





*Advancement in in-car technology must be matched by even greater control of contamination and static discharge in the manufacturing environment.*

Whether you are a chip manufacturer, a third party component manufacturer or an OEM automotive manufacturer, Colorex will protect your product and profit.

Colorex is an advanced technical flooring system specifically designed to control static discharge in ESD sensitive areas such as cleanrooms and manufacturing and assembly environments across the automotive electronics industry and beyond.

Not only does Colorex provide an ideal solution for any automotive manufacturer demanding premium quality floor coverings with electro-conductive or static dissipative characteristics, it is also aesthetically pleasing and will enhance any commercial interior, from specialised scientific research establishments to highly industrialised manufacturing and assembly environments.

Colorex is a high density floor covering that offers superior heavy load resistance to conventional PVC flooring, together with excellent resistance to chemical contamination and staining. Longevity is further enhanced by the ease with which the surface can be repaired and refinished in situ.

## A UNIQUE MANUFACTURING METHOD

It is the unique way in which Colorex is made that gives this advanced technical floor covering its exceptionally high density, heavy load resistance and durability. These are critical performance properties for production and assembly areas, including challenging heavy manufacturing facilities where resistance to high point loading and heavy rolling traffic is demanded.

The dense construction and pore-free surface, resulting from the application of intense heat and pressure, combine to give Colorex its inherent resistance to chemicals and staining, and allow extensive and effective surface repairs to be made, avoiding the need to replace tiles.

Whilst offering the performance features normally associated with ESD 'sheet' products Colorex tiles do not require the high plasticiser content that gives sheet vinyl its flexibility, but which can also result in out-gassing and poor mechanical performance such as indentation. Colorex has only minimal plasticiser content and exceptionally low VOC emissions, providing the perfect solution for any environment where micro-contamination has to be controlled.



### WE OFFER COLOREX IN TWO MAIN FORMS:

#### Colorex SD/EC:

A premium conductive glue down tile that is highly dimensionally stable, offers low emissions and is available with two ranges of conductivity SD and EC.

#### Colorex Plus:

A loose lay conductive floor system with a surface composed of Colorex tile material. This ensures all the benefits of standard Colorex like 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.

## HOW COLOREX IS MADE

### STEP 1: CHIPS AND CONDUCTIVE COATING

Small vinyl chips are coated with a conductive substance.

#### ADVANTAGES

- The conductive coating on the chips ensures that the unique electrostatic dissipative properties are consistent throughout the product.
- The construction guarantees a lifelong conductivity that remains unaffected by changes in humidity and temperature.

### STEP 2: HIGH PRESSURE PRODUCTION

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

#### ADVANTAGES

- The conductive coating on the chips forms a dense network of tiny black veins. These 'conductor paths' enable safe electrostatic discharge through the whole thickness of the tile.
- The compressed construction creates an extremely dense product with high traffic durability, ensuring suitability for a range of manufacturing environments including those where pallet trucks and forklift trucks operate.

### STEP 3: SPLITTING AND SURFACE TREATMENT

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

#### ADVANTAGES

- The compressed construction and pore-free surface give Colorex its easy to clean and repairable properties.
- The tiles are more convenient to work with than large rolls of sheet, and installation is easier and more straightforward.
- As with all modular products, less waste is generated during the installation.

## MAJOR PROBLEMS FACED BY CUSTOMERS

### CRACKED FLOORING

Colorex is highly resistant to high point loading, rolling traffic and falling loads and is easily repaired in the event of damage.

### COST AND TIME REQUIRED TO UPLIFT EXISTING FLOORS

Colorex Plus can be overlaid onto existing cracked flooring once the damage has been patched.

### 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 industrial 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 backing.

### UNSIGHTLY PATCHING AND REPAIRS

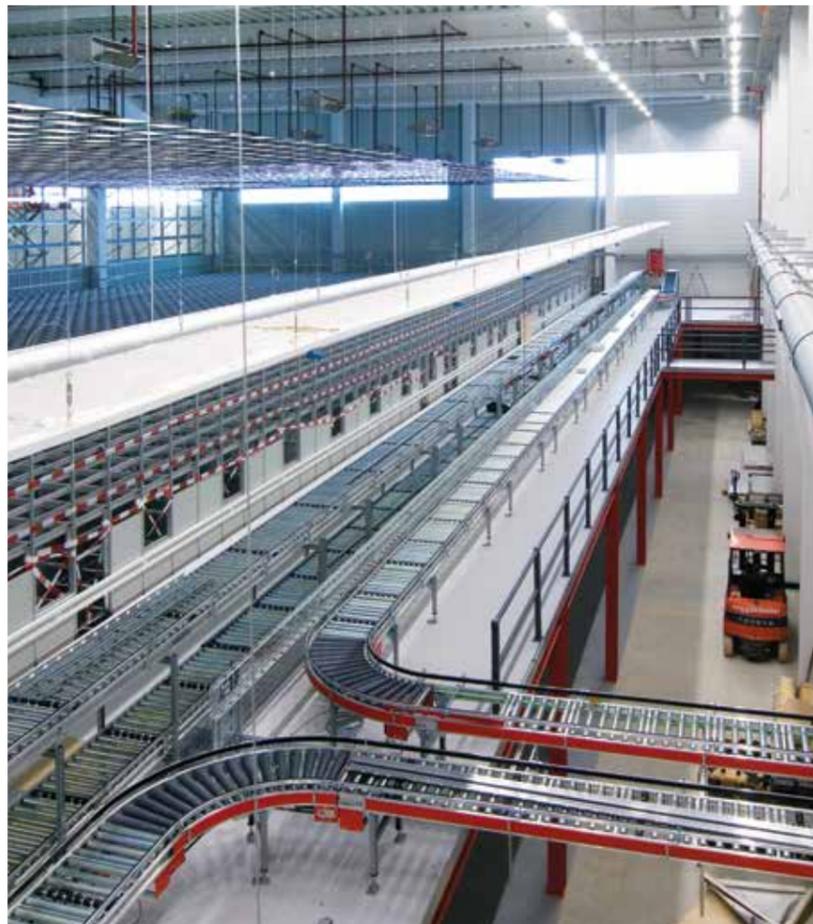
It is difficult to effectively repair many types of flooring commonly used in manufacturing environments, and over time, an unsightly patchwork effect can be created. Colorex can be invisibly repaired with ease, ensuring that the appearance of the floor can be maintained for many years.

### CHEMICAL STAINING

Colorex has excellent chemical resistance thanks to its pore-free surface construction and low plasticiser formulation.

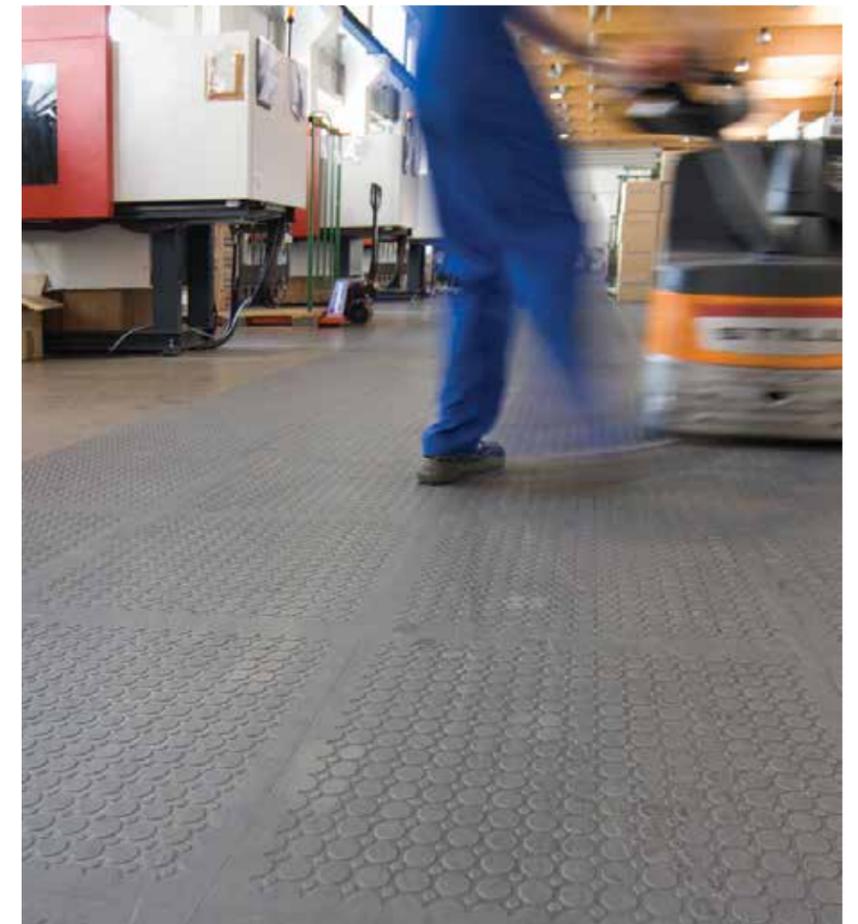
### FLEXIBILITY OF RELOCATION

In constantly changing production areas, especially when the site is leased, the requirement is for flexible flooring solution that can be uplifted and relocated to meet the needs of the business, rather than permanently fixed flooring. Colorex Plus is easy to relocate.



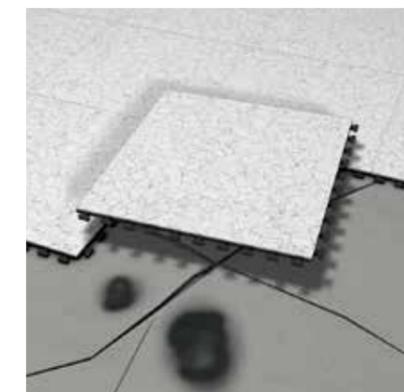
## WHY CHOOSE COLOREX?

1. Colorex offers complete peace of mind as it fully complies with all ESD and cleanroom standards which have been verified by independent bodies including Fraunhofer IPA.
2. Colorex offers a lifetime conductive warranty assuring optimal ESD performance throughout the life of the product.
3. The low plasticiser content in Colorex tile creates a unique dimensional stability and prevents shrinkage.
4. The low plasticiser content also ensures extremely low VOC emissions and out-gassing making Colorex the right choice for any area where control over micro-contamination is required.
5. The surface of Colorex can be fully repaired extending the useful life of the product.
6. The dense construction of Colorex provides excellent resistance to heavy loads making it an ideal solution for all types of commercial and industrial environments.



R11 Plus

## LOOSE LAY MODULAR SOLUTIONS



Colorex Plus tile overlaying existing flooring

### COLOREX PLUS

Renovating an industrial floor can be a very costly and labour intensive project. The downtime needed to move or disassemble heavy production equipment and the expense of renovating a complex subfloor have to be accounted for, in addition to the cost of installing the new floor surface. Colorex Plus, a high performance loose lay tile solution provides a cost effective alternative.

Suitable for applications where expensive preparatory measures and lengthy downtimes are not acceptable, Colorex Plus can be installed without interrupting operations and (unlike a poured floor) is immediately accessible. There's no need for special subfloor treatments or preparations. The tiles are connected across the floor using a unique dovetailing system that remains hidden from view. As the tiles have a genuine Colorex surface they offer all the proven features and benefits of a standard Colorex tile.

### R10 & R11 PLUS

Forbo recognises that a durable loose lay floor offers many advantages for general manufacturing areas that have no requirement for ESD protection. R10/11 Plus offers the same loose lay tile format as Colorex Plus with either a light or heavily embossed slip resistant surface, in place of a conductive surface. R10 and R11 Plus can be used as a standalone flooring solution or in combination with Colorex Plus, as the shared dovetail connection allows the products to be seamlessly connected. R10 and R11 Plus are suitable for heavy traffic including pallet trucks and forklifts.



# IDEAL FOR CHALLENGING INDUSTRIAL ENVIRONMENTS

## SUITABLE FOR THE TOUGHEST SETTINGS

Industrial environments present their own flooring issues, particularly in areas with high wear and tear. Forbo's Colorex high performance floor covering systems are designed for use in all industrial areas, including the toughest of settings. Cut from a homogeneous, solid block of highly compressed material they have a high vinyl content and a well-balanced amount of mineral filler for optimum performance.

## COLOREX OFFERS:

- High mechanical and wear resistance with no need for factory coatings or additional surface hardening treatments.
- Excellent chemical resistance thanks to the pore-free surface and an exceptionally low plasticiser content.
- A 100% repairable and restorable solution that leaves no trace of abrasive treatment methods.
- Resilience and durability to withstand forklift traffic.
- Resistance to high point loading (1,500 PSI).
- Minimal likelihood of cracking, (unlike resin poured floors).



## FULL SITE SOLUTION

Our ESD flooring doesn't stop at the threshold of the cleanroom; we can supply advanced high performance flooring for all ESD sensitive areas in industrial settings, extending across the factory floor and into every area of the site as required.

To complement our ESD flooring we can offer 'R10' and 'R11'; rugged, quick-lay general purpose warehousing flooring that addresses the need of customers for whom epoxy resin flooring is starting to fail or has already become unusable. The way that R11 integrates seamlessly with EC Plus means that ESD flooring need only be used in localised areas where it is needed.



## MANUFACTURING CUSTOMER REFERENCES

Siemens  
 Bosch  
 Audi  
 Continental  
 Hella  
 Porsche  
 Nexteer Automotive  
 ASK

## Technical specifications

Colorex meets the requirements of EN 649

		Colorex SD	Colorex EC	Colorex EC Plus	Colorex Basic Plus	R11 Plus
CE marking	EN 14041	Compliant	Compliant	Compliant	Compliant	Compliant
ASTM**		Compliant	Compliant			
Total thickness	ISO 24346 / EN 428	2.0 mm / 3.0 mm*	2.0 mm / 3.0 mm*	10.5 mm	10.5 mm	10.5 mm
Tile size	EN 427	615 x 615 mm 615 x 1230 mm*	615 x 615 mm 615 x 1230 mm*	608 x 608 mm	608 x 608 mm	608 x 608 mm
Commercial very heavy	ISO 10874 / EN 685	34	34	34	34	34
Industrial heavy	ISO 10874 / EN 685	43	43	43	43	43
Electrical resistance	IEC 61340-4-1 EN 1081 (100V) ANSI/ESD 7.1	$10^6 \leq R \leq 10^9 \Omega$	$5 \times 10^4 \leq R \leq 10^6 \Omega$	$2.5 \times 10^4 \leq R \leq 10^6 \Omega$	n.a.	n.a.
Electrical resistance in combination with ESD Shoes	IEC 61340-4-5 ESD STM 97.1	n.a.	$R < 3.5 \times 10^7 \Omega$	$R < 3.5 \times 10^7 \Omega$	n.a.	n.a.
Outgassing	IDEMA M11-99	total < 1 µg/cm <sup>2</sup>	total < 1 µg/cm <sup>2</sup>	total < 2 µg/cm <sup>2</sup>	total < 2 µg/cm <sup>2</sup>	n.a.
Total TVOC 28 days	AgBB guidelines	< 1 mg/m <sup>3</sup>	< 1 mg/m <sup>3</sup>	< 1 mg/m <sup>3</sup>	< 1 mg/m <sup>3</sup>	n.a.
Total TSVOS 28 days		< 0.1 mg/m <sup>3</sup>	< 0.1 mg/m <sup>3</sup>	< 0.1 mg/m <sup>3</sup>	< 0.1 mg/m <sup>3</sup>	n.a.
Bacteriostatic	SNV 195 920	Pass	Pass	Pass	Pass	n.a.
Chemical resistance	ISO 26787 / EN 423	Excellent	Excellent	Excellent	Excellent	Excellent
Slip resistance	DIN 51130	R9	R9	R9	R9	R11
Total weight	ISO 23997 / EN 430	3.2 kg/m <sup>2</sup>	3.2 kg/m <sup>2</sup>	12.4 kg/m <sup>2</sup>	12.4 kg/m <sup>2</sup>	11.4 kg/m <sup>2</sup>
Dimensional stability	ISO 23999 / EN 434	0.05%	0.05%	n.a.	n.a.	n.a.
Thermal dilation coefficient		n.a.	n.a.	0.11 mm/m°C	0.11 mm/m°C	0.11 mm/m°C
Residual indentation	ISO 24343-1 / EN 433	0.035 mm	0.035 mm	n.a.	n.a.	n.a.
Resistance to loads (performance may vary, subject to local conditions)		n.a.	n.a.	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/cm <sup>2</sup> - dynamic loads: 90 kg/cm <sup>2</sup>		
Abrasion resistance	EN 660-2	Group M	Group M	Group M	Group M	n.a.
Castor chair continuous use	ISO 4918 / EN 425	no effect	no effect	no effect	no effect	n.a.
Light fastness	ISO ISO 105 B02	≥ 6	≥ 6	≥ 6	≥ 6	n.a.
Impact sound reduction	ISO ISO 140-8	2 dB	2 dB	12 dB	12 dB	12 dB
All Colorex products meet the requirements of EN 14041						
Body voltage generation, with appropriate ESD shoes	IEC 61340-4-5 ESD STM97.2 EN 1815	40 V	20 V	20 V	< 2 kV	< 2 kV
Reaction to fire	EN 13501-1	B <sub>f</sub> -s1	B <sub>f</sub> -s1	B <sub>f</sub> -s1	B <sub>f</sub> -s1	B <sub>f</sub> -s1
Slip resistance	EN 13893	µ = 0.60	µ = 0.60	µ = 0.60	µ = 0.60	n.a.
Thermal conductivity	EN 12524	0.28 W/(m·K)	0.28 W/(m·K)	0.28 W/(m·K)	0.28 W/(m·K)	0.28 W/(m·K)

\* Available on request

\*\* Product also tested to ASTM. Results available on request.



EN 14041

Photography by Jörg Schielcher, Hof, Germany.

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creating better environments

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