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Revisions:

Compared to VN 1577-2 (2014-02), the following changes have been made:

- a) Content and editorial revision, adaptation to new layout.
- b) Chap. 1, 2, 3, 4: Scope, area of application, purpose and normative references newly included.
- c) Chap. 5.1: Item 5 redefined.
- d) Chap. 5.3: Name "Voith Paper" instead of "Voith".
- e) Chap. 6.2: Addition of "volatile corrosion inhibitor" and "5. Shrink-wrap foil transparent".
- f) Chap. 7: Revision, adaptation to VN 1577-1.
- g) Chap. 8: Revision, packing matrix redefined. Transport route truck, rail and air amalgamated to land/air; transport type container deleted.
- h) Chap. 9: Revision of the packing categories, summary table containing the packing categories deleted. Further changes see i) and j).
- i) Chap. 9.1: Revision of the packing category "VK 2a: Wooden supports for rolls".
- j) Chap. 9.2, 9.3, 9.4: Revision: "VK 8a: Seaworthy case for rolls (with lining up to 15 tonnes)" changed to "VK 4a: Crate with lining for rolls (up to 15 tonnes)"; "VK 8b: Seaworthy case (with lining), from 15 to 30 tonnes for rolls" changed to "VK 4b: Crate with lining for rolls (15 to 30 tonnes)"; "VK 8c: Seaworthy case (with lining), from 30 tonnes upwards for rolls" changed to "VK 4c: Crate with lining rolls (from 30 tonnes upwards)". Some texts revised or replaced by references to previous chapters and/or VN 1577-1.
- k) Chap. 10: Chapter newly included.
- l) Chap. 11: Text/content replaced by reference to VN 1577-1.
- m) Chap. 12: Text/content for marking and signing instructions replaced by reference to VN 1577-1. Content for handling marking incorporated into chapter 9.2.6.
- n) New figures: Fig. 2: Illustration of the longitudinal boarding; Fig. 3 – Fig. 11: Securing the roll in the crate (for a more detailed description, see the respective figure).
- o) Figures removed: Fig. 2: Case design up to 3t; Fig. 3: Case design (roll bearings) from 3t; Fig. 4: Case execution, reinforced (over 15 to); Fig. 5: Case design (roll bearings); Fig. 6; Fig. 7; Fig. 8; Fig. 9; Fig. 10: Fitting of heavy-lift hardware; Fig. 11: Example for lettering and handling marking; Fig. 12: Symbol for handling marking.

1 Scope

This standard applies across the group to the entire scope of Voith Paper and its subcontractors.

2 Area of application

This standard is used in the Shipping Department at Voith Paper and its subcontractors.

3 Purpose

This standard defines the packing standard for coated and uncoated rolls, which must be applied to Voith Paper and its subcontractors. The necessary packing type is determined by goods classes and packing categories. Conditions for corrosion protection and storage of rolls are defined in VN 1576-2.

4 Normative references

VN 1576-2	Preservation and Storage Part 2: Preservation and storage of rolls
VN 1577-1	Packing standard Part 1: General packing standard
VN 1578	Transport of Rolls (Internal)
ISO 780	Packaging - Distribution packaging - Graphical symbols for handling and storage of packages

Unless stated otherwise, the most recent version of this standard shall apply.

5 General conditions

5.1 Special notes

1. Fundamentally, the regulations set forth in VN 1577-1 apply to rolls and cylinders provided that they are valid for rolls and cylinders.
2. If the end customer gives other instructions for packing, it must be pointed out to him that Voith Paper's packing instructions are different.
3. VN 1578 must be observed throughout Voith Paper and by external suppliers within the manufacturing location, as well as on site (during installation or roll change).
4. When transporting rolls with assembled bearings, use the supplied transport securing device.
5. The wooden box/roll crate is designed for one-time usage. Each time the crate is reused, it must be ensured beforehand that its condition permits reliable transport. Damaged parts have to be replaced. Only the roll for which the crate was designed is allowed to be transported in this crate. Unless otherwise contractually defined, the liability if roll crates are reused lies with the sender.
6. Rapid temperature changes lead to damage or destruction of the roll cover.

5.2 Corrosion protection

Because of the long transport and storage time, all rolls must be protected against corrosion. Corrosion protection is to be applied in accordance with VN 1576-2. The processing instructions for the relevant anti-corrosion agent must be strictly followed.

5.3 External packing inspections (for direct deliveries)

1. Voith Paper has the right to inspect the packing at any time at the contractor's.
2. If repeated inspections are necessary at the fault of the contractor, the contractor shall bear the resultant costs (e.g. labor, travel expenses, material costs).
3. Packing inspections shall not relieve the contractor of his contractual obligations.

5.4 Guarantee

The contractor guarantees contractual performance of the packing according to the state of the art, in particular the best quality and suitability of the packing material, as well as the suitability of the packing, taking into account the goods to be packed and the actual stresses, for the guarantee periods set forth in the relevant contracts.

6 Packing materials

6.1 Wood

All wood used (crates, pallets, dunnage bars, etc.) must be treated in accordance with the IPPC Standard and marked accordingly.

6.2 Foils

1. Aluminum composite foil designed as sealing layer foil
2. VCI foil (volatile corrosion inhibitor)
3. Wrapping paper (board)
4. Flexible lamella packing (e.g. Lamiflex, Lamipack)
5. Shrink-wrap foil transparent

6.3 Padding and filler materials

Padding paper, air bags, air cushion foils, foam foils and foam mats are to be used as filler material.

ATTENTION: Styrofoam chips must never be used.

The use of hygroscopic filler and padding materials (e.g. wood wool, hay, straw, waste paper, etc.) to fill out empty spaces and/or for padding is not allowed.

7 Goods classes (GK)

As the materials to be packed are of different physical and chemical sensitivities, they are classified into various goods classes, depending on their properties.

If the goods class is not specified, this must be determined by the contractor itself. If anything is unclear, consult Voith Paper.

The materials are classified into seven different goods classes in accordance with VN 1577-1. Rolls are assigned to goods class 4.

Note: For rolls coated with rubber, polyurethane and ceramic, use exclusively packing category VK 4a or VK 4b.

8 Packing matrix

Should several carriers be deployed for shipment of the goods, the packing must be in accordance with the highest packing category/transport class.

If the order does not specify the transport type, road or air transport via truck, rail or aircraft must be assumed.

	Transport route		
	Road/Air	Sea	
GK	VK		Storage in accordance with VN 1576-2
4	4a, 4b, 4c	4a, 4b, 4c	A Coated rolls
4	2a, 4a, 4b, 4c	4a, 4b, 4c	B Uncoated rolls

9 Packing categories (VK)

The packing categories are defined in VN 1577-1.

As the packing of rolls requires particular consideration (including roll weight), sub-categories with additional references are defined for the packing categories concerning rolls.

9.1 Packing category VK 2a: Wooden supports for rolls

Fundamentally, the regulations for the wooden support packing category as described in VN 1577-1 shall apply. The following must also be observed when using wooden supports for rolls:

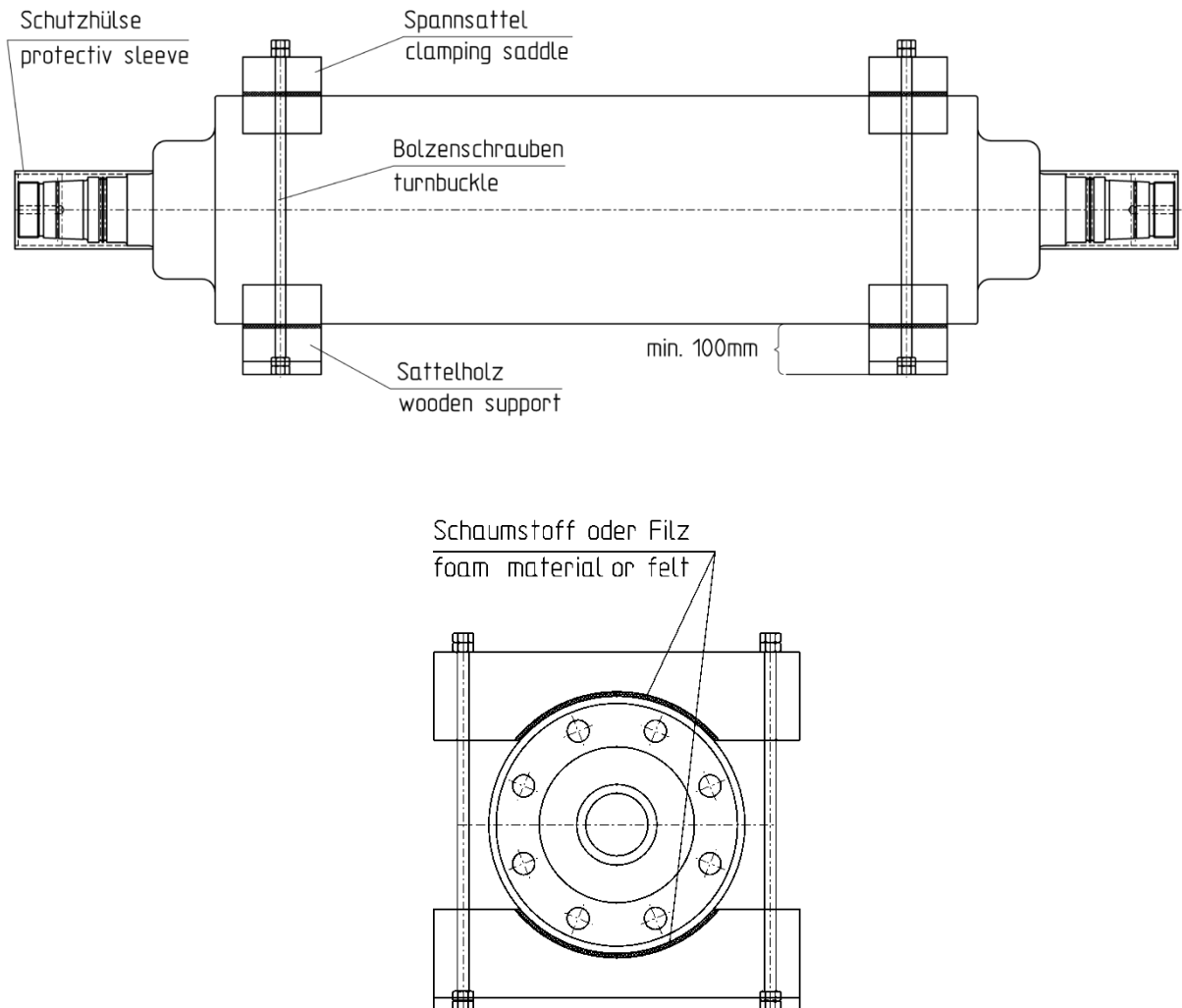
The use of wooden supports is allowed if no handling operations occur. For door-to-door transport (truck transport), uncoated rolls may be packed on wooden supports (trestles).

Nipco-/Nipcorect rolls must be shrink-wrapped. General shrink-wrapping is not required for other roll types.

The wooden supports must be designed so that contact with the rolls, if several rolls are transported by truck, is avoided. A slipping of the wooden supports on the truck is to be prevented by appropriate measures.

For Nipco-/Nipcorect rolls, additional support for the axles is required. This is intended to prevent the axle weight being on the rolling body and causing damage.

Fig. 1: Design of the supports



9.2 Packing category VK 4a: Crate with lining for rolls (up to 15 tonnes)

Basically the crate design has to be suitable for the total gross weight.

9.2.1 Crate bottom

Refer to VN 1577-1, Crate bottom

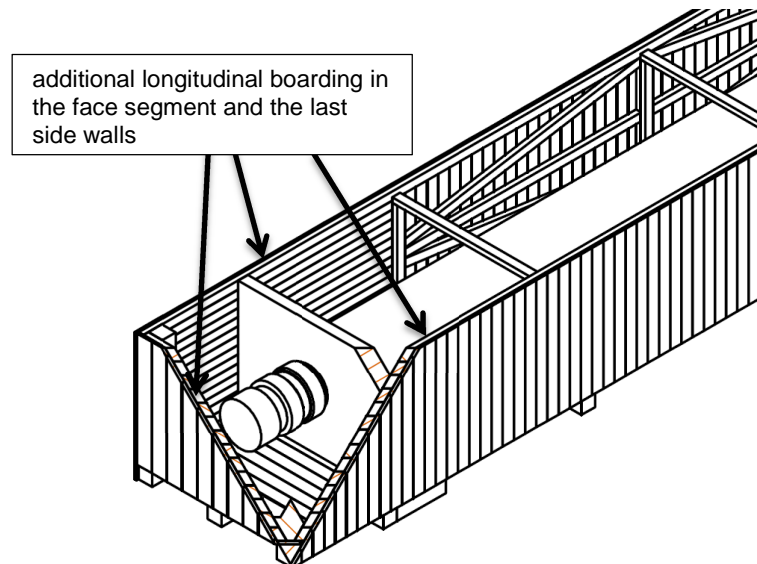
9.2.2 Side walls, front walls and cover

Truss-type stiffening is required.

Side walls: Strap frame and diagonals on the inside. Between the strap frame and the boarding, a lining with waterproof specialty paper or equivalent materials with sufficient overlap is to be applied. The lining must not be pierced or damaged.

At the last segments of the side walls (on both ends of the crate), additional longitudinal boarding must be provided on the inside instead of the diagonal.

Fig. 2: Illustration of the longitudinal boarding



Front walls: Strap frame of the front wall at least 100 x 100 mm thick. The strap frame must be stiffened on wide crates at a distance of max. 1200 mm with vertical squared timbers. Care must be taken that the vertical straps are always carried out continuously.

In this case too, additional longitudinal boarding must be provided, as with the side walls.

9.2.3 Stack pressure

Refer to VN 1577-1, Stack pressure

9.2.4 Lining

Refer to VN 1577-1, Lining

9.2.5 Contact surface

To prevent the roll shell from touching the crate, provide contact surfaces in the crate. Chapter 9.5 describes the design of the contact surfaces in the crate in detail.

Coated rolls may only be supported on their journals or hubs. Placing on the roll face is forbidden. In special cases (e.g. hard rubber covering or shortened journal), use special devices.

Select the design of the support in accordance with the load and the available contact surface (at least 50 mm). Where required, use hardwood. Furthermore, lay out the contact surface with an anti-slip rubber, foam material or felt.

After the roll has been placed in the crate, the preservation of the roll must be checked for damage and repaired, if necessary.

The distance of the rolls from each other and from the side walls must be at least 100 mm.

The distance of the rolls from the bottom and from the cover must be at least 100 mm.

9.2.6 Handling marking

Roll crates must be provided with the following handling marking:

- Protect from moisture
- Center of gravity
- Attach here
- Top
- Allowed temperature range (values are explicitly stated)
- Lifting by forklift is not allowed
- Symbol for storage class
- Drive side

Symbols designed according to ISO 780.

Order-related additions/additional symbols must be observed.

The "center of gravity" symbol must be put on at least two adjacent sides of the package as soon as the weight of the package exceeds 1 t or the center of gravity is decentralized/off-center.

9.3 Packing category VK 4b: Crate with lining for rolls (15 to 30 tonnes)

Refer to 9.2

9.3.1 Crate bottom

Refer to VN 1577-1, Crate bottom

In deviation, however, the following applies:

The minimum dimensions for longitudinal skids and transverse bottom skids must be specified by the crate manufacturer based on weight.

9.3.2 Side walls, front walls and cover

Refer to 9.2.2

9.3.3 Stack pressure

Refer to VN 1577-1, Stack pressure

9.3.4 Lining

Refer to VN 1577-1, Lining

9.3.5 Contact surface

Refer to 9.2.5

9.3.6 Handling marking

Refer to 9.2.6

9.4 Packing category VK 4c: Crate with lining for rolls (from 30 tonnes upwards)

Refer to 9.2

9.4.1 Crate bottom

Refer to VN 1577-1, Crate bottom

In deviation, however, the following applies:

The minimum dimensions for longitudinal skids and transverse bottom skids must be specified by the crate manufacturer based on weight.

At the suspension points, two transverse bottom skids each are to be mounted side by side.

On delivery, a lengthwise boarding must be fitted to the transverse bottom skids or to the wooden safety device.

9.4.2 Side walls, front walls and cover

Refer to 9.2.2

In deviation, however, the following applies:

When there is vertical boarding, fit straps horizontally in addition at a distance of max. 1200 mm with at least 100 x 120 mm.

9.4.3 Stack pressure

Refer to VN 1577-1, Stack pressure

9.4.4 Lining

Refer to VN 1577-1, Lining

9.4.5 Contact surface

Refer to 9.2.5

In deviation, however, the following applies:

The distance between the rolls and the side walls or to the vertical straps must be at least 100 mm.

The distance of the rolls from the bottom and from the cover or to the horizontal straps must be at least 200 mm.

9.4.6 Handling marking

Refer to 9.2.6

10 Securing the roll in the crate

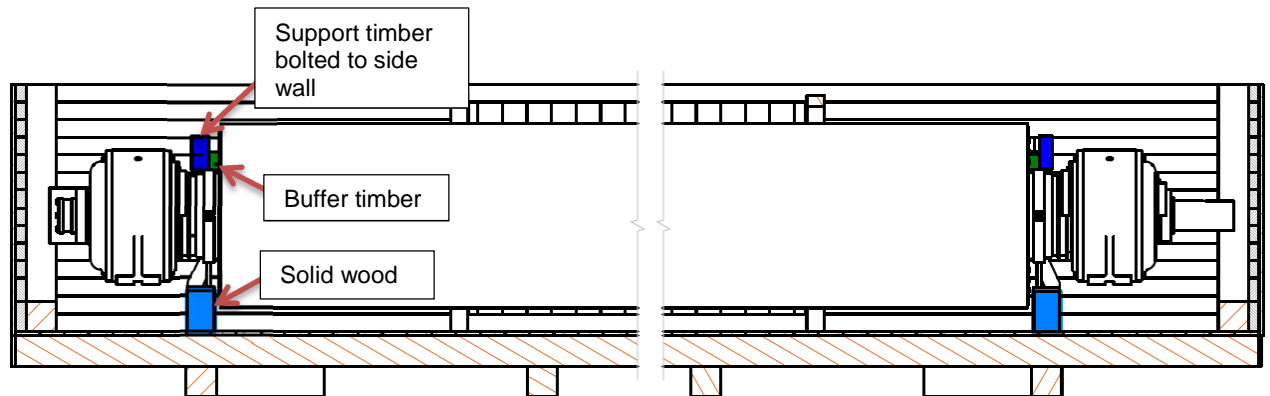
Rolls with and without bearing must be secured in the crate to prevent slippage. This securing device must be executed as follows, depending on roll type and design.

10.1 Roll supported on the journal with transportation rack

The roll is secured in the crate bolted to a solid wood and to the longitudinal skids by a steel transportation rack fixed to the roll (through bolt with nut and washer). The transverse skids must always be directly beneath the support point.

Support timbers are to be provided on the top of the roll in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls. Buffer timbers, which are to be provided between shell end face and the support timber, create an additional axial security device.

Fig. 3: Securing the roll in the crate, which is supported on the journal, with transportation rack

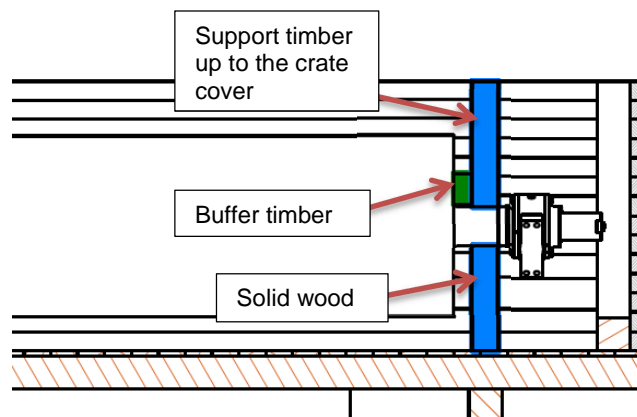


10.2 Roll supported on the journal without transportation rack

The design is as per chapter. 10.1, though without transportation rack. In this case, the journal is placed in a piece of solid wood bolted to the longitudinal skids (through bolt with nut and washer).

Support timbers are to be provided between journal and crate cover in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls. Buffer timbers, which are to be provided between shell end face and the support timbers, create an additional axial security device.

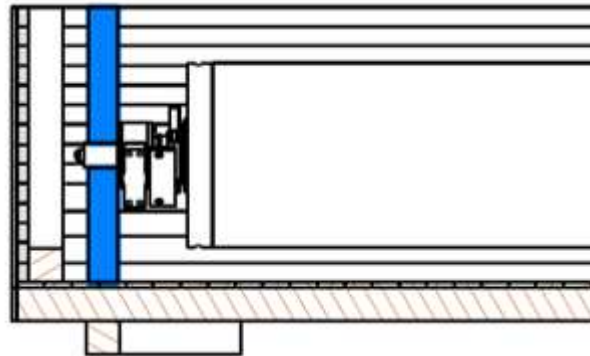
Fig. 4: Securing the roll in the crate, which is supported on the journal, without transportation rack



10.3 Roll supported on the journal with journal extension

The design is as per chapter 10.2. In this case, however, the roll is placed on an extension previously mounted on the journal (at the outermost end of the roll) (e.g. for guide rolls with rope sheave).

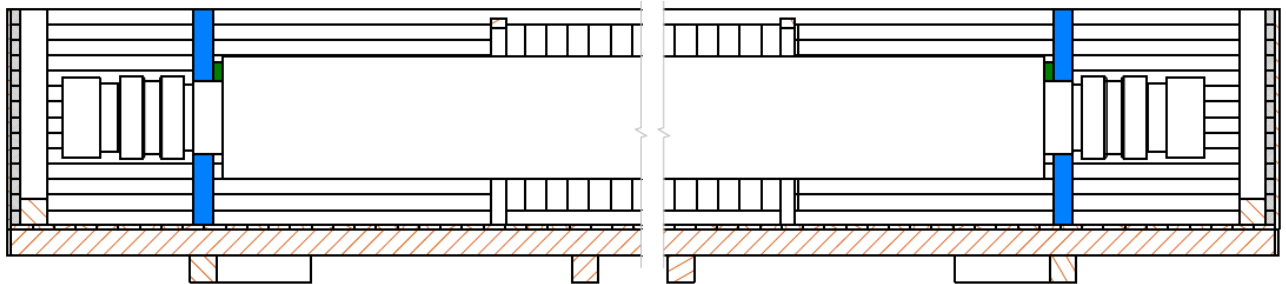
Fig. 5: Securing the roll in the crate, which is supported on the journal, with journal extension



10.4 Reel spool

The design is as per chapter 10.2.

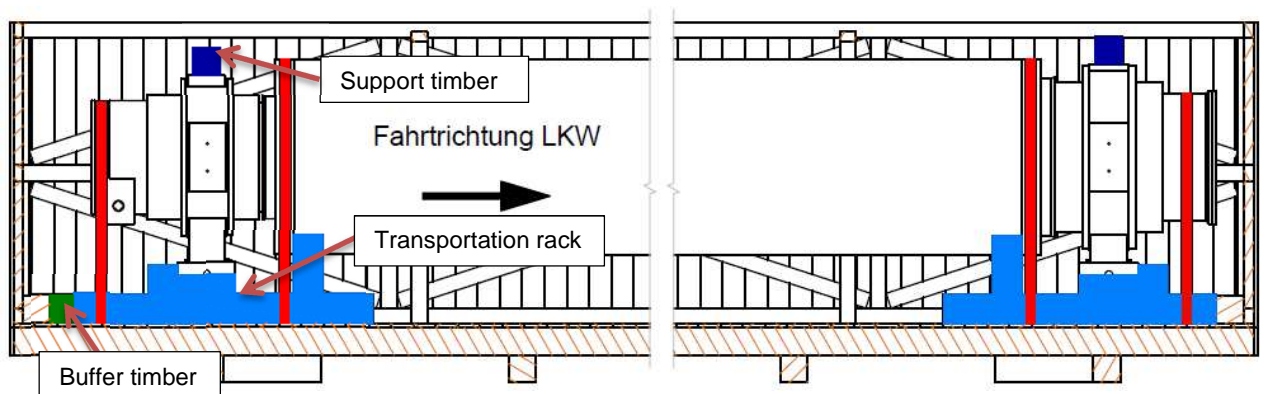
Fig. 6: Securing the reel spool in the crate



10.5 Suction roll with transportation rack and/or wooden slide

The suction roll is fixed to the transportation rack/slide made of steel or wood and then bolted together with the longitudinal skids in the crate (through bolt with nut and washer). The free space at the crate bottom is lined with wood to prevent axial slippage. In addition, support timbers are to be provided on the bearing housing in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls.

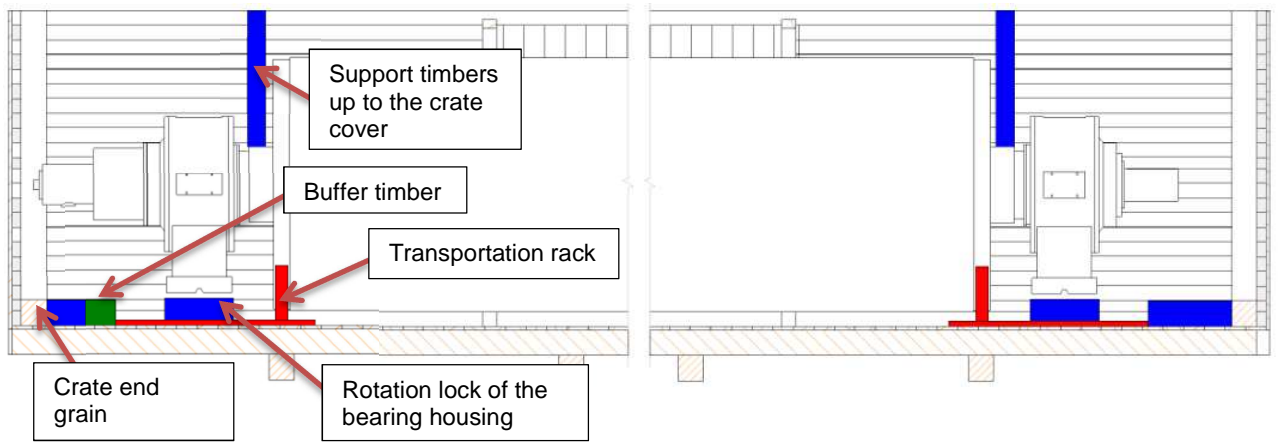
Fig. 7: Securing the suction roll in the crate, with transportation rack or wooden slide



10.6 Press roll supported on the shell with transportation rack

The design is as per chapter 10.5. However, support timbers are to be provided between journal and crate cover in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls.

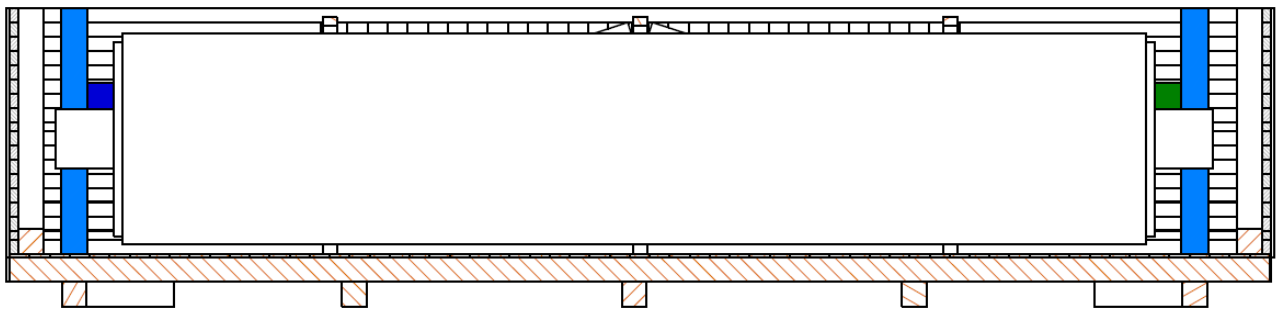
Fig. 8: Securing the press roll in the crate, which is supported on the shell, with transportation rack



10.7 Roll shell with flanged journal or dummy head

The design is as per chapter 10.2. However, the roll shell is fixed in the crate only with flanged journal and dummy head without bearing.

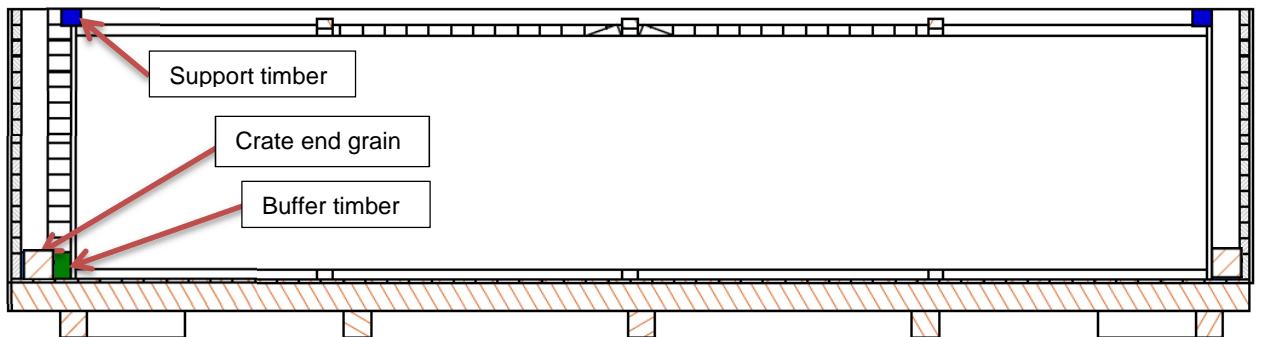
Fig. 9: Securing the roll shell in the crate with flanged journal or dummy head



10.8 Roll shell without cover or coating

The roll shell is placed in half shells made of solid wood. The free space is lined against the crate end grains to prevent axial slippage. In addition, support timbers are to be provided on the shell in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls.

Fig. 10: Securing the roll shell without cover or coating in the crate

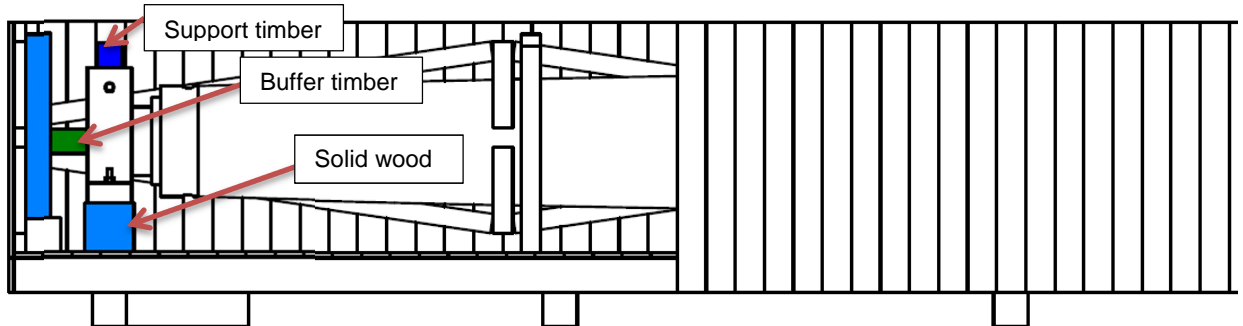


10.9 Spreader roll

In the case of spreader rolls, the bearing housings are bolted to the solid wood and to the longitudinal skids (two continuous bolts with nut and washer in each case).

As additional axial support, a solid wood is inserted between bearing end face and a vertical squared timber on the crate end face. In addition, support timbers are to be provided on the bearing housing in order to prevent the roll from being lifted up vertically during transportation. These must be bolted to the side walls.

Figure 11: Securing the spreader roll in the crate



11 Heavy-lift hardware (suspension plates and crate angles)

Refer to VN 1577-1, Heavy-lift hardware (suspension plates and crate angles)

12 Marking and signing instructions

Refer to VN 1577-1, Marking and signing instructions