

DESSO

AirMaster®

Clears
the Air®

 Tarkett

Innovating to contribute
to people's health and
wellbeing



DESSO Desert AirMaster® 9525, 9970

Photo front page: DESSO AirMaster® Earth 9535, 1051. Photo back: DESSO AirMaster® Sphere 9107, 6422

On average, people spend 90% of their time indoors. At Tarkett, we strive to contribute to people's health and wellbeing by improving indoor air quality.



Breathing clean air is vital to human health

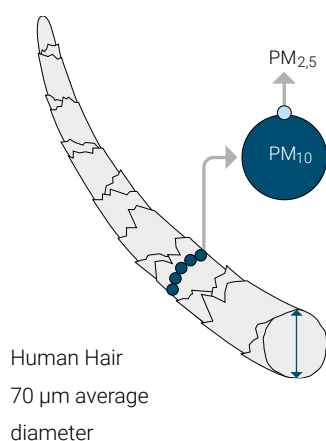
Breathing clean air is a fundamental human right. Yet air pollution is a growing risk to people's health, causing 6.5m deaths annually, according to the World Health Organization (WHO).¹

When we think about air quality, we tend to imagine city smog, heavy industry or streets polluted with car exhaust fumes. But indoor air quality is just as important, if not more so, because we spend 90% of our time indoors.

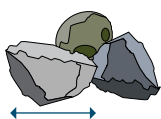
Tiny, invisible particles called particulate matter (PM), also known as particle pollution or fine dust, play a determining factor in the air quality of homes and workplaces, and are directly linked to health risks.²

Particulates with an aerodynamic diameter of 10 μm or smaller (PM_{10}), in particular, can contain microbial contaminants, such as mould, pollen and allergens,³ which can lead to respiratory problems and allergic reactions. They can also affect the heart and lungs, causing serious physiological problems.

Taking action to improve indoor air quality is vital to contributing to human health and wellbeing, now and in the future.



Human Hair
70 μm average
diameter



Fine Beach Sand
90 μm in diameter







Understanding particulate matter

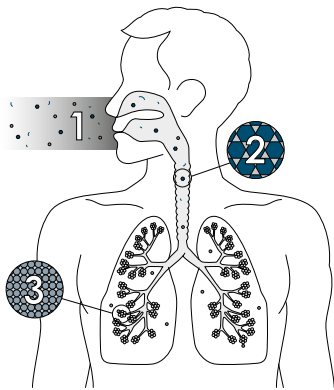
The particulate matter we breathe in our homes and workplaces can be grouped into two categories:

PM₁₀

Particles with an aerodynamic diameter of up to $10\ \mu\text{m}$ – these can cause health problems because they are typically small enough to pass through the throat and enter the lungs.⁵

PM_{2.5}

Fine particles with an aerodynamic diameter smaller than $2.5\ \mu\text{m}$ – these can produce harmful effects on the respiratory and cardiovascular system.



How does particulate matter enter the body?

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



A breath of fresh air in the workplace


Businesses have a responsibility to create a healthy, creative working environment for their employees. And with 45% of Europe's office workers feeling disengaged with their work,⁶ there is no time to lose.

The workplace as we know it, is ripe for reinvention. What's more, the human experience must be the driving force behind every element of space,⁷ starting with the air we breathe.

Improving indoor air quality can have an immediate, positive and tangible impact on workplace health and wellbeing and performance. In fact, studies show it can raise office worker productivity by 0.5 to 5 percent, generating estimated savings of \$20 to \$200 billion.⁸

DESSO AirMaster captures harmful fine dust from the indoor air more effectively than any other flooring solution, and can help play a fundamental role in contributing to the health and wellbeing in today's workplaces.

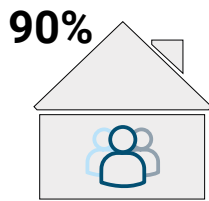




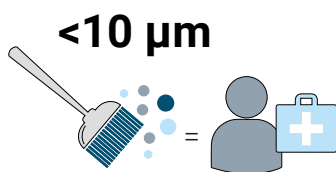
Improving
indoor air
quality can raise
office worker
productivity by
0.5 to 5%



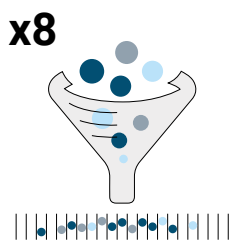
Indoor air quality by the numbers



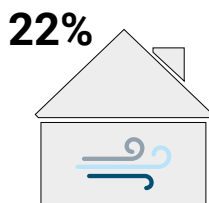
The proportion of that most people spend indoors.



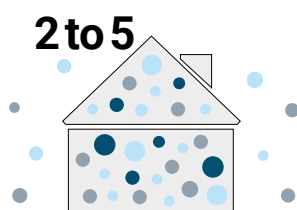
The diameter of particles that pose a problem to human health.⁹



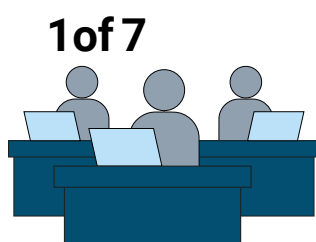
The effectiveness of DESSO AirMaster at capturing and retaining fine dust than smooth flooring solutions.¹⁰



Indoor air quality dominates workplace health concerns, second only to noise levels.¹¹



Concentrations of some pollutant indicators can be 2 to 5 times higher indoors than outdoors.¹²



Workplace environment is one of the seven 'systems' designated by the World Economic Forum as vital to improving health and wellbeing and sustaining socio-economic growth.¹³

DESSO AirMaster[®] contributes to a healthier workplace

Carpets are a popular choice for the workplace as they help to absorb sound, improve air quality and create a welcoming environment. Indeed, there is often less particulate matter (or fine dust) in carpeted rooms.¹⁴

DESSO AirMaster's patented technology helps to improve indoor air quality for employees. Fine dust (< 10 µm) is caught and retained in the fine yarns of its DESSO AirFilters™, while coarser fine dust (> 10 µm) is captured in the thicker yarns of the DESSO DustCollectors™. The carpet's unique structure prevents dust from becoming airborne again once captured.

Importantly, DESSO AirMaster has been engineered to release dust easily during cleaning, ensuring that the carpet retains its advanced filtering functionality.¹⁵

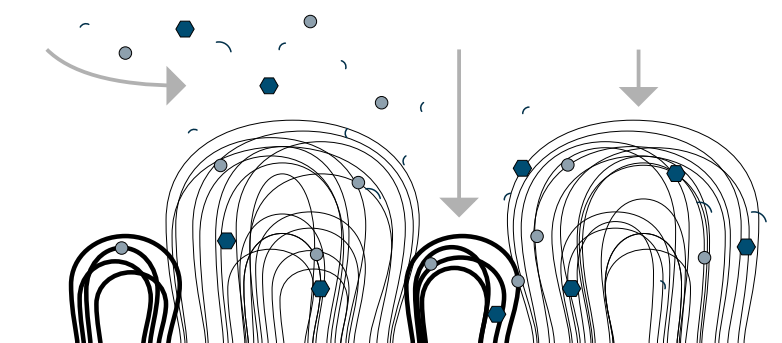
How does it work

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.

Enlarged profile of DESSO AirMaster



- Fine dust (<10 µm)
- Coarser dust (>10 µm)



Proven effectiveness in clearing the air



DESSO AirMaster is the **first product in the world** to be awarded the **GUI Gold Plus label**, the highest possible accreditation awarded by Gesellschaft für Umwelt- und Innenraumanalytik (GUI), Germany's leading independent air quality testing organisation.

Scientists at GUI's laboratory measured DESSO AirMaster's ability to reduce fine dust concentration, conducting 15 tests in three test rooms, each furnished with different flooring solutions (smooth floor, standard loop pile carpet and DESSO AirMaster).

The result?

DESSO AirMaster is **8 times more effective** at capturing and retaining fine dust than smooth flooring solutions (PM₁₀). It is also **4 times more effective** than standard carpet solutions (PM₁₀).¹⁶ Already in 2010, this alone led to a GUI Gold label as the first product in the market, followed by the GUI Gold Plus label in 2015.

The Gold Plus label was awarded for high performance on three further test criteria:

- Suitability for allergy sufferers
- High fine dust binding capacity
- Low Volatile Organic Compound (VOC) emission properties.¹⁷





DESSO AirMaster[®] laboratory test

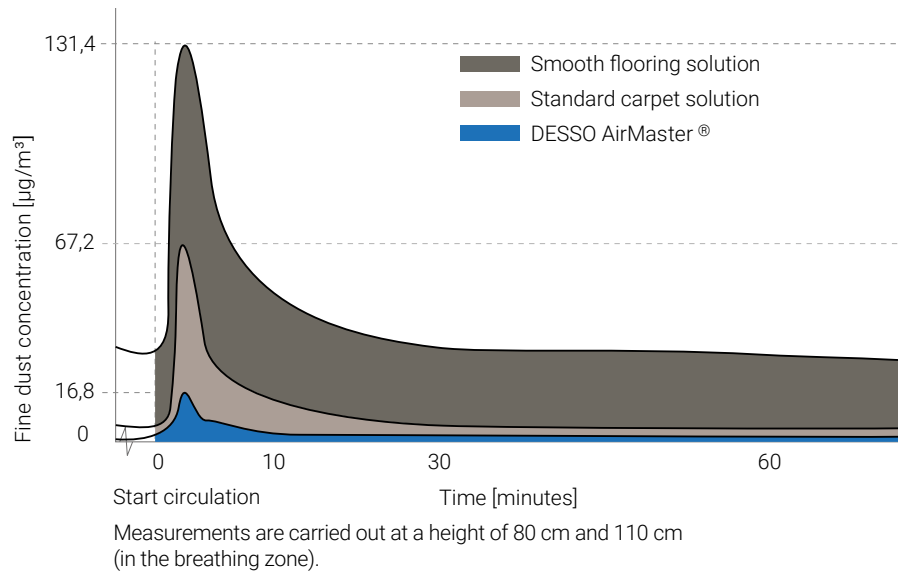
The GUI Gold label has been awarded based on the average of **15 repeated tests** in which the excellent fine dust capturing performance of DESSO AirMaster was measured, to safeguard that the results are **scientifically sound** and not just based on a one-time performance. During some tests, DESSO AirMaster proved to be **up to 20 times more effective** in capturing and retaining fine dust than smooth flooring solutions.

DESSO AirMaster laboratory test (median values)

DESSO AirMaster is 8 times more effective in capturing and retaining fine dust than smooth flooring solutions.

With DESSO AirMaster the concentration of particulate matter drops significantly faster than with smooth flooring.

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



Smooth floor

DESSO AirMaster[®]



Further proving the benefits of AirMaster®

Studies continue to show that textile floor coverings help to improve indoor air quality. Here are some highlights:

- Particulate matter¹⁸ is the **most significant pollutant in terms of the impact on human health**. Fraunhofer WKI¹⁹
- Textile floor coverings absorb more particulates from the air than a smooth surface. TNO²⁰
- **The concentration of fine dust (PM₁₀) is significantly reduced with AirMaster**, compared to smooth floors. TNO²¹
- The concentration of fine dust in a school classroom was dramatically reduced over a two-week period using a Philips air purifier and a DESSO AirMaster carpet; **particulate matter²² was reduced by 60-90 % during the weekend and 30-50 % during the week**. Radboud University.²³



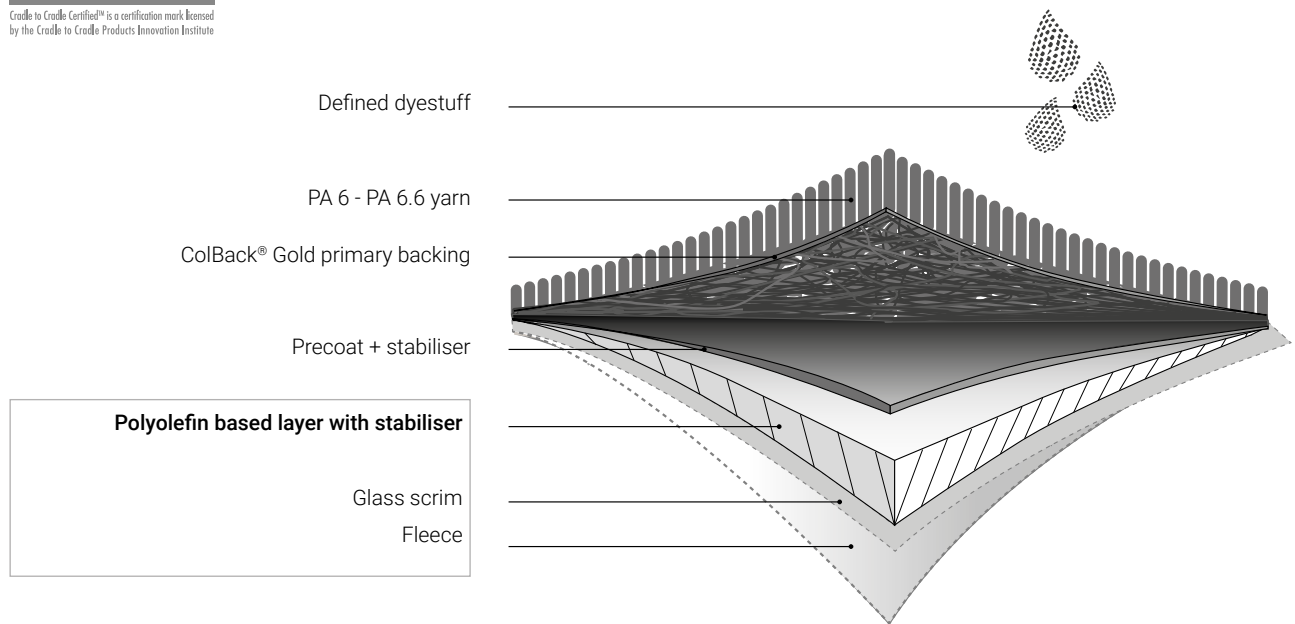




DESSO AirMaster® is Cradle to Cradle® Silver level-certified



For Tarkett, developing carpets that help to contribute to improving people's health and wellbeing and protect the environment is central to both our innovation strategy and our longstanding Cradle to Cradle® commitment. Today, the entire DESSO AirMaster range is Cradle to Cradle® Silver level-certified, with EcoBase™ backing as standard.



We live our Cradle to Cradle® vision in multiple ways:

- DESSO AirMaster collections contain **100% regenerated ECONYL® nylon yarn**, made from recovered waste materials such as end-of-life carpet yarn and discarded fishing nets.
- Every DESSO AirMaster carpet tile features a primary backing, Colback® Gold,²⁴ with up to a 95%²⁵ decrease in antimony content, helping to preserve finite antimony reserves and promote safer tile recycling.
- All AirMaster products are made with Cradle to Cradle® Gold-certified DESSO EcoBase® backing, made from **100% positively defined**²⁶ ingredients. DESSO EcoBase contains at least 75% positively defined recycled content and the backing can be fully recycled in our own production facility.
- We use calcium carbonate (lime), a waste product of the Dutch drinking water industry, as the raw material in our DESSO EcoBase carpet backing. As a result, DESSO's products with DESSO EcoBase backing contain on average 50% positively defined recycled content in accordance with Cradle to Cradle® principles.
- **ReStart®** is our take-back programme for **post-consumer carpet tiles**. Upon return, carpets are processed using our Refinity® recycling facility²⁷ which separates the yarn and other fibres from the backing.

Easy to clean

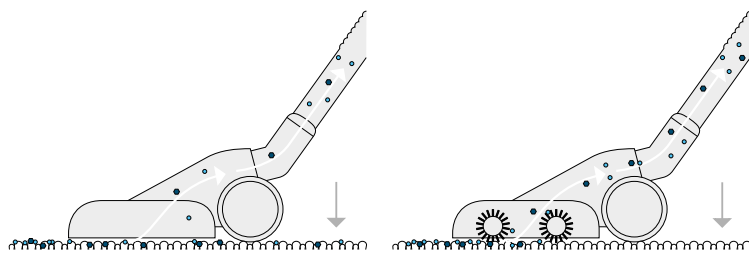
Regular cleaning and maintenance is important for every flooring solution. Good maintenance enables the DESSO AirMaster to perform to its best over time, continuously retaining fine dust from the indoor air.

During vacuum cleaning, more than 80% of the captured dust is released by DESSO AirMaster, which is a 16% improvement over standard carpets.²⁸ Additionally, the air speed at the core of the carpet structure is 55% higher compared to standard carpets,²⁹ further enhancing dust release.³⁰

Top tip

Tarkett advises applying a brush roller nozzle for professional use.

The vacuum cleaner must also have a properly functioning HEPA filter to prevent the fine dust from being blown back into the air.





Project partners

GUI

GUI (Gesellschaft für Umwelt- und Innenraumanalytik GmbH) is an independent German analysis organisation that conducts microbiological, immunological and chemical studies for businesses and households.

Philips, Domestic appliances, Floor care (Part of Royal Philips)

Royal Philips of the Netherlands is a leading health technology company focused on improving people's health and enabling better outcomes across the health continuum from healthy living and prevention, to diagnosis, treatment and home care. Philips leverages advanced technology and deep clinical and consumer insights to deliver integrated solutions. The company is a leader in diagnostic imaging, image-guided therapy, patient monitoring and health informatics, as well as in consumer health and home care.

TNO

TNO is an independent research organisation focused on innovation with purpose. Its research helps to improve the competitiveness of companies and organisations, and benefits both society and the economy.

Fraunhofer WKI

Fraunhofer WKI is a research organisation developing technologies and products and providing services for the responsible use of renewable resources, with a focus on reducing environmental impact and improving quality of life.

Radboud University medical centre

Radboud University medical centre is one of eight university medical centres in The Netherlands. It advances human knowledge and wellbeing by conducting biomedical, translational and clinical research.

References

- ¹ World Health Organization, total number of deaths caused by ambient and indoor air pollution in 2012.
- ² World Health Organization Air quality guidelines for particulate matter, global update 2005.
- ³ Pima County, Department of Environmental Quality.
- ⁴ μm symbol represents a micrometre; one thousandth of a millimetre.
- ⁵ World Health Organization Air quality guidelines for particulate matter, Global update 2005.
- ⁶ Independent study of 2,500 office workers, commissioned by Tarkett.
- ⁷ Gensler Experience Index 2017.
- ⁸ William J. Fisk and Arthur H. Rosenfeld of the Lawrence Berkeley National Laboratory in Berkeley in California, United States.
- ⁹ World Health Organization Air quality guidelines for particulate matter, Global update 2005.
- ¹⁰ Based on tests performed by GUI with DESSO AirMaster[®] versus a standard smooth floor and versus standard structured loop pile carpet (median values).
- ¹¹ Independent study of 2,500 office workers, commissioned by Tarkett.
- ¹² United States Environmental Protection Agency, 2012.
- ¹³ World Economic Forum, Future of Healthy: How to Realise Returns on Health, 2016.
- ¹⁴ Study performed by Deutscher Allergie- und Asthmabund e.V. in 2005.
- ¹⁵ See section: Easy to clean.
- ¹⁶ Based on tests performed by GUI with DESSO AirMaster[®] versus a standard smooth floor and versus standard structured loop pile carpet (median values).
- ¹⁷ (ISO 16000 test analysis, according AgBB evaluation scheme 2010 and in accordance with GUT emission criteria).
- ¹⁸ $\text{PM}_{2.5}$ and PM_{10} .
- ¹⁹ Fraunhofer WKI report / Literature survey on pollutants which are relevant for today's science on indoor air quality (IAQ) in Western Europe – No. MAIC-2013-1097.
- ²⁰ TNO report / TNO-060-UT-2011-01978.
- ²¹ TNO report / Onderzoek naar de werking van DESSO AirMaster[®] in de praktijk / Case study on the functionality of DESSO AirMaster[®] – Dr. J. Duyzer, M.M. Moerman – TNO 2013 R11203.
- ²² PM_{10} , $\text{PM}_{2.5}$, and $\text{PM}_{1.0}$.
- ²³ Radboudumc report / Influence of a combined dust reducing carpet and compact air filtration unit on the indoor air quality of a classroom, P.T.J. Scheepers, J.J. de Hartog, J. Reijnaerts, G. Beckmann, R.B.M. Anzion, February 2013.
- ²⁴ Colback[®] Gold delivers the same the same high performance as our previous primary backing with up to a 95% decrease in antimony content.
- ²⁵ In comparison with standard non-woven primary backing.
- ²⁶ Positively defined means all ingredients have been assessed as either Green (optimal) or Yellow (tolerable) according to the Cradle to Cradle[®] assessment criteria. As described in Cradle to Cradle[®] Certified^{CM} Product Standard Version 3.1.
- ²⁷ We are currently re-building our Refinity[®] recycling facility to separate the yarn from the backing more efficiently, before each material is recycled and will therefore only be able to scale up our ReStart[®] program when this process has been completed.
- ²⁸ Tests performed by Philips Floorcare, applying 350W of airpower and a tri-active nozzle (tested acc. 60312).
- ²⁹ Tests performed by BOND Textile Research with DESSO AirMaster[®] versus standard structured loop pile carpet.
- ³⁰ Tarkett advises to apply a brush roller nozzle for professional use. Optimal cleaning performance when vacuuming in the pile direction.



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About Tarkett

With net sales of more than €2.8 billion in 2017, Tarkett is a worldwide leader of innovative flooring and sports surface solutions. Offering a wide range of products including vinyl, linoleum, carpet, rubber, wood, laminate, synthetic turf and athletic tracks, the Group serves customers in more than 100 countries worldwide through its major brands: Tarkett, Desso, Johnsonite, Tandus Centiva, Tarkett Sports, FieldTurf and Beynon. With approximately 13,000 employees and 34 industrial sites, Tarkett sells 1.3 million square meters of flooring every day, for hospitals, schools, housing, hotels, offices, stores and sports fields. Committed to "Doing Good. Together", the Group has implemented an eco-innovation strategy based on Cradle to Cradle® principles and promotes circular economy, with the ultimate goal of contributing to people's health and wellbeing, and preserving the natural capital. Tarkett is listed on Euronext Paris (compartment A, ISIN: FR0004188670, ticker TKTT) and is included in the following indices: SBF 120, CAC Mid 60.

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