

DESSO

The Floor is Yours



4208

DESSO AirMaster®

The carpet that clears the air





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Innovation to improve the quality of everyday life

At Desso, we are always asking ourselves how our carpet solutions can do more for people in their daily lives. The development of products that make a difference is at the heart of our business.

Desso is committed to delivering superior products and developing pioneering solutions through continuous innovation. Our innovation strategy is concentrated in 3 key areas:

- Creativity** Spearheaded by Desso's design philosophy CARPETECTURE® and our international concept Circles of Architects®
- Functionality** Pioneering solutions that make a difference, such as DESSO SoundMaster®, DESSO AirMaster®, DESSO Light Reflection Master®
- Cradle to Cradle®** Developing products and processes that will contribute towards a better environment and indoor quality

Our carpet solutions already contribute to providing outstanding performance qualities for enhanced human well-being. However, we keep looking for improvements to go one step further. DESSO AirMaster® is a key example of an innovative solution that takes design and functionality to the next level. It contributes to better working and living conditions in offices, schools, care centres and other commercial environments.

Clean air is of vital importance



The air that we breathe has a crucial effect on our health and well-being. Since we spend on average more than 90% of our time indoors¹⁾, the air quality inside is of utmost importance. The presence and size of particulate matter (PM) or fine dust is a determining factor in air quality and is directly linked to potential health problems²⁾. Once inhaled, these particles can contribute to the spread of microbial contaminants, such as mould, pollen and allergenes³⁾. In addition, they can affect the heart and lungs and cause serious physiological problems (e.g. changes in lung function or inflammation markers)²⁾.

The World Health Organization (WHO) has designed clear guidelines on air pollution from fine dust (indoor and outdoors), indicating that presence with an aerodynamic diameter of 10 µm or smaller (PM₁₀) is damaging to your health. These small particles are invisible to the naked eye and do not necessarily produce a noticeable odour. Therefore a visibly clean room can have a considerable air quality issue. **Extensive evidence from WHO indicates that concentrations of fine dust currently found in most cities in developed countries around the world results in a serious health risk²⁾.**

¹⁾ U.S. Environmental Protection Agency, Office of Air and Radiation. Report to Congress on Indoor Air Quality, Volume II: Assessment and Control of Indoor Air Pollution.

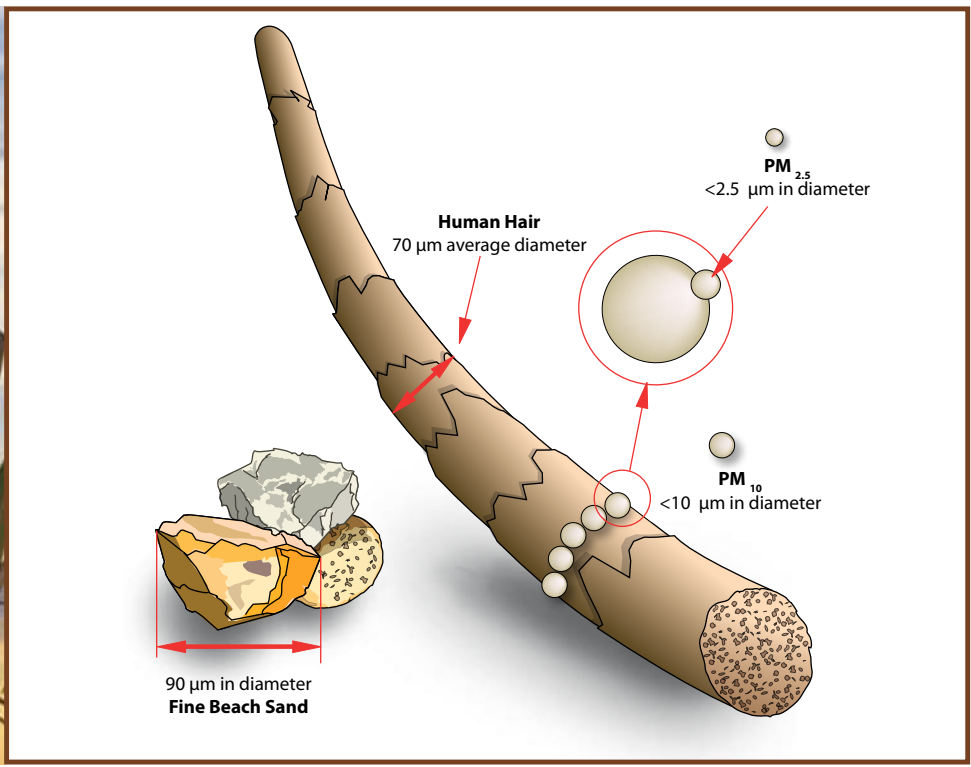
²⁾ World Health Organization Air quality guidelines for particulate matter, global update 2005.

³⁾ Pima County, Department of Environmental Quality.



What is
particulate
matter?





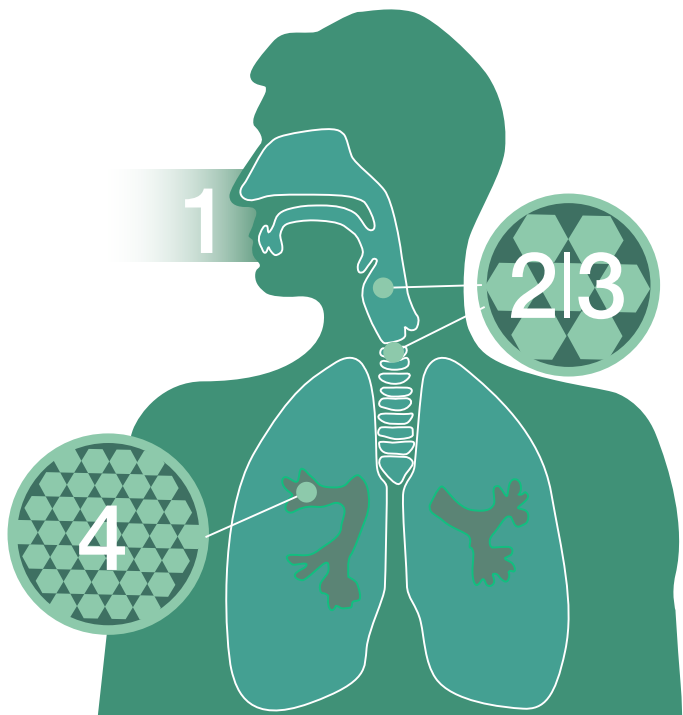
Particulate matter, also known as particle pollution or PM, is a mixture of extremely small particles. The size of particles is directly linked to their potential for causing health problems. The smaller these particles are, the more hazardous they are to your health. Particulate matter can be grouped into two categories:

PM₁₀ Inhalable particles, with an aerodynamic diameter of up to 10 µm (all smaller particles are included). Particles of this size cause health problems, because these are the particles that generally pass through the throat and enter the lungs⁴⁾.

PM_{2.5} Fine particles with an aerodynamic diameter smaller than 2.5 µm. Particles of this size or smaller can have effects to the respiratory and cardiovascular system⁴⁾.

⁴⁾ World Health Organization Air quality guidelines for particulate matter, global update 2005.





How particulate matter enters your body

- 1 Particulate matter enters our respiratory (lung) system through the nose and throat.
- 2|3 The larger particulate matter is eliminated through coughing, sneezing and swallowing.
- 4 Smaller particulate matter can penetrate deep into the lungs. It can travel all the way to the alveoli, causing lung and heart problems and delivering harmful chemicals to the blood system.

The essential role of DESSO AirMaster®



According to a study performed by the German Allergy and Asthma Association (DAAB)⁵⁾, it is proven that the burden from fine dust is dramatically reduced when using carpet, as opposed to hard flooring.

With the introduction of DESSO AirMaster® this functionality is taken to the next level. Its patented⁶⁾ technology has been specially developed to capture and retain hazardous particulate matter. In fact, DESSO AirMaster® is **8 times more effective** in capturing and retaining fine dust than hard flooring and **4 times more effective** than standard carpet solutions (PM₁₀)⁷⁾, making it **the most effective flooring solution to capture fine dust from the indoor air**.

⁵⁾ Study performed by Deutscher Allergie- und Asthmabund e.V. in 2005.

⁶⁾ Patent is still pending in some countries

⁷⁾ Based on tests performed by GUI, with DESSO AirMaster® versus standard PVC hardfloor and versus standard structured loop pile carpet.





DESSO AirMaster®

Capturing fine dust
using patented⁸⁾
technology

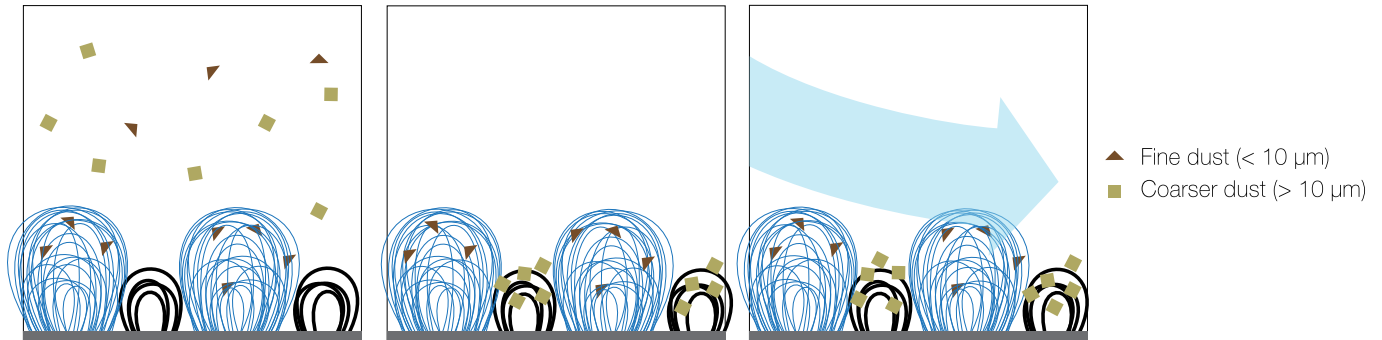
The Desso engineered product is able to capture fine dust, without the use of chemical additives. It is the carpet's structure that delivers a mechanical solution, making this functionality permanent and without side effects. The high pile consists of ultra fine yarn filaments (DESSO AirFilters™), capturing and retaining the smallest particulate matter (< 10 µm). The coarser dust is captured in the thicker yarns of the lower pile (DESSO DustCollectors™). The open product structure ensures that dust is easily released during cleaning, to ensure maximum regeneration⁹⁾ of the carpet's filtering functionality.

⁸⁾ Patent is still pending in some countries.

⁹⁾ See section: DESSO AirMaster® Continuous air filtering capacity.

How does it work?

Enlarged profile of DESSO AirMaster®



Very fine dust is captured and retained in the fine yarns of the DESSO AirFilters™.

Coarser fine dust is captured in the thicker yarns of the DESSO DustCollectors™.

The unique structure of DESSO AirMaster® prevents the dust from becoming airborne again.

DESSO AirMaster®

Proven
effectiveness in
clearing the air



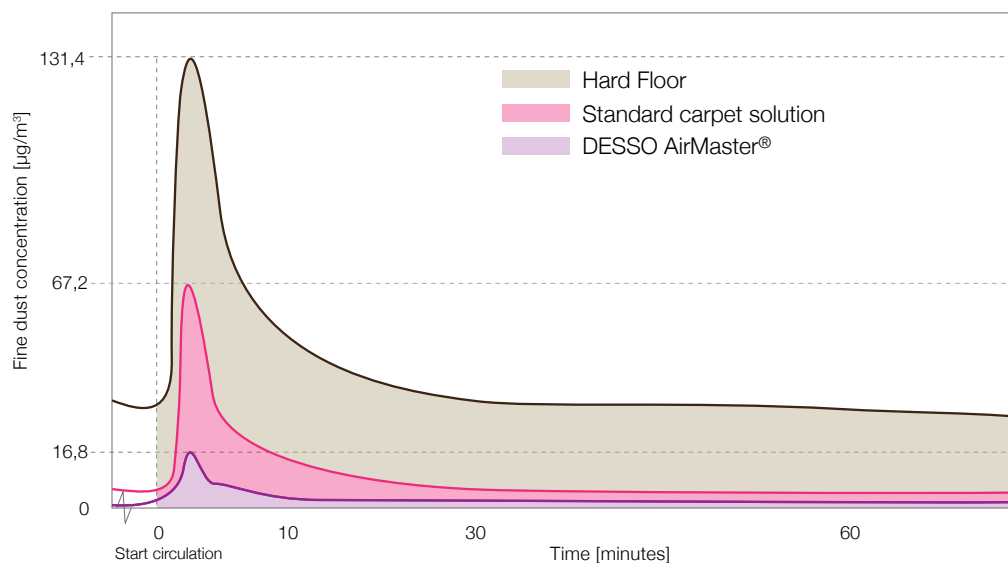
To prove the superior filter function of DESSO AirMaster® tests are performed in the laboratory of the independent German test institute GUI, which specializes in the analysis of indoor and outdoor air quality. During the tests a specific amount of fine dust is blown into a room simulation with a certain flooring solution (hard floor, standard carpet or DESSO AirMaster®). The room simulation is then left to allow the fine dust to settle on the floor. After a certain period of time the air in the room is circulated again, which simulates a person walking in a room or a door opening. The reduction of fine dust concentration in the air is then measured.

Based on these test results DESSO AirMaster® is the first product in the world that is certified with a GUI Gold logo¹⁰⁾.



¹⁰⁾ GUI Gold logo is awarded when fine dust retention efficiency > 80% (PM₁₀)

DESSO AirMaster® laboratory test - Particulate Matter (PM₁₀)



Measurements are carried out at a height of 80 cm and 110 cm (in the breathing zone)

With DESSO AirMaster® the amount of airborne particulate matter is 8 x lower than with hard floors.

With DESSO AirMaster® the concentration of particulate matter drops significantly faster than with hard floors.

With hard flooring the amount of airborne particulate matter stays consistently higher than the peak level of DESSO AirMaster®.

With DESSO AirMaster® the fine dust concentration in the indoor air is 8 times lower than with hard flooring solutions (PM₁₀)¹¹⁾

With DESSO AirMaster® the fine dust concentration in the indoor air is 4 times lower than with standard carpet solutions (PM₁₀)¹²⁾

¹¹⁾ Based on tests performed by GUI, with DESSO AirMaster® versus standard PVC hardfloor.

¹²⁾ Based on tests performed by GUI, with DESSO AirMaster® versus standard structured loop pile carpet.





TNO study confirms previous findings

Dutch research agency TNO has rounded off an exploratory study¹⁹⁾ into the relationship between particulate matter in the indoor air and the presence of a soft or hard floor covering in the rooms in question. One of the findings of the study was that textile floor covering absorbs more particulates from the air than a smooth surface. This is thanks to the larger micro-surface of such floor coverings and better contact between their surface and the air. As a result, the presence of textile floor covering can limit the concentration of airborne particulate matter in indoor spaces.

The study was conducted under the direction of Dr Jan Duyzer of TNO. Neither Europe nor the US have legislation in place dealing with the quality of indoor air in relation to particulate matter. This is remarkable, as particularly in North-West Europe, people spend most of their time indoors. Measurements reported in the literature confirm that the concentration of airborne particulates in buildings and homes with textile floor covering is lower than in comparable locations with smooth floor covering. Duyzer: 'To which extent the concentration in specific cases is reduced as a result of the presence of floor covering, depends on the ventilation used. However, in most cases, the reduction appears significant.'

¹⁹⁾ TNO report / TNO-060-UT-2011-01978.

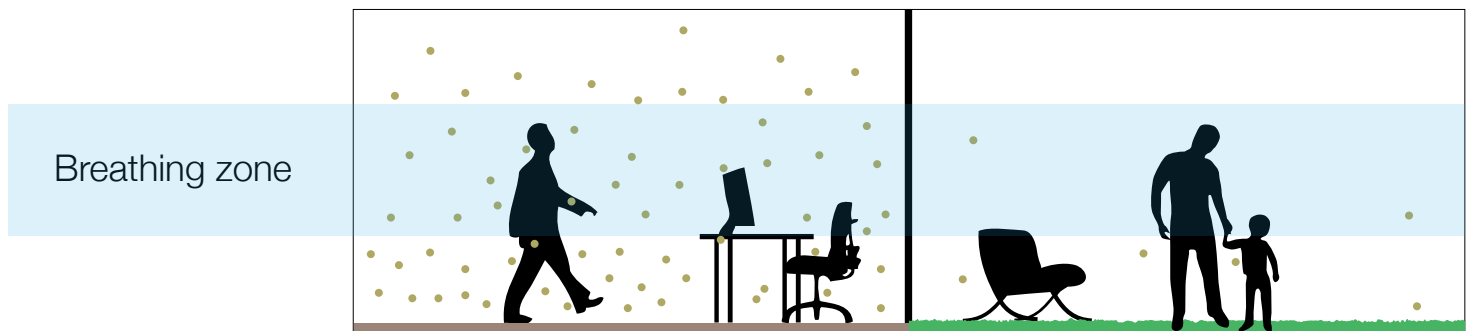
DESSO AirMaster®

Reducing
fine dust in
the breathing zone



Hard floor

DESSO AirMaster®



As mentioned, the size of particulate matter is directly linked to its potential for causing health problems. Particles with an aerodynamic diameter of $10\ \mu\text{m}$ or smaller (PM_{10}) can enter the lungs and particles smaller than $2.5\ \mu\text{m}$ ($\text{PM}_{2.5}$) can even enter the cardiovascular system, resulting in serious health effects¹⁴⁾. The size of the particles also determines the time they spend in the air. Particles of PM_{10} remain airborne for hours. Smaller particles can remain airborne even longer, depending on air circulation¹⁵⁾.

When applying DESSO AirMaster® fine dust is captured and retained, which helps creating a cleaner breathing zone¹⁶⁾.

¹⁴⁾ United States Environmental Protection Agency (US EPA).

¹⁵⁾ World Health Organization, Europe fact sheet EURO/04/05.

¹⁶⁾ Measurements are carried out in the breathing zone at a height of 80 and 110 cm (PM_{10}).

DESSO AirMaster®

Continuous air
filtering capacity





A regular and thorough cleaning and maintenance programme is important for every flooring solution. For DESSO AirMaster® it ensures a maximum regeneration of performance potential to capture and retain fine dust from the indoor air.

The ribbed structure and the open spaces between the thick and fine yarns create optimal air circulation by vacuum cleaners. Tests indicate that over 80% of the dust is released by the carpet during vacuum cleaning. This is a 16% improvement compared to standard carpet¹⁷⁾. Additional tests indicate that during vacuum cleaning the airspeed at the core of the carpet structure is 55% higher compared to standard carpet¹⁸⁾, resulting in an improved dust release¹⁹⁾.

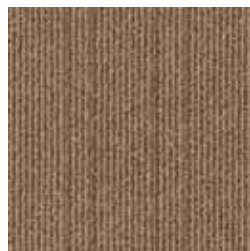
¹⁷⁾ Tests performed by Philips Floorcare, applying 350W of airpower and a tri-active nozzle (tested acc. 60312).

¹⁸⁾ Tests performed by BOND Textile Research with DESSO AirMaster® versus standard structured loop pile carpet.

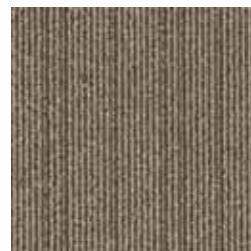
¹⁹⁾ Desso advises to apply a brush roller nozzle for professional use. Optimal cleaning performance when vacuuming in the pile direction.

Express yourself, create your own world

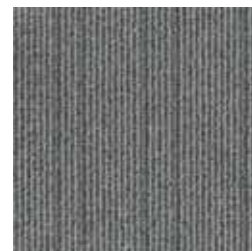
Colours and pattern designs define the look and character of a building or a room. DESSO AirMaster® comes in 24 colours, offering you a range of possibilities. Combinations of colours and structure create exciting design variations and can be used to define specific areas or zones. DESSO also offers the design flexibility to create your own AirMaster®.



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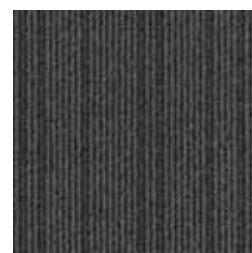
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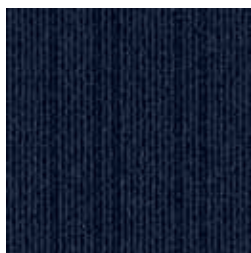
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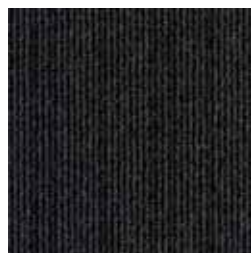
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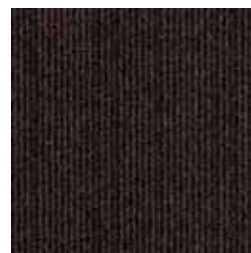
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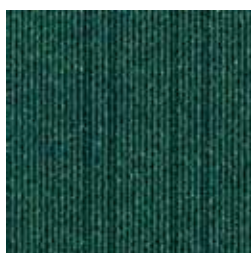
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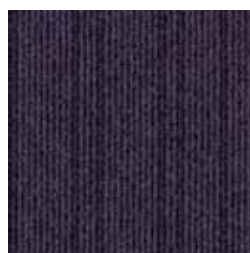
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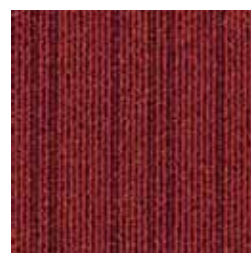
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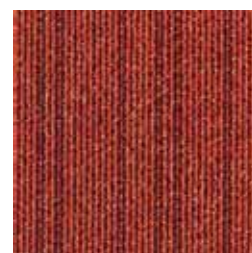
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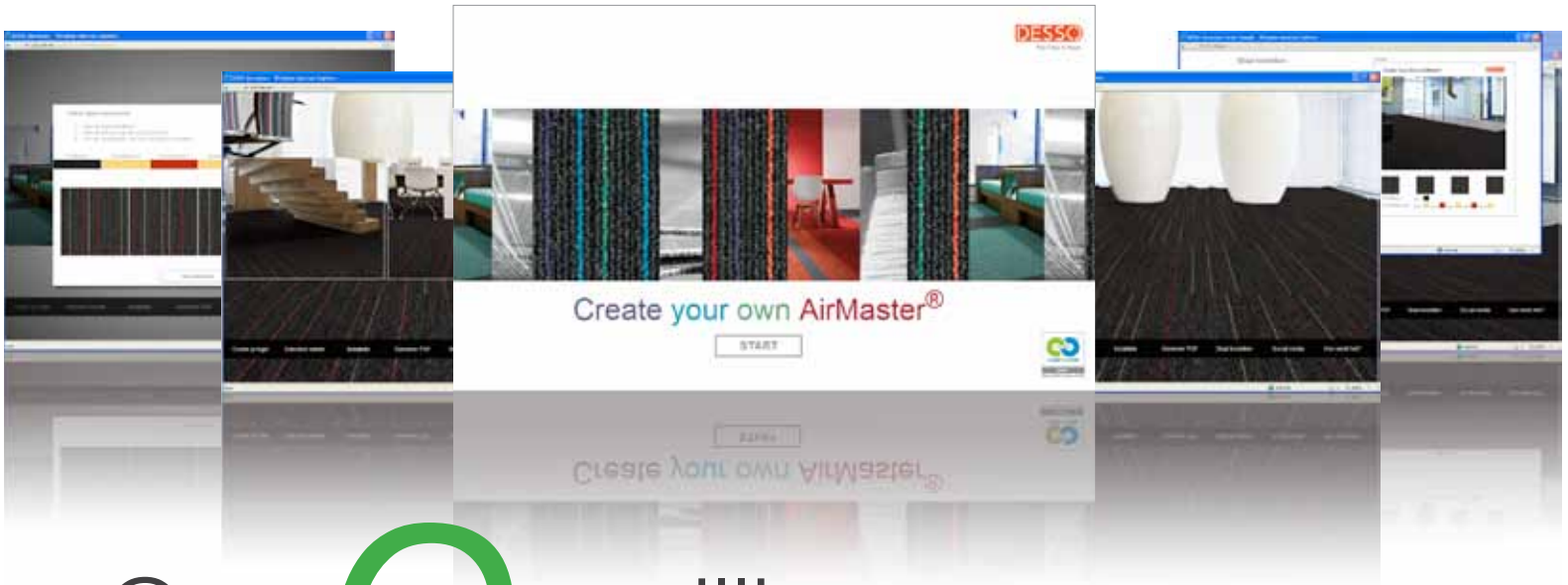
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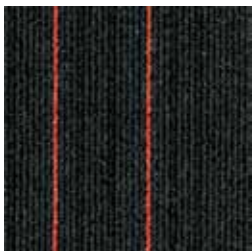
Over **6** million design possibilities!

When using 'Create your own AirMaster®' you have the freedom to create the colour combination of the carpet tiles yourself.

You have a choice of **6 background colours** and can select up to **5 accent colour lines** from a collection of 16.



Curious? Go directly to www.desso.com



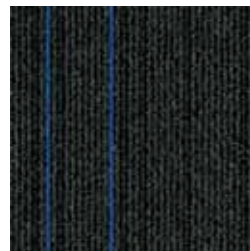
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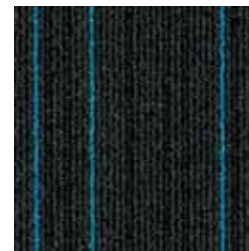
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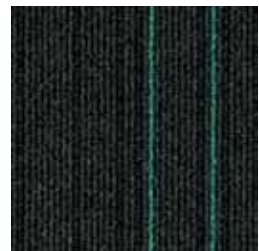
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Contributing to a better office environment

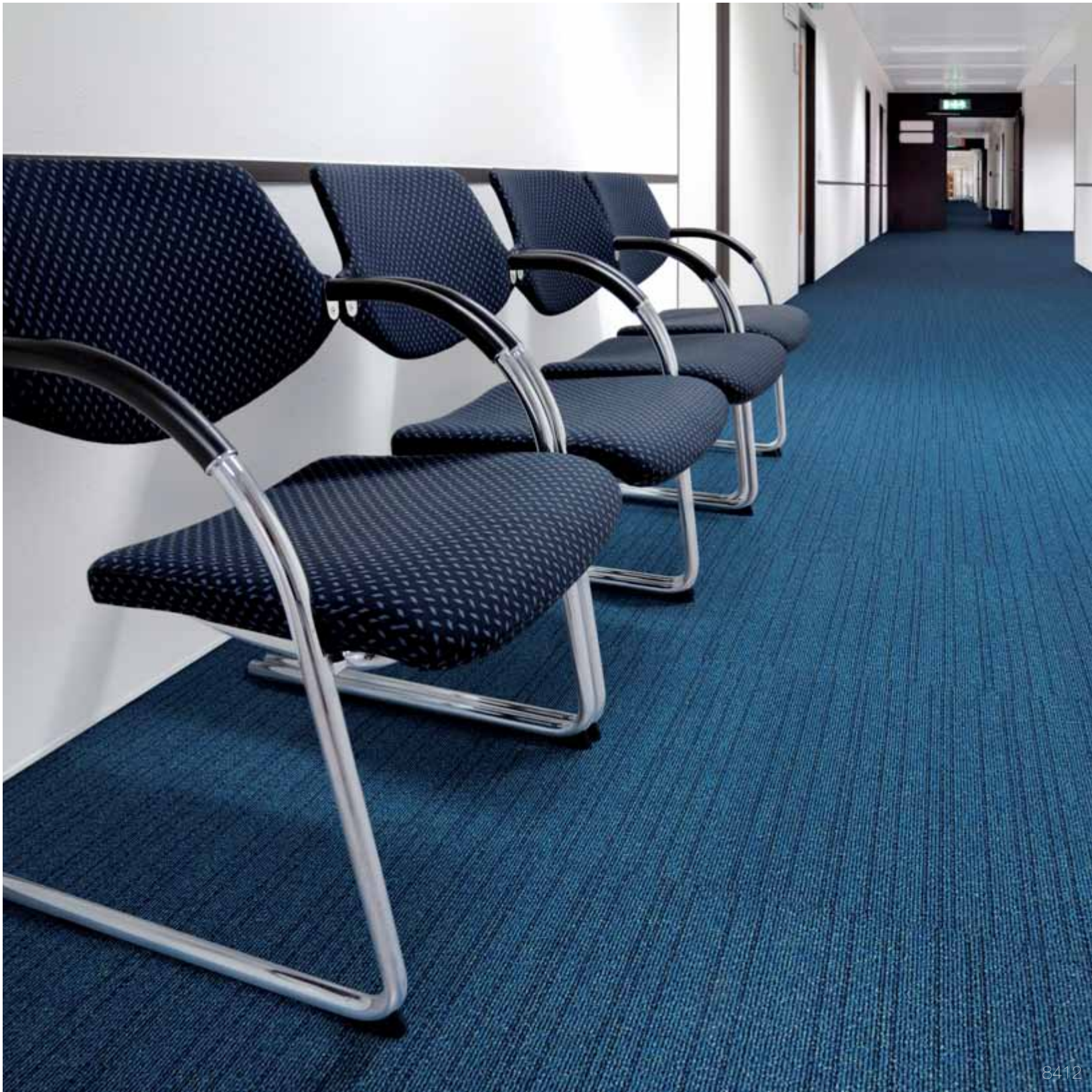


The average fulltime employee spends as much as 1880 hours a year (over 21% of his/her time) in the office environment. It is therefore obvious that the indoor air quality at work has a major effect on the health and wellness of employees. In fact the US Environmental Protection Agency (EPA) calls indoor air quality one of the top five environmental health risks of our time. Researchers also found that the financial benefits of improving office climates (e.g. less absence due to illness) can be 8 to 17 times greater than the costs of making those improvements²⁰⁾.

Cleaner air is beneficial to a healthy office environment. DESSO AirMaster® captures harmful fine dust from the indoor air more effectively than any other flooring solution.

²⁰⁾ William J. Fisk and Arthur H. Rosenfeld of the Lawrence Berkeley National Laboratory in Berkeley, in California, United States.







Improving air quality in healthcare facilities

The benefits of carpet in a healthcare environment have been substantiated by several studies and are increasingly acknowledged by key decision makers. Carpet contributes to a higher standard of comfort, making patients feel at home in a quiet and pleasant environment, which is likely to result in a better night's rest and a shorter recovery period. Furthermore the rigid surface of carpets causes fewer accidents. If a patient should fall, the chance of injuries is much lower when compared to hard floors (1,5% instead of 4%)²¹.

With the introduction of DESSO AirMaster® the benefit of carpet solutions is raised to a new level. Research from the World Health Organization shows that particulate matter smaller than 10 µm can lead to acute health effects, such as: inflammatory reactions in the lungs, respiratory symptoms, adverse effects on the cardiovascular system and increase in medication use. Long-term exposure results in a substantial reduction in life expectancy.

DESSO AirMaster® is capable of filtering fine dust from the indoor air, dramatically reducing the risk of inhaling these particles²².

²¹) 4 mm loop pile carper (source: Booth et al., 1996, BR Orth. Res. Soc. Proc., Sept.).

²²) Test performed by independent German test institute GfI.

Fresh air in classrooms

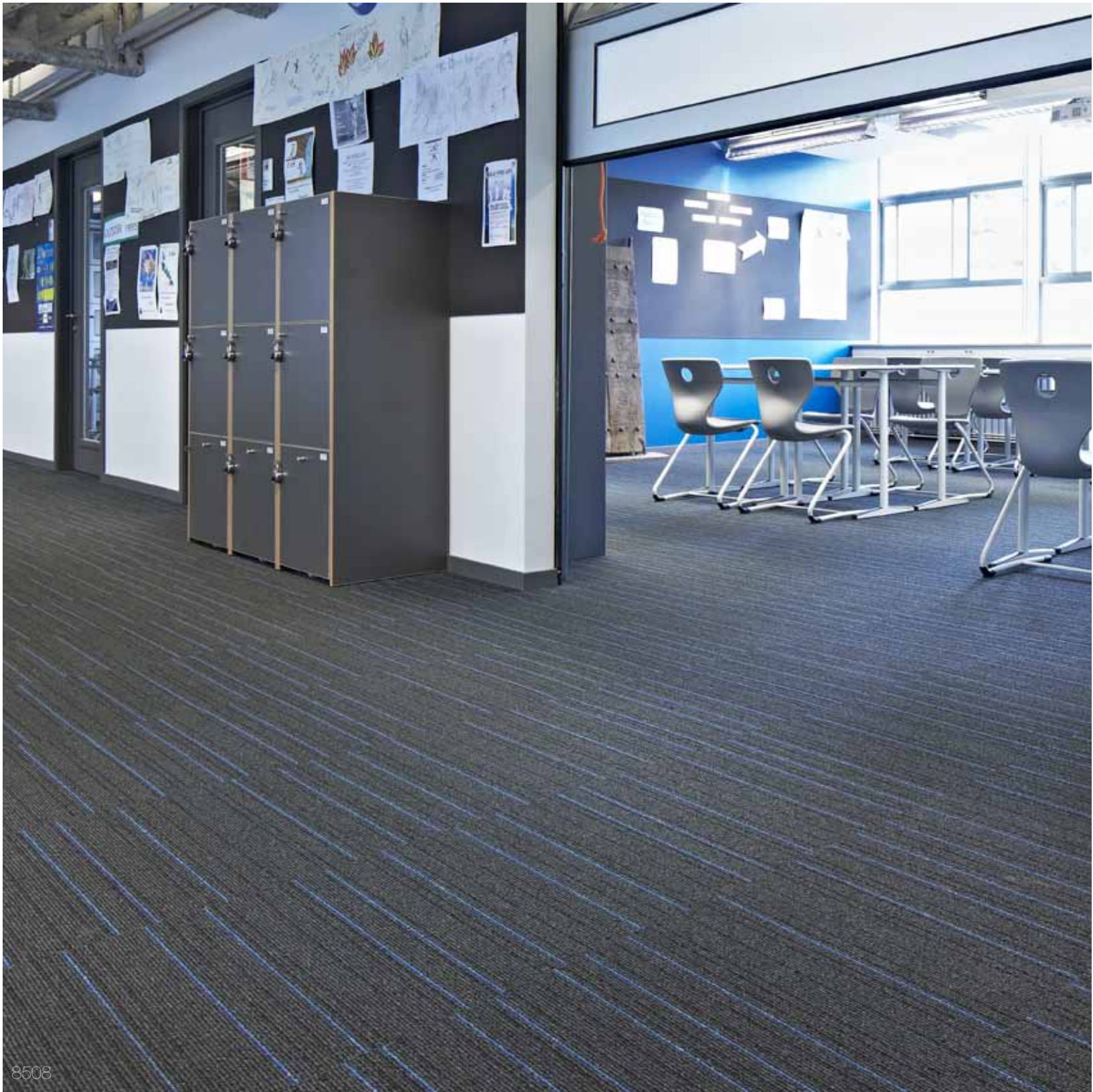


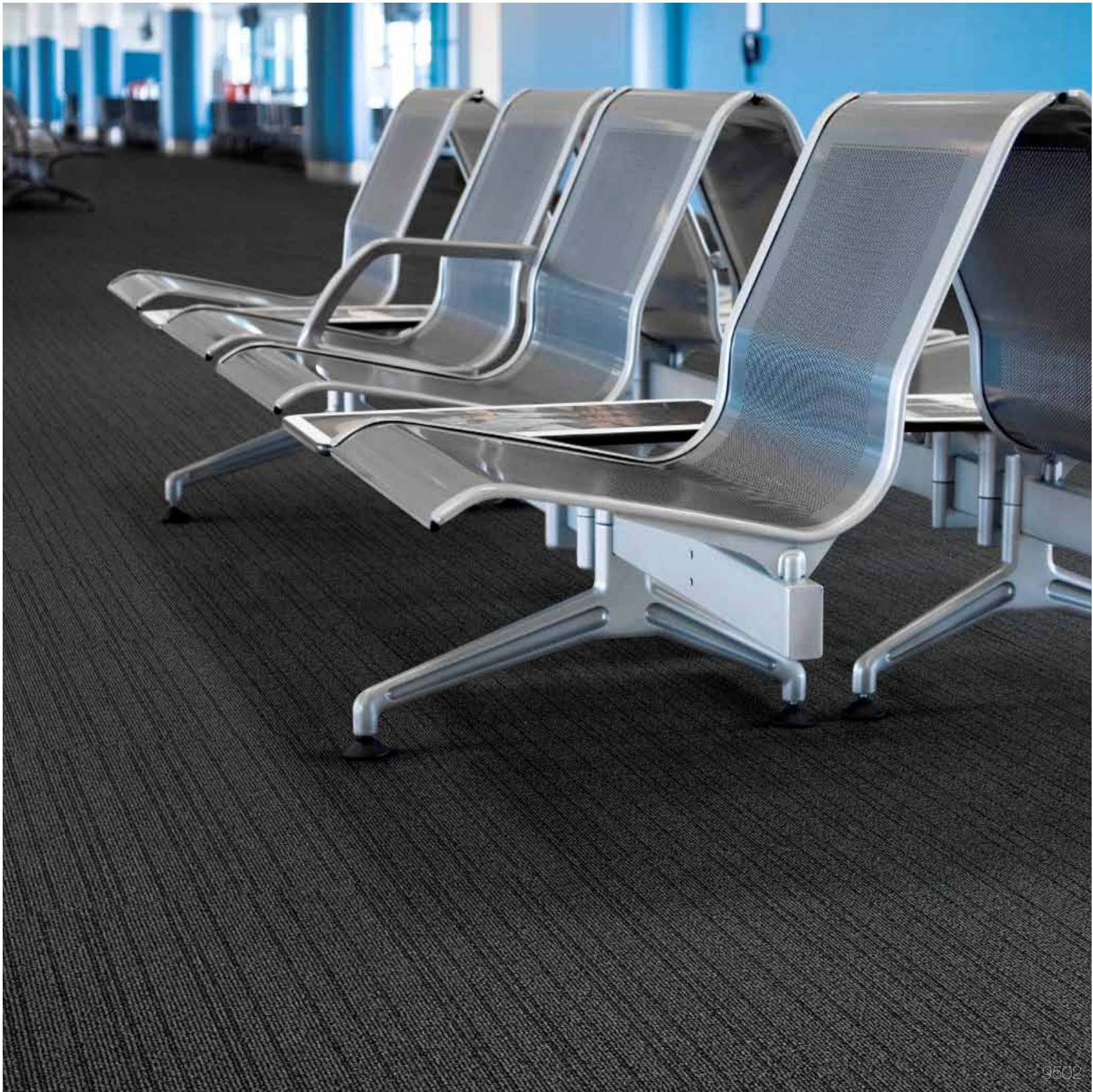
Desso carpet helps to contribute towards an improved atmosphere for learning. In addition to helping to create an aesthetically pleasing school environment where teachers want to teach and students want to learn, carpet also creates a safer environment for children. Carpet is less slippery than hard surfaces and more forgiving in the event of a fall. Carpet also offers a significant improvement in acoustic performance, especially when DESSO SoundMaster® is applied²³⁾. Acoustic performance is a feature which is increasingly sought in schools. It helps create a more productive learning environment, making the classroom a comfortable and quieter place to study.

It is known that poor indoor air quality in classrooms can have a major impact on the comfort and health of students, which, in turn, can affect concentration, attendance and student performance, as well as long-term problems like asthma. The effect of poor indoor air quality on smaller children is likely to be even more serious, as they are physically more active, contributing to a constant process of recirculation of particulate matter. The same effect can occur to classes with high numbers of pupils.

DESSO AirMaster® can improve indoor air quality, providing a cleaner and safer learning environment for our children.

²³⁾ For more information about DESSO SoundMaster® you can contact your Desso representative or go to www.desso.com.







Bringing healthy air to high traffic locations

High traffic locations, such as retail outlets or airports, see hundreds or even thousands of visitors every day. Not only does carpet improve comfort, sound absorption and acoustic performance at these locations, it can also contribute to a cleaner indoor air.

DESSO AirMaster® captures and retains fine dust, which can result in a significant reduction to the spread of microbial contaminants (e.g. mould, pollen and allergens) amongst visitors, passengers and staff.

DESSO AirMaster®

The carpet
that clears
the air



An assessment carried out by the WHO indicates that an increasing range of adverse health effects can be linked to airborne particulate matter²⁴⁾. Desso aims to contribute to improved indoor air quality, resulting in better health, wellness and well-being of people.

Whether it is in the office, the classroom, retail outlets, airport lounges or healthcare environments, DESSO AirMaster® offers an outstanding flooring solution to drastically improve indoor air quality. With DESSO AirMaster® you can rely on the proven solution that captures and retains harmful fine dust from the air.

DESSO AirMaster®
clears the air

²⁴⁾ World Health Organization Air quality guidelines for particulate matter, global update 2005.





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Project partners



GUI (Gesellschaft für Umwelt- und Innenraumanalytik GmbH) is an independent German analysis organisation that provides microbiological, immunological and chemical studies for individual households as well as complete project handling in the scientific and industrial field.

PHILIPS

Royal Philips Electronics of the Netherlands is a diversified Health and Well-being company, focused on improving people's lives through timely innovations. As a world leader in healthcare, lifestyle and lighting, Philips integrates technologies and design into people-centric solutions, based on fundamental customer insights and the brand promise of "sense and simplicity".

TNO

TNO is an independent research organisation whose expertise and research make an important contribution to the competitiveness of companies and organisations, to the economy and to the quality of society as a whole. TNO's unique position is attributable to its versatility and capacity to integrate this knowledge. Innovation with purpose is what TNO stands for. We develop knowledge not for its own sake but for practical application. To create new products that make life more pleasant and valuable and help companies innovate. To find creative answers to the questions posed by society.

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The Floor is Yours

About DESSO®

Desso is a global carpets, carpet tiles and sport pitches company, active in more than 100 countries. Desso products are supplied to corporate offices, education, healthcare, government, homes and also hotels, cruise liners and airlines.

It also produces world leading sports surfaces such as the DESSO GrassMaster®, which has been installed at the home grounds of premier football sides and at the football 'temple' Wembley.

Today, most people spend on average 90% of their time indoors which has led to the company's vision: 'How to make the floor work for our health and wellbeing'.

Our mission is to ensure that we develop unique products that deliver a much improved indoor environment that maximises people's health and wellbeing and ultimately their performance. This is driven by our innovation programme based on the three pillars of **Creativity, Functionality and Cradle to Cradle®** design.

For more information please visit: www.desso.com

