Preservation and Packing Standard

for delivery of
Spare Parts
in the
Steel Division

PRODUCT GROUP CATALOGUE

Revision record

Rev. Nr.	Date	Change contents
4	7.10.2020	Revison in Productgroup KS1
5	23.11.2020	Adjustment due to the General Data Protection Regulation(GDPR) - no changes in content

Table of contents

Product group catalogue

1 Scope of validity

Organizational scope

Steel Division

Activity-specific and role-specific field of application

All persons or roles involved in the procurement and repair process of spare parts:

- Requisitioner in the maintenance departments of the business units such as engineers, technicians, dispatchers
- Purchasers/ FE
- Material management and classification / TSL
- Mechanical Technical Center / TSM
- Electrical Technical Center / TSE
- Suppliers of spare parts -> the distribution to the suppliers must be carried out by the respective purchaser

2 Purpose

The present document is a product group catalog and describes the requirements for the preservation and packaging of spare parts in the case of a new procurement or repair.

The appendix to this document contains further information on the individual corrosion protection methods as well as packaging and delivery.

3 Responsibilities and tasks

From 15 selectable product groups (see chapter 6) a suitable one has to be selected by the requisitioner

The selected product group must then be considered by all the persons involved in the ordering or repair process.

The supplier of the ordered or repaired spare parts is responsible for the correct preservation / packaging in accordance with the specifications.

4 Special instructions for the supplier

1. The packaging and preservation of the material to be procured is binding on the suppier in accordance with a product group determined by voestalpine.
2. The content that is specified in the corresponding product group description is to be understood as a minimum requirement. If the supplier experience require additional measures to protect the spare parts, these must be carried out in agreement with voestalpine.
3. If the supplier intens to make deviations from the Preservation an Packing Standard, it is necessary to consult voestalpine.
4. In case of an improper or defective preservation or packaging, the packaging material must be freshly re-stored or packed by the contractor on-site at voestalpine in accordance with the specifications.

5. The design and the execution of packaging in accordance with the VCI and desiccant method must be carried out by qualified personnel. Corresponding information can be found in the appendix.
6. The contractor guarantees a state-of-the-art packaging as well as the best quality and suitability of the packaging material.
7. Basically, the packaging must be designed so that the packaged spare parts can be transported and stored without damage. Furthermore, the packaging must withstand several envelopes during transport.
8. The dimensioning an manufacturing of pallets, boxes, partial packaging, etc., has to be made in accordiance with the weight and the nature of the spare parts. Corresponding information can be found in the appendix.
9. The supplier is committed to economical and space-saving packaging
10. If necessary, the supplier hast o ad special measures for de-preservation and commissioning before usage of spare parts.

5 Other applicable/pertinent documents

Not applicable

6 Overview of product groups and how they work

Nr.	Name oft he selected product group	4-digit code for selection
1	No specifications	KEIN
2	Special text	SOND
3	Stainless components	KM1
4	Parts: Tectyl	KM2
5	Parts: VCI/drv agent	KM3
6	Rolls: protective layer	KM4S
7	Rolls: oil and foil	KM4O
8	Rolls: VCI/dry agent	KM4V
9	Gears	KM5
10	Pumps	KM6
11	Cylinders	KM7
12	Valve technology	KM8
13	Electr. machines	KS1
14	Electr. switching devices	KS2
15	Electronic componentse	KS3

From the catalog of 15 selectable product groups displayed here, the requisitioner must select an appropriate one using the 4-digit code in the SAP system (codes are shown in the table on the right).

In principle there are 3 possibilities:

1. By selecting one of the product groups 3 to 15, a "fixed text module" assigned to this product group is copied to the material master record in the SAP system. If this fixed text module should not fit exactly, it is possible to describe desired deviations or extensions via an additional supplementary text in the SAP-system.
2. By selectin „KEIN", it is possible to consciously decide, that NO SPECIFICATIONS will be made. This is useful to avoid unnecessary costs if a special preservation is not necessary (eg: if no preservation is necessary or components are installed directly, etc ..) In this case, the text module „with regard to preservation and instructions are given to the supplier“ will be adopted in the SAP -system.
3. By selecting "SOND" it is possible to make a SPECIAL TEXT (aside from the selectable catalog). In this case, SAP enters an empty field into which a free text (special text) can be entered.

Product group catalogue

The product groups listed in the table are described in detail on the following pages. The structure of the description is always divided into 3 areas:

1. Indications of when this product group can be selected or makes sense
2. Examples of components belonging to this product group
3. At the end of each product group description, the requirements for preservation and packaging are specified, wehen the concerned product group will be selected. The supplier must conserve or supply the spare parts as described.

PRODUCT GROUP „KEIN“ – NO SPECIFICATIONS

When do I choose this product group?

- Conservation doesn't matter ; no preservation is desired.
- For spare parts, where a packaging and preservation is required according to manufacturer default.
- For spare parts with a short storing period or if they are immediately installed in the plant

This product group includes, for example,:

- Bearings, Seals, etc...

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

With regard to preservation and packaging, no instructions are given to the supplier.

PRODUCT GROUP „SOND“ – SPECIAL TEXT

When do I choose this product group?

- If none of the above mentioned product groups or texts seems appropriate and you would like to write a text yourself.

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Note: If you select "SOND" no fixed text module is applied.

PRODUCT GROUP KM1 – STAINLESS COMPONENTS

When do I choose this product group?

- corrosion-resistant spare parts

This product group includes, for example

- Plastic spare
- parts from corrosion-resistant materials
- stainless steel welding parts

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- With regard to preservation and packaging, no instructions are given to the supplier.

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM2 – TECTYL (PROTECTIVE-LAYER METHOD)

When do I choose this product group?

- Not corrosion-resistant spare parts, when it **IS POSSIBLE** to apply or the remove a protective layer coating

This product group includes, for example:

- General manufacturing parts with bare surfaces such as brackets, etc.
- Reel segments
- shafts
- knifes
- racks und gears
- sliding parts

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- A corrosion free storage period of 5 to 7 years (at indoor storage) shall be ensured by a long-term preservation with protective layer. Therefore, bare and machined surfaces have to be preserved with Tectyl 506EH or a comparable product.

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM3 – VCI or DRY AGENT-METHOD

When do I choose this product group:

- Not corrosion-resistant spare parts, when it is NOT POSSIBLE to apply or the remove a protective layer coating.

This product group includes, for example:

assembled units such as:

- complete gear couplings, shape rolls, straightening roller sets, drive spindles, assembled reels, gauge control cylinders
- parts with inaccessible areas for conservation or extract preservation

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

One of the two indicated methods have to ensure Corrosion free long-term preservation of 5-7 years (at indoor storage).

optional:

VCI method with alu compound foil

or

Dry agent method with alu compound foil

Transport Packaging:

- Delivery in a box is necessary (to protect the aluminum composite foil). If a box has already been supplied, it will be reused.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM4S – ROLLS (PROTECTIVE LAYER- TECTYL)

When do I choose this product group:

- For rollers, if a permanent preservation is desired (long storage)

Disadvantage of preservation for this product group:
The protective layer (Tectyl) must be removed before usage of the component! (comparatively expensive and a lot of work)

This product group includes, for example:

- Rollers as items (organic coated rolls, hardened steel rollers, rollers with weld, carbide-coated rollers, hard chrome plated rollers, etc...)
- Rollers as complete units with brackets

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- A corrosion free storage period of 5 to 7 years (at indoor storage) shall be ensured by a long-term preservation with protective layer. Therefore, bare and machined surfaces have to be preserved with Tectyl 506EH or a comparable product.
- Threaded holes must be protected with grease against corrosion.

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him. If no other specification is made by the requestioner, the delivery must be made in a returnable box. If a box has already been supplied, it will be reused.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM4O – ROLLS (with PROTECTION OIL and FOIL)

When do I choose this product group:

This is a mixed version to the preservation of rolls, which is:

- easy and cheap compared to KM4V (VCI or desiccant),
- but –in contrast to the protective coating method - has the advantage that here no elaborate work It is necessary to remove the protective coating (especially on the rolls barrel).
- only the stock stub be preserved with Tectyl

Advantage:

- if this product group ist selected, there is no removal of an protective layer or similar on the ball necessary.
- Easier and cheaper as a preservation by product group KM4V

Disadvantage

- until now there is unfortunately no long-term experience

This product group includes, for example:

- Rolls as items (organic coated rolls, hardened steel rollers, rollers with weld, carbide-coated rollers, hard chrome plated rollers, etc...)
- Rolls as complete units with brackets

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- lubricate the roller surface with corrosion protection oil and coat with VCI foil,
- The end faces of the roll mantle are sealed against leaking oil with a stretch film
- Shaft ends and bare surfaces must be preserved with Tectyl 506EH or a comparable product
- Threaded holes must be protected with grease against corrosion

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him. If no other specification is made by the requestioner, the delivery must be made in a returnable box. If a box has already been supplied, it will be reused.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM4V – ROLLEN (VCI or DRY AGENT)

When do I choose this product group:

- For rolls, if a permanent preservation is desired (long storage)

Advantage:
  - when preservation according this product group no removal of a protective layer or similar component used is necessary.

Disadvantage:
  - comparatively higher costs

This product group includes, for example:

- Rolls as items (organic coated rolls, hardened steel rollers, rollers with weld, carbide-coated rollers, hard chrome plated rollers, etc...)
- Rolls as complete units with brackets

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- One of the two indicated methods have to ensure Corrosion free long-term preservation of 5-7 years (at indoor storage).

  optional:

  VCI method with alu compound foil

  or

  Dry agent method with alu compound foil

Transport Packaging:

- Delivery in a box (to protect the aluminum composite foil)
- If no other specification is made by the requestioner, the delivery must be made in a returnable box.
- If a box has already been supplied, it will be reused.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM5 – GEARS

When do I choose this product group:

For gears

This product group includes, for example:

- Spur gears,
- bevel gear,
- bevel-helical gear units,
- planetary gear, worm gear, special gear, etc

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- By **provisions made by the supplier for long-term preservation**, a corrosion-free storage period of min. 5-7 years (when stored indoors). must be guaranteed.
- The selection as well as the extent of the taken measures will be at the discretion of the supplier and shall be determined and implemented by him.

ATTENTION:

- Products for indoor preservation (e.g. running in oils with VCI inhibitors) shall be compatible with future lubricant
- The measures shall be chosen in a way that the no essential dismantling or adjustment work will be necessary for depreservation.
- A corresponding attachment sheet on required activities prior to commissioning of the gear shall be attached to the spare part undetachably.

Only for information purposes, an example of a possible variant as described below:

1. Corrosion protection of the casing inside by a corresponding oil resistant internal painting
2. Implementation of a trial run with a running-in gear oil (e.g. with VCI inhibitors)
3. Unscrew the breather and seal it airtight with the sealing plug; further close all openings
4. Remove through cover. Fill shaft gaskets with grease, then mount again through cover
5. Protect bare outer surfaces , such as shaft ends etc. with Tectyl 506EH against corrosion
6. Wrapping with VCI foil

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Product group catalogue

The measures planned by the supplier for preservation and packaging must be coordinated with the user before delivery.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM6 – PUMPS

When do I choose this product group:

For pumps

This product group includes, for example:

- Hydraulicpumps
- Screw pumps
- chemical pumps , etc

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

- By **provisions made by the supplier for long-term preservation**, a corrosion-free storage period of min. 5-7 years (when stored indoors). must be guaranteed.
- The selection as well as the extent of the taken measures will be at the discretion of the supplier and shall be determined and implemented by him.

ATTENTION:

- Products for indoor preservation (e.g. running in oils with VCI inhibitors) shall be compatible with future lubricant
- The measures shall be chosen in a way that the no essential dismantling or adjustment work will be necessary for depreservation.
- A corresponding attachment sheet on required activities prior to commissioning of the gear shall be attached to the spare part undetachably.

Only for information purposes, an example of a possible variant as described below:

1. Corrosion protection of the casing inside by a corresponding oil resistant internal painting
2. Implementation of a trial run with with a medium with VCI inhibitors
3. Close the suction and discharge nozzles and all openings with blind flanges or plugs
4. Protect bare outer surfaces , such as shaft ends etc. with Tectyl 506EH against corrosion
5. Wrapping with VCI foil

Transport Packaging:

- The transport packaging (pallet, frame, box, returnable box ...) must always be agreed with the requestioner or specified by him.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

The measures planned by the supplier for preservation and packaging must be coordinated with the user before delivery.
Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM7 – CYLINDERS

When do I choose this product group:

For cylinders

This product group includes, for example:

- Hydraulic-Cylinders

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

By **provisions made by the supplier for long-term preservation**, a corrosion-free storage period of min. 5-7 years (when stored indoors). must be guaranteed.
The selection as well as the extent of the taken measures will be at the discretion of the supplier and shall be determined and implemented by him.

ATTENTION:

- The measures shall be chosen in a way that the no essential dismantling or adjustment work will be necessary for depreservation.
- A corresponding attachment sheet on required activities prior to commissioning of the gear shall be attached to the spare part undetachably

Only for information purposes, an example of a possible variant as described below:

1. Execution of the functional test of the cylinder with a medium with VCI inhibitors
2. Close all openings with blind flanges or plugs
3. Protect bare external surfaces with Tectyl 506EH or DENSO-BANDAGES against corrosion

Transport Packaging:

- The transport packaging (pallet, frame, box, reusable box ...) must always be agreed with the user or specified by him.
- The cylinder must be delivered when retracted.
- The bearing of the cylinder should be designed in such a way that there is no stress on guiding and sealing elements.
- Piston rod and threads must be protected against mechanical damage.

The measures planned by the supplier for preservation and packaging must be coordinated with the user before delivery.
Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KM8 – VALVE TECHNOLOGY

When do I choose this product group:

For hydraulics, pneumatics and other media (cooling water, gases, ...)

This product group includes, for example:

- Proportional valves
- Switching valves

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection and delivery:

The protection, packing and delivery of the components basically will take place acc. to manufacturer standard, shall comply however with the following framework conditions

- A storage period of min. 5-7 years (for indoor storage) should be ensured.
- The storage conditions must be enclosed with the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KS1 – ELEKTR. MACHINES

When do I choose this product group:

For el. machines

This product group includes, for example:

- Motors
- Gear motors
- speedometer engines

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection:

By provisions made by the supplier for long-term preservation, a corrosion-free storage period of 3 years (when stored indoors). must be guaranteed.
The selection as well as the extent of the taken measures will be at the discretion of the supplier and shall be determined and implemented by him.

ATTENTION:

- The measures shall be chosen in a way that the no essential dismantling or adjustment work will be necessary for depreservation.
- A corresponding attachment sheet on required activities prior to commissioning of the gear shall be attached to the spare part undetachably
- In any case, bare outer surfaces should be protected against corrosion.

Transport Packaging:

- Delivery of the component basically acc. to manufacturer standard
- Components must be secured individually against turning over.
- The top surface of the component must be provided with dust protection.
- To avoid condensation, it is important to ensure the best possible lateral ventilation of the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KS2 – ELEKTR. SWITCHING DEVICES

When do I choose this product group:

For el. switching devices

This product group includes, for example:

- Contactors, switches,
- interlocks

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection and delivery:

The protection, packing and delivery of the components basically will take place acc. to manufacturer standard, shall comply however with the following framework conditions

- A storage period of min. 5-7 years (for indoor storage) should be ensured.
- The storage conditions must be enclosed with the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

PRODUCT GROUP KS3 – ELEKTRONIC COMPONENTS

When do I choose this product group:

For electronic. components

This product group includes, for example:

- Plug-in cards
- Control units
- Measuring device
- Flame detector

Requirements for the supplier with regard to packaging / preservation for this product group: (fixed text module)

Corrosion protection and delivery:

The protection, packing and delivery of the components basically will take place acc. to manufacturer standard, shall comply however with the following framework conditions

- A storage period of min. 5-7 years (for indoor storage) should be ensured.
- The storage conditions must be enclosed with the component.

Further information on the execution of corrosion protection, boxes, pallets and frames can be found in the chapter „Attachments“

Attachments

1. Color coating:

In the case of a paint coating, the following minimum procedure shall be done:

Surface pretreatment			
Blast derusting-			EN ISO 12944 p 4 Derusting degree Sa 2 ½
Substrate coating			
1	Binding agents: Hardening agents: Pigment:	2 comp. epoxy resins Polyamide or /-adduct Zinc phosphate, Micaceous iron ore	Shade: red brown Layer thickness: 70 µm
Cover coat			
2	Binding agents: Hardening agents: Pigment:	2 comp. epoxy resins Polyamide or /-adduct Titanium oxide, (mica), Coulored pigments Layer thickness	Shade: as specified Layer thickness: 70 µm

2. Corrosion protection methods:

2.1. Protective layer method:

2.1.1. Description of the method:

At the protective layer method, after cleaning and drying of the surfaces to be protected a uniform protection layer will be applied which separates the metallic surfaces from the aggressive mediums, such as humidity, salts, acids etc.

Possible protection layer agents are Tectyl 506EH of Messrs. Valvoline or an agent comparable to this agent of an alternative manufacturer.

2.1.2. Important notes on execution:

- Observe application notes of the protection agent manufacturer
- Minimum dry film thickness 50my

2.2. Desiccant method: (Dry agent)

2.2.1. Description of the method:

At this method, the air space within the climate protection packing will be sealed together with the packed goods and the drying agent by a barrier foil from the outside climate. The drying agent bags will contain water vapour absorbing non water soluble and chemically inert drying agents, such as silica gel, aluminium silicate, clay, blue gel, bentonite

By the absorption capacity of the drying agent, the air humidity in the foil will be lowered so that the danger of corrosion for the storage is excluded. As the absorption capacity is limited, this only will be possible if the packed goods are enclosed by a water vapour tight and sealed barrier. It is particularly important that during the whole transport and storage time the foil envelopment remains absolutely tight in order to maintain the microclimate inside the foil. The protective effect will be lost at opening and improper reclosure of the internal packing.

Drying agents are commercialized in so-called drying agent units (TME). The volume of the required drying agent units will result from the volume of the packing and the real and requested relative air humidity inside the packing, the water contents of the hygroscopic packing auxiliaries, the type of the barrier foil (water vapour permeability).

Acc. to DIN 55 473 the following formula applies to calculating the number of drying agent units in one packing (DIN 55 474):

$$n = (1/a) \times (V \times b + m \times c + A \times e \times WDD \times t)$$

n	Number of drying agent units				
a	Water quantity the drying agent unit can absorb, in accordance with the admissible air humidity in the packing :				
	admissible final humidity	20%	40%	50%	60%
	factor a	3	6	7	8
e	Correction factor referred to their admissible final humidity in %:				
	admissible final humidity	20%	40%	50%	60%
	factor e	0,9	0,7	0,65	0,6
V	Internal packing volume in m3				
b	Humidity contents of the entrapped air in g/m3				
m	Mass of the hygroscopic packing auxiliaries in kg				
c	Factor for the humidity contents of he hygroscopic packing auxiliaries in g/kg				
A	Surface of the barrier foil in m2				
WDD	Water vapour permeability of the barrier foil referred to the climate to be expected g/m2d, measured acc. to DIN 53 122 part 1 or part 2 (d = day)				
t	Total storage period in days				

2.2.2. Important notes on execution:

- The corrosion protection packing acc. to the dry agent method shall be designed in a way that the components will survive undamaged a storage period of 5 to 7 years of indoor storage.
- For the barrier foils, only the use of aluminium compound foils with a water vapour permeability (WDD) below 0.1 (g/m2d) will be admissible.
- Drying agent bags always will be supplied in defined basic packing sizes, acc. to the size of the drying agent units a basic packing may consist of one bag or up to 100.
- A basic packing only shall be opened immediately before removal of the bags and thereafter shall be sealed again immediately.
- The drying agents shall be located suspended on strings in the upper area of the barrier foil so that they are well lapped by the air.
- Ir makes sense to suspend instead of a small quantity of large drying agent bags many small bags as so the surface of the dring agent available becomes larger and the water can be better absorbed.
- Particular attention has to be paid to a proper execution of the weld seams/sealing seams.
- In order to achieve the longest possible protection effect, the barrier foil must be sealed immediately after introduction of the drying agent bags.
- Mo removal of existing protection layers.
- Only suck off abt. 70% of the entrapped air in order to guarantee a still sufficient air circulation.
- The direct contact of the drying agent bags with the packed goods shall be avoided at any rate as the humid drying agent would promote corrosion.
- Drying agent nevertheless shall be introduced directly with the packed goods (not outside the cartons or similar packing)
- Hygroscopic additions inside the foil with minimum possible material humidity.
- Only the use of drying agents certified acc. to DIN 55473 will be admissible.
- Sharp edges or angles on the packed goods shall be padded.
- The foil bags shall be checked for tightness.
- In order to avoid water bags on the foil, attention has to be paid to a corresponding structure and a proper cover construction of the case.
- Between outer packing (case) and inner packing a minimum distance of 50 mm shall be provided.

The design and implementation of the corrosion protection packing acc. to the VCI method must be carried out by qualified personnel

2.3. VCI-method:

2.3.1. Description of the method:

VCI is the English abbreviation for „Volatile Corrosion Inhibitor“.

At the VCI method a chemical agent acts which generates from the vapour phase within a closed barrier foil a type of protective atmosphere and protects thereby metallic materials against corrosion.. The agent will reach even points of difficult access and will penetrate even hollows, bores etc. The protective layer serves as barrier against humidity, salts, oxygen and other corrosion promoting mediums.

2.3.2. Important notes on execution:

- The corrosion protection packing acc. to the dry agent method shall be designed in a way that the components will survive undamaged a storage period of 5 to 7 years of indoor storage.
- For the barrier foils, only the use of aluminium compound foils with a water vapour permeability (WDD) below 0.1 (g/m2d) will be admissible
- The goods have to be clean and dry
- The packing staff shall wear gloves during handling of the metallic parts.
- The VCI material shall adhere as close as possible to the packed goods. At larger packings, an additional agent depot must be introduced.
- Hygroscopic additions inside the foil with minimum possible material humidity.
- In order to achieve the longest possible protection period, the barrier film must be welded immediately
- Special attention is to be paid to a professional execution of the welds / sealing seams
- Sharp edges or angles on the packed goods shall be padded.
- The foil bags shall be checked for tightness.
- In order to avoid water bags on the foil, attention has to be paid to a corresponding structure and a proper cover construction of the case.
- Between outer packing (case) and inner packing a minimum distance of 50 mm shall be provided for

The design and implementation of the corrosion protection packing acc. to the VCI method must be carried out by qualified personnel

3. Packaging an delivery

3.1. Pallets and frames

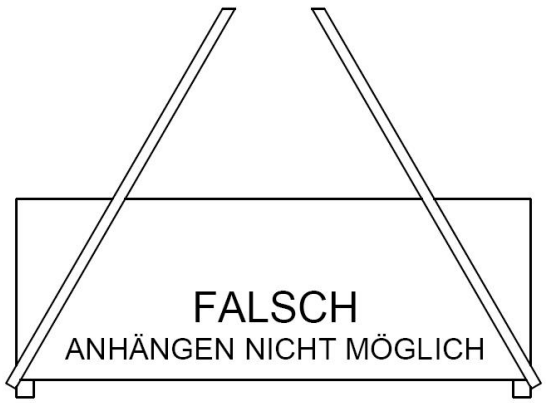
- Admissible are one-way pallets or disposable pallets which can be lifted on 4 sides, however at least on 2 sides, by a fork lifter.
- If possible, four-way pallets of wood 1200x800 mm (EURO pallet) acc. to ÖNORM A 5300 or DIN 15146-2 shall be preferred.
- If necessary, on the pallets different frames can be placed
- In order to avoid damage, the pallet shall protrude the workpiece on all sides by min. 20 mm.
- The workpieces shall be fastened onto the pallet by a suitable steel strapping, plastic strip so that slipping is not possible.
- The parts shall be protected against damage by the fastening means accordingly
- Between the goods and the packing woods at any rate a suitable barrier, e.g. aluminium foil, anti-slip mat or something similar shall be placed

3.2. Box for general components

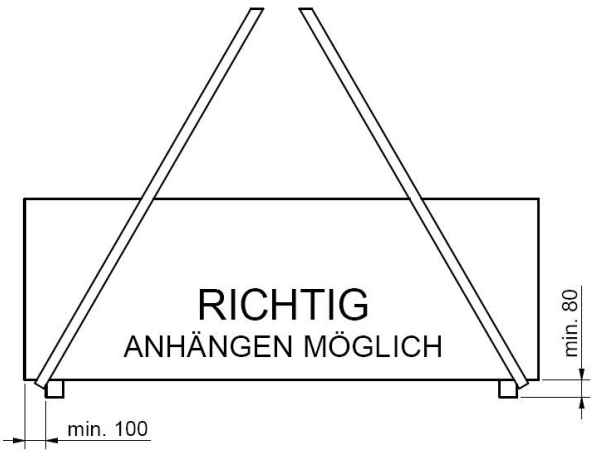
Basically the box design shall be chosen and designed in accordance with the total gross weight.

- Admissible are plywood and also solid wood boxes which can be supported on 2 sides by a fork lifter.
- The handling of the cases by crane with straps or ropes shall be possible. Therefore the position of the skids shall be selected in a way that the case can be slinged by straps or ropes (see scheme)

Wrong – Suspension not possible



Correct Suspension possible



- In order to avoid damage, the box shall protrude the workpiece to be packed on all sides by at least 50 mm.
- The workpieces shall be fastened onto the pallet by a suitable steel strapping, plastic strip so that slipping iis not possible.
- The parts shall be protected against damage by the fastening means accordingly
- Between the goods and the packing woods at any rate a suitable barrier, e.g. aluminium foil, anti-slip mat or something similar shall be placed.

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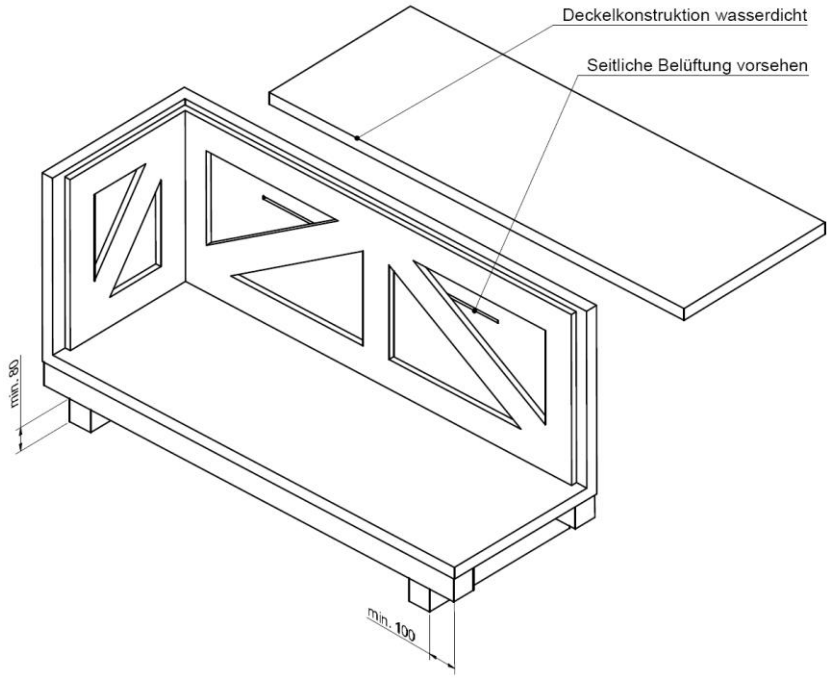
- The cover construction shall be designed watertight. The generation of water bags shall be excluded.
- No cladding of the lateral walls – for venting the case slots or openings shall be provided for.
- In the case of handling by crane, the box shall withstand the stringent forces from the strap or rope slinging. In case of need, lattice type heavy lift hardware (case angles) shall be provided for.The case angles will serve as protection of the case against damage at slinging by ropes, chains etc. to a crane
- Suspension plates shall be designed and attached acc. to the total weight of the loaded cases
- Boxes shall be provided with the following handling marks acc. to DIN 55402:

    - „Admissible stapling load“
    - „protect against humidity“
    - „center of gravity“
    - „Sling here“ o „Up“
    - „Do not apply fork lifter here“

Scematic diagram of a box for general components:

Water tight cover construction Provide for lateral ventilation

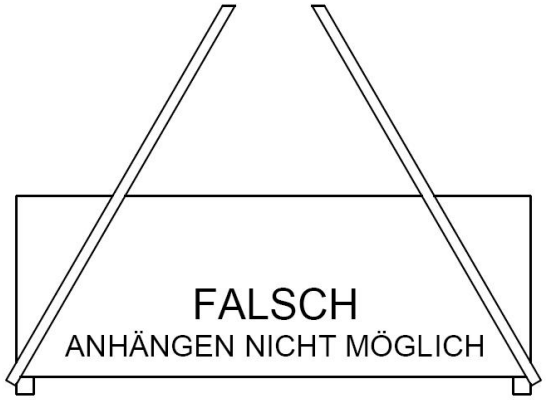


3.3. Reusable box for rolls and rollers

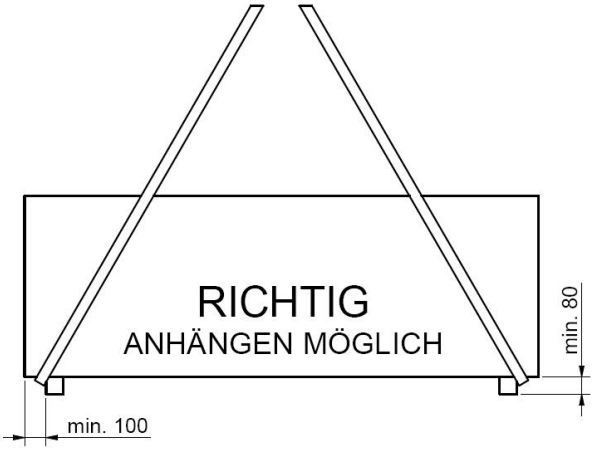
Basically the case design shall be selected and designed in accordance with the total gross weight.

- Admissible are plywood and also solid wood cases which can be supported on 2 sides by a fork lifter.
- The handling of the cases by crane with straps or ropes shall be possible Therefore the position of the skids shall be selected in a way that the case can be slinged by straps or ropes (see scheme)

WRONG Suspension not possible



CORRECT Suspension possible



- The rolls shall be fastened by suitable steel strappings, palsti strip or bolts so in the case that a slipping or turning over is impossible.
- he parts shall be protected against damage by the fastening means accordingly
- Between the goods and the packing woods at any rate a suitable barrier, e.g. aluminium foil, anti-slip mat or something similar shall be placed.
- The cover construction shall be designed watertight. The generation of waster bags schall be excluded.
- No cladding of the lateral walls – for venting the case slots or openings shall be provided for.
- In the case of handling by crane, the case shall withstand the stringent forces from the strap or rope slinging. In case of need, lattice type heavy lift hardware (case angles) shall be provided for.The case angles will serve as protection of the case against damage at slinging by ropes, chains etc. to a crane.
- Suspension plates shall be deigned and attached acc. to the total weight of the loaded cases
- Cases shall be provided with the following handling marks acc. to DIN 55402:

    - „Admissible stapling load“
    - „protect against humidity“ o „center of gravity“
    - „Sling here“
    - „Up“
    - „Do not apply fork lifter here“

In addition, the following requirements shall be fulfilled:

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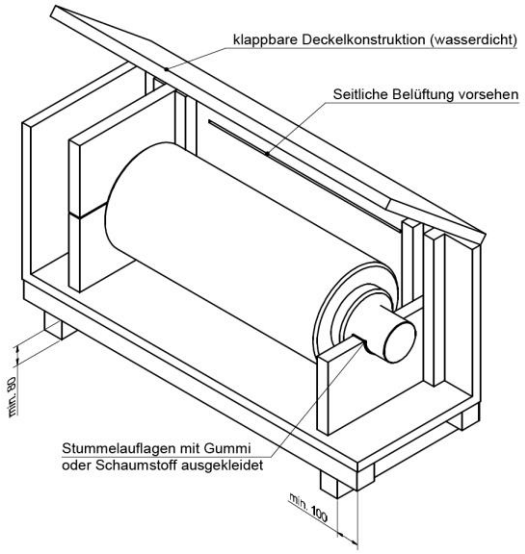
- Cases for rolls shall be designed as reusable case with a folding cover for multiple use. The cover shall be secured against unintentional opening.
- A contact between roller shell and case shall be avoided:
    1. At lose rolls stub supports shall be provided on the roller ends (see scheme for lose rolls)
    2. If there are mounted already bearings on the rolls, care has to be taken that the roll is not supported by these bearings .(see scheme for lose rolls)
    3. At completely assembled roller units, no stub supports will be necessary. In this case the roller weight will be supported by the bearing blocks.(see scheme for complete rollers)
- The design of the support shall be chosen in accordance with the load and the support surface available (min. 50 mm). In case of need, hard wood shall be used. Moreover the support surface shall be padded with rubber or felt.
- After putting the roller into the case, the preservation of the roller shall be checked for damage and repaired in case of need.
- The distance between the rolls, to the lateral walls, to the bottom and to the cover shall amount to min. 50 mm..

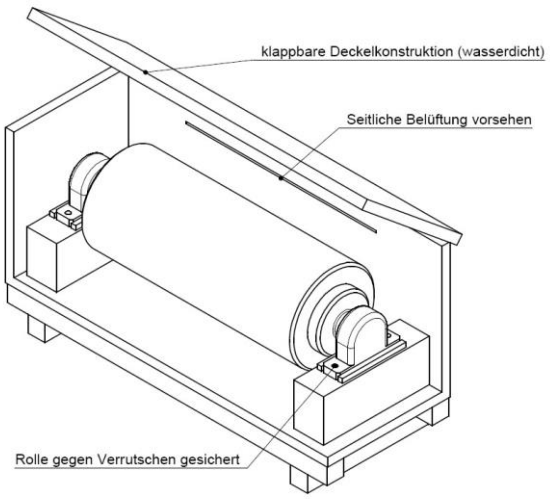
Scematic diagram of a box for general components for Rolls and rollers

Folding cover design Watertight
Provide lateral ventilation
Stub supports padded with rubber or foam



Design for lose rolls

Folding cover design Watertight
Provide lateral ventilation
Roll secured against slipping



Design for complete rolls