Corrosion prevention

AbsorGel® vs. VCI: an environmental and cost comparison

ABSORTECH

How to protect against corrosion

Finding corrosion on metal components after transport and shipping can come as a nasty and very costly surprise. The product/component must be re-worked – or, even worse, the components must be scrapped. Which of course creates extra delays and costs throughout the supply chain, damages supplier trust and, last but by no means least, greatly increases the environmental burden through the use of extra energy and materials.

Four ways to protect against corrosion:

- **Ship by air** – shorten the transit time with air shipments, although it is costly and not environmentally sustainable.
- **Apply oil, grease or treatments** – shielding the metal surface protects it from corrosion. But surface protection comes with a high cost and often the oil or grease needs to be cleaned off before the next step in the manufacturing process.
- **Wrap in VCI plastic** – special plastic covering, known as VCI technology (volatile corrosion inhibitor), is frequently used. But VCI is expensive, plastic-intensive and still not the most efficient nor sustainable method of preventing corrosion on metal. What's more, depending on the shipping conditions, VCI may not be enough on its own. Explore our AbsorGel® vs. VCI study report on the next page.
- **Use desiccants** – desiccants reduce the moisture in the surrounding air to eliminate a root cause to corrosion. In most cases, desiccants are also the simplest, most cost-efficient and environmentally aware solution compared to the above methods.

About desiccants

Moisture in the air can be measured as the relative humidity (RH) and is a root cause of corrosion. So the higher the RH, the higher the risk of corrosion. Desiccants absorb the moisture so that the RH stays below 60% where corrosion generally will not take place. Getting to and staying below 60% RH is so critical that desiccants are often needed to complement a solution based on VCI technology.

AbsorGel® vs. VCI study report

Absortech studies show significant savings in cost, plastic and CO_2 – with the same or better performance.

>75%

less CO_2

>60%

less plastic

>50%

lower costs

This is a summary report of a case study comparing the cost and environmental footprint for two different corrosion prevention approaches: VCI technology vs. eliminating the root cause for corrosion by absorbing moisture with AbsorGel® desiccants.

What is VCI and how does it work?

VCI stands for "volatile corrosion inhibitor" and is often recognized as thick, colored plastic bags or plastic wrapping. But VCI comes in other forms as well, such as emitters, foam, paper or plastic boards. VCI is added to a packaging material (such as plastic) and when the packaging material is closed, the VCI molecules travel inside the packaging, attach to the metal surface and create a temporary protecting coat.

Testing AbsorGel® against VCI

Absortech has done rigorous testing in a climate chamber, a controlled container environment and a field test from 2020 to 2022. In this series of tests[1], Absortech has compared results between customers' current VCI configurations and using AbsorGel® Pouch desiccants. The data (cost, amount of plastic, type of VCI) collected is verified by customers and other stakeholders. In our examination, packaging of different types and volumes has been reviewed: pallets, plastic boxes, cardboard boxes and wooden boxes.

[1] Throughout the field tests a tracking device has monitored the transport or shipping – a data logger called Absortrack™. Absortrack has also been used inside containers to monitor the surrounding conditions. Climate chamber tests have been set at fixed conditions of RH 80% and 20 °C.

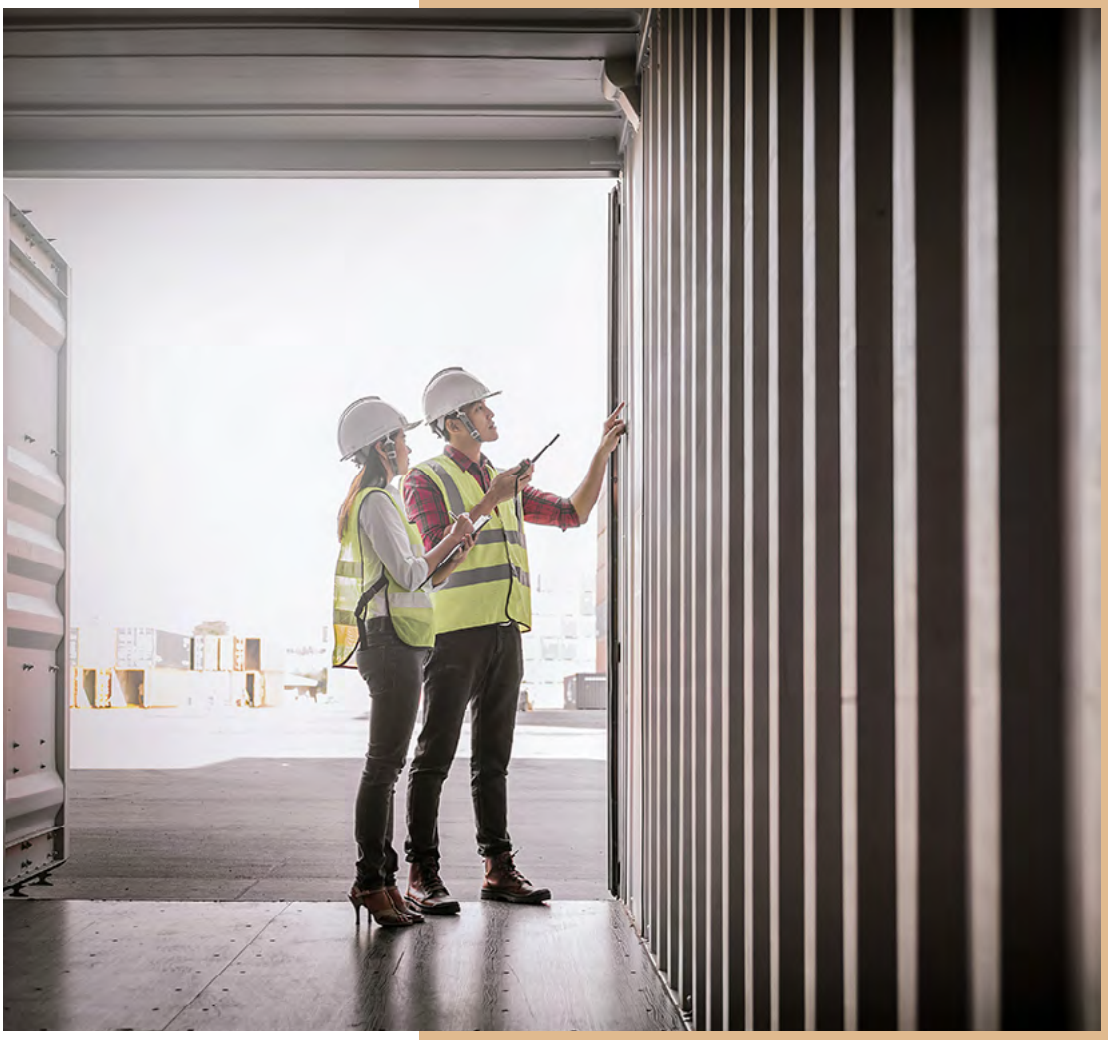
Field test: AbsorGel® desiccants vs. VCI technology

AREA	FINDINGS IN THE COMPARISON TESTS
CORROSION PREVENTION	EQUIVALENT OR IN FAVOUR OF ABSORGEL®
PLASTIC REDUCTION	60%-90% SAVINGS IN FAVOUR OF ABSORGEL®
CO_2 FOOTPRINT REDUCTION	75%-90% SAVINGS IN FAVOUR OF ABSORGEL®
COST REDUCTION	50%-80% SAVINGS IN FAVOUR OF ABSORGEL®

In favour of moisture absorption with AbsorGel® desiccants:

- **Same or better corrosion prevention**
  In our research, corrosion prevention was at least as good as or better than accomplished by various VCI solutions.
- **Less plastic used**
  We found that VCI (normally 80-120 microns thick) could be completely substituted with AbsorGel® complemented with a thin PE cover (even down to 25 microns)[2]. Though, some testing indicates that other safe moisture barriers can be achieved without PE bags, depending on outer conditions and transit time.
- **Smaller CO_2 footprint**
  Our test show that reduction of plastic and the use of alternative raw materials reduces the CO_2 footprint for the packaging solution.
- **Cost reduction**
  VCI is typically more costly compared to desiccants complemented by conventional PE cover. Savings calculations are based on Absortech material costs and VCI costs provided by various sources. Therefore, savings results depend on the costs each customer may have for their VCI solutions. Further, while costs for VCI remains similar regardless of shipping time, additional desiccants may be needed for longer shipping times.

[2] The thickness and the MVTR rate of the PE bag should not only be evaluated as a moisture barrier. It is also important that the PE bag will withstand any risk of goods or outer material tearing holes in it.



Next step?

While the study report shows clear cost and environmental advantages with AbsorGel®, it is important to find the right solution for your goods and your situation. Each packaging configuration, ambient temperatures and duration of transport are different. As a result, the true and correct comparison must be evaluated from case to case, and from customer to customer. Typically, by arranging comparative tests in which all variable parameters can be eliminated. Absortech offers a service called POMM (Peace of Moisture Mind®), which can be used for finding optimized moisture protection.

To learn more about the study or discover just how much your own tailored desiccant solution can help you, please contact us:

DOWNLOAD THE CASE STUDY

Disclaimer
Calculations regarding savings in this report are based on data provided by partners, customers and suppliers, as well as calculations made from Absortech´s best knowledge. The inputs in cost, plastic content and CO_2 footprint for certain packaging materials not belonging to Absortech's product range should therefore be seen as approximate values due to the possible variations between different brands and product variations.

Absortech helps you prevent moisture damage during transport. Our promise is to protect your brand, increase your savings and lower the environmental footprint of your logistics processes. We are a pioneer in moisture damage prevention with headquarters in Sweden. Since 1996, we have been offering a wide range of inhouse developed and produced desiccants made from calcium chloride. Peace of Moisture Mind® is our moisture damage prevention concept, which includes steps like audits, tests and global supply chain solutions. We are committed to base our operations on sustainable principles and help businesses like yours implement sustainable solutions to prevent moisture damage.

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