



# **colorex<sup>®</sup> and sphaera<sup>®</sup> SD | EC**

Leading the way in cleanroom and ESD flooring for healthcare

creating better environments

**Forbo**  
FLOORING SYSTEMS



# PROVIDING PEACE OF MIND IN HEALTHCARE FACILITIES

Forbo Flooring Systems is an international market leader with a wealth of experience in providing ESD and cleanroom flooring. Within the wide range of Forbo products, there are several collections which offer a solution for the highest requirements and needs of controlled environments. These collections are featured in Forbo’s Under Control portfolio. Whether you are performing cardiovascular surgery or taking care of patients on an intensive care unit, Forbo’s Under Control solutions will protect you and your clients.

Each solution within the portfolio contains specific properties that we offer to meet very high requirements of a controlled environment in healthcare facilities where ensuring a safe and hygienic environment are important concerns.

Keep everything **Under Control**. Under Control refers to what is important: making sure the environment is managed, everything is controlled and kept safe. It also refers to the base, to the floor.

One of the most trusted brands on the market is the homogeneous vinyl tile collection Colorex. You can have peace of mind that Colorex complies to every standard and norm that is required today and likely to be required tomorrow.

The newest addition to the flooring offer for controlled environments is Sphera SD | EC. This homogeneous vinyl sheet flooring provides permanent ESD control and ensures the highest hygienic properties.



Colorex SD 550000 | white Colorex SD 550036 | water

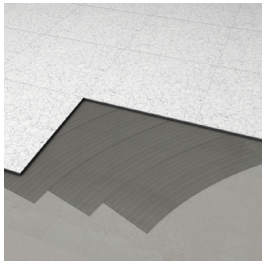
# IDEAL FOR CHALLENGING AREAS WITH HIGH DEMANDS ON HYGIENE

Healthcare environments present their own flooring issues, particularly through the combination of demand for ESD control, harsh cleaning procedures and the ever increasing recognition of the need to control micro contamination. Forbo’s high performance floor covering systems are designed for use in both high classification areas such as operating theatres and cleanrooms as well as non-classified areas like patient rooms.

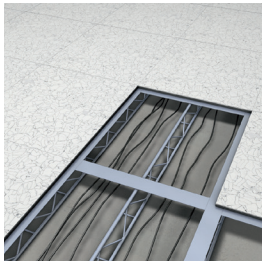
## Colorex SD | EC

Its conductive properties avoid the negative effects of an accumulation of static electricity. Static discharges can be unpleasant for patients and employees and sensitive medical devices can be negatively influenced by static charges.

At the same time, the compact, pore-free surface is resistant to bacteria and moulds, helping you to maintain the highest standards of hygiene. Often Colorex is bonded to a raised access floor panel that can be used in cleanrooms.



Colorex with welded seams fully adhered directly to the floor



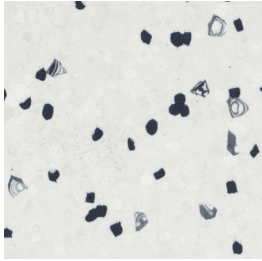
Colorex bonded to a raised access floor panel

## Sphera SD | EC

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, where intensive cleaning with aggressive disinfectants is part of the daily business require smart solutions. Sphera SD | EC provides permanent ESD control and ensures the highest hygienic properties, thanks to the SMART control ⚡ top.



sphera® SD

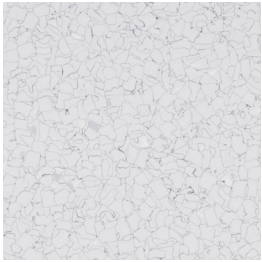


sphera® EC

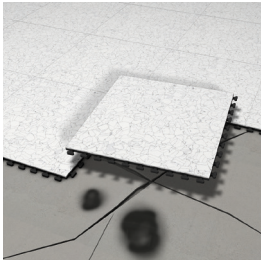
## Colorex plus

Colorex plus is a loose lay conductive floor system with a surface composed of Colorex tile material. This ensures all the benefits of standard Colorex, such as high density, easy repair and stain resistance but also combines the benefits of a heavy duty loose lay tile.

Colorex plus can be installed quickly and easily without the need for conductive adhesive. Specific, expensive sub floor treatment or preparation is not necessary.



colorex® SD | EC | plus



Colorex as loose lay tile: **colorex® plus EC**



# CLEANROOM SUITABILITY

## GETTING IT RIGHT FIRST TIME

Following a comprehensive programme of testing, suitability for use in cleanroom applications has been certified by the renowned Fraunhofer IPA Institute in Germany. ISO standards and GMP regulations for air purity require compliance by presenting consistent results that are verified on a regular basis.

### Contamination control

Healthcare facilities can contain a cleanroom environment, where airborne particles and outgassing of materials need to be controlled to avoid contamination. Colorex and Sphera SD | EC satisfy strict requirements for particle release behaviour and outgassing, helping to reduce the threat of contamination and negative effects on the health of patients.

### GMP

Good Manufacturing Practice (GMP) guidelines are regulations from the European Union, U.S. Food and Drug Administration and the World Health Organization (WHO) to secure the quality of medication and (prescription) drugs. The guidelines requires a smooth floor which is tight and free from cracks to ensure optimal hygiene and low contamination risk. Colorex complies with the requirement for GMP A class once installed, for the life span of the product without the risk of cracking like poured floors.

### Attention for details

In highly sensitive areas and other places that have strict hygiene requirements, it's vital that floor-to-wall transitions are water-tight, perfectly hygienic and aesthetically pleasing. Our integrated coving system and skirting, create a perfect seal for these critical areas using the same Colorex material. The radius of the preformed Colorex and Sphera SD | EC corners is linked to the size of cleaning pads found on most commercial cleaning machines. This ensures that no sharp corners are created that would prove difficult to clean. Preformed corners are prevented from tearing thanks to their special construction.

### Customer references for Colorex

- The Saint Vival hospital, Brazil (Colorex EC)
- Juntendo hospital, Japan (Colorex EC)
- SRO AG Spital, Switzerland (Colorex SD)
- Rijnstate hospital, Netherlands (Colorex SD)



| FRAUNHOFER<br>IPA RESULTS | Airborne particle<br>emission and cleanroom<br>suitability (ISO 146441-1) | Outgassing (ISO 14644-8)<br>ISO Accm-class, 23 °C |         | Chemical<br>resistance<br>(ISO 2812-4) | Cleanability<br>(VDI guideline<br>2083 Part 4) | GMP                   |
|---------------------------|---|---|---------|--|--|-----------------------|
|                           |   | VOC   | SVOC    |  |  |                       |
| Colorex® SD               | ISO 4   | - 8.1   | < - 9.6 | Excellent                              | Report<br>available                            | Class A               |
| Colorex® EC               | ISO 2   | - 8.1   | < - 9.6 | Excellent                              | Report<br>available                            | Class A               |
| Colorex® EC plus          | ISO 2   | - 8.1   | < - 9.6 | Excellent                              | Report<br>available                            | Class A               |
| Sphera® SD                | ISO 6   | - 8.3   | - 8.5   | Very good                              | No test  | Class A<br>(expected) |
| Sphera® EC                | ISO 5   | < - 9.6   | < - 9.6 | Very good                              | No test  | Class A<br>(expected) |

# MAJOR PROBLEMS

## FACED BY CUSTOMERS

At Forbo we understand the needs and challenges of healthcare customers. Our solutions do not stop at the threshold of an operation theater, we can supply advanced high performance flooring for all sensitive areas in healthcare settings, from the laboratories to patient rooms and into every area of the site as required.

### Cleanroom conformity

Colorex and Sphera SD | EC ranges are independently certified as “Cleanroom Suitable Material” by Fraunhofer IPA. Colorex EC and plus EC are suitable for ISO class 2 and GMP A environments. We achieve this through Colorex’s dense construction specifically designed to reduce particle emission both from abrasion and outgassing whilst having a bacteriostatic surface. Colorex SD is suitable for ISO class 4 and GMP class A environments.

The different product construction of Sphera SD | EC results in ISO class 6 for Sphera SD and ISO class 5 for Sphera EC. This is sufficient in most areas in healthcare facilities.

### Harsh cleaning processes

Common causes of functional and aesthetic degradation of floors are harsh cleaning methods in pharmaceutical manufacturing. Commonly used substances have been tested by Fraunhofer IPA. Colorex shows excellent chemical resistance thanks to its pore free surface and low plasticizer formulation. Also Sphera SD | EC ensures excellent resistance to chemicals, thanks to the SMART control top. Both collections can withstand harsh cleaning processes.

### Cost and time required to uplift existing floors

Colorex plus can be overlaid onto existing cracked flooring once the damage has been patched. Our range of accessories still allow for full, hygienic coving.

### Costly downtime for flooring renovation

Colorex plus can be fitted dust-free in a fraction of the time required to lay a traditional poured floor or install glue-down sheet options.

### Subfloor humidity

Commonly known to be one of the biggest causes of flooring failure, subfloor humidity will emulsify adhesives and cause poured resin floors to lift. Colorex plus is unaffected by subfloor humidity thanks to its unique raised and ventilated honeycomb.

### Cracked flooring

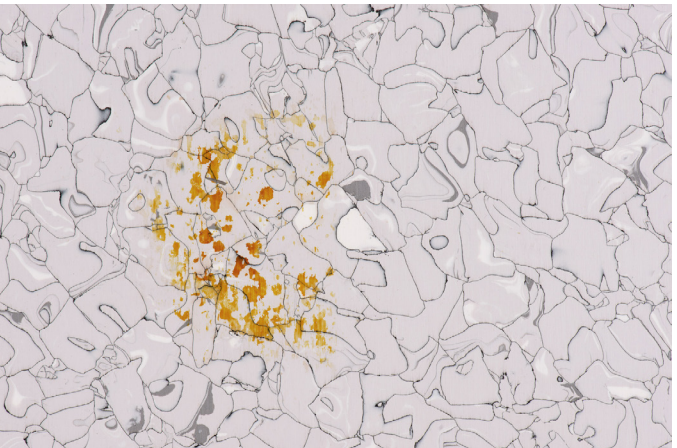
Unacceptable in any cleanroom or hygiene critical area is cracked flooring. Unlike resin poured floors, vinyl flooring has a minimal likelihood of cracking. Colorex is highly resistant to high point loading, rolling traffic and falling loads. If damage does occur, the floor can be easily repaired and restored.

### Repairs and unsightly patching

It is difficult to effectively repair many types of flooring commonly used in manufacturing environments, and over time, an unsightly patchwork effect can be created. If damage occurs, Colorex can be invisibly repaired with ease, ensuring that the appearance of the floor can be maintained for many years.



A piece of Colorex can be used for a seamless repair



Stubborn stains left by iodine based substances can be fully removed

# A UNIQUE MANUFACTURING METHOD

## HOW COLOREX IS MADE

For decades, Colorex has been produced by Forbo in a factory which specializes in the production of vinyl ESD and cleanroom tiles. The production process has been specifically set up for this product and the development work is carried out by ESD and cleanroom specialists with extensive knowledge of the application areas.

**Step 1: Chips and conductive coating**

Vinyl chips are coated with a conductive substance.

- The coating on the chips ensures that the ESD properties are consistent throughout the product.
- The construction ensures permanently conductive or dissipative properties over time.
- The technology used guarantees performance, regardless of changes in humidity and temperature.

**Step 2: High pressure production**

By applying very high pressure and a high temperature, these coated chips are then compressed into solid blocks of homogeneous material.

- After pressing, the conductive coating around each chip forms a dense, continuous network of tiny black veins.
- The continuous paths enable safe electrostatic discharge across both the width and the depth of the tile.

**Step 3: Splitting and surface treatment**

Colorex tiles are cut from the solid blocks of homogeneous material and machine finished to provide a pore free surface.

- Colorex is a highly compressed tile with a compact pore free, easy to clean and repairable surface.
- Batch information is printed on the back of each tile to enable easy identification.

**Finished product**

To ensure the integrity of the product post-production, special care is taken to get the product to the final location in good shape.

- Distinct labelling of the pallet.
- Protection to prevent damage during transport and handling.

# THE BENEFITS

## OF COLOREX

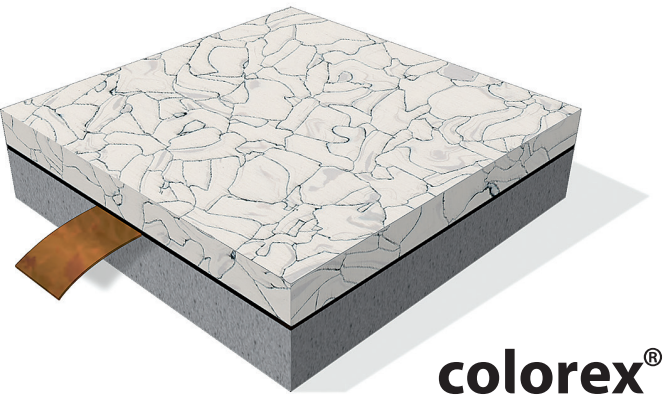
It is the unique way in which Colorex is made that gives this advanced technical floor covering its exceptionally high density, limited particle release and outgassing. Other benefits of Colorex dense construction are heavy load resistance and durability; critical performance properties for wheeled equipment and heavy hospital beds.

The dense construction and pore free surface combine to give Colorex its inherent resistance to chemicals and staining. This makes Colorex compatible with the industry's aggressive cleaning chemicals. The surface permits extensive and effective surface repairs to be made nearly invisible and avoiding the need to replace tiles.

Whilst offering the performance features normally associated with ESD 'sheet' products, Colorex tiles do not require the high plasticizer content that gives sheet vinyl its flexibility, but which can also result in outgassing and poor mechanical performance.

Colorex has only minimal plasticizer content and exceptionally low VOC emissions, providing the perfect solution for any environment where micro contamination has to be controlled.

Other benefits of the dense construction of Colorex are heavy load resistance and durability. These are critical performance properties for non-classified transit, storage and warehousing areas, where resistance to high point loading and heavy rolling traffic is demanded and a clean environment must be maintained.

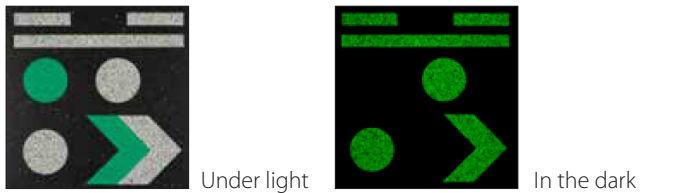


### Why choose Colorex?

- 1 | The technology ensures a permanently conductive product guaranteeing optimal performance throughout the life of the product, regardless of the humidity level of the area. Colorex fully complies with all ESD standards with the resistance to electricity being monitored continuously, online, through the production process.
- 2 | The surface of Colorex can be fully repaired extending the useful life of the product. The colour assuan is specifically designed for areas where betadine is used; the stubborn stains are invisible.
- 3 | The low plasticizer content in Colorex tiles creates a unique dimensional stability and prevents shrinkage.
- 4 | The low plasticizer content also ensures extremely low emissions and outgassing making Colorex the right choice for cleanrooms. Colorex fully complies with all cleanroom standards, as confirmed by the Fraunhofer Institute.

\*Measurement reports are available upon request.

- 5 | The dense construction of Colorex and the Colorex plus loose lay system provides excellent resistance to heavy loads making it an ideal solution for commercial and industrial environments.
- 6 | Colorex is available in tile format, a prerequisite for raised access floors found in areas with laminar airflow or HVAC systems.
- 7 | There is an option to add safety signs and guiding with signal and glow.





# STATE-OF-THE-ART PROCESS

## HOW SPHERA SD | EC IS MADE

Forbo has invested in the most up to date equipment and technology available to provide customers with products and solutions of constant and exceptional quality from sources that are fully operated and controlled by Forbo employees. The manufacturing process for Sphera SD | EC includes five main steps:

**Step 1: Producing granulate**

Forbo's new internal extrusion process enables the controlled creation of granules in an efficient way. PVC granules are created by extruding PVC dry blend and colour pigments. The functional granules are separately produced using a similar process, with a conductive black carbon component for Sphera EC.

**Step 2: Mixing**

The size and ratio of coloured and functional chips 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. Unlike conventional manufacturing, there is no need to back sand the product, which means there is no over-application of granules (less waste) and the process is more energy efficient.

**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. The embossing achieves a particularly matt finish, which diffuses light and conceals any minor sub-floor imperfections. Forbo calls this SMART control ⚡ top, as it provides permanent and consistent conductivity and very good resistance to stains and scuffmarks. On the reverse 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.

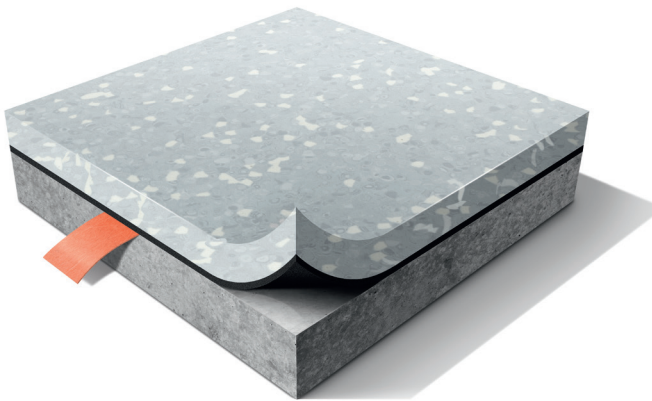
# THE BENEFITS

## 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.

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.

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  $1 \times 10^6 \leq R \leq 10^8 \Omega$ .



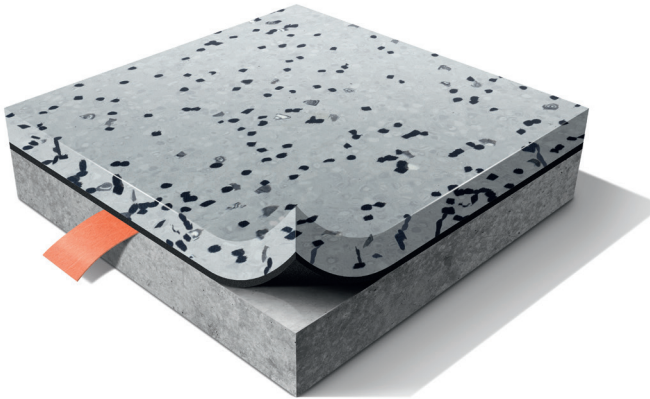
sphera<sup>®</sup>SD

### Why choose Sphera SD | EC?

- 1 | In critical areas, control of cleanliness of the air and surfaces is essential to reduce the risk of contamination with particles or microorganisms. Sphera SD has been approved for cleanrooms to class 6 and Sphera EC for cleanrooms to class 5, as confirmed by the Fraunhofer Institute.
- 2 | The bacterial resistance of Sphera SD | EC is excellent and the mould resistance very good, as also confirmed by the Fraunhofer Institute.
- 3 | Innovative product development and carefully controlled production processes ensure a solution with permanent conductive and dissipative properties, which comply with all ESD standards.

For the production of Sphera EC ingredients from our 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 protects the floor against stains, scuffmarks and gives the floor an easy to clean surface.



sphera<sup>®</sup>EC

- 4 | 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 area.
- 5 | Low TVOC emissions and outgassing. Vital for application areas where sensitive materials are used, contributing to a healthy indoor environment. TVOC emissions are  $\leq 0,01 \text{ mg/m}^3$ .
- 6 | The unique SMART control ⚡ top makes Sphera SD | EC resistant to stains and scratches, for a durable and hygienic solution.
- 7 | Thanks to the conductive backing on Sphera SD | EC, the flooring material itself allows horizontal diverting of static electrical buildup. The installation depends less on proper use of conductive adhesive and skills of an installer which drastically reduces the risk of a malfunctioning floor and non conductive spots across the surface.



# HOW TO CHOOSE COLOREX OR SPHERA SD | EC

We constantly strive to produce sustainable flooring solutions that create better environments across all application areas. At the same time we help to take care of the natural environment through our commitment to sustainable development, responsible raw material procurement and manufacturing processes.

Colorex offers complete peace of mind as it fully complies with all ESD and cleanroom standards. Sphera SD | EC is a trustworthy solution for most application areas in controlled environments. Both products have been extensively tested and verified by independent bodies including Fraunhofer IPA. Which product is the best solution depends on the specific circumstances of the premises, application area and requirements. Contact a Forbo specialist for detailed information.

|                  | Permanent and consistent ESD control | Cleanroom conformity and particle control | Dimensional stability and seams | Chemical resistance | Contamination control and hygienics | Heavy loads resistance | High point loads resistance | Repairability and restorability    |
|------------------|--------------------------------------|---|---------------------------------|---------------------|-------------------------------------|------------------------|-----------------------------|------------------------------------|
| colorex® SD      | Static dissipative                   | ISO 4                                     | ≤ 0.05%, more seams             | Excellent           | Excellent                           | Extreme                | 1500 PSI                    | Can be fully restored and repaired |
| colorex® EC      | Electrostatic conductive             | ISO 2                                     | ≤ 0.05%, more seams             | Excellent           | Excellent                           | Extreme                | 1500 PSI                    | Can be fully restored and repaired |
| colorex® plus EC | Electrostatic conductive             | ISO 2                                     | ≤ 0.25%, interlocking dovetails | Excellent           | Excellent                           | Heavy                  | 1500 PSI                    | Can be fully restored and repaired |
| sphera® SD       | Static dissipative                   | ISO 6                                     | ≤ 0.4%, less seams              | Very good           | Excellent                           | Moderate               | 250 PSI                     | Polishing by dry buffing           |
| sphera® EC       | Electrostatic conductive             | ISO 5                                     | ≤ 0.4% , less seams             | Very good           | Excellent                           | Moderate               | 250 PSI                     | Polishing by dry buffing           |

# 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. Colorex and Sphera SD | EC form the base of the Forbo’s **Under Control** portfolio.

The installation and final finish of the floor will have significant impact on the floors performance and lifespan. Forbo has developed a series of products and pre-formed accessories to ensure the final result will keep functioning for the protection of your product.

### Accessories

In hygiene sensitive areas, high quality finishes are a must from a hygienic point of view. The use of preformed corners and skirtings provides the perfect solution for water-tight floor-to-wall transitions which are perfectly hygienic and aesthetically pleasing. Our integrated coving system for Colorex creates a perfect seal for these critical areas.

Preformed corners with a radius linked to the size of cleaning pads found on most commercial cleaning machines. This ensures that no sharp corners are created that would prove difficult to clean. Preformed outer corners are prevented from tearing thanks to their because of their special construction. The inner reinforcement prevents the outer corners tearing or breaking due to high mechanical pressure, e.g. the rotation of a cleaning machine.

The accessories shown on the right are frequently used accessories. More options are available, please ask your local Forbo contact or visit our website for the complete offer.



## eurocol

Installation of controlled environment flooring can require the use of specific accessories such as conductive adhesive and copper strips, as offered by Eurocol or other high quality brands.

## coral® & nuway®

Entrance flooring systems such as 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 strict hygienic requirements. 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.





# THE COLLECTIONS

## colorex® SD | EC | plus

SD 150201 | EC 250201  
everest\*

SD 150204 | EC 250204  
montblanc\*

SD 150206 | EC 250206  
moonstone

SD 150213 | EC 250213  
sahara\*

SD 150225 | EC 250225  
kiwi

SD 150221 | EC 250221  
pacific

SD 150205 | EC 250205  
adula\*

SD 150262 | EC 250262  
nevo

SD 150264 | EC 250264  
meru

SD 150234 | EC 250234  
twilight

SD 150222 | EC 250222  
niagara\*

SD 150240 | EC 250240  
etna

SD 150207 | EC 250207  
quartz\*

SD 150263 | EC 250263  
massif

SD 150219 | EC 250219  
assuan

SD 150268 | EC 250268  
pelion

SD 150265 | EC 250265  
blue ridge

SD 150266 | EC 250266  
fuji

SD 150267 | EC 250267  
montserrat

\* items also available in Colorex plus

| colorex®  | plus EC | plus basic | plus R10 |
|-----------|---------|------------|----------|
| everest   | 621001  |            |          |
| montblanc | 621004  | 611004     |          |
| adula     | 621005  | 611005     |          |
| quartz    | 621007  | 611007     | 661007   |
| sahara    | 621013  | 611013     |          |
| niagara   | 621022  | 611022     |          |

## colorex® signal

Colorex signal glow  
under light

Colorex signal glow  
in the dark

EC 250299  
glow

SD 150231  
sole

SD 150237  
amazonas

SD 150233  
fuego

## sphera® SD

SD 550000  
white

SD 550007  
grey sky

SD 550017  
ivory

SD 550032  
soft lilac

SD 550036  
water

SD 550050  
olive

SD 550003  
light neutral grey

SD 550008  
silver grey

SD 550023  
sand

SD 550034  
amethyst

SD 550037  
China blue

SD 550049  
yellow green

SD 550005  
dark neutral grey

SD 550018  
mortar

## sphera® EC

EC 450000  
white

EC 450007  
grey sky

EC 450017  
ivory

EC 450032  
soft lilac

EC 450036  
water

EC450050  
olive

EC 450003  
light neutral grey

EC 450008  
silver grey

EC 450018  
mortar

EC 450034  
amethyst

EC 450037  
China blue

EC 450049  
yellow green

EC 450005  
dark neutral grey





## Technical specifications

Colorex® meets the requirements of EN ISO 10581 and ASTM 1700  
Sphera® SD | EC meets the requirements of EN ISO 10581

|  |   | Colorex® SD                       | Colorex® EC  | Colorex® plus EC                  | Sphera® SD                        | Sphera® EC                        |
|--|---|-----------------------------------|--|-----------------------------------|-----------------------------------|-----------------------------------|
|  | Binder content  | EN ISO 10581                      | type 1   | type 1                            | type 1                            | type 1                            |
|  | Total thickness   | EN ISO 24346                      | 2.0 mm / 3.0 mm*   | 2.0 mm / 3.0 mm*                  | 10.3 mm                           | 2.0 mm                            |
|  | Surface finish  |                                   | n.a.   | n.a.                              | n.a.                              | SMART control ⚡top                |
|  | Commercial use  | EN ISO 10874                      | 34 very heavy  | 34 very heavy                     | 34 very heavy                     | 34 very heavy                     |
|  | Light industrial use  | EN ISO 10874                      | 43 heavy   | 43 heavy                          | 43 heavy                          | 43 heavy                          |
|  | Roll width  | EN ISO 24341                      | n.a.   | n.a.                              | 2 m                               | 2 m                               |
|  | Roll length   | EN ISO 24341                      | n.a.   | n.a.                              | ≤ 27 m<br>~ 26 m                  | ≤ 27 m<br>~ 26 m                  |
|  | Tile size   | EN ISO 24342                      | 615x615 mm<br>615x1230 mm*   | 615x615 mm<br>615x1230 mm*        | 607x607 mm                        | n.a.                              |
|  | Total weight  | EN ISO 23997                      | 3.2 kg/m²  | 3.2 kg/m²                         | 12.0 kg/m²                        | 2.9 kg/m²                         |
|  | Electrostatics (general requirements)   | IEC 61340-5-1                     | Compliant  | Compliant                         | Compliant                         | Compliant                         |
|  | Electrical resistance   | IEC 61340-4-1<br>ESD STM7.1       | 1 x 10⁵ ≤ R ≤ 10⁸ Ω  | 5 x 10⁴ ≤ R ≤ 10⁸ Ω               | 2.5 x 10⁴ ≤ R ≤ 10⁸ Ω             | 1 x 10⁵ ≤ R ≤ 10⁸ Ω               |
|  | Electrical resistance in combination with ESD control footwear                            | IEC 61340-4-5<br>ESD STM97.1      | R ≤ 1 x 10⁸ Ω  | R ≤ 3.5 x 10⁷ Ω                   | R ≤ 3.5 x 10⁷ Ω                   | R ≤ 1 x 10⁸ Ω                     |
|  | Body Voltage Generation, in combination with ESD control footwear<br><i>Typical value</i> | IEC 61340-4-5<br>ESD STM97.2      | < 100 V<br>~ 40 V  | < 100 V<br>~ 20 V                 | < 100 V<br>~ 20 V                 | < 50 V<br>~ 0 V <> 30 V           |
|  | Electrical insulation to ground   | DIN VDE 0100                      | ≥ 50 kΩ  | n.a.                              | n.a.                              | ≥ 50 kΩ                           |
|  | Dimensional stability   | EN ISO 23999                      | ≤ 0.05%  | ≤ 0.05%                           | ≤ 0.25%                           | ≤ 0.4 %                           |
|  | Residual indentation<br><i>Typical value</i>  | EN ISO 24343-1                    | ≤ 0.10 mm<br>~ 0.02 mm   | ≤ 0.10 mm<br>~ 0.02 mm            | ≤ 0.10 mm<br>~ 0.05 mm            | ≤ 0.10 mm<br>~ 0.03 mm            |
|  | Resistance to loads   |                                   | Powered pallet truck and forklifts: total weight up to 2.5 t with hard wheels and up to 5 t with air tyres. Static loads: 50 kg/cm² - dynamic loads: 90 kg/cm² (performance may vary, subject to local conditions) |                                   |                                   | n.a.                              |
|  | Castor chair continuous use   | ISO 4918                          | Pass   | Pass                              | Pass                              | Pass                              |
|  | Impact sound reduction  | EN ISO 140-8                      | 2 dB   | 2 dB                              | 12 dB                             | 4 dB                              |
|  | Light fastness  | EN ISO 105-B02                    | ≥ 6  | ≥ 6                               | ≥ 6                               | ≥ 7                               |
|  | Resistance to chemicals   | EN ISO 26987                      | Excellent  | Excellent                         | Excellent                         | Very good                         |
|  | Slip resistance   | DIN 51130                         | R9   | R9                                | R9                                | R9                                |
|  | Bacteria resistance   | ISO 846                           | All products do not support growth of bacteria   |                                   |                                   |                                   |
|  | Outgassing: VOC   | ISO 14644-8                       | - 8.1  | - 8.1                             | - 8.1                             | - 8.3                             |
|  | Indoor Air Emissions: TVOC after 28 days  | EN 16516                          | ≤ 0.025 mg/m³  | ≤ 0.025 mg/m³                     | ≤ 0.025 mg/m³                     | ≤ 0.01 mg/m³                      |
|  | Cleanroom particle emission   | ISO 14644-1                       | ISO 4  | ISO 2                             | ISO 2                             | ISO 6                             |
|  | Creating better environments  |                                   |  |                                   |                                   |                                   |
|  | Renewable electricity   |                                   | Colorex SD, Colorex EC, Sphera SD and Sphera EC are manufactured using 100% electricity from renewable sources   |                                   |                                   |                                   |
|  | Recycled content  |                                   | Colorex plus contains up to 95% recycled content in the backing  |                                   |                                   |                                   |
|  | Colorex and Sphera® SD   EC products meet the requirements of EN 14041                    | EN 14041<br>CE<br>0201083-DuP-003 | EN 14041<br>CE<br>0201083-DuP-003  | EN 14041<br>CE<br>0201083-DuP-003 | EN 14041<br>CE<br>0200304-DuP-003 | EN 14041<br>CE<br>0200305-DuP-003 |
|  | Reaction to fire**  | EN 13501-1                        | B <sub>fl</sub> -s1, G, CS   | B <sub>fl</sub> -s1, G, CS        | B <sub>fl</sub> -s1, L, CS        | B <sub>fl</sub> -s1,G, NCS        |
|  | Slip resistance   | EN 13893                          | μ ≥ 0.30   | μ ≥ 0.30                          | μ ≥ 0.30                          | μ ≥ 0.30                          |
|  | Thermal conductivity  | EN 12524                          | 0.25 W/(m·K)   | 0.25 W/(m·K)                      | 0.25 W/(m·K)                      | 0.25 W/m·K                        |
|  | Body voltage  | EN 1815                           | ≤ 2 kV   | ≤ 2 kV                            | ≤ 2 kV                            | ≤ 2 kV                            |
|  | Electrical behaviour - static dissipative   | EN 1081                           | ≤ 1 x 10⁹ Ω  | n.a.                              | n.a.                              | ≤ 1 x 10⁹ Ω                       |
|  | Electrical behaviour - conductive   | EN 1081                           | n.a.   | ≤ 1 x 10⁶ Ω                       | ≤ 1 x 10⁶ Ω                       | n.a.                              |

\* Available on request  
\*\* Product also tested to ASTM. Fire ASTM E648: class 1, Smoke ASTM 662: pass

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.







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, flocked and entrance flooring products combine functionality, colour and design, offering you total flooring solutions for any environment.

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