



sphera[®] SD | EC

homogeneous conductive vinyl

creating better environments

Forbo
FLOORING SYSTEMS

A **TRUSTWORTHY** SOLUTION OF **CONSISTENTLY** HIGH QUALITY

Sphera SD | EC is Forbo's homogeneous vinyl collection with conductive properties in sheet format. The collection is specifically designed to control static discharges and particle emissions in the most sensitive environments, such as pharmaceutical, MedTech and healthcare facilities. Sphera SD | EC provides permanent ESD control and ensures the highest hygienic properties, thanks to the SMART control ⚡ top.

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CONTROLLING ESD AND PARTICLE EMISSION IN LIFE SCIENCES

Sphera SD | EC provides permanent ESD control and ensures the highest hygienic properties. Whether it is a production location in the MedTech industry, a laboratory in Pharma, or an X-ray room in healthcare, this floor is a solution that keeps its promise.

In critical environments static discharge can cause large scale damage. A flooring solution with permanent ESD properties, can help to avoid costs from product failure, processing issues, equipment malfunction or hygienic problems. Sphera SD | EC contributes to the prevention of unwanted electrostatic build-up and discharges.

Sphera SD | EC helps to keep a controlled environment clean by limiting the particle and TVOC emission from the floor covering.

Sphera SD has been approved by the Fraunhofer institute for use in cleanroom areas up to ISO class 6. Sphera EC may be used up to ISO class 5, according to ISO 14644-1. Furthermore Sphera SD | EC has been tested by the Fraunhofer institute for the following aspects:

- Outgassing analysis and classification (ISO 14644-8)
- Biological resistance (ISO 846)
- Chemical resistance (ISO 2812-1)

Certificates can be obtained from the local sales manager.



SD 550000 | white SD 550036 | water



EC 450000 | white

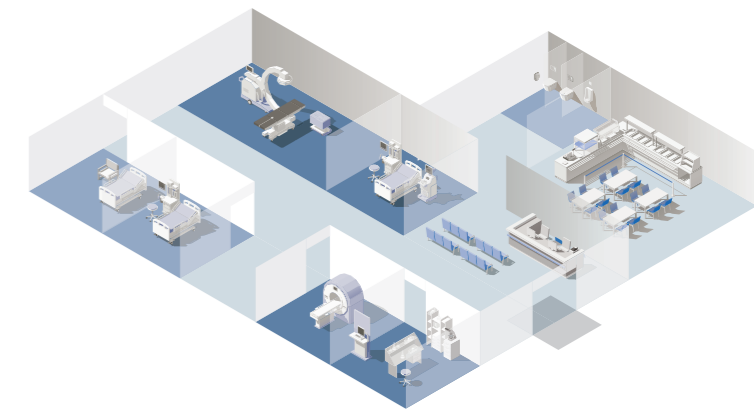
HYGIENE AND SAFETY IN HEALTHCARE

Ensuring a safe environment is one of the most important concerns for sensitive healthcare environments. Static discharges can be unpleasant for patients and employees and sensitive medical devices can be negatively influenced by static charges.

Sphera SD | EC provides a trustworthy conductive flooring solution, effectively protecting the people and equipment against static events.

Health and hygiene are crucial in healthcare facilities. Sensitive environments where intensive cleaning with aggressive disinfectants is part of the daily business require smart ⚡ solutions. The conductive surface treatment is stain resistant and withstands widely used decontamination procedures. Also heavy traffic from beds, (motorized) wheelchairs, or equipment is most often daily business. Sphera SD | EC is the durable, highly stable and indentation resistant solution.

Sheet format of Sphera SD | EC requires less welding and ensures highest hygiene properties.

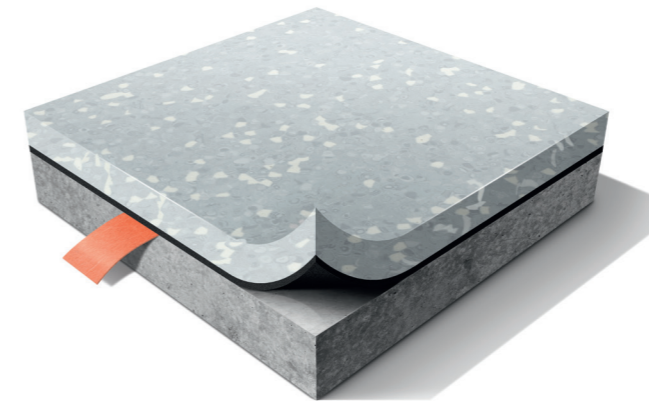


- Forbo flooring solutions suitable for controlled environments, for most demanding areas.
- Forbo entrance flooring systems, to keep dirt and moisture outside.
- Other Forbo flooring solutions, which meet the high safety and hygienic standards of healthcare environments.

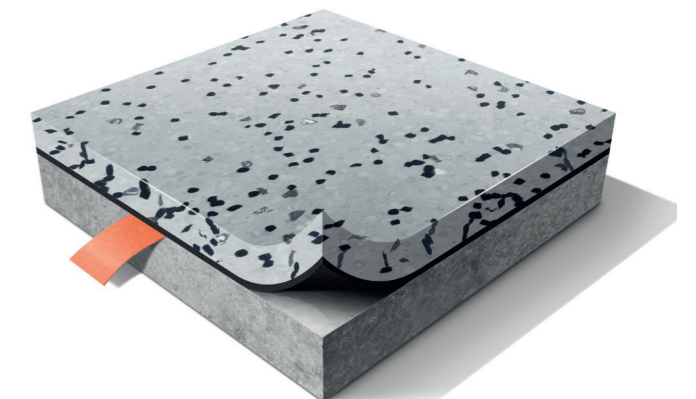
THE BENEFITS OF SPHERA SD | EC

The Forbo Sphera SD | EC sheet collection offers a trustworthy solution delivering consistently high quality for the most demanding of controlled environments. Our technical flooring solution will perform regardless of the conditions of the area.

- Innovative product development and carefully controlled production processes ensure a solution with permanent conductive properties, which comply with all ESD standards.
- Optimal performance of the product will remain throughout the lifetime of the product, regardless of the conditions of the environment, such as the relative humidity level in the application area.
- In critical areas, control of cleanliness of the air and surfaces is essential to reduce the risk of contamination with particles or micro-organisms. Sphera SD has been approved for cleanrooms up to class 6 and Sphera EC for cleanrooms up to class 5 by the Fraunhofer institute.
- Low TVOC emissions and outgassing. Vital for application areas where sensitive materials are used, contributing to a healthy indoor environment. TVOC emissions are $\leq 0,01 \text{ mg/m}^3$.



sphera[®]SD



sphera[®]EC

- The unique SMART control ⚡ top makes Sphera SD | EC resistant to stains and scratches, for a durable and hygienic solution.
- Thanks to the conductive backing on Sphera SD | EC, there is no need for conductive adhesive underneath the full sheet. This reduces installation costs and risk of installation errors. Only on the copper strip the floor needs to be attached with conductive adhesive.





SMART ⚡ SOLUTIONS FOR CONTROLLED ENVIRONMENTS

Forbo's Sphera SD | EC collection is an innovative addition to the product category of homogeneous conductive vinyl flooring. Design, technology and performance meet in this high-quality and visually attractive flooring solution.

The greenfield production set-up allowed for the newest technologies and insights to be used, that's what we call: SMART.



Sustainable Modern Advanced Robust Technology

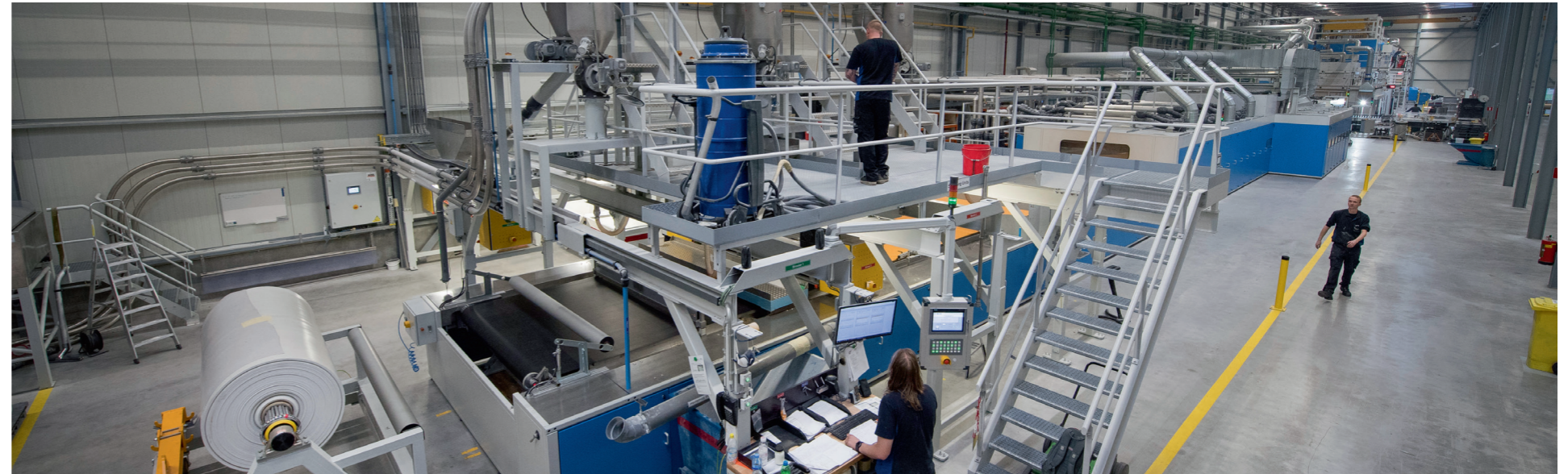
For Sphera SD | EC additional functional components that are relevant for the envisioned applications are used; ensuring that this is also the smart solution for conductive flooring systems.

For Sphera SD an innovative technology is used to create a **permanent** dissipative, consistently performing granule. Integration of this granule in the product ensures an electrical resistance of $1 \times 10^6 \leq R \leq 10^8 \Omega$.

For the production of Sphera EC ingredients of the Colorex technology are used; a proven consistent high performance technology and product with many years of experience. These ingredients ensure that Sphera EC has an electrical resistance of $5 \times 10^4 \leq R \leq 10^6 \Omega$.

The SMART control ⚡ top is the finishing touch on both Sphera SD and EC. It is protecting the floor against stains, scuffmarks and gives the floor a saturated high end appearance.

STATE-OF-THE-ART PRODUCTION PROCESS



Conductive homogeneous vinyl is most commonly used in industry and healthcare segments, in application areas where a reliable solution of consistently high quality is mandatory.

Establishing our own production plant for homogeneous vinyl forms part of Forbo's overall strategy to provide customers with products and solutions from sources that are fully operated and controlled by Forbo employees.

Being able to build the facility from scratch has enabled Forbo to invest in the most up to date equipment and technology available and to produce a product that offers unique opportunities for designers, as well as exceptional quality for end users and installers.

Sphera SD | EC is produced 100% phthalate free, in a zero waste environment, where constant and optimal quality can be ensured in an efficient and sustainable way.

Within this production, there are three main processes that are unique to Forbo, leading to a consistent product quality:

- Forbo's new internal extrusion process enables the controlled creation of granules in an efficient way.
- The second unique process utilises a combipress for sheet making: a combination of pressure and temperature to achieve a perfectly in gauge (2.0 mm) product every time.
- Lastly, a relaxation zone without water cooling, which instead uses a controlled air temperature and air flow to achieve best in class dimensional stability.

The manufacturing process for Sphera SD | EC includes five main steps:

STEP 1: Producing granulate

PVC granules are created by combining PVC dry blend and colour pigments. Three coloured PVC compositions are mixed together to create a vinyl mass, which is then pushed through a die plate, similar to the Sphera Element collection. The functional granules are separately produced using a similar process, but in a single white colour for Sphera SD and with a black carbon component for Sphera EC.

STEP 2: Mixing

The three-coloured design granules and the functional granules are mixed in a fixed ratio. This ratio is carefully set to make sure that the distribution of the functional granules is sufficient to consistently meet all conductivity requirements no matter which spot on the floor is chosen to do the measurement.

Step 3: Sheet making

The granules are then released by precision scatter units onto a conveyor belt. A steel-belt press forms a homogeneous sheet with a truly non-directional visual of the required thickness. Unlike conventional manufacturing, there is no need to back sand the product.

STEP 4: Lacquering, embossing and backside primer

In-line, Sphera SD | EC has a conductive UV-cured lacquer applied on the top of the product. After drying the lacquer, application of an embossing achieves a particularly matt finish, which diffuses light and conceals any minor sub-floor imperfections. The Forbo engineered process provides a film of lacquer with consistent thickness on both the peaks and in the valleys. Forbo calls this SMART control ⚡ top, as it provides permanent and consistent conductivity and very good resistance to stains and scuffmarks.

On the backside of the product, a permanently conductive primer is applied.

STEP 5: Relaxation

Homogeneous vinyls acquire tension during production. The tension in Sphera SD | EC is removed by heating the material again and then slowly cooling to achieve the most dimensionally stable sheet product in this category.

THE COLLECTION

SPHERA SD

The Sphera SD and Sphera EC collections have been designed by thinking in solutions from a customer perspective. For working environments where focus and concentration is needed, the natural tones like beiges and greys with less contrast are appreciated. For spaces that ask for a spark of positivity, where people wait, connect or relax, brighter colours are added to the collection. Beneficial for both personnel and patients.

sphera® SD

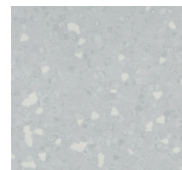


SD 550000 | white

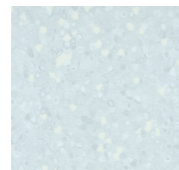


SD 550017 | ivory
LRV 62%
NCS S 1500-N

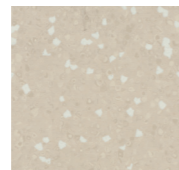
The white chips in the SD collection are the functional, dissipative particles in this floor, which assure the permanent dissipative properties.



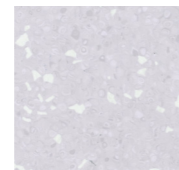
SD 550003 | light neutral grey
LRV 52%
NCS S 2500-N



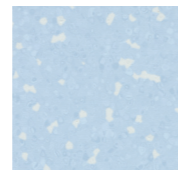
SD 550007 | grey sky
LRV 59%
NCS S 2002-850G



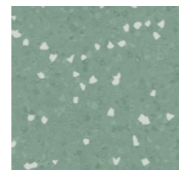
SD 550023 | sand
LRV 51%
NCS S 2005-Y40R



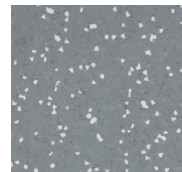
SD 550032 | soft lilac
LRV 53%
NCS S 2005-R50B



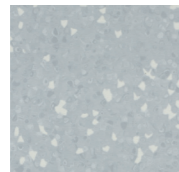
SD 550036 | water
LRV 57%
NCS S 1510-R90B



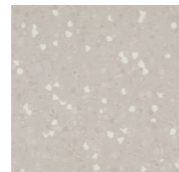
SD 550050 | olive
LRV 31%
NCS S 4010-G10Y



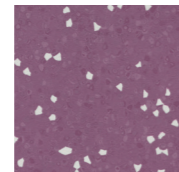
SD 550005 | dark neutral grey
LRV 22%
NCS S 4502-B



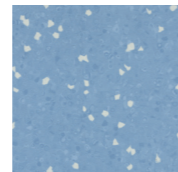
SD 550008 | silver grey
LRV 47%
NCS S 2502-B



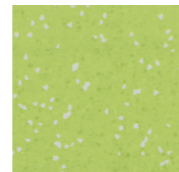
SD 550018 | mortar
LRV 47%
NCS S 2502-Y



SD 550034 | amethyst
LRV 17%
NCS S 5030-R30B



SD 550037 | china blue
LRV 38%
NCS S 2030-R90B



SD 550049 | yellow green
LRV 53%
NCS S 2000-N

The light colour of the white chips in the SD collection gives a fresh and clean visual, where small objects like needles can easily be found.

Both Sphera SD and Sphera EC offer the possibility to create a zoning approach. You can choose for a soft zoning or the use of more bright colours to denote different areas.

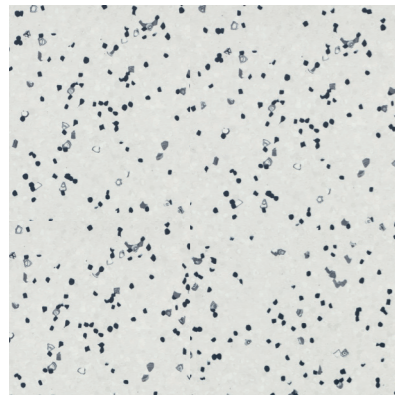


THE COLLECTION

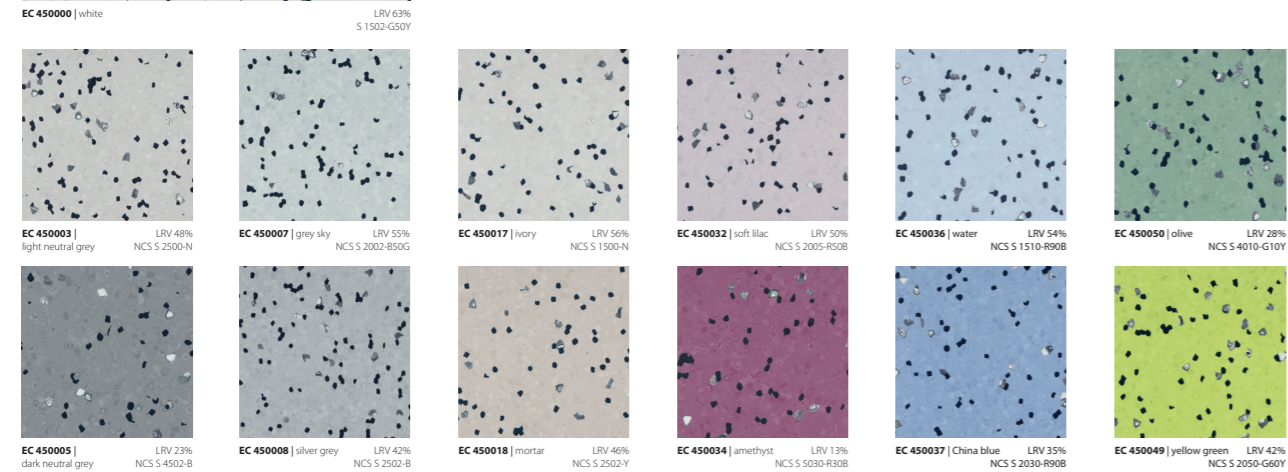
SPHERA EC

The Sphera EC collection has a clean and fresh look, thanks to the black and white marbled design chips. The amount of conductive granules is carefully chosen to make sure the performance is consistent everywhere across the floor. The design and colours of the Sphera EC collection are coordinated with the Sphera SD and the non conductive Sphera Element collection. This creates the possibility to make beautiful combinations when conductive and regular homogeneous vinyl flooring are used in one building.

sphera® EC



The black chips in the Sphera EC collection are the functional, conductive particles in this floor, which assure the permanent conductive properties.



Both Sphera SD and Sphera EC include a range of brighter colours which relate to natural scenes. People are spending a great deal of time inside. Colours associating to natural scenery, such as forests and the sea, have a positive influence on the human mind.



INSTALLATION AND MAINTENANCE

A prerequisite for a floor that performs for many years is the quality of the installation. The conductive backing on Sphera SD | EC makes the installation easier and less critical when it comes to ESD performance. There is no need for conductive adhesive underneath the full sheet. Only on the copper strip the floor needs to be attached with conductive adhesive.

The installation of Sphera SD | EC is visualized on the right.

The basic steps are:

1. Grounding by copper strip
2. Applying conductive adhesive
3. Applying normal adhesive
4. Installing Sphera SD | EC

The appearance, performance and durability of the installed floor covering will be determined to a large extent by the quality of the prepared subfloor and the conditions in which they are laid. As with any resilient floor covering, irregularities in the subfloor will be visual in the finished flooring.

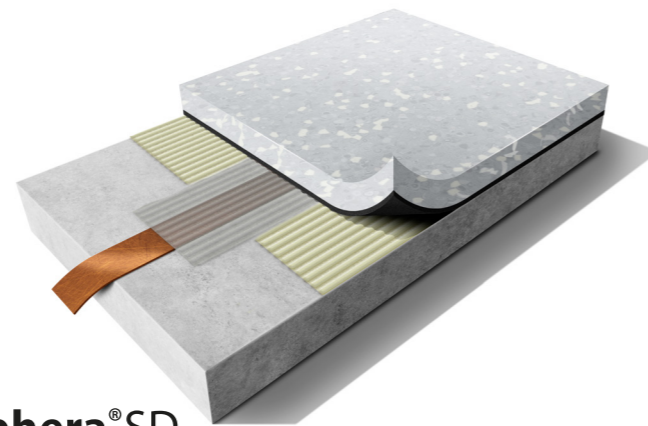
The installation of Sphera SD | EC rolls should be carried out in accordance with the national code of practice for the installation of resilient floor coverings if applicable.

Areas to receive flooring should be clean, free from other trades or materials, fully enclosed and weather tight. Subfloors should be clean and free of contaminants, smooth, sound, even and permanently dry.

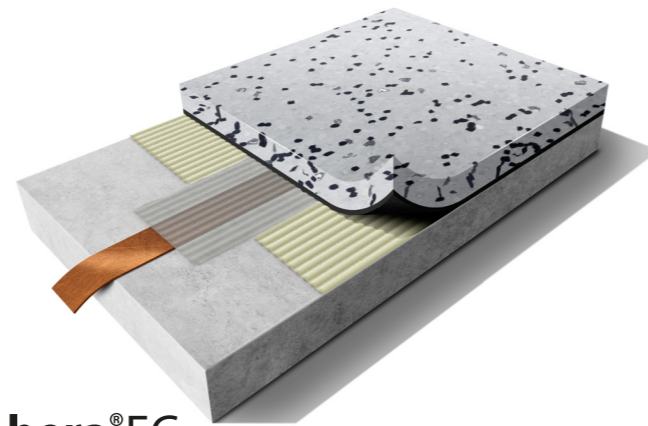
Once installed Sphera SD | EC can be easily cleaned and maintained, thanks to their highly durable SMART control ⚡ top.

The full installation guide and the cleaning and maintenance advice can be downloaded from our website:

www.forboflooring.com



sphera® SD



sphera® EC

Technical specifications

Sphera SD | EC meets the requirements of EN ISO 10581

		Sphera SD	Sphera EC
	Binder content	EN ISO 10581	type 1
	Total thickness	EN ISO 24346	2.0 mm
	Surface finish		SMART control ⚡ top
	Collection size		14
	Commercial use	EN ISO 10874	34 very heavy
	Light industrial use	EN ISO 10874	43 heavy
	Roll width	EN ISO 24341	2 m
	Roll length	EN ISO 24341	≤ 27 m ~ 26 m
	Total weight	EN ISO 23997	2.9 kg/m ²
	Electrostatics (general requirements)	IEC 61340-5-1	Compliant
	Electrical resistance	IEC 61340-4-1 ESD STM7.1	1 x 10 ⁶ ≤ R ≤ 10 ⁹ Ω
	Electrical resistance in combination with ESD control footwear	IEC 61340-4-5 ESD STM97.1	R ≤ 1 x 10 ⁹ Ω
	Body voltage generation, in combination with ESD control footwear <i>Typical value</i>	IEC 61340-4-5 ESD STM97.2	< 50 V ~ 0 V <> 30 V
	Electrical insulation to ground	VDE0100	≥ 50 k Ω
	Dimensional stability <i>Typical value</i>	EN ISO 23999	≤ 0.4 % ~ 0.2 %
	Residual indentation <i>Typical value</i>	EN ISO 24343-1	≤ 0.10 mm ~ 0.03 mm
	Castor chair continuous use	ISO 4918	pass
	Light fastness	EN ISO 105-B02	≥ 7
	Flexibility	EN ISO 24344	Ø 10 mm
	Resistance to chemicals	EN ISO 26987	very good
	Slip resistance	DIN 51130	R9
	Bacteria resistance	EN 846	Does not support growth
	Indoor Air Emissions: TVOC after 28 days	ISO 16516	≤ 0.01 mg/m ³
	Creating better environments		
	Renewable electricity		Sphera SD is manufactured using 100% electricity from renewable sources
			Sphera EC is manufactured using 100% electricity from renewable sources
	Sphera SD EC meets the requirements of EN 14041	CE EN 14041 0200304-00P-003	CE EN 14041 0200304-00P-003
	Reaction to fire	EN 13501-1	B _s -s1,G, NCS
	Slip resistance	EN 13893	μ ≥ 0.30
	Thermal conductivity	EN 12524	0.25 W/m·K
	Body voltage	EN 1815	≤ 2 kV
	Electrical behaviour - static dissipative	EN 1081	≤ 1 x 10 ⁹ Ω
	Electrical behaviour - conductive	EN 1081	n.a.

All Forbo Flooring Systems' sales organisations worldwide have a certified Quality Management System in accordance with ISO 9001. All Forbo Flooring Systems' manufacturing operations have a certified Environmental Management System in accordance with ISO 14001. The Life Cycle Assessment (LCA) of Forbo Flooring Systems' products is documented in individual Environmental Product Declarations (EPD's) which can be found on all of our websites.



UNDER CONTROL PORTFOLIO

Within the wide range of Forbo products, there are several collections which offer a solution for the highest requirements and needs of controlled environments.

Under Control refers to the base, the floor. It indicates what matters: the environment is managed, controlled and is safe. Each solution within the portfolio contains specific properties that can be requested to meet very high requirements of a controlled environment in industry, healthcare and all other segments where there is a need for controlling ESD or particle emission.

colorex®

Colorex is an advanced technical tile flooring system specifically designed to control static discharge in sensitive areas such as cleanrooms, operating theatres and the electronics industry. Colorex is available with different levels of conductivity and in different constructions. With Colorex SD, Colorex EC and the Colorex plus EC loose lay system, static charges flow easily through the dense network of conductive veins. The dense construction provides excellent resistance to heavy loads. The Colorex surface is 100% repairable and restorable, what makes the product unique.



marmoleum® ohmex

It is Forbo's most sustainable static dissipative flooring solution, created from natural, renewable and recycled raw materials. It contains no phthalates, no plasticizers and no mineral oil. Marmoleum Ohmex is designed for specific applications in controlled environments, such as intensive care units, x-ray and MRI rooms, server rooms and data centers.

Marmoleum Ohmex is a linoleum floor covering that meets higher requirements for electrical conductivity of $< 1 \times 10^8 \Omega$, providing the relative humidity level is above 40%.



	Permanent and consistent ESD control	Cleanroom conformity and particle control	Seamless solution	Chemical resistance	Contamination control and hygienics	Heavy loads resistance
sphera® SD	● ● ●	●	● ● ●	● ● ●	● ● ●	●
sphera® EC	● ● ●	●	● ● ●	● ● ●	● ● ●	●
colorex® SD	● ● ●	● ●	● ●	● ●	● ● ●	● ● ●
colorex® EC	● ● ●	● ● ●	● ●	● ●	● ● ●	● ● ●
colorex® plus EC	● ● ●	● ● ●	● ●	● ●	● ● ●	● ● ●
colorex® plus basic	n.a.	● ●	● ●	● ●	● ● ●	● ● ●
colorex® plus R10	n.a.	●	● ●	● ●	●	● ● ●
marmoleum® ohmex	●	n.a.	● ● ●	●	●	n.a.

coral® & nuway®

Entrance flooring systems Coral and Nuway are not meant to be installed in controlled environments, but they are essential for almost every building. Soil and dirt can inhibit the conductive properties of ESD flooring. Capturing dirt in an early stage by the use of entrance flooring can be part of a contamination control plan for facilities with ESD areas and cleanrooms.

Entrance flooring can even be used for internal and external entrance areas where heavy duty loads and intense pedestrian and/or wheeled traffic are to be catered. Nuway Tuftiguard HD provides in those entrance areas a suitable solution.



eurocol

Installation of controlled environment flooring can require the use of specific accessories like conductive adhesive and copper strips, as offered by Eurocol.



SD 550034 | amethyst SD 550032 | soft lilac

Forbo Flooring Systems is part of the Forbo Group, a global leader in flooring and movement systems, and offers a full range of flooring products for both commercial and residential markets. High quality linoleum, vinyl, textile, flocced and entrance flooring products combine functionality, colour and design, offering you total flooring solutions for any environment.



Other countries

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