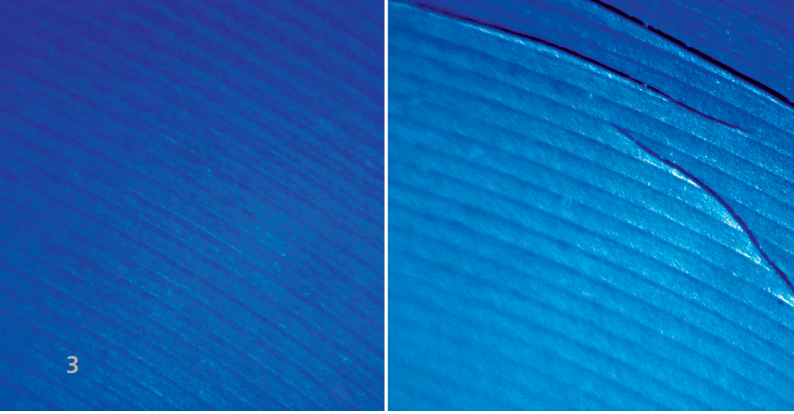
Requirements have risen particularly in the following sectors:

- Semiconductor manufacture / electronics
- Microsystem manufacture
- Medical and pharmaceutical products
- Food industry
- Precision engineering
- Optics and glass processing
- Display manufacture
- Photovoltaics
- Aeronautics and space

Cleanliness levels and contamination

In view of this, the market is increasingly calling for a practical and reliable method to assess the cleanliness properties of all materials used. Cleanliness suitability and cleanroom suitability are key technical performance characteristics.


LAG



Material tests are conducted on the following products/ semifinished products, for example:

- Materials for machines and equipment
- Flooring materials
- Sealants and lubricants
- Surface cos (varnishes, paints)
- Insulating materials

Certification methods and standards

The cleanliness requirements of materials depend on the technological requirements of the industry concerned:

- Particle emissions from material pairings
- Biological resistance (ability to resist metabolism)
- Chemical resistance
- Antibacterial efficacy (microbicidity)
- Outgassing from material samples (VOC, acids and bases, formaldehyde, ammonia and ammonium compounds)
- Verification of cleanability using fluorescent test contamination (riboflavin test)
- H_2O_2 absorption / desorption

Classification results can only be compared if a defined and standardized procedure for cleanliness tests and methodically proven test practices is implemented. Amongst others, Fraunhofer IPA conducts its qualification tests based on the following recognized standards and guidelines:

- ISO 846
- ISO 2812-1, -4
- ISO 4628-1
- ISO 10304-1
- ISO 14159
- ISO 14911
- ISO 14644-1, -8, -15
- ISO 16000-6, -9, -11
- ISO 22196
- EHEDG Doc. 8/EU GMP Annex 1
- DIN EN 1672-2
- VDI 2083-17, -18, -20
- VDI 2452

1 *Riboflavin test before (left) and after (right) cleaning.*

2 *Particle emission test using the roll-on-disk method.*

3 *Microscopic assessment of chemical resistance before (left) and after (right) exposure to a chemical.*

4 *Microchamber for VOC/SVOC emission tests.*

4

If no standards or procedures exist for the qualification tasks we are asked, we develop methodically proven test procedures based on our broad knowledge and experience. The institute has wide-ranging expertise in implementing cleanliness concepts in all areas of manufacturing.

Documentation

Qualification or certification results are supplied in the form of test logos, certificates and statements, as well as detailed test reports.

Database

Once a test piece has been successfully certified, results are fed into an Internet-based database, which is the only one of its kind in the world. This allows project partners to manage their results and contact data online and, on request, to make then available for public use (e.g. for research or marketing purposes).

Click on the following link
to access the database:
www.db.cleanmanufacturing.fraunhofer.de/en

Cleanroom® Suitable Materials

Our services

To assess, develop and optimize materials, as well as for marketing activities, we:

- Offer industry-based advice
- Identify relevant tests and test pieces
- Certify devices, components and systems for use in clean areas
- Certify manufacturing environments and products according to cleanliness requirements
- Certify and develop testing and measuring techniques to assess cleanliness
- Identify any potential for improvement
- Including customer- and market-oriented documentation
  - Test logo
  - Certificates
  - Statements
  - Detailed test reports
  - Electronic data files
  - Database

CONTACT

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For further information about our services, as well as specific advice, please get in touch with our contact partners.

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Cover Picture *Material sample for VOC/SVOC emission tests.*