

1.1 Distribution List:

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Additional Applicable Documents:

Delivery, packaging and shipping regulations

Please note:

- Managers must ensure that this Work Instruction is made known and accessible to all relevant staff.
- The current revision number available on the L'Orange intranet generally applies.
- When a new revision number is released, the previous revision number will no longer apply and must be replaced in the relevant locations.
- Revisions are marked with an asterisk (*) to the right.

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Date			
Signature			



1 Purpose

These operating instructions contain information on VCI products and describe how to use them.

2 Scope of Application

These working instructions are binding for all of L'Orange GmbH's departments.

3 Responsibility

	Responsibility						
	Supplier	Incoming goods	Storage	Dispatch	Production	External storage	Container management
R = responsible P = participating I = information Task							
Packaging and preservation with VCI products	V	V	V	V	V	V	M
Shelf life monitoring	V	V	V	V	V	V	

4 Training courses on corrosion

All employees who use VCI products are trained.

5 Definitions

C o r r o s i o n is the reaction of a metallic material and leads to progressive destruction.

This reaction is triggered by various factors:

- Air: Oxygen, moisture and industrial exhaust gases
- Water
- Processing media: Soldering and degreasing agents, etc.
- Dust: Dust and dirt attract moisture
- Hand sweat

V C I stands for **Volatile Corrosion Inhibitor**. Due to its evaporation properties, the VCI material - applied to carrier materials made of paper, cardboard, foils or foam or incorporated into powders, sprays or oils - passes into the gas phase in a relatively continuous pace and settles as an invisible monomolecular protective coating on the packaged goods (metal surfaces) in the form of a film. Therefore, neither humidity nor atmospheric oxygen can have direct contact to the metal surface.

6 Process

6.1 Packaging and preservation with VCI products

In principle, the following shall apply: a **new, unused VCI film must be used** for storage. After sealing, the packaging date (e.g. 07/18) must be marked on the new VCI film before the opening edge.)

The marking is done with the help of Edding 750 paint markers (allow to dry).

In the case of storage on a pallet or grid box, the packaging date must also be entered on the accompanying document (or in other accompanying papers) and affixed to the front. For pallets containing several part numbers, a “blue hanger” must be attached for each part number, on which the packaging date is noted.

Optimum corrosion protection is achieved when the application instructions are observed. If, for unchangeable reasons, it is not possible to comply with the application instructions in all the points listed, this may result in reduced corrosion protection!

The following use instructions must be observed when packing:

➔ Pack metal surfaces only when dry and clean!

A liquid film or dirt on the metal surface, such as dust, can only be infiltrated to a limited extent by the VCI active ingredient. Residues from previous production steps can have a lasting negative effect on corrosion protection.



Source: EXCOR® GmbH, Stand 03/2016

Wear gloves!

Protect your hands from injuries, and the metal surface, especially the primary oxide film, from chemical destruction by hand sweat! It is therefore mandatory to wear gloves. **However, cotton gloves are not suitable for this purpose.**



Source: EXCOR® GmbH, Stand 03/2016

➔ **Observe ambient temperature!**

If there is a temperature difference between the metal surface and the ambient air, condensation may occur before the VCI active ingredient has been able to build up its protective effect on the metal surface. If cold metals are packaged in a warm environment, condensation forms on the cold metal surface. If warm metals are packaged in a cold environment, condensation forms on the cold inner surface of the packaging. The VCI packaging may therefore only be opened or closed after the product has adapted to the ambient temperature. Note -> When packing, the humidity should not exceed 50%. If the value is above 50%, the use of additional desiccants would be necessary.



Source: EXCOR® GmbH, Stand 03/2016

➔ **Close properly!**

Direct **contact with liquids** must be avoided during transport and storage. The packaging must be designed in such a way that there are minimal external influences on the interior.

Example for internal handling



VCI sacks for pallets must always be slam shut.

The aim is to seal the film in such a way that no additional ambient air can penetrate.

Example for productive parts that are outsourced to Winz



In the case of parts that are removed to Winz, a pallet lid must be used for sealing in addition to the film.

Shipping examples



For pallets and mesh boxes, fold and seal VCI film and seal



Close VCI foil with cable tie



Weld VCI film

Intermediate layers or a **compartment** can impair or prevent the free access of the VCI to the center of the packaging. When using stacking intermediate layers, each layer must be covered on the top and bottom with a VCI-active packaging material.



Source: EXCOR® GmbH, Stand 03/2016

Organic packaging materials

All **contact points to organic packaging materials** such as wood, paper, solid and corrugated board can cause corrosion at the contact point to the metal surface. Therefore, the packaging material may only be used outside the VCI film.

When using VCI products, the functional side (evaporation side) must be observed.



Source: EXCOR® GmbH, Stand 03/2016

Source: EXCOR® GmbH and supplements by L'Orange

6.2 Unpacking goods from VCI products

- The packaging unit must be at ambient temperature, otherwise the VCI film cannot be opened.
- After removing components, close the packaging immediately to avoid large-volume exchange with the ambient air. Opening the packaging for a short time has no negative consequences because the VCI protective atmosphere regenerates.
- The corrosion protection of the removed component from the VCI film persists for only approx. 5 minutes after removal from the VCI atmosphere. The VCI active ingredient then volatilized without leaving any residue.
- the VCI effect persists for 2 years, even when the film is opened and closed daily
- Change interval of the VCI film is 2 years. After these 2 years have elapsed, the preservation must be carried out using a new VCI film. The shelf life of VCI film is checked in each KST that uses it.

6.3 Storage of VCI products

when storing VCI products, the delivery date must be observed. The removal takes place according to the FIFO principle.

- If possible, packaging materials should be stored in the original packaging, otherwise it must be ensured that evaporation is minimized (example: store VCI cardboard and paper in a VCI bag).
- Do not store VCI products in the immediate vicinity of foods.
- Do not expose VCI products to UV radiation.

7 Effects on the Environment

- VCI films are recyclable, suitable for disposal in landfill and can be used as a source of renewable energy.
- Corrosion protection oil must be disposed of in accordance with official regulations. Contaminated packaging must be emptied and can then be recycled after appropriate cleaning.
- VCI paper and cardboard are recyclable or can be used as a source of reusable energy, according to local regulations.