

Product Information 202K

VULKODURIT1250 KTW

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Base

Natural rubber (NR) and styrene-butadiene rubber (SBR)

Material Group

Hard rubber linings

Workshop rubber linings

System Description / Application

Single-layer hard rubber lining based on natural rubber (NR) and styrene-butadiene rubber (SBR), vulcanized in an autoclave.

VULKODURIT 1250 KTW is FDA-compliant (US FDA 21 CFR 177.2600e) and WRAS-compliant (BS6920-1:2000). The sheet also meets the requirements of the KTW-BWGL Appendix D. Corresponding external test certificates can be provided on request.

Depending on the requirements, the thickness of the rubber sheet may range between 3 - 6 mm.

Rubber lining is mainly used in the following applications:

- Drinking water
- aqueous food

System Design

- Priming with Pre-Coat Mixture
- Alternatively priming with Primer 1 + Primer 2 on stainless steel and grey cast iron
- Vulkodurit-Adhesive LS3A on substrate (1 x on steel, 2 x on stainless steel and grey cast iron)
- Vulkodurit-1250KTW-Sheet + KCH-Diluent 5, alternatively Seam-Solution 2104/N1

Properties

- FDA conformity
- KTW conformity
- WRAS conformity

Physical Data

Physical Property	Value	Unit	Testing Standard
Density	1.18 ± 0.02	g / cm ³	DIN EN ISO 1183-1
Adhesive strength	≥ 10	MPa	DIN EN ISO 4624
Maximum surface pressure	10	MPa	
Elongation at tear	> 10	%	DIN 53504
Tensile strength	> 15	MPa	DIN 53504
Shore D hardness	72 ± 5		DIN ISO 7619-1
Temperature resistance	100	°C	

The values given are average values, determined from 4 mm thick, vulcanized rubber samples.

Chemical Resistance

Please contact our application engineering team to discuss the suitability of our products for your project.

Packaging / Shelf Life**NOTE! Observe the relevant safety data sheets for transport, storage and handling!**

- The shelf life is given in months.
- All components must be stored and transported dry.
- Protect components from sunlight.
- The minimum shelf life applies to a storage temperature of 20 °C. Higher temperatures reduce, lower temperatures increase the shelf life.

Component	Item Number	Package	Quantity	Shelf Life
Vulkodurit-1250KTW-Sheet 3 mm	6071503300	Roll	11 m ²	6
Vulkodurit-1250KTW-Sheet 4 mm	6071503400	Roll	11 m ²	6
Vulkodurit-1250KTW-Sheet 5 mm	6071503500	Roll	11 m ²	6
Vulkodurit-1250KTW-Sheet 6 mm	6071503600	Roll	11 m ²	6
Primer 1	5040271039	Hobbock	23 kg	12
Primer 2	5040274001	Hobbock	25 kg	12
Vulkodurit-Brushing-Adhesive	5040257131	Hobbock	21 kg	6
Vulkodurit-Adhesive LS3A	5040253014	Hobbock	22 kg	6
Seam-Solution 2104/N1	5040703040	Hobbock	18 kg	12
KCH-Diluent 5	5040021041	Canister	8 kg	24
KCH-Cleaner 1	5040016068	Canister	8.5 kg	24
Release liners quality 2602/4706/125 C	9012015	Roll	55 m ²	

The minimum shelf life of Vulkodurit-1250KTW-Sheet is 12 months when stored at a temperature of < 15 °C.

By using refrigerated containers, a storage temperature of < 20 °C can be achieved. This extends the shelf life of the components. Please check whether corresponding measures are required on a project-by-project basis.

Working Equipment**NOTE! The materials to be processed may have a corrosive effect on mixing and processing tools due to the substances they contain or their abrasive components. Therefore, only use tools that are suitable for mixing and processing.**

measuring cup, scale, mixing vessels, basket spiral stirrer right-rotating, item number 9702285114, compressed air stirrers with compressor

paint roller, brush

whitewash brush / wide brush

half-moon / quarter-moon knife, heated irons, heated knives, rubber lining scissor (tailor's scissors 25 cm), pressure rollers, pressure scraper, linen cloth, vacuum cleaner, screw clamps

optional angle grinder, tools for special geometries (rubber bulbs, mandrels etc.), heating tables

measuring and testing equipment

spring balance, shore D hardness measuring device, Spark tester (e.g. Elmed inspect 35)

Cleaning of Equipment

NOTE! Follow the safety instructions!

Tools that are soiled with uncured materials can be cleaned with KCH-Cleaner 1 (primer) or KCH-Diluent 5 (adhesive).

Only clean in well-ventilated areas.

Close packages immediately after use!

Requirements for the Application

Basic Requirements

- During application, the temperatures of the substrate, the ambient air and the materials to be applied must be between 10 °C and 30 °C.
- The optimum application temperature is 20 °C. Higher and lower temperatures affect the pot life and consistency of the materials being applied. Consumption and application performance may change as a result.
- The object temperature must have a dew point difference of at least 3 K, and at least 5 K for relative humidity above 70 %.
- During application, the substrate must be kept absolutely dry. No moisture (condensate, mist, etc.) may get onto the surfaces to be protected.
- Unevenness must already be levelled out in the substrate.
- The construction site must be protected from draught and direct sunlight.

Steel / Stainless Steel / Grey Cast Iron

- Refer to DIN EN 14879-1 as well as to STEULER-KCH-Formsheet 020 and 030.
- The steel surface is blasted to near white blast cleaning. The following requirements must be achieved after blasting:
 - Degree of preparation Sa 2 1/2 according to DIN EN ISO 12944-4
 - Roughness grade medium (G) according to DIN EN ISO 8503-1
 - Roughness depth $R_z = 50 - 70 \mu\text{m}$
- After blasting, the reformation of rust must be prevented by suitable measures, such as priming directly.
- The condition of the substrate needs to be documented. For the documentation, use the STEULER-KCH-Test-Record 003 (steel) / 004 (screed) or comparable documentation materials.
- Stainless steel is blasted with ferrite-free blasting material.
- Grey cast iron must be tempered in the autoclave prior to blast cleaning, in order to expel any inclusions of moisture.

Mixing Ratios / Consumptions / Application**NOTE! Follow the safety instructions!****Priming on Steel****Pre-Coat Mixture****Pre-Coat Mixture**

Component	kg / mix	Litre / mix	Basic mixing ratio kg	Basic mixing ratio litre
Vulkodurit-Brushing-Adhesive	5.000	6.024	1.000	1.250
Primer 2	0.500	0.521	0.100	0.104
Total	5.500		1.100	
Yield per application step	≈ 25 m ²	≈ 25 m ²	≈ 5 m ²	≈ 5 m ²
Number of application steps	1			
Consumption per m ²	0.220 kg			

Consumption Quantities per m²

Component	kg / m ²
Vulkodurit-Brushing-Adhesive	0.200
Primer 2	0.020
Total	0.220

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	3 hours
Maximum waiting time	2 days

Mixing

- Weigh or measure the required quantity of the liquid components and place in a mixing vessel.
- Mix with stirring tool and basket spiral stirrer at 300 – 500 rpm until a homogeneous mixture is formed.
- Move the stirrer along the bottom and sides of the mixing vessel.

Application

- The application is applied using paint roller or brush. Avoid the formation of puddles.

Alternatively Priming on Stainless Steel / Grey Cast Iron**Primer 1 + Primer 2**

To prime stainless steel / grey cast iron, apply Primer 1 and Primer 2 one after the other, once each.

Primer 1

Yield per 23 kg package	≈ 153 m ²
Number of application steps	1
Consumption per m ²	0.150 kg

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	2 hours
Maximum waiting time	3 months

Primer 2

Yield per 25 kg package	≈ 125 m ²
Number of application steps	1
Consumption per m ²	0.200 kg

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	2 hours
Maximum waiting time	5 days

Application

- The application is applied using paint roller or brush. Avoid the formation of puddles.

Application Adhesive

The adhesive is applied exclusively to the primed substrate.

Vulkodurit-Adhesive LS3A

Yield per application step per 22 kg package	≈ 88 m ²
Number of application steps	1 (steel) 2 (stainless steel, grey cast iron)
Consumption per application step per m ²	0.250 kg
Total consumption per m ²	0.250 kg (Steel) 0.500 kg (Stainless Steel, Grey Cast Iron)

Application-Relevant Times**Waiting Times**

	Application on	Minimum Waiting time at 20 °C	Maximum Waiting time at 20 °C
Adhesive coating 1	Substrate	2 hours	2 days
Adhesive coating 2	Substrate	2 hours	5 days

The waiting time strongly depends on the climatic conditions. You should therefore check before subsequent application whether the product has dried sufficiently (finger back test).

If the waiting time is not observed, bubble formation after application is expected.

Mixing

- Stir the liquid components in the original package with a compressed air stirrer until a homogeneous consistency is achieved.
- Move the stirrer along the bottom and sides of the mixing vessel.

Application

- Apply the adhesive evenly using brush or whitewash brush / wide brush.
Do not use rollers.
- Avoid accumulations.
- Substrate steel: the adhesive is applied to the substrate once.
- Substrate stainless steel / grey cast iron: the adhesive is applied to the substrate twice.

NOTE!

To avoid condensation, the substrate, rubber sheet and adhesive must never be colder than the ambient temperature at the application area. This is particularly important to observe when the weather changes from cold to warm and humid. A higher risk of condensation also exists when the relative humidity is > 70 %.

Remedies

- Use air dryers.
- Heat up the rubber sheets above ambient temperature prior to adhesive application.

Pre-Treatment of Rubber Sheets With KCH-Diluent 5 or Seam-Solution 2104/N1

- Apply KCH-Diluent 5 to rubber sheet (adhesive side + bevelled cuts).
- Apply Seam-Solution 2104/N1 to older rubber sheets and seams.
- After waiting time, the rubber sheet is rolled up in release liners. The ends of the release liners must be sealed with scotch tape so that no threads can adhere. Intermediate storage of the rubber sheet rolled up in release liners at most 60 minutes.

KCH-Diluent 5

Yield per 8 kg package	≈ 80 m ²
Number of application steps	1
Consumption per m ²	0.100 kg

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	5 minutes
Maximum waiting time	10 minutes

Seam-Solution 2104/N1

Yield per 18 kg package	≈ 180 m ²
Number of application steps	1
Consumption per m ²	0.100 kg

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	15 minutes
Maximum waiting time	24 hours

Application

- The application is applied using brush. Avoid the formation of puddles.

Walkability During Rubber Lining

NOTE! The fresh, unvulcanized rubber sheets are sensitive. Wear shoes with soft, smooth soles. Do not wear safety shoes, as this may cause damage.

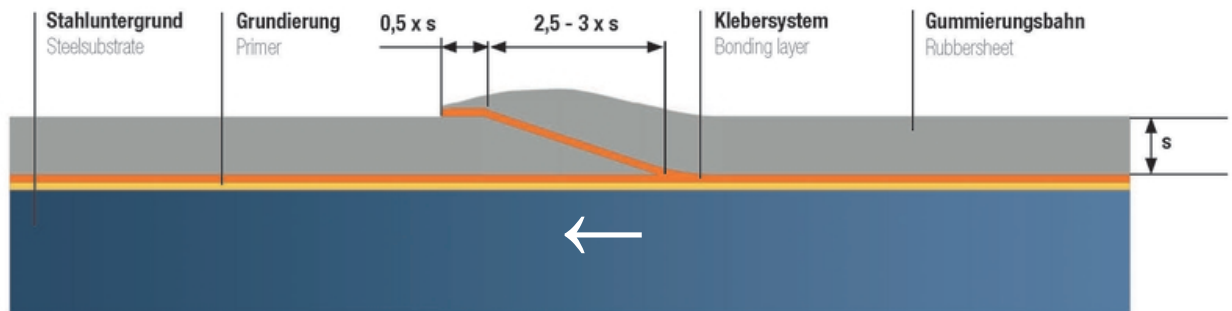
Particularly exposed areas, such as walkways, can be covered with Keraprotect (article 6077005000) to prevent mechanical damage.

Application Rubber Sheets

- Observe waiting times.
- Place the cut-to-size rubber sheets so that they are free of tension.
- Press on lightly by hand.
- On a flat, smooth substrate, scrape the rubber sheet firmly using a heated iron or scraper, or carefully roll it firmly with a roller ≈ 30 mm wide.
- Seams, corners and edges must be firmly rolled with a rounded roller ≈ 3 mm wide.

Formation of Seams

The seams are formed according to DIN EN 14879-4 with bevel cut overlap. See the scheme below



The pointed end of the bevelled cut must be oriented in the direction of flow.

Multi-Layer Rubber Lining**Pre-Treatment of Rubber Sheets With KCH-Diluent 5**

- Cut the seams of the lower rubber sheets smooth.
- Apply KCH-Diluent 5 once to the adhesive side of the lower and upper rubber sheet.
- Apply the rubber sheet with staggered seams.

KCH-Diluent 5

Yield per 8 kg package	$\approx 80 \text{ m}^2$
Number of application steps	2 (1 x adhesive side lower rubber sheet + 1 x adhesive side upper rubber sheet)
Consumption per adhesive side per m^2	0.100 kg
Consumption total per m^2	0.200 kg

Application-Relevant Times

Times	20 °C
Minimum waiting time between application steps	5 minutes
Maximum waiting time	10 minutes

Application

- The application is applied using brush. Avoid the formation of puddles.

Rubber Lining of Pipes

A rubber hose is pre-fabricated according to the nominal diameter of the pipe.

Pipes DN < 50

- Apply KCH-Diluent 5 generously to the pre-assembled rubber hose.
- Pull it wet into the pipe.
- Allow the solvent to evaporate completely.
- After evaporation of solvents press the hose carefully against the pipe wall.

Pipes DN 50 to DN 125

- Apply Vulkodurit-Adhesive LS3A to the inside of both ends of the pre-assembled rubber hose.
- Wait for at least 30 minutes.
- Close one end of the hose tightly.
- Blow compressed air through an opening of ≈ 10 mm at the other end.
- Close the blown-up rubber hose tightly.
- Pull the rubber hose quickly into the pipe using a rope.
- Pull a suitable ironing plug coated with ironing solution through the pipe to press the rubber lining onto the pipe wall without creating bubbles.

Pipes > DN 125 to < DN 500

- Pull the pre-fabricated into the pipe using a non-stick coated fabric, ensuring that required waiting times are observed.
- Remove the non-stick coated fabric.
- Pull a suitable rubber plug (rubber bulb) through the pipe to press the rubber lining onto the pipe wall without creating bubbles.

Vulcanization

Vulcanization Workshop

Autoclave Vulcanization With Hot Air

Vulcanization pressure ≥ 4.0 bar

The pressure must be achieved prior to heating up and must not be lowered before the cooling down process is finished.

Vulcanization Temperatures

Heat up	in 180 minutes to 80 °C in 90 minutes to 105 °C in 90 minutes to 138 °C	Hold for 2 hours Hold for 2 hours
Plateau	≈ 18 hours	hold at 138 °C
Cooling down	in 60 minutes to 110 °C in 150 minutes to 80 °C	

If the autoclave is loaded differently, program changes in the heating time are necessary.

Testing

Test Specifications

The tests are carried out in according to the standards specified for the respective test points.

Documentation is carried out using the relevant Test-Records.

Testing Before Vulcanization / Post-Treatment

1. Visual testing of the system for any visible defects such as bubbles, inclusions, inequalities, cracks seam defects or mechanical damage.
2. Pore test according to "Initial test".
3. Elimination of damaged areas before vulcanization, see "repair".

Testing After Vulcanization / Post-Treatment

Testing for Shore D Hardness

Testing Standard DIN ISO 7619-1

Target value 72 ± 5 at 23 °C, measured at the vulcanized rubber lining.

Layer Thickness Test on Steel

Testing Standard DIN EN 14879-4

Target value $\geq$ specified thickness of the rubber lining - 10 %. Please observe the project-specific agreements.

The measurement is carried out with a magnetic inductive layer thickness tester, e.g. of the company Elektro-Physik.

Adhesive Strength Test

Testing Standard DIN EN ISO 4624

The test is carried out on sample plates which have been produced simultaneously to the lining works.

- Tapping test with hammer and chisel.

Target for the appearance of fracture: conchoidal chipping in pieces.

Testing of Tightness

Testing Standard DIN EN 14879-4

Elmed ISOTEST inspect 35 test device, earthed.

Measurement Parameters

Thickness of the rubber lining	Adjustment	Display sensitivity	Test voltage (kV)
3 mm	3.7	1	15
4 mm	6.0	1	20
5 and 6 mm	8.3	2	25

Further Tests

Subsequent tests are only permissible with 3 kV/mm thickness of the rubber lining.

Repair / Connections

When carrying out repairs to rubber linings, the same guidelines must be observed as for the application of the rubber lining itself.

NOTE! **Parts subject to heavy wear must only be repaired after consultation with our applications engineering team. Otherwise, there is a risk of further damage to the repaired areas, particularly blistering.**

Repair Before Vulcanization

- Cut out any defective areas of the rubber lining right down to the substrate.
- Bevel the edges where they meet the remaining rubber lining.
- Roughen up the exposed substrate.
- Cut a suitable strip of rubber sheet.
- Bevel the edges of the rubber strip.
- Apply the rubber strips as described under 'Mixing Ratios / Consumption / Application'.

Repair After Vulcanization

- Cut out any defective areas of the rubber lining right down to the substrate.
- Bevel the edges where they meet the remaining rubber lining.
- The remaining rubber lining must be firmly adhered to the substrate.
- Grind off the remaining rubber lining affected by the medium until you reach the unaffected material.
- Roughen up any overlapping surfaces and exposed substrate.
- Cut a suitable strip of rubber sheet.
- Bevel the edges of the rubber strip.
- Apply the rubber strips as described under 'Mixing Ratios / Consumption / Application'.

Repair Areas With a Diameter < 300 mm

- Roughen the surface of the newly applied rubber lining.
- Apply a second layer of rubber sheet.
- The seams of the first layer must be covered.
- Cover several repair areas within a small area with a single second layer.
- Vulcanization of the repair areas in accordance with the application engineering team.

Safety / Disposal

- Ensure sufficient ventilation, especially when working in closed rooms, pits or containers.
- No smoking / no fire.
- Observe the safety data sheets, hazard warnings and safety advice on the containers.
- Wear the appropriate personal protective equipment. Avoid direct contact of the material with the skin.
- Clean and care for hands with skin protection soap and ointment. Do not use solvents.
- Wear a dust mask when grinding, e.g. during repairs.
- Follow the operating instructions in accordance with §14 Hazardous Substances Ordinance and Technical Rules for Hazardous Substances TRGS 507.
- Comply with the accident prevention regulations of the employers' liability insurance associations.
- Avoid direct contact of the materials with the flame, pay particular attention to welding beads during welding work.
- Preferably use residual quantities.
- Do not pour residues down the sink or into the dustbin.
- Collect residual quantities for disposal separately in durable, sealable and labelled containers.

The information in this product information corresponds to our current technical knowledge and experience. They only represent general guidelines and average values. A legally binding assurance of certain properties or suitability for a specific purpose cannot be derived from this.

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