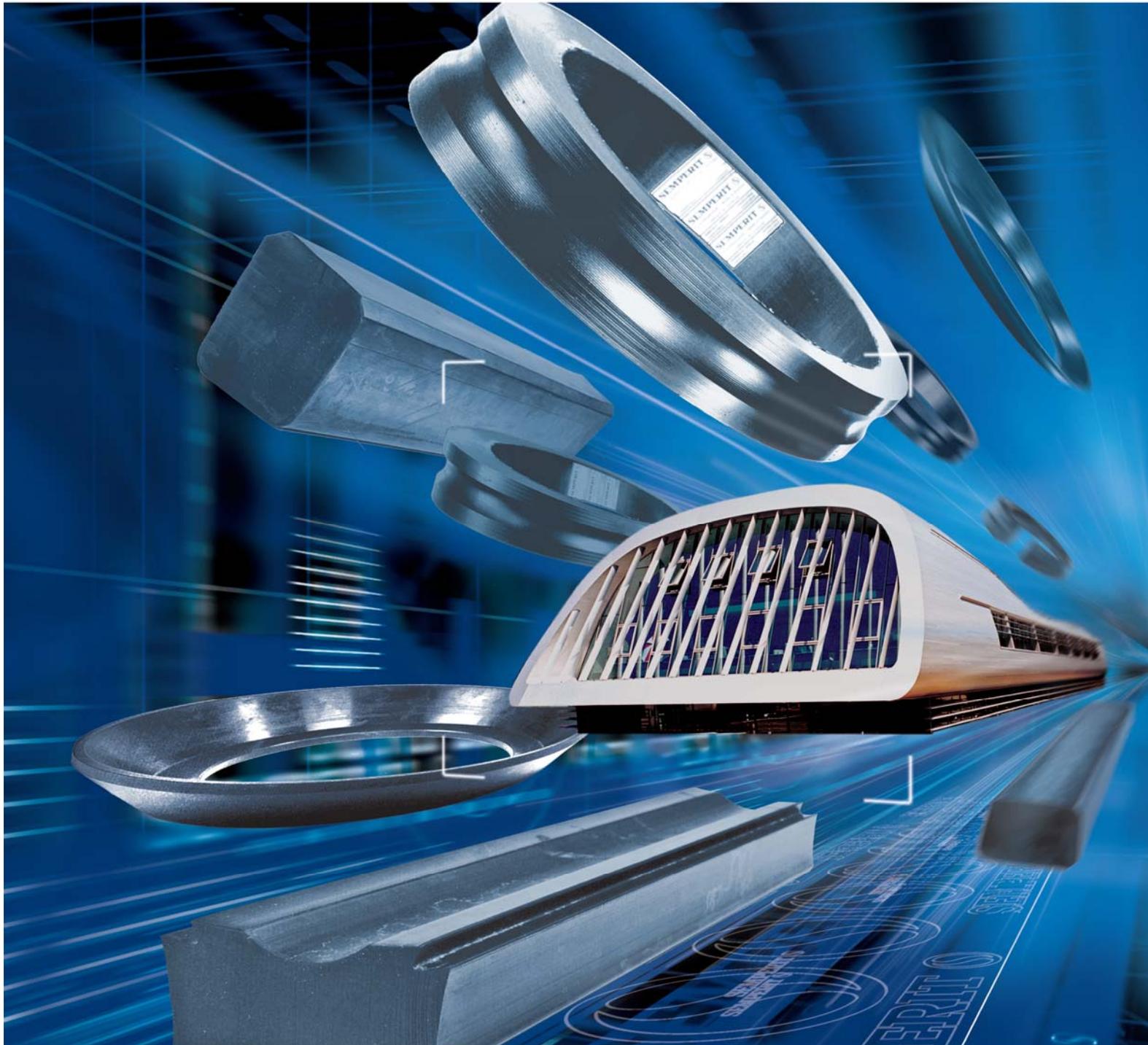


SEMPERIT 

USER Instructions bull wheel liners

ROPEWAY ENGINEERING



semperform[®] 
A MEMBER OF THE SEMPERIT-GROUP

SEMPERFORM ROPEWAY ENGINEERING USER INSTRUCTIONS BULL WHEEL LINERS

Overview

This user instruction sheet contains important information on Semperit bull wheel liners for skilifts. In detail this document contains only information on bull wheel lines made from rubber.

This user instruction sheet does not include the sheave liners, the pressed liners which are open on one side and individual constructions for specialised fields of application.

For detailed information on the products mentioned above please order detailed documentation separately.

This user instruction sheet contains information about the responsibility of the operator and is intended for professionals. If you have any questions please don't hesitate to ask our team.



© Doppelmayr Seilbahnen GmbH - bull wheel liner

Selection of the correct bull wheel liner



Do only apply bull wheel liners for skilifts on specified bull wheels. Any change of the bull wheel makes user defined pretesting necessary.

That constitutes a hazardous change of operational performance.

Consequences that might occur could be, for example, overheating, breakdown, or derailling.

Only parts made by Semperit are allowed to set in service as so called Semperit original spare parts. Only use spare parts whose technical specification meets the needs of the plant manufacturer.

The electrical conductivity of the liner is defined by the plant manufacturer. It is imperative that all spare parts must have the same electrical conductivity.

If any problems occur please contact our team or the after sales department of your plant manufacturer.

Under no circumstances rework the bull wheel liners. No changes to the liner profile are necessary nor permitted.



Damaged or snagged bull wheel liners must be renewed. It is **not permissible** to set used bull wheel liners back in service. Damage in the structure of the bull wheel liner is not visible on the surface.

Storage of bull wheel liners

The characteristics of the product could change in case of inappropriate conditions during storage or by improper use of goods.

Goods made with rubber change their product characteristics continuously over time, in order to slow down this process it is important to minimize exposure to oxygen, ozone, heat, solar radiation, solvents, and compression or stress.

The bull wheel liners have to be stored at low air temperature and ideally in darkness. Temperature should be in between -10°C and +25°C.

The distance between the product and the nearest heat source (e.g. radiator) must be at least 1 meter. The specification for storage and attendance is defined in DIN 7716 (ISO 2230) standard.

Semperit bull wheel liners for skilifts may contain the materials A2432 or A438 which are classified at B2 as flammable.

(DIN4102-1 „Fire behaviour of building materials and components, Part 1: Building materials – Definitions, requirements and testing, issue May 1998, Section 6.2).

It is important to check every liner before application on the bull wheel. Although Semperit is certified by ISO 9000, damages might have occurred during delivery. Potential damages on the surface of the liner (e.g. burrs, nicks, etc.) mean the liner must be scrapped using appropriate methods. In case of inappropriate handling the liner might get damaged. Any deformation or other damage has to be checked by the plant manufacturer.

Maximal period of storage

We are unable to determine a maximal period of storage. In Addition to our general terms and conditions, Semperit provides a minimal mileage of 30.000km for original Semperit bull wheel liners. This warranty is valid 18 months after start-up, but no longer than 2 years after delivery.

The physical characteristics change due to the conditions during storage. If any damages, hardenings, stainings, cracks, outbursts, deformations, soaked or sticky or any other changes to the conditions at delivery are visible, the bull wheel liner must not set in operation.

Before the application of a proper liner by the criteria's mentionend above later than 2 years after delivery, every liner has to be checked seperatley. The responsibility for the duration of storage is in the hands of the operator.

Cutting to length of a bull wheel liner

Typically the bull wheel liner has to be cut to the correct length. The viscoelastic rubber is optimized for a high operation performance, but on the other hand hard to cut.

Be aware of your safety: We suggest **cutting** the liner **with safety gloves**.

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We suggest cutting the bull wheel liner by punching. Take care of your safety and object the rules of the punching machine manufacturer.

If you cut the bull wheel liner by a motor saw, be aware not to overheat the rubber.

We suggest cutting the rubber only by a low drive of the motor saw. Rubber that might overheat has to be cooled down by clear water or soap water. **Do not use oil or grease.**

If you cut the bull wheel liner to length by a knife, we suggest using a hollow ground knife. **Do not use a serrated knife.**

To make sure doing a proper cutting site, mark the cut line before cutting the liner. Use clear water to cool the rubber.

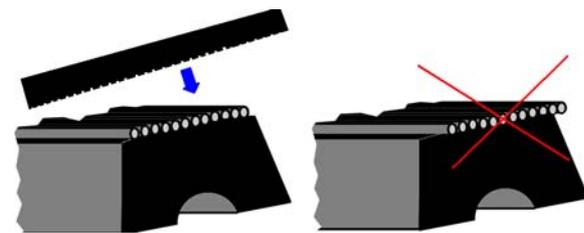
We recommend to bend the liner during cutting minimizing friction.



Cutting to length of a bull wheel liner

Cutting to length of a liner with a reinforcement material

Bull wheel liners from Semperit with a reinforcement material (wires of steel) have to be cut to length by a hacksaw. At first the reinforcement material has to be cut, at second the rubber profile. The cutting site has to be plane.



Cutting to length of a liner with a reinforcement material



Be aware of sharp edged steel wires. Use **protective equipment** (gloves, etc.) by cutting.

Application of the bull wheel liner

If you have any questions concerning the application process, please feel free to ask the plant manufacturer. He is happy to give you any advice on handling the application process.



The application has to be done by the standards of the plant manufacturer.

Typically the liner is pressed in the groove of the bull wheel by mechanical force. In some cases you'll need special

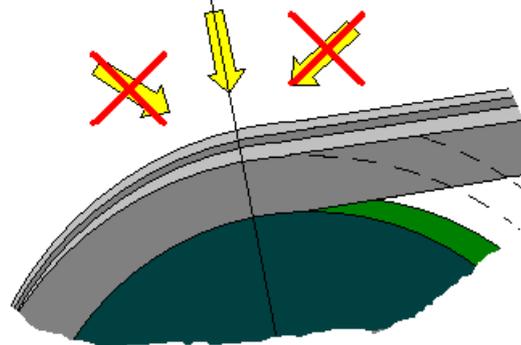
equipment for the pressing process. Please take care of the user instructions of your plant manufacturer.

Check the groove of the bull wheel on damages and abrasion before mounting the liner. Repair any damages on the surface, in case the liner might get damaged. Report the damages immediately to the manufacturer of the plant.

Clean the groove of the bull wheel before mounting the liner. Take care to remove any oily or greasy stains.

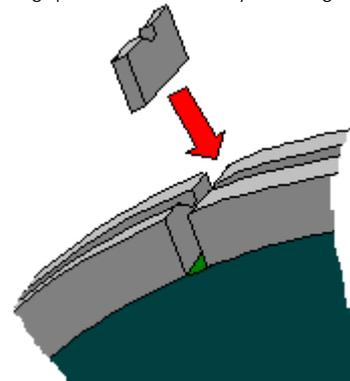
Attention: Because of potential chemical reactions no parts of the solvent should remain on the groove. We suggest cleaning the groove with clean water.

The liner has to be pressed by radial force, in case the rubber gets damaged. Be aware not to tighten or expand the liner this might result a gap after a short time.



The liner has to be pressed only by radial force

The gap should be filled by inserting a smaller piece of liner.



Inserting a smaller piece of liner

Do not damage the liner during the application. Cracks and slices on the liner have lots of influence of the operational performance to the liner. In case there might occur hazardous disruptions of the liner, do not mount damaged bull wheel liners.



To simplify the mounting process, lubricate the bull wheel liner and the groove with clean water or soap water. **Under no circumstances should oil or grease be used to lubricate the liner.** It is not allowed to use any solvent to clean the rope.

To prevent the liner from slipping once it is mounted on the bull wheel use only a minimal amount of soap water during the application process.

The application of too much soap water will result in a slipping liner.

Inspection before start-up

After the successful application, the liner has to be checked visually. First of all the rubber has to fit on the bull wheel and be mounted centrally. If there are any mountains or valleys the liner has to be removed.

Notice: Semperit bull wheel liners are manufactured with bigger production dimensions than assembly dimensions. It's due to assure a high operation performance.

Run-in

Before a bull wheel liner could be handled by operation conditions, it should run for about 2 to 4 hours at low performance and low speed (2 to 3 m/s) This has a positive influence on the lifecycle performance of the liner.

Exposure of bull wheel liners

The admissible exposure of liners (velocity and load) was defined by the plant manufacturer during the engineering process; it is not acceptable to exceed the permissible strain.

Ongoing inspections



In any case the **required inspections written by the plant manufacturer** must be done.

The following inspection has to be done additionally:

Daily:

Visual inspections of the bull wheel liner by the daily check run. If any damage or other shortcomings occur, the liner has to be checked carefully.

Any kind of unusual abrasion, unevenness or carbonization could be a sign of functional failure. Any contamination of oil or grease has to be cleaned.

The use of cleaning agents or solvents is not acceptable. Cleaning with water is accepted, but only if water temperature does not exceed 25°C and the surface of the liner is not harmed. It's not allowed to clean the liner with a pressure washer.

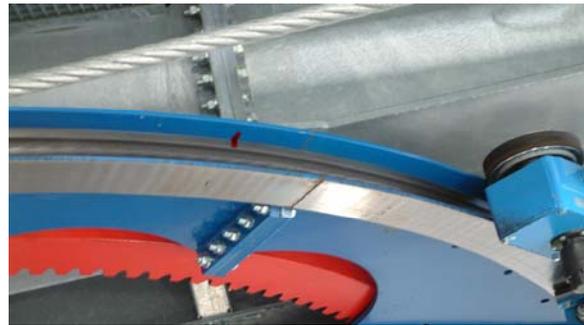
Furthermore the liner has to be checked acoustically. If any sounds are unusual the liners have to be checked carefully.

Once a week:

Once a week the liners have to be inspected for abrasion, operating temperature and hardness. Therefore only few liners should be inspected by randomized examination.

We recommend checking the operating temperature by an infrared working temperature sensor. To check the operating temperature the plant should be stopped after all-out operation. Also the temperature on the surface has to be checked. The operating temperature will rise slowly after stopping the plant, but will reach its peak within a few minutes. The maximum value is the operating temperature.

Under no circumstances use any temperature sensor which pierces the liners. This could harm the liner seriously.



Method to check gliding of the bull wheel liner

Once a year:

It is necessary to check every liner in the plant, if any damage, abrasion or hardness are visible.

If any problems on a particular bull wheel liner occur, these liners have to be checked regularly.

We strongly recommend keeping records containing the information mentioned below :

- Date of changing the liners
- Operational performance listed in miles or operating hours
- Date of inspection of individual liner
- Measured values checked by inspections (operational temperature, hardness, etc.)
- Any kind of unusual incidents or observations

Maintenance of the rope

Oil or grease are materials that are related to rubber and have influences on the product characteristics of the liners. Semperit has developed a wide knowledge in the production of rubber materials. We know that the operational service of a liner can be seriously affected by the smallest of changes. In particular when the rope has to be changed. We suggest that in case you have to change the rope it's very important to change the liners too.

1) Interaction of greasy rope and rubber

Requirements on lubricant regarding the interaction of the materials are written in chapter A.2.2. of EN 12385-8. The inspection has to be done by DIN ISO 1817 (DIN 53521). The inspection has to be done by a standardized temperature of 50°C to make a benchmark possible.

Grease which does not fit the requirement, is not allowed to be used. This is because any physical characteristics might change significantly. In case of a newly developed grease, we recommend to analyse any potential chemical abrasion of the grease on the liner.

Only products which meet the requirements are allowed to be applied. This method does not specify the amount of grease to be used .

2) Amount of grease

The lubrication should be limited to the strands of the rope (chapter 5.3.1. "Schmierung" in EN12385-8).

Any grease, even if it's tested by the specification mentioned above, has influence in the physical specifications of rubber.



That's why the amount of grease should be as little as possible; otherwise it could harm the liners. Take care that only the strands should be lubricated, because grease could harm the liners.

A **thick amount of grease** on the rope or on the liner is **not permissible**.

3) Solvent

Because of potential chemical reactions the lubricant and the solvent must not corrode the liners.

The solvent must evaporate after the application process and vaporize within a few minutes. It should only be used on small areas of material.

Change of bull wheel liners

Liners for skilifts made from rubber are subjected to uneven abrasion and wear like automotive tyres. This is due to many factors like temperature, environment, etc.

Obey the instructions of the plant manufacturer.

Typically we find one of three cases:

1) Mechanical abrasion

Mechanical abrasion has to be checked regularly. The specification of the plant manufacturer has to be observed. The liner is applied correctly if the rope puts only radial force on the bull wheel.

If any abrasion occurs, this could be an indication of an incorrect mounting of the liner. In this case we suggest notifying your plant manufacturer.

Worn bull wheel liners may affect the safety of passengers. Therefore the minimum profile diameter of the bull wheel liner must be defined by the plant manufacturer.

2) Thermal corrosion of bull wheel liners

Because of dynamic strain the rubber warms itself up (churning of the rubber).

The point of maximum heat is located a few millimetres under the surface of the groove.

The hardening process of the rubber is accelerated by high air temperature.

At the beginning of the hardening process only slight impacts are visible on the surface of the liner, typically in form of crack-lines.

Next the bottom of the groove breaks open and the liner crumbles. This process might happen within a short amount of time. Thermal corrosion can occur very quickly if the plant is subjected even to short periods of overloading.



Thermal corrosion of bull wheel liners

Cracks, high hardenings (rise of 5 Shore A) or high operating temperature (over 80°C) is a significant sign of thermal abrasion.

Measuring the correct operating temperature is listed in the section on daily inspections.

If there are any holes besides hair-line cracks visible on the surface the bull wheel liner has to be renewed.

If any questions occur please don't hesitate to contact the plant manufacturer.

3) Miscellaneous reasons of breakdown

Beside the two major reasons for liners failing, many other causes like lightning, frozen liners, lack of grease, etc. could

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damage the liner. If any of these reasons mentioned above applies to your plant, please contact your plant manufacturer.



For safety reasons do not use damaged liners.

You are welcomed to contact us for help in investigating the failure.



Typical damage of improper use of grease

Bull wheel liners which appear to be giving an unusual operational performance, have an unusual appearance, unusual sound of operation or slipping of the bull wheel liner might be damaged. The cause of the problem must be clarified. Please notify your plant manufacturer.

summary

Grade of abrasion	task
Abrasion of the bull wheel liner more than defined standard of plant manufacturer	swap
Small cuts on the surface of < 1mm	Daily observation
Thermal abrasion	swap
Rise of hardness more than 5 Shore A	swap
Operation temperature > 80°C	Swap the liner, please contact your plant manufacturer
Corrosion on surface	Swap the liner, please contact your plant manufacturer
Worn sheave liner	swap
Damage by lightning or equivalent	Swap the liner, please contact your plant manufacturer
non typical body structure or sound of operation	please contact your plant manufacturer

Demounting of bull wheel liners

The demounting of the bull wheel liner has to be done under the user instructions of your plant manufacturer. Be aware not to damage the groove of the bull wheel. Any damages have to be repaired before mounting the liner.

We recommend to documentate the hours of operation, mileage and abrasion of the bull wheel.



Do not make any changes on your plant. Any changes have to be reported to your plant manufacturer. **Do not change the profile of bull**

wheel liner without noticing your plant manufacturer. This is a hazardous intervention in your plant.

Attention: Take care that any changes on your plant, especially on security-relevant components, are subjected the law.

Disposal

If you don't offend against any standard or law, national or international, the liners should be disposed like car tyres.

We suggest disposing of your used bull wheel liners by dumping or by thermal recycling in plants that are state approved. Disposal by burning without any environmental protections is against the law.

To safeguard our environment, we suggest to dispose of your used bull wheel liners by a professional recycling company who has specialized on recycling of rubber.



Under no circumstances set any used bull wheel liner back in service again even if it's renewed by turning or grinding.

Warning:

Information like figures, calculations, test values or data is based on our customer advice. It is the result of tests conducted over years. Since the application of the product may have an impact on the use of the product, this information is meant only as a rough guide. In each individual case it is the task of the customer alone to examine if the specific quality criteria of our products are sufficient for the specific purpose of application. Inappropriate use, excessive load or admission with non-permissible media may impair the function of our products. Our experts are glad to answer any of your questions.

Any and all transactions concluded with SEMPERIT shall be based on our General Terms and Conditions. We assume warranty and liability based on our General Terms and Conditions, applicability of any other general terms and conditions shall be excluded. Liners and lining strips for bull wheel and conveyor belts shall be subject to special warranty provisions; warranty claims do especially not exist if a defect can be traced back to external impacts, e.g. improper storage, installation maintenance or inappropriate or improper use, order specifications, negligence and natural wear as well as interference with the product by the customer or third persons.

In Addition to our general terms and conditions we provide a minimal mileage of our bull wheel liners of 30.000 km. This warranty is valid for 18 months started by date of operation, but at maximum for a period of two years started by date of delivery.

The Semperit gurantee applies if any defect in quality occurs within the time listed above provided that:

- a) User instructions have been observed,
- b) The maintenance for the rope used grease, mentioned in chapter „maintenance of the rope“ recommended has been tested on potential chemical reactions. Moreover the tests had been accomplished by no chemical reactions,
- c) The strain on the textile carcass has reached it's maximum strain capacity only for a short amount of time,
- d) Notify Semperit as soon as possible, in case of problems in product quality.

We can only provide warranty if the delivered product has any failures which can be investigated on production or material failures. In that case we will provide a compensation delivery and charge the difference of today's price and warrantee minimal mileage.

We cannot accept warranty if any problem occur in case of invalid storage, invalid application, invalid maintenance, invalid product characteristics specifications, any interventions of third parties etc.



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