

Datenbank zu reinraumtauglichen Werkstoffen und Fertigungsanlagen

Lounges 2012: Vortragssession CSM – Cleanroom Suitable Materials

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STRUKTUR DES VORTRAGS

- Wissensmanagement im „Web 2.0“-Zeitalter
 - Umsetzung: Clean Manufacturing Portal
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 - Expertenforum
 - Portlet-Sharing
 - Neue Datenbanksuche (Anwendungsbeispiel)
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 - Erweiterung und Integration ins Clean Manufacturing Portal
 - Datenbanksuche (Anwendungsbeispiel)
 - ausgewählte Funktionalitäten
 - Zusammenfassung und Ausblick
-

Wissensmanagement im „Web 2.0“-Zeitalter

- Ausgangssituation: äußerst umfangreicher Datenbestand
 - ca. 900 auf Reinheitstauglichkeit untersuchte Equipments
 - ca. 300 auf Reinheitstauglichkeit untersuchte Werkstoffe
- Lösung: Datenverwaltung in einem elektronischen **Datenbanksystem**
- Ziel: möglichst **intuitive** und **nutzerfreundliche Oberfläche**
 - Benutzeroberflächen für **problemangepasste, interaktive Suchabfragen** ohne aufwändige Bedienungsanleitung und ohne zusätzliche Software
 - einfach **mit allen gängigen Browsern** ohne zusätzliche Software-Installation **weltweit** auf jedem PC mit Internetzugang **nutzbar**
- Ergebnis:
 - Datenbank für reinraumtaugliches Equipment: www.tested-device.com
 - Datenbank für reinraumtaugliche Materialien: www.ipa-csm.com

Umsetzung: Clean Manufacturing Portal

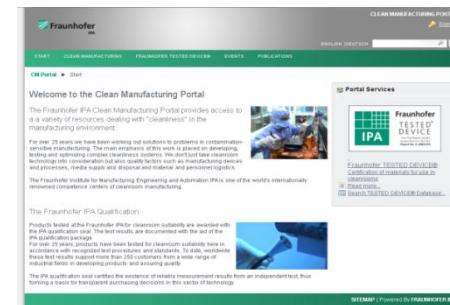
■ Launch des Clean Manufacturing Portals im November 2011

- Bündelung aller Kompetenzen rund um die Reinheit auf einer zentralen Plattform, bspw. folgender Datenbanken:
 - Tested-Device® Datenbank (seit November 2011)
 - CSM® Datenbank (ab Sommer 2012)
 - Reinheitsvalidierung: Life Science, Automobilindustrie etc. (ab Herbst 2012)

- „Google-Ready“, intuitive Bedienung, flexibel und erweiterbar

■ Clean Manufacturing Portal mit „Web 2.0“-Funktionalitäten

- Expertenforum
- Wiki
- Blog/Newsticker
- Verknüpfung mit Xing, Facebook, ...
- Portlet-Sharing



Tested-Device® Datenbank: Sichtbarkeit im Internet



- Kunden können Daten einsehen und verwalten
- Prüfobjekte/-ergebnisse für Suchanfragen öffentlich freigeben
- Statische URLs:
alle Produktergebnisse über Google auffindbar
- Recommend-Button:
Weiterempfehlung über unterschiedlichste Plattformen möglich –
mit nur einem Klick!

Tested-Device® Datenbank: Expertenforum

Kekse im Reinraum?

« Zurück zu Personalverhalten

Threads [Zurück | Nächste]

 [Neuen Thread posten](#)  [Abonnieren](#)  [Thread sperren](#)  [Thread verschieben](#)

[Kekse im Reinraum?](#)

[Anonym](#) 17.10.11 16:51

↳ [Definitiv: Nein](#)

[Guido Kreck](#) 17.10.11 16:54

Anonym

[Kekse im Reinraum?](#)

17.10.11 16:51

 [Antworten](#)  [Antwort mit Zitat](#)  [Schnelle Antwort](#)

Ich bin etwas verwirrt: Mir wurden neulich Kekse im Reinraum bei einer Abnahme angeboten - geht das denn???

0 (0 Stimmen)    [kennzeichnen](#)

 [Oben](#)  [Bearbeiten](#)  [Berechtigungen](#)  [Löschen](#)



Guido Kreck
Rang: Youngling
Nachrichten: 4
Eintrittsdatum: 28.06.11

 [Neue Beiträge](#)
 [Diesen Benutzer](#)
[verbannen](#)

[Definitiv: Nein](#)

17.10.11 16:54 als Antwort auf Anonym.

 [Als Antwort markieren](#)  [Antworten](#)  [Antwort mit Zitat](#)  [Schnelle Antwort](#)

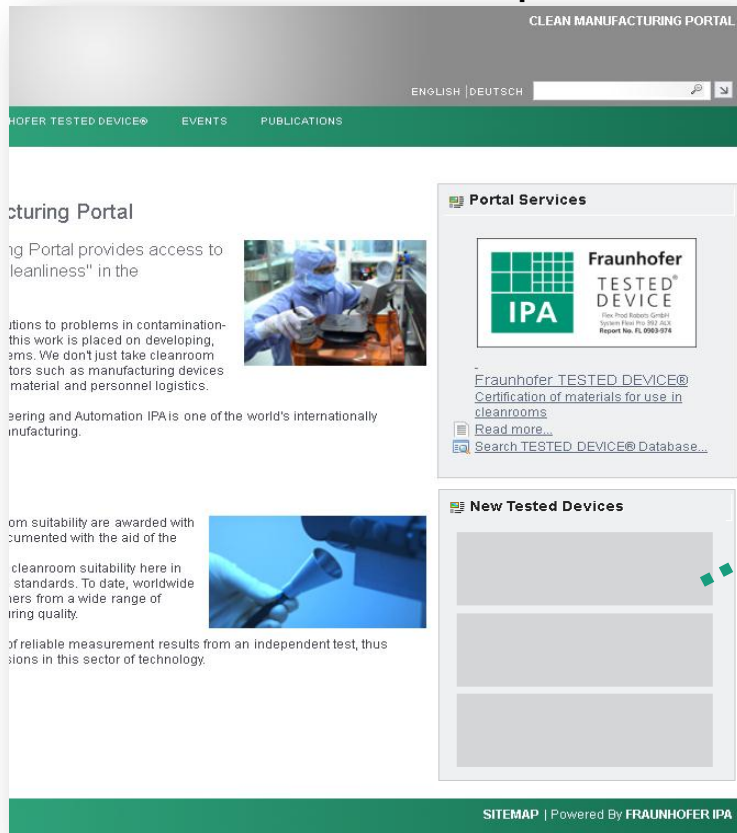
Wie bspw. in der VDI 2083 Blatt 15.1 steht, sind Essen und Getränke absolutes Tabu! Aber in der Richtlinie steht auch, dass das Personal regelmäßig geschult werden muss - vielleicht liegt es ja daran? Wir bieten Ihnen gerne eine individuelle Personalschulung an...

0 (0 Stimmen)    [kennzeichnen](#)

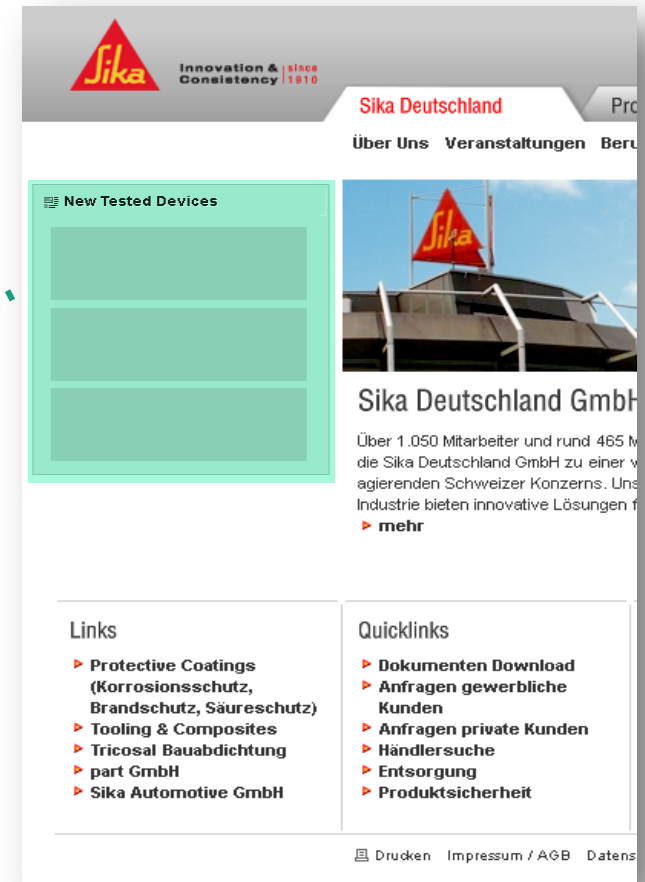
 [Oben](#)  [Bearbeiten](#)  [Berechtigungen](#)  [Thread teilen](#)  [Löschen](#)

Tested-Device® Datenbank: Portlet-Sharing

Reinraum Webportal



Sika Webseite



bspw. als

- Google Gadget
- Andere Widgets

Tested-Device® Datenbank: Neue Datenbanksuche

CLEAN MANUFACTURING PORTAL[Sign In](#)

ENGLISH | DEUTSCH

START | CLEAN MANUFACTURING | FRAUNHOFER TESTED DEVICE® | EVENTS | PUBLICATIONS

[CM Portal](#) ▶ [Fraunhofer TESTED DEVICE®](#) ▶ [Database](#)

[Search](#) ▶

Fraunhofer TESTED DEVICE® Database

Fraunhofer TESTED DEVICE® is an internationally recognized certificate for products which have been objectively qualified based on acknowledged standards and guidelines governing their suitability for cleanroom applications. Regardless what industry branches are associated with the products - we carry out the necessary verifications and publish their results at the request of our customers in our extensive database.

Search

Speedlinks


Cable Guiding System


Cable Systems


Chairs


Lighting Systems


Robotics


Transfer Systems and Bearing


Wafer Equipment


Wall / Ceiling / Floor


All Tested Devices

 Recommend

SITEMAP | Powered By FRAUNHOFER IPA

CSM®-Datenbank: Aktuelle Version

- Erreichbar über www.ipa-csm.com
- **„Customer Zone“:**
 - Individualisierter Zugang für **Kunden**, die nach **CSM-Verfahren** getestet haben
=> **firmeneigene** Datensätze
 - **CSM-Phasenteilnehmer:** Vollzugriff auf alle Werkstofftests des **CSM-Verbunds**
 - **„Public Zone“:** Ergebnisse aus **öffentlichen** Projekten und von **freigegebenen** Werkstoffen



CSM®-Datenbank

■ Daten aus folgenden CSM-Untersuchungen bisher erfasst:

- **Particles**
- **Outgassing**
- **Chemical Resistance**
- **Biological Resistance**
- **Microbicidity**

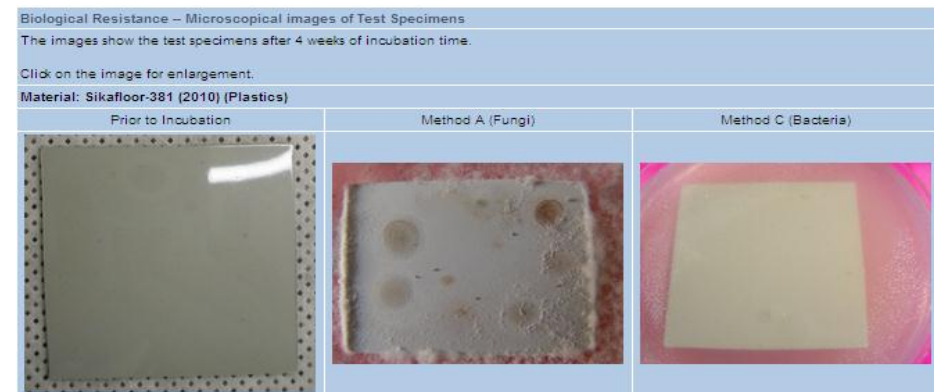
■ **Erweiterung** der Datenbank um weitere Materialcharakteristika geplant (**Reinigbarkeit, ESD, ...**)

■ **Beispielhafte Nutzerführung:** Auswahl eines Fußbodenbelags

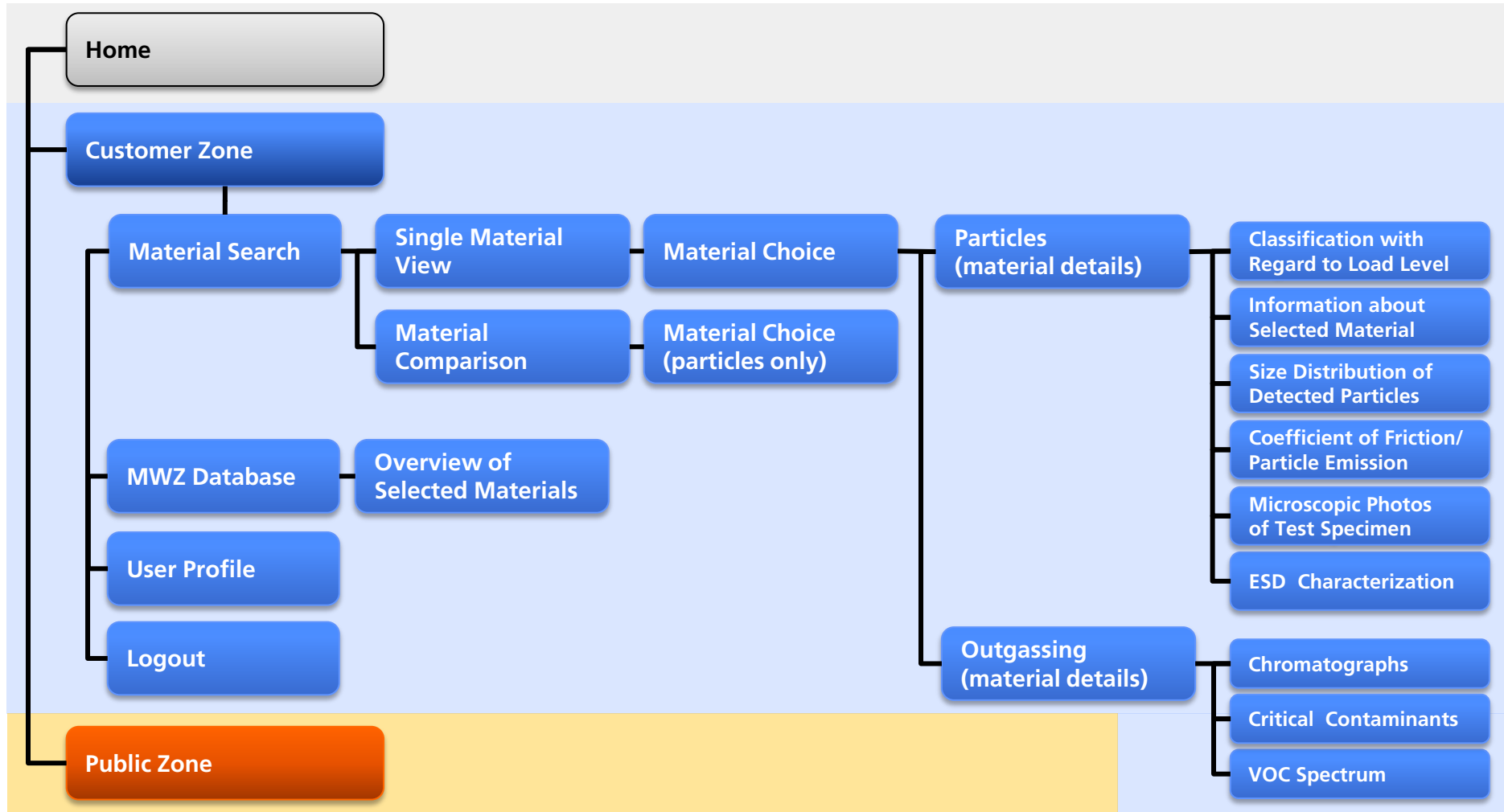
Single Material View Material Comparison

Test Type	----
Material Category	-----
or	
Application Field	Biological Resistance Chemical Resistance Microbicidity Outgassing Particle

Particle	Outgassing	Chemical Resistance	Biological Resistance	Microbicidity						
Method		The test sample is placed on a carbon-free Agar-media spiked with microorganisms for a 4 week incubation period. A visual inspection according to ISO 846 is performed after the incubation time.								
Selected Material		Sikafloor-381 (2010) (Plastics)								
Overall Result		2								
Single Results		<table border="1"> <thead> <tr> <th>Technique</th> <th>CSM-Classification</th> </tr> </thead> <tbody> <tr> <td>Method A (fungi)</td> <td>2</td> </tr> <tr> <td>Method C (bacteria)</td> <td>0</td> </tr> </tbody> </table>			Technique	CSM-Classification	Method A (fungi)	2	Method C (bacteria)	0
Technique	CSM-Classification									
Method A (fungi)	2									
Method C (bacteria)	0									
Further Results		Information about the selected Material Microscopic images								
Back										



CSM[®]-Datenbank: Schema der Datenbankstruktur



Welcome Page

The screenshot shows the homepage of the Cleanroom Suitable Materials (CSM) website. The header features the CSM logo (a stylized 'C S M' with 'IPA' below it) and the text 'Cleanroom[®] Suitable Materials'. A navigation bar at the top right contains links: 'Info', 'Impressum', 'Data Protection', and 'Contact'. A left sidebar contains a menu with 'Home', 'Customer Zone', and 'Public Zone'. The main content area is titled 'Welcome to the CSM material database!' and contains several paragraphs of text. A large image on the right side of the main content area shows various cleanroom components and equipment. A 'Back to overview' button is located at the bottom right of the page.

Callouts:

- Login for industrial alliance members (access only for customers with user name and password):** Points to the 'Customer Zone' link in the sidebar.
- Public zone (access without password):** Points to the 'Public Zone' link in the sidebar.
- General and legal information:** Points to the 'Info', 'Impressum', 'Data Protection', and 'Contact' links in the top navigation bar.

Website Content:

Header: C S M IPA Cleanroom[®] Suitable Materials

Navigation Bar: Info | Impressum | Data Protection | Contact

Sidebar: Home, Customer Zone, Public Zone

Main Content:

Welcome to the CSM material database!

The data base gives an overview of tests which have been carried out on numerous material pairings with regard to core cleanroom suitability parameters. The material pairings have mainly been assessed with regard to: particle emission, ESD characterization, tribological assessment and outgassing.

The data can be called up either singly or comparatively. The results are available as tables, diagrams and figures. As a rule, each object can be selected and printed.

The research results shown have been obtained from tests using special techniques which have been developed by the Fraunhofer Institute for Manufacturing Engineering and Automation in Stuttgart as part of the industrial alliance «Cleanroom Suitable Materials» (CSM). The scientific results give an insight into the current situation in the field of clean manufacturing.

The data base is divided into two sections: a public section and an extended area for members of the CSM industrial alliance.

You'll find instructions about how to use the data base in the information section.

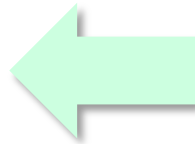
Image: CLEANROOM Suitable Materials

Footer: Back to overview

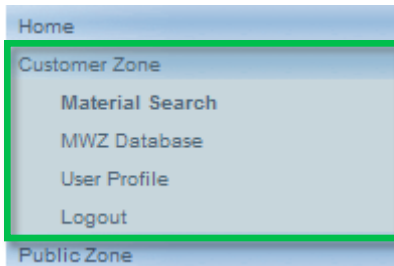
Customer Zone (Login)

User Name

Password



Register here using your access data.
If you haven't received this, please get in touch with
your project manager.



Participants of the various phases of the industrial alliance or customers who have had materials tested using the CSM procedure receive the required login data.

After logging into the Customer Zone, the user is shown a list of materials which have been tested with regard to particle emission, outgassing or ESD characteristics ([Material Search](#)). The user is also able to view the [MWZ Database](#) (outgassing list with results from M+W Zander AG). Contact details can be changed at any time under the [User Profile](#).

To sign out securely, please use the Logout button.

[Back to overview](#)

Material Search (Single Material View)

Single Material View [Material Comparison](#)

Material Category

▼

or

Application Field

▼

Material Name

----- (optional)

▼

Tests

----- (optional)

▼

Continue

Extended Search

Material Number

----- (Search by standardized material number)

▼

Free Text Search for Materials

--- (Search by full or partial name)

Continue

Specific material information can be searched for under **Material Search**. Once a pre-selection has been made via **Material Category** or **Application Field**, the list of materials can be further narrowed down via **Material Name** and **Tests**.

A search via **Material Number** or **Free Text Search for Materials** can be started under **Extended Search**.

A search query is initiated by clicking on the button »Continue«.

[Back to overview](#)

Material Search (Single Material View)

– Material Choice

In this zone, a list of materials appears which corresponds with the pre-selection made under **Material Search**. Results of **Particle Emission** or **Outgassing** tests carried out on materials can be called up using the appropriate link (**View**).

Single Material View [Material Comparison](#)

Single Material View > Material Choice

Material	Type of test	
	Particle	Outgassing
a-C:H-Schicht (1,0 µm)	View (Specimen)	-
CompCote H	View (Specimen)	-
Dicronite (WS2)	View (Specimen)	-
Harteloxal	View (Specimen)	-
NiP	View (Specimen)	-
Plasbor auf Stahl 1.0711	View (Specimen)	-
ta-C-CF4-Schicht (1,0 µm)	View (Specimen)	-
ta-C-Schicht (0,5 µm)	View (Specimen)	-
ta-C-Schicht (0,5 µm)	View (Counter Specimen)	-
ta-C-Schicht (1,0 µm) - geglättet	View (Specimen)	-

<< previous page 1 of 2 next >>

[Back](#)

Material list
corresponding with
pre-selection

Link to open
overview of results

[Back to overview](#)

Material Search (Single Material View) – Particles

Here, the test results are shown regarding the material selected under **Material Choice** (particle results).

Single Material View Material Comparison

Single Material View > Material Choice > Material Details

Particle Outgassing

Method The material is tribologically stressed (by friction) in a defined way. The resulting particle emission is measured and analyzed.

Material Specimen a-C:H-Schicht (1,0 µm)

Material Counter Specimen 100Cr6

Lubricant ----

Material Pairing AIF 07

Tribological Load Ball-on-disk test
A ball (counter specimen) is pressed with a defined normal force at a radius on a disc (specimen) while a lubricant can be present. The disc spins with a relative speed.

Overall Result ISO Class 7 (according to ISO 14644-1)
GMP-cleanliness class (according to cGMP Annex 1)

Single Results [Generate Diagram](#)

	Load Level	A 01	A 03	A 05
	Normal Force [N]	1	5	8
	Classification	Cleanroom Class [according to DIN EN ISO 14644-1]		
Particle Size	0.5 µm	3.0	5.4	5.7
	0.7 µm	3.2	5.6	5.9
	1.0 µm	3.5	5.7	6.0
	5.0 µm	4.5	6.6	6.7
	10.0 µm	4.5	5.4	5.3
	25.0 µm	1.0	1.0	1.0

Further Results [Information about the Selected Material](#)
[Microscopic Pictures of Test Specimen](#)
[Size distribution of Detected Particles](#)
[Coefficient of Friction / Particle Emission \(Temporal Progression\)](#)
[ESD-Characterization](#)

[Back](#)

Depending on the selection made, it may be possible to change the material specimen, material counter specimen or lubricant (depending on range of tests).

Specification of material pairing with key; indication of load test performed: ball-on-disk test or reel-on-disk test

Overall Result (corresponding ISO Class or GMP cleanliness class) or classification according to load level and particle size shown either as a table or as a diagram under [Generate Diagram](#).

You will also find the following links:

Explanations of load levels under [Normal Forces \[N\]](#);

Overview table showing the various Air Cleanliness Classes under [according to EC-GMP Annex 1 \("in operation"\)](#)

Further data available under Further Results:

- [Information about Selected Material](#)
- [Microscopic Photos of Test Specimen](#)
- [Size Distribution of Detected Particles](#)
- [Coefficient of Friction / Particle Emission](#)
- [ESD Characterization](#)

[Back to overview](#)

Material Search (Single Material View) – Particles (Links)

Regulatory				Limiting values of each air cleanliness class for differing particle sizes and reference volumes (acc. to ISO 14644-1)											
Dir. En.	EC-GMP	US FDA	US FDA	0.1 µm		0.2 µm		0.3 µm		0.5 µm		1.0 µm		5.0 µm	
ISO 14644-1	Class	Class	Class	per m³	per 1000	per m³	per 1000	per m³	per 1000	per m³	per 1000	per m³	per 1000	per m³	per 1000
1				10	0.3	2	0.1								
2				100	3	24	1	10	0.3	4	0.1				
3				1.000	30	237	7	100	3	20	1	8	0.2		
4				1.000	30	237	7	100	3	20	1	8	0.2		
5				10.000	300	2.370	67	1.000	20	200	10	80	2		
6				10.000	300	2.370	67	1.000	20	200	10	80	2		
7				100.000	3.000	23.700	670	10.000	200	2.000	100	800	20	20	20
8				100.000	3.000	23.700	670	10.000	200	2.000	100	800	20	20	20
9				1.000.000	30.000	237.000	6.700	100.000	2.000	20.000	1.000	8.000	200	200	200

(according to cGMP Annex 1)

»According to EC-GMP Annex 1« (in operation) opens a table which shows an overview of results and also compares various standards of air cleanliness classes

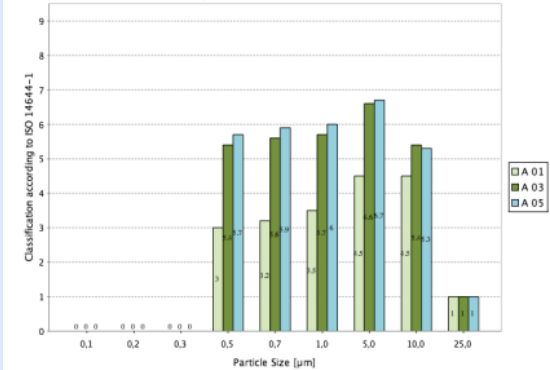
Legend to used Load Levels for Testing for Particle Emission												
Load Level	A 01	A 02	A 03	A 04	A 05	A 06	A 07	A 08	A 09	A 10	A 11	A 12
Normal Force [N]	1	3	5	6	8	10	11	13	15	16	18	20
Circular Line at Radius [mm]	70	90	110	130	150	170	200	220	240	260	280	300
Relative Speed [mm/s]	50	50	50	100	100	100	100	100	100	150	150	150
Number of Revolutions	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Legend to used Load Levels for Testing for Particle Emission												
Load Level	B 01	B 02	B 03	B 04	B 05	B 06	B 07	B 08	B 09	B 10	B 11	B 12
Normal Force [N]	15	45	75	90	120	150	165	195	225	240	270	300
Circular Line at Radius [mm]	250	250	250	250	250	250	250	250	250	250	250	250
Relative Speed [mm/s]	150	150	150	150	150	150	150	150	150	150	150	150
Number of Revolutions	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Normal Force [N]

Under »Normal Forces [N]« a definition of the load parameters is given

a-CH-Schicht (1,0 Åµm) vs 100Cr6 (AIF 07) – Classification in Regards of the Load Level



Legend to used Load Levels for Testing for Particle Emission												
Load Level	A 01	A 02	A 03	A 04	A 05	A 06	A 07	A 08	A 09	A 10	A 11	A 12
Normal Force [N]	1	3	5	6	8	10	11	13	15	16	18	20
Circular Line at Radius [mm]	70	90	110	130	150	170	200	220	240	260	280	300
Relative Speed [mm/s]	50	50	50	100	100	100	100	100	100	150	150	150
Number of Revolutions	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

Generate Diagram

»Generate Diagram« opens the diagram: classification with regard to load level

Back to overview

Material Search (Single Material View)

– Particles (Information about Selected Material)

Particle – Information about the Selected Material

The pictures show the test specimen of the selected material (upper left) and the corresponding materials used in the tribological testing of this material (material pairing).

Also you can find the contact information of the company that has commissioned the testing for this material pairing.

Click on the pictures for enlargement.

Specimen	Company Contact
a-C:H-Schicht (1,0 µm) (Coating)	Fraunhofer Institut Werkstoff- und Strahltechnik
	Winterbergstraße 28 01277 Dresden Deutschland www.iws.fraunhofer.de Mr. Dr. Bernd Schultrich Bernd.Schultrich@iws.fraunhofer.de
Counter Specimen	Lubricant
100Cr6 (Metals)	----- (null)
	no document submitted

Description of page

Picture of specimen
(click on picture to
enlarge)

Contact information of
company which
commissioned the
material pairing test

Picture of counter
specimen (click on
picture to enlarge)

Information about
lubricant

[Back to overview](#)

Material Search (Single Material View)

– Particles (Microscopic Pictures of Test Specimens)

Particle – Microscopical Pictures of Test Specimens

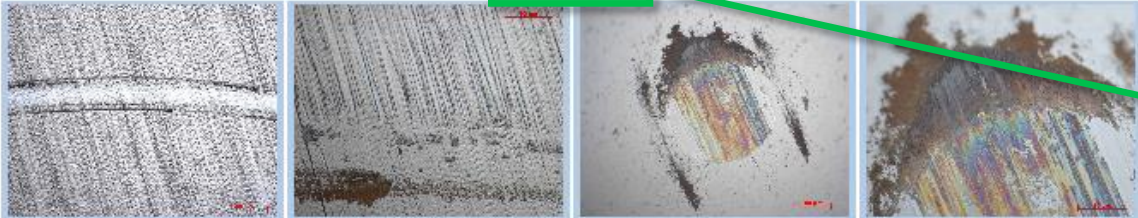
The pictures show the contact area of the specimen and the counter specimen after tribological testing at the lowest and highest tested load level. The pictures are taken immediately after the testing, so debris eventually generated during the test can be seen.

Click on the pictures for enlargement.

Selected Material Pairing: a-C:H-Schicht (1,0 µm) vs. 100Cr6 – [AIF] [07]

Material Specimen	Material Counter Specimen
a-C:H-Schicht (1,0 µm) (Coating)	100Cr6 (Metals)

Load Level A 01



Load Level A 03



Zone containing information about page contents

Material pairing tested

Material specimen / counter specimen

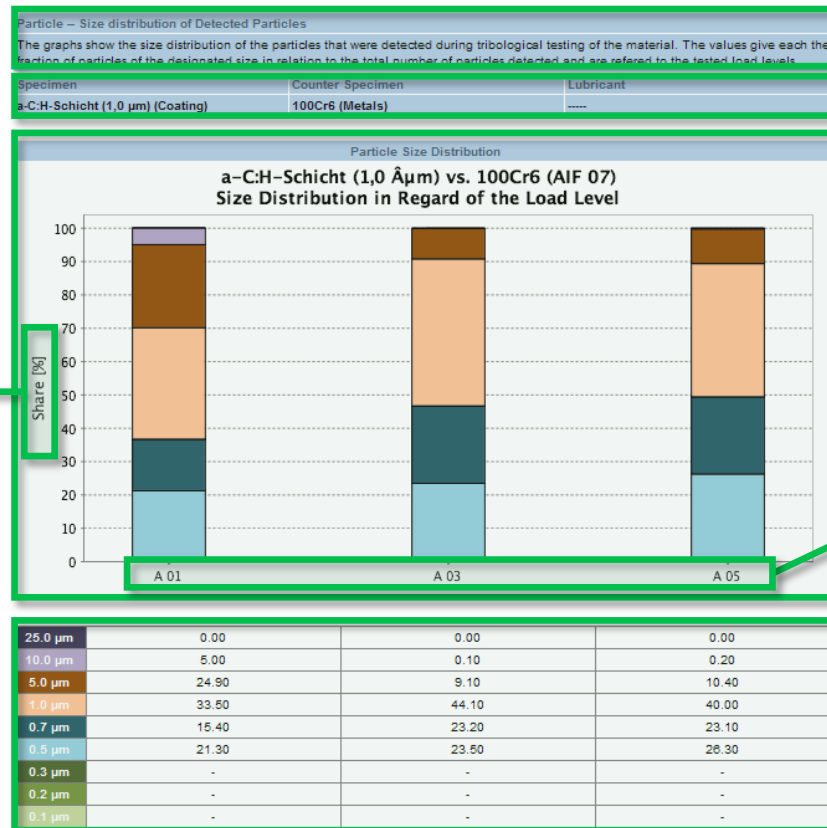
Load level

Microscopic pictures of specimen / counter specimen after tribological testing. Click on pictures to enlarge.

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Material Search (Single Material View)

– Size Distribution of Detected Particles



Description of page

Selected material pairing

Particle size expressed in percent of total number of particles detected on application of load levels shown

Diagram: size distribution with regard to load level

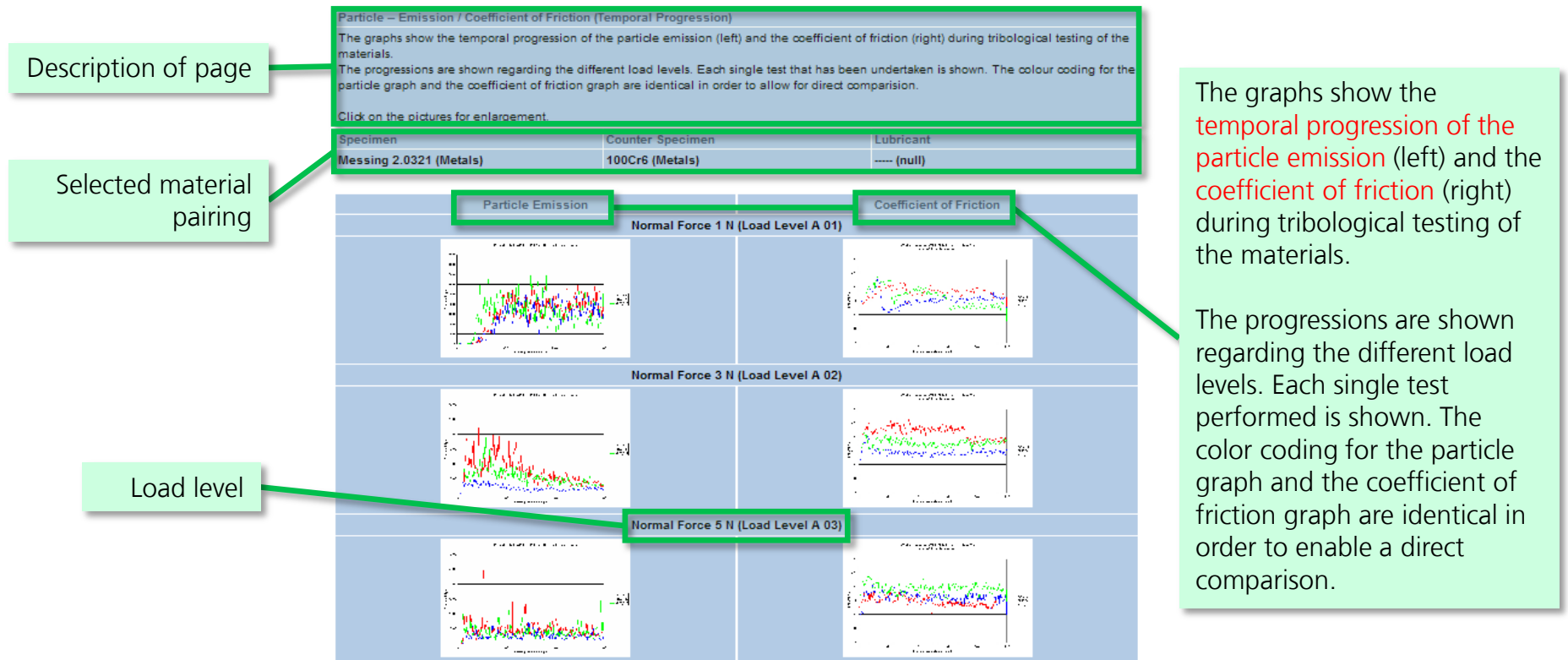
Load levels

Legend with data table showing percentage of particles detected in the size channels recorded

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Material Search (Single Material View)

– Particle Emission / Coefficient of Friction



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Material Search (Single Material View)

– Particle Emission / Coefficient of Friction

Selected material

Particle – ESD-Characterization

a-C:H-Schicht (1,0 µm) (Coating)

Charging behavior

Method

The results obtained show to what extent a charge can be induced on the surface of the test specimen. The test specimen is placed on an insulating base and subjected to a high voltage (Corona Voltage, CV) for 1 second. Immediately afterwards the surface charge present on the surface is measured. The measurement is repeated on varying the polarity and voltage applied (4 to 10 kV).

Charging behavior (description of test procedure)

Charging behavior (results)

Charging of surface			
Corona Voltage applied [kV]	Surface Charge [V]	Corona Voltage applied [kV]	Surface Charge [V]
-4	736,2	+4	342,4
-6	> 1100	+6	> 1100
-8	n.a.	+8	n.a.
-10	n.a.	+10	n.a.

Surface resistance (description of test procedure)

Surface resistance

Method

The surface resistance reflects the ability of a test object to discharge an electrical charge via its surface. The test specimen is placed on an insulating base. A measuring probe of a defined mass with two skids aligned in parallel and insulated against one another on the underside is placed on the test specimen. The skids have a defined geometry and are set at a defined distance away from each other. The resistance Skid 1 → surface specimen → Skid 2 is measured.

Surface resistance (result)

Surface resistance (ESD evaluation according to EN 61340-5-1)

Surface Resistance [Ohm]	Evaluation (IPA)	
2.0E3	Elektrostatisch leitfähig	
ESD Evaluation according to EN 61340-5-1	Up to 10E+05 Ohm	Electrostatic conductive
	Up to 10E+11 Ohm	Electrostatic dischargeable
	Higher 10E+11 Ohm	Isolating

[Back to overview](#)

Material Search (Material Comparison)

Material Comparison enables particle emission results from up to 3 materials to be compared at a glance

The interface shows a 'Material Comparison' tab selected. Below it are two dropdown menus: 'Material Category' (set to 'Coating') and 'Application Field' (set to '-----'). Below these are three buttons: 'Add selection', 'Remove selection', and 'Material Comparison'. A table lists various materials with checkboxes in the 'Add/Remove' column. Some checkboxes are checked, indicating pre-selection. A callout points to the 'Add selection' button, stating it opens the overview. Another callout points to the table, stating that materials are selected by ticking boxes for a maximum of 3 materials. A third callout points to the 'Material Comparison' button, stating it deletes the pre-selection made. A fourth callout points to the table, stating that corresponding materials appear based on the pre-selection and can be extended by selecting other materials according to the category or application field.

Acceptance of pre-selection

Deletes the pre-selection made

Corresponding with the pre-selection made, a list of materials appears which can be extended by selecting other materials according to Material Category or Application Field on clicking on Add Selection

Pre-selection of the desired materials for the material comparison via **Material Category** and **Application**

Opens overview of Material Comparison

The desired materials for the material comparison are selected by ticking the appropriate boxes for a maximum of 3 materials.

Material	Particle	Add/Remove
a-C:H-Schicht (1,0 µm)	Specimen	☒
CompCote H	Specimen	☐
Dicronite (WS2)	Specimen	☐
Harteloxal	Specimen	☐
NiP	Specimen	☐
Plasbor auf Stahl 1.0711	Specimen	☐
ta-C-CF4-Schicht (1,0 µm)	Specimen	☒
ta-C-Schicht (0,5 µm)	Specimen	☒
ta-C-Schicht (0,5 µm)	Counter Specimen	☐ (Maximum 3 selections)
ta-C-Schicht (1,0 µm) - geglaettet	Specimen	☐
ta-C-Schicht (3,0 µm)	Counter Specimen	☐
TiC	Specimen	☐
TiN (1,0 µm)	Specimen	☐

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Material Search (Material Comparison)

Particle – Material Comparison

a-C:H-Schicht (1,0 µm) vs. 100Cr6 with ----

Load Level		A 01	A 03	A 05
Normal Force [N]		1	5	8
Classification		Cleanroom Class [according to ISO 14644-1]		
Particle Size	0.5 µm	3.0	5.4	5.7
	0.7 µm	3.2	5.6	5.9
	1.0 µm	3.5	5.7	6.0
	5.0 µm	4.5	6.6	6.7
	10.0 µm	4.5	5.4	5.3
25.0 µm		1.0	1.0	1.0

ta-CF4-Schicht (1,0 µm) vs. 100Cr6 with ----

Load Level		A 03	A 05
Normal Force [N]		5	8
Classification		Cleanroom Class [according to ISO 14644-1]	
Particle Size	0.5 µm	6.3	7.0
	0.7 µm	6.5	7.2
	1.0 µm	6.7	7.5
	5.0 µm	7.6	8.3
	10.0 µm	6.2	6.8
25.0 µm		1.0	1.0

ta-C-Schicht (0,5 µm) vs. 100Cr6 with ----

Load Level		A 01	A 02
Normal Force [N]		1	3
Classification		Cleanroom Class [according to ISO 14644-1]	
Particle Size	0.2 µm	6.2	6.8
	0.3 µm	6.4	7.0
	0.5 µm	6.5	7.2
	5.0 µm	5.6	6.4

Opens a table of an overview which classifies the selected material pairings in dependence upon load level and particle size

Single Material View Material Comparison

Material Comparison View > Material Choice

Method The material is tribologically stressed (by friction) in a defined way. The resulting particle emission is measured and analyzed.

Material Specimen a-C:H-Schicht (1,0 µm)

Material Counter Specimen 100Cr6

Lubricant ----

Material Pairing AIF 07

Tribological Load Ball-on-disk test

Overall Result ISO Class 7 (according to ISO 14644-1)

Material Specimen ta-C-CF4-Schicht (1,0 µm)

Material Counter Specimen 100Cr6

Lubricant ----

Material Pairing AIF 06

Tribological Load Ball-on-disk test

Overall Result ISO Class 9 (according to ISO 14644-1)

Material Specimen ta-C-Schicht (0,5 µm)

Material Counter Specimen 100Cr6

Lubricant ----

Material Pairing AIF 01

Tribological Load Ball-on-disk test

Overall Result ISO Class 8 (according to ISO 14644-1)

Back Generate Diagram Particle Size Comparison

Selected material No.1

Possibility of selecting other counter specimens and if appropriate, other lubricants

Key for material pairing

Load test performed

Overall result



Opens a diagram showing classification in dependence upon load level and particle size

Back to overview

Material Search (Single Material View)

– Outgassing

Single Material View [Material Comparison](#)

Single Material View > Material Choice > Material Details

Particle

Outgassing

Method

A material probe is heated at a specified temperature in a closed chamber while the chamber is flushed with inert gas. The gas transports the outgassing components through an adsorbent which afterwards is analyzed by gas-chromatography combined with mass spectrometry (GC/MS)

Selected Material

Material 1

Overall Result

Substance Family	Outgassing Temperature	
	23 °C / 73 °F	90 °C / 194 °F
TVOC	-6.9	tested

At the given temperature and an assumed sampling surface area of 1 m², the material emits a quantity of the given substance family over 1 second which does not exceed the limiting value of the given Class stated in ISO 14644-8 for a reference volume of 1 m³.

Further Results (Restricted Area)

[Chromatographs](#)
[Critical Contaminants](#)
[VOC Spectrum](#)

Back

Brief description of procedure

Overall result:
Details of
corresponding ISO
AMC Class at 23°C or
other test
temperatures

Selected material

Further results (only visible
to commissioning company
unless otherwise expressly
authorized):

- [Chromatographs](#)
- [Critical Contaminants](#)
- [VOC Spectrum](#)

[Back to overview](#)

Material Search (Single Material View) – Outgassing (Chromatographs)

Description of page

Selected material

Chromatogram of blank value or material

Chromatogram of blank value (left) / material (right)
Click on graphs to enlarge.

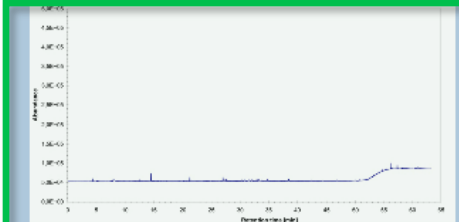
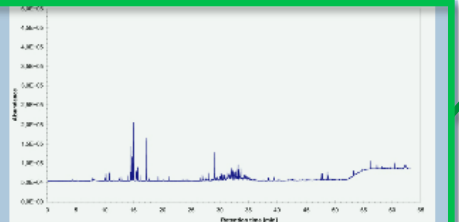
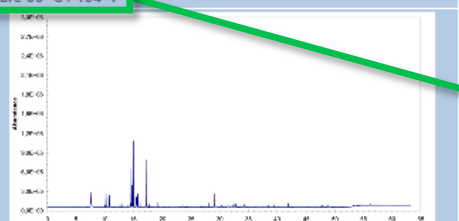
Temperature at which outgassing test was performed

Outgassing – Chromatographs

The qualitative VOC spectrum is ascertained based on the chromatographs obtained from the gas chromatography tests and the mass spectrograms from the mass spectrometer. In chromatographs, each separate substance possesses a characteristic retention time which is filed in appropriate databases. The substances can be identified by comparing the retention time observed in the test with the retention time in the databases. The chromatogram itself reflects the chronological progression of the detection of the various substances.

Click on the pictures for enlargement.

Material 1

Blank Value	Detected Substances
Outgassing Temperature 23 °C / 73 °F	
	
Outgassing Temperature 90 °C / 194 °F	
	

Back to overview

Material Search (Single Material View)

– Outgassing (Critical Contaminants)

Description of
page

Outgassing – Chromatographs

Considering a cleanroom environment several substance families are commonly more critical to the production process than others.

The CSM procedure for outgassing testing contains a check for the critical contaminants

- Siloxane
- Amine
- Organic Phosphate
- TVOC

The table at the bottom shows the detected amounts for those contaminants. The detected amount for TVOC is given as well.

Material 1

Description of the partial samples used for outgassing tests

For testing at	Surface [cm ²]	Volume [cm ³]	Weight [g]	Pre-Conditioning [d]
23 °C / 73 °F	1.3E-3	2.6E-6	5.0E0	-
90 °C / 194 °F	1.3E-3	2.6E-6	5.0E0	-

Description of
sample

Selected material

Contaminant	Measured outgassing rate [g/m ² s]	
	23 °C / 73 °F	90 °C / 194 °F
Siloxane	0.0	0.0
Amine	0.0	0.0
Organic Phosphate	0.0	0.0
TVOC	552.855	2033.54

Results obtained at test
temperatures

[Back to overview](#)

Material Search (Single Material View)

– Outgassing (VOC Spectrum)

Description of page

Description of sample

Choice of temperature

Selected material

Sorting function for list of substances

List of substances stating quantities

Outgassing – VOC Spectrum

The qualitative VOC spectrum is ascertained based on the chromatograms obtained from the gas chromatography tests and the mass spectrograms from the mass spectrometer.

Through the use of toluol as a reference substance in known concentrations parallel to the tests, the concentration of each substance identified can be expressed as a toluol equivalent (quantitative analysis on the basis of toluol equivalents).

The quantities of the substances detected are given in relation to the mass, volume and weight of the respective partial sample.

Material 1

Description of the partial samples used for outgassing tests

For testing at	Surface [cm²]	Volume [cm³]	Weight [g]	Pre-Conditioning [d]
23 °C / 73 °F	1.3E-3	2.6E-6	5.0E0	-
90 °C / 194 °F	1.3E-3	2.6E-6	5.0E0	-

Select Temperature: 23 °C / 73 °F

Sort according to: -----

Substance	CAS-No.	Retention time [min]	Detected Mass [g]	Outgassing rate correlated to		
				Surface [g/m²]	Volume [g/m³]	Mass [g/g]
1(3H)-Isobenzofuranon	87-41-2	39.5	9.9E-9	2.2E-9	1.1E-6	5.5E-13
2,2,4,6,6-Pentamethylheptan	13475-82-6	27.98	7.8E-9	1.7E-9	8.5E-7	4.3E-13
2-(2-Butoxyethoxy)-ethanol oder Isomer	112-34-5	34.22	1.7E-8	3.8E-9	1.9E-6	9.6E-13
2-Ethyl-1-hexanol	104-76-7	29.0	2.8E-8	6.2E-9	3.1E-6	1.6E-12
2-Ethylhexanal	123-05-7	28.51	3.4E-9	7.5E-10	3.7E-7	1.9E-13

[Back to overview](#)

My User Profile

My User Profile

Contact Data						
	Title	First Name	Last Name	Phone	E-Mail	
User		Fraunhofer	IPA			
Company	Fraunhofer IPA					
Address	Nobelstraße 12					
City	70569 Stuttgart					
Country	Deutschland					
User Name	IPA					
Current Password						
New Password						
Confirm New Password						

Company Contacts						
No.	Title	First Name	Last Name	Phone	E-Mail	City
1		Fraunhofer	IPA			Stuttgart

Save Changes

Back to overview

Via the user profile, you can alter key contact data such as **Title**, **Telephone Number** and **E-Mail Address** (fields shaded yellow). Confirm alterations with **»Save Changes«**. If your company details change, please get in touch with Fraunhofer IPA.

You can also alter your **access data** here. In the process, your password will be filed in an encoded form which cannot be read in plain text even by database administrators.

MWZ Database

Description of page

Selection of materials via Material Category

Sorting function for list of selections made

List of selected materials with choice of diagram format

MWZ Database – Outgassing

Please notice:

The following pages contain information that has been provided by the company M+W Zander, Stuttgart, for the benefit of the members of the Industrial Alliance "Cleanroom Suitable Materials (CSM)".

Over 100 products for cleanroom use have been tested at M+W Zander in the last years, the data give the results of those tests. To get detailed information of single materials, please take the Material ID and contact M+W Zander at mwz@online.de!

We would like to thank M+W Zander for the generous offer of this data!

Please select a material category from the drop down list below!

Material Category:

Sort according to:

ID	Pre-Conditioning Time [d]	TVOC [µg/g]	High Boiler [µg/g]	Amine [µg/g]	Organic Phosphate [µg/g]	Usability RE: Covered Clean-Room Area [%]	Note	Select for Diagram
P 002	1	1440	355	n.d.	1	< 50	Kleber vorkonditioniert 16 Stunden bei 50 °C	☐
P 003	0.5	38	< 1	9	n.d.	> 50	Kleber	☐
P 004	n.a.	540	31	51	n.d.	> 50	Kleber	☐
P 006	n.a.	2780	653	n.d.	n.d.	< 5	Kleber	☐
P 043	30	324	187	n.d.	n.d.	> 50	Kleber	☐
P 044	n.a.	365	346	n.d.	n.d.	> 50	Kleber	☐
P 074	2	2600	1390	n.d.	n.d.	< 5	Kleber	☐
P 075	2	3090	970	n.d.	n.d.	< 5	Kleber	☐
P 102	2.5	4770	1865	14	360	nicht geeignet	Kleber	☐

Generate Diagram

Opens a diagram with selected materials

Selection of contaminants for diagram, update via »Refresh Diagram«

MWZ Database – Outgassing

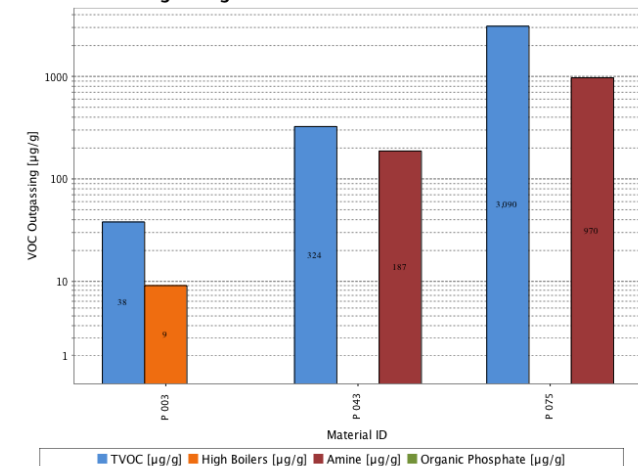
Diagram of selected materials.

Show Contaminants

☒ TVOC ☒ High Boilers ☒ Amine ☒ Organic Phosphate

Refresh Diagram

Outgassing – Overview of selected materials



[Back to overview](#)

IPA-CSM Siegel

- Deutschland- und EU-weit **geschützt** **Logo** des Industrieverbunds
- **Zertifizierung** der getesteten Werkstoffe
- ➔ **Industrienutzen:**
 - Wissensvorsprung durch Zertifizierung
 - Marketingzwecke/Kundenakquise
- ➔ **Fraunhofer IPA-Nutzen:**
 - **Kostenlose PR** für IPA-CSM und das **Fraunhofer IPA** insgesamt
 - **Imagegewinn** für Fraunhofer IPA
 - kompetenter Partner d. Industrie für **angewandte Forschung**
 - ‚Stiftung-Warentest‘-Charakter
 - Erweiterung ‚Tested Device®‘



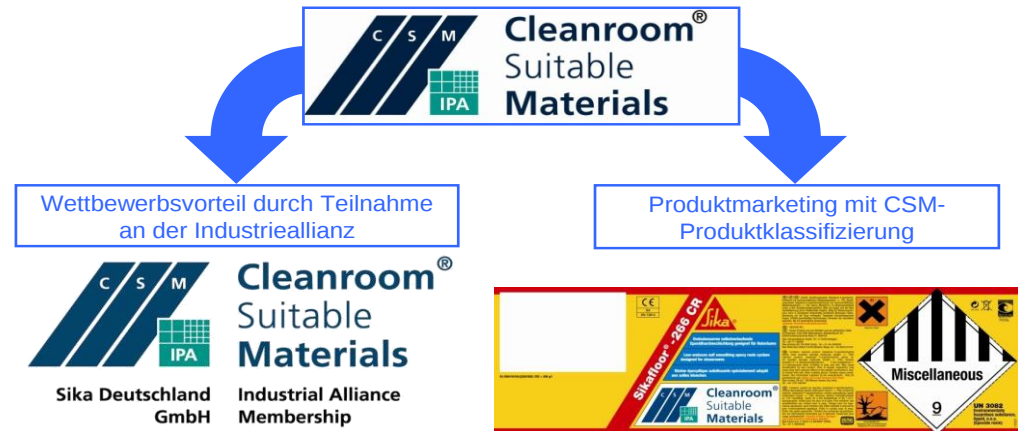
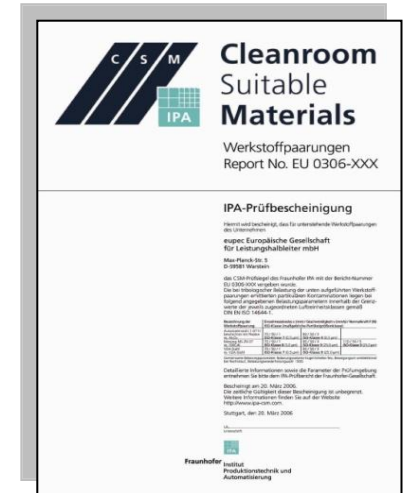
DRAFT INTERNATIONAL STANDARD ISO/DIS 14644-8
ISO/TC 209 Secretariat: ANSI
Voting begins on Voting terminates on



Cleanrooms and associated controlled environments—
Part 8:
Cleanroom suitable materials



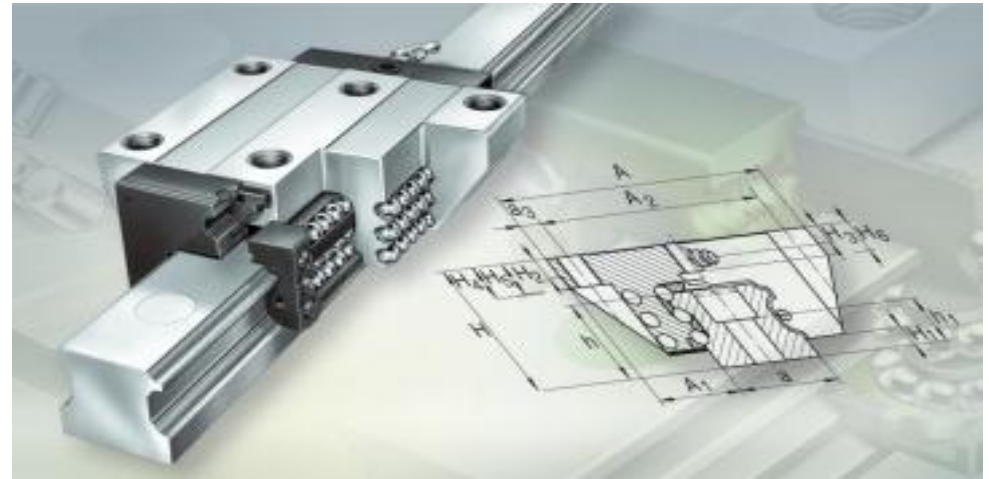
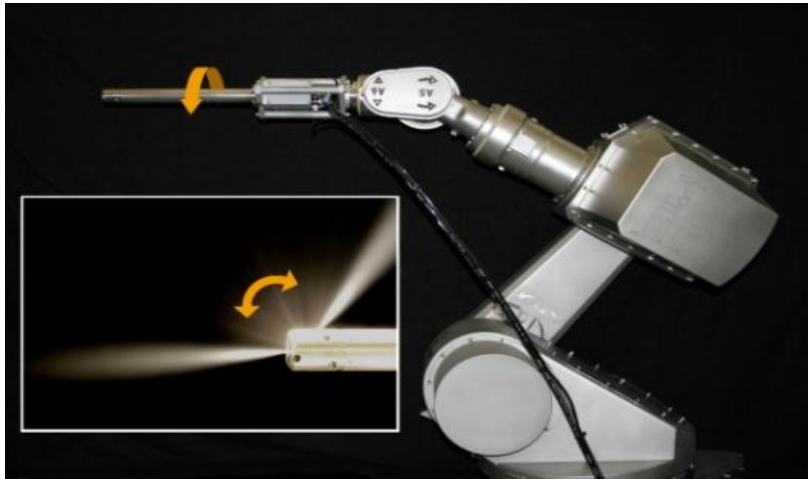
VDI-RICHTLINIEN							
Reinraumtechnik Reinraumtaugliche Werkstoffe	VDI 2083 Blatt 17 Entwurf						
VEREIN DEUTSCHER INGENIEURE Cleanroom technology – Training of cleanroom personnel Empfehlung für: • Eintragung in das Verzeichnis der VDI-Richtlinien als Dokument zur VDI 2083 • Die VDI-Richtlinien dieser Tabelle kann abgerufen werden unter: http://www.vdi-verein.de/empfehlungen • In der Tabelle der VDI-Gesellschaft Technische Gebäudetechnik Prüfung 10 11 30 40032 Düsseldorf	Inhalt: <table border="1"> <tr> <td>Vorbereitung</td><td>2</td></tr> <tr> <td>Einführung</td><td>2</td></tr> <tr> <td>Anwendungsbereich</td><td>3</td></tr> </table>	Vorbereitung	2	Einführung	2	Anwendungsbereich	3
Vorbereitung	2						
Einführung	2						
Anwendungsbereich	3						



CSM[®]-Datenbank: Einsatzmöglichkeiten

Vorbewertung und Eingrenzung möglicher
Werkstoffpaarungen mittels CSM-Verfahren
vor Anlagenrealisierung

- **FESTO**: Pneumatikzylinder
- **KUKA**: Robotersystem mit Reinigungslanze
- **INA Schaeffler**: Kugelumlaufeinheit (geschmiert)



Zusammenfassung und Ausblick

■ Clean Manufacturing Portal

- Portal für alles rund um die Reinheit
- zentraler Zugang für Kunden, Industrieverbund-Teilnehmer und interessierte Öffentlichkeit
- Web 2.0 Funktionalitäten (Expertenforum, Wiki, Portlet-Sharing etc.)
- optimiert für Google-Suche

■ Tested-Device® Datenbank

- Datenbestand wird stetig erweitert
- Für Kunden: Einsehen, Verwalten von Prüfbobjekten und Ergebnissen
- Freigabe: Daten können der Öffentlichkeit zugänglich gemacht werden

■ CSM®-Datenbank

- Erweiterung des Leistungsspektrums: Reinigbarkeit, ESD etc.
- Freigabe: Daten können der Öffentlichkeit zugänglich gemacht werden
- Integration ins Web 2.0 basierte Clean Manufacturing Portal