

Prüfbericht / Test Report

Nr. / No. AL340.0

**über die Prüfung eines Korrosionsschutzmittels für Bremsscheiben
hinsichtlich der Auswirkungen auf die Bremswirkung**

***Concerning the test of a corrosion inhibitor for brake discs regard-
ing the effect on braking efficiency***

**TÜV NORD Mobilität
GmbH & Co. KG**
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Sitz der Gesellschaft:
Hannover, HRA 27006
Geschäftsführer
Dr. Robert Plank (Vors.)
Hartmut Abeln
Thorsten Walingner

**1 Name / Anschrift des Antragstellers /
Applicant's Name and Address:**

KENT International SAS
29 Rue Charles Edouard Jeanneret
CS 70001 Technoparc
FR-78306 Poissy Cedex
FRANCE

**2 Technische Merkmale /
Technical Features:**

- 2.1 Produkt / *Product*: Korrosionsschutzspray / *Corrosion Protection
Spray (Aerosol)*
- 2.2 Marke / *Make*: KENT
- 2.3 Typ / *Type*: Brake Disc Rust Protection

3 Aufgabenstellung / Test Purpose

Es sollte beispielhaft an einem serienmäßigen Pkw nachgeprüft werden, ob sich das Bremsverhalten und die Bremswirkung bei bestimmungsgemäßer Anwendung des Sprays KENT BRAKE DISC RUST PROTECTION verändert. / *It must be checked with the use of a standard passenger vehicle, whether the braking performance was altered with the application of KENT BRAKE DISC RUST PROTECTION.*

Vom Antragsteller wurde zur Verfügung gestellt / *The following was provided by the Applicant:*

- 2 Spraydosen / *2 aerosol cans* KENT BRAKE PARTS CLEANER 2, P/N 83920 11, S/C: BPC2
- 2 Spraydosen / *2 aerosol cans* KENT BRAKE DISC RUST PROTECTION P/N 86416, S/C: BDRP
- 1 Merkblatt bezüglich Anwendung und der technischen Daten für / *1 document regarding the application and the technical properties of* KENT BRAKE DISC RUST PROTECTION
- 1 EG-Sicherheitsdatenblatt gemäß / *1 EC technical safety document according to* 1907/2006/EG, Artikel 31

Hersteller / *Manufacturer:*

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Marke und Typ / *Make and Type:*

KENT Brake Disc Rust Protection

4 Prüfungen / Tests

4.1 Fahrversuche / Vehicle Test

- nach Absprache mit dem Auftraggeber / *as discussed with the applicant*
Prüfergebnisse siehe Pkt. 6 / *See section 6 for test results*

4.1.1 Prüffahrzeug / Test Vehicle

- Messgeräte für / *Measurement equipment for:*

Geschwindigkeit, Verzögerung /
Velocity, Deceleration:

Peiseler Messsystem mit V-Box III und
Auswertung DB Print, Software Version 1.31 /
*Peiseler measurement system with V-Box III
and evaluation DB Print, software release 1.31*

Bremssdruck /
Brake Line Pressure:

GULBINAT-Manometer, Klasse 1,0 /
GULBINAT pressure gauge, class 1.0

Bremsscheiben-Temperatur /
Temperature of Discs:

Temperaturmessgerät Greisinger GTH 1170 mit
Handfühler SKF NiCr-Ni / *Greisinger GTH 1170
temperature gauge with hand-operated sensor
SKF type NiCr-Ni*

Prüfmasse /
Mass of Test Vehicle:

MWT Achslastwaage / *MWT axle scale*

4.1.2 Prüfstrecke / Test Track

Ort / *Location:*

Essen (D)

Art / *Surface:*

Beton / *Concrete*

Zustand / *Condition:*

trocken / *dry*

Prüfdatum / *Test Date:*

20. + 21.04.2015

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Marke und Typ / *Make and Type:* KENT Brake Disc Rust Protection

4.2 Technische Merkmale des Prüffahrzeugs / *Technical Description of the Test Vehicle:*

Fabrikmarke / <i>Make:</i>	VOLKSWAGEN
Typ und Handelsbezeichnung / <i>Type and Trade Name:</i>	AU / GOLF VII 1.2 TSI
Fahrzeug-Ident.-Nr. / <i>Chassis-No.:</i>	WWWZZZAUZEW152404
Fahrzeugklasse / <i>Category of Vehicle:</i>	M ₁
Genehmigungsnr. der Bremsanlage / <i>Approval No. of the Brake System:</i>	E4-13HRESC-000358*02 Corr.01
Reifengröße / <i>Tyre Size:</i>	205/55 R16
Motorleistung / <i>Engine Power:</i>	77 kW
Hauptzylinder / <i>Master Cylinder:</i>	Serie / <i>Series</i>
Bremsdruckminderung / <i>Pressure Reduction:</i>	elektronische Bremskraftverteilung / <i>Electr. Brake Force Distribution (EBD)</i>
Bremskraftverstärker / <i>Booster:</i>	Unterdruck / <i>Vacuum</i>
Bremskreisaufteilung / <i>Distribution of Brake Circuits:</i>	DIN 74000 - X
Radzylinder (Achse 1/2) / <i>Wheel Cylinder (Axle 1/2):</i>	∅ 57,00 mm / ∅ 38,00 mm
Bremsscheibe (Achse 1) / <i>Brake Disc (Axle 1):</i>	∅ 285 x 25 mm, belüftet / <i>ventilated</i>
Bremsscheibe (Achse 2) / <i>Brake Disc (Axle 2):</i>	∅ 272 x 10 mm, massiv / <i>solid</i>

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Marke und Typ / *Make and Type:*

KENT Brake Disc Rust Protection

Rüstzustand / <i>Test Condition</i>	Original / <i>Original</i>
Bremsbelag / <i>Brake Lining</i>	
Marke u. Typ (Achse 1) / <i>Make and Type (Axle 1):</i>	JURID 201 FF
Marke u. Typ (Achse 2) / <i>Make and Type (Axle 2):</i>	TEXTAR T4402 FG
Prüfmasse / <i>Mass of Test Vehicle</i>	
beladen Gesamt / Achse 1/2 <i>Laden Total / Axle 1/2:</i>	1730 kg / 920 kg / 810 kg

5 Prüfungen / *Tests*

Vor den Fahrversuchen wurden die Bremsbeläge des angelieferten Fahrzeugs konditioniert, um stabile Reibwerte zu garantieren. Dazu wurde das Fahrzeug im Stadtverkehr aus unterschiedlichen Geschwindigkeiten sowie mit unterschiedlichen Bremsdrücken abgebremst. Die dabei maximal erreichten Temperaturen an den Bremsscheiben betragen ca. 300°C. Nach dem Aufheizen wurden die Bremsen abgekühlt und durch kurze, intensive Bremsungen aus geringer Geschwindigkeit wieder gereinigt. Diese Putzstopps erfolgten wieder aus kalter Bremse ($\leq 100^{\circ}\text{C}$) und wurde solange durchgeführt, bis sich ein allgemein stabiler Reibwert einstellte. Die Konditionierung wurde nach jeder Versuchsreihe erneut durchgeführt.

Die im Folgenden beschriebenen drei Versuchsreihen erfolgten jeweils mit beladenem Fahrzeug:

1. ohne KENT BRAKE DISC RUST PROTECTION
2. 20 Minuten nach Einsprühen mit KENT BRAKE DISC RUST PROTECTION
3. 20 Stunden nach Einsprühen mit KENT BRAKE DISC RUST PROTECTION

Jede Bremsung erfolgte aus der Ausgangsgeschwindigkeit von 50 km/h bis zum Stillstand. Der Bremsdruck betrug jeweils 40 bar, alle Bremsungen wurden aus kalter Bremse ($\leq 100^{\circ}\text{C}$) durchgeführt. Bei jeder Bremsung wurde der Bremsdruck an der Vorderachse, die Fahrzeuggeschwindigkeit sowie die Verzögerung aufgezeichnet.

Für jede Versuchsreihe wurden nacheinander 7 Bremsungen durchgeführt, gefolgt von einer neuen Konditionierung für die nächste Versuchsreihe. Weiterhin wurden die Brems-scheiben nach jeder Versuchsreihe zunächst mit dem KENT BRAKE PARTS CLEANER 2 gereinigt, ohne die Räder zu entfernen. Nach der Reinigung hatten die Bremsscheiben 20 Minuten lang Zeit, um zu trocknen. Nach der Trocknung wurde der KENT BRAKE DISC RUST PROTECTION Spray aus 10 cm Entfernung aufgesprüht. Nachdem die Scheiben eingesprüht waren, wurden die Räder gedreht, so dass die noch freien Bereiche der Bremsscheiben ebenfalls eingesprüht werden konnten. Entsprechend dem Kundenauftrag wurden die Räder für alle Versuche nicht demontiert. /

The braking components of the test vehicle were conditioned until a stable coefficient of friction was obtained. The conditioning procedure was performed in city traffic with brake applications performed at different vehicle velocities and vehicle deceleration rates. This was to ensure that a maximum temperature of approximately 300°C was achieved. After

the brake component conditioning procedure, the brakes were allowed to cool ($\leq 100^{\circ}\text{C}$) and another set of intense braking applications were performed to ensure, that the brake discs and pads were cleaned sufficiently. The brake cleaning applications were performed with an initial brake disc temperature less than 100°C and were performed until a stable coefficient of friction was obtained. The conditioning procedure was performed before the start of every new test series.

The testing procedure for KENT BRAKE DISC RUST PROTECTION with a laden vehicle was performed under three different conditions:

- 1. without KENT BRAKE DISC RUST PROTECTION*
- 2. 20 minutes after treatment with KENT BRAKE DISC RUST PROTECTION*
- 3. 20 hours after treatment with KENT BRAKE DISC RUST PROTECTION*

Every brake application was performed from an initial velocity of 50 km/h to a standstill with a brake line application pressure of 40 bar and an initial brake disc temperature of less than 100°C . During these deceleration events, the front axle brake line pressure, vehicle velocity and vehicle deceleration were monitored and recorded.

For all three test conditions, seven brake applications were performed followed by the conditioning process as stated above. The brake discs were then cleaned with KENT BRAKE PARTS CLEANER 2 without removing the wheels from the vehicle, and were allowed to dry completely (20 minutes). Once the brake discs were dry, KENT BRAKE DISC RUST PROTECTION was applied at a distance of 10 cm from the brake disc. After the brake discs were sprayed, the wheels were rotated to expose the untreated area under the brake pads and the untreated area was sprayed to ensure the discs were completely covered. It was requested by the customer, that the wheels should not be removed for product application.

6 Prüfergebnisse / Test Results

Aus der ersten Versuchsreihe ohne KENT BRAKE DISC RUST PROTECTION wurde für die Verzögerung ein Mittelwert von $4,86 \text{ m/s}^2$ errechnet. Dieser Wert wurde als Referenzwert für die nächsten beiden Versuchsreihen angewendet.

Die zweite Versuchsreihe wurde 20 Minuten nach der Anwendung des KENT BRAKE DISC RUST PROTECTION durchgeführt. Nach der Trocknungszeit von 20 Minuten war die Oberfläche noch nicht vollständig getrocknet und noch leicht klebrig. Bei der ersten Bremsung aus kalter Bremse zeigte sich, dass die Verzögerung im Vergleich mit dem ohne Spray erzielten Mittelwert geringfügig abgesunken war. Der erzielte Wert war aber immer noch in einem akzeptablen Bereich.

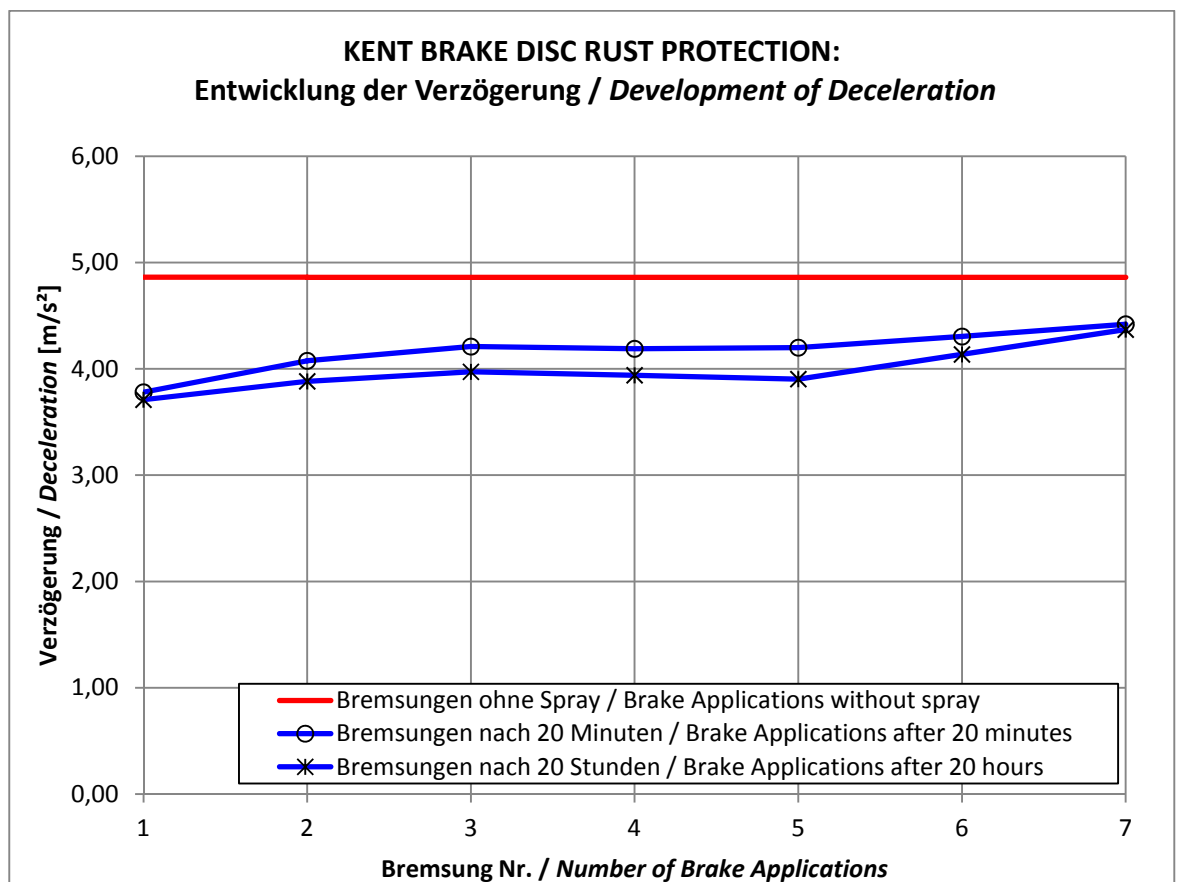
Die dritte Versuchsreihe wurde 20 Stunden nach der Anwendung des KENT BRAKE DISC RUST PROTECTION durchgeführt. Vor Beginn der Versuche wurde festgestellt, dass der Lackauftrag durchgehärtet und oberflächlich trocken war. Während des ersten Bremsung war deutlich ein knurrendes Geräusch hörbar, welches man auch häufig beim Einfahren von neuen Bremsbelägen feststellen kann. /

Through the performance of the first braking series without KENT BRAKE DISC RUST PROTECTION, an average vehicle deceleration of 4.86 m/s^2 was achieved. This value was used as a reference for the following two test series.

The second braking series was performed 20 minutes after KENT BRAKE DISC RUST PROTECTION was applied. After a drying time of 20 minutes, the surface coat on the brake discs was not completely dry but slightly tacky. During the first brake application (cold braking) it was clear the vehicle experienced a lower rate of deceleration when compared with the following deceleration values. However, when this value was compared with the cold braking deceleration value from the first series, the cold values from both tests were very similar and was deemed acceptable.

The third braking series was performed after a waiting period of 20 hours. Upon inspection of the brake discs, the KENT BRAKE DISC RUST PROTECTION had formed a clear surface coat on the brake discs which, when touched, felt hardened. During the first brake application, a grinding sound similar to that of when new brake pads are conditioned was heard. Once the brakes were released from a standstill, the brake pads were again strongly adhered to the brake disc. When an attempt to move the vehicle was made, the vehicle lifted slightly as if the parking brake was engaged before the brake pads were able to break free.

Das folgende Bild zeigt die Reibwertentwicklung bei den oben beschriebenen Fahrversuchen. / The following diagram shows the development of the coefficient of friction as described above during the vehicle tests.



7 Zusammenfassung / *Conclusion*

Die Versuche mit KENT BRAKE DISC RUST PROTECTION wurden erfolgreich absolviert. Alle gemessenen Verzögerungswerte in beiden Versuchsreihen waren im zulässigen Bereich. Nach jeweils einigen Bremsungen war die Wirkung des Schutzsprays weitgehend verschwunden und die Messwerte pendelten sich auf den Werten ohne Einsatz des Sprays ein. Das Korrosionsschutzmittel beeinträchtigte nicht die Sicherheit des Fahrzeugs während der vom TÜV NORD durchgeführten Fahrversuche unter den spezifizierten Randbedingungen. /

It was determined that KENT BRAKE DISC RUST PROTECTION successfully completed the testing procedure. During both braking series with KENT BRAKE DISC RUST PROTECTION, all deceleration values were within the acceptable deviation range when compared to the deceleration values without the corrosion protection spray. After a short series of brake applications, the vehicle brake components were restored to the original condition and function with no residual effects of the corrosion protection observable. The corrosion protection did not effect vehicle safety during the TÜV NORD test procedure under the pre described test conditions.

8 Anmerkungen und Empfehlungen / *Remarks and Recommendations*

Auffällig bei der ersten Versuchsreihe (nach 20 Minuten) war, dass die Bremsbeläge beim Anfahren nach dem Stillstand mit den Bremsscheiben leicht verklebt waren. Dies äußerte sich durch deutlich vernehmbare Geräusche beim Losbrechen der Bremsbeläge von den Bremsscheiben. Diese Geräusche waren ebenfalls bei den nächsten 4 Bremsversuchen hörbar. Nach sechs Bremsungen war der Reibwert stabil. Beim Anfahren waren keine Geräusche mehr hörbar.

Auch in der zweiten Versuchsreihe (nach 20 Stunden) trat erneut der Effekt zutage, dass die Bremsbeläge beim Anfahren nach dem Stillstand mit den Bremsscheiben verklebt waren. Beim Losbrechen der verklebten Bremsbeläge von den Bremsscheiben waren erneut deutliche Geräusche hörbar. Diese Geräusche nahmen bei den Folgebremssungen immer stärker ab. Nach der fünften Bremsung waren keine Geräusche mehr wahrnehmbar.

Auffällig war, dass sich auf den Bremsscheiben zahlreiche verharzte, dunkle Placken, bestehend aus dem Bremsscheibenschutzspray vermischt mit Bremsbelagabrieb, gebildet hatten. Nach der abschließenden Neu-Konditionierung der Bremsanlage waren diese Placken vollständig verschwunden und der mittlere Reibwert war wieder auf das Anfangsniveau von vor den Versuchen mit dem Bremsscheibenschutzspray angestiegen.

Um sicherzustellen, dass die festgestellten Phänomene (Verkleben, Geräusche, schwarze Placken auf den Bremsscheiben) nicht auftreten, wird empfohlen, den Schutzauftrag, vor Benutzung eines mit KENT BRAKE DISC RUST PROTECTION behandelten Fahrzeugs, vollständig abzubremsen. Während der durchgeführten Versuche war die Beschichtung bei mittlerer Verzögerung aus 50 km/h nach 5 - 10 Bremsungen verschwunden. /

It was clear during the first test procedure (after 20 minutes), when the brakes were release from a standstill, the brake pads were lightly adhered to the brake disc. This was noticed through a loud "cracking" sound when the brakes were released. The same sound was heard for the following four brake applications (see diagram below for deceleration development). After six brake applications, the coefficient of friction stabilized and there

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were no sounds during the braking process and when the brakes were released from a standstill.

Similarly during the second test procedure (after 20 hours) a loud “cracking” sound was clearly audible when the brakes were released. This sound and adherence of the brake pads to the brake discs occurred during the next three stops. After the fifth consecutive stop there were no audible sounds when the brakes were released.

After the tests were completed of both brake series’ with KENT BRAKE DISC RUST PROTECTION, black residue of the spray was clearly visible on the discs which was hardened onto the disc surface. However, after the completion of each test series the brake components were re-conditioned. This process completely cleaned the spray residue from the disc surface and the coefficient of friction was regenerated to the original condition value.

To ensure the pre described phenomena (adhesion, noise and black residue on brake discs) does not occur, it is recommended to clean the brake discs applied with KENT BRAKE DISC RUST PROTECTION through a series of brake applications. The corrosion protection was removed from the brake discs through a series of 5 – 10 stops with an initial velocity of 50 km/h and a vehicle deceleration ranging from 3 – 7 m/s².

9 Anlagen / Appendix

1 Merkblatt bezüglich Anwendung und der technischen Daten für / *1 document regarding the application and the technical properties of KENT BRAKE DISC RUST PROTECTION*

1 EG-Sicherheitsdatenblatt gemäß / *1 EC technical safety document according to 1907/2006/EG, Artikel 31*

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Geschäftsstelle Essen, 03.06.2015

Fil/Zahn
- 10653 -

Institut für Fahrzeugtechnik und Mobilität
Fachbereich Bremssysteme


Dipl.-Ing. Zahn



BRAKE DISC RUST PROTECTION



UPDATED 25/08/2015



A clear coat based product to protect brake discs against corrosion and flush rust during a medium to long period of vehicle inactivity.

Tested by TÜV NORD according to test report AL340.0*.

*on www.kenteurope.com

P/N°:

- 86416 (S/C: BDRP) - 500 ml Aerosol

Features & Benefits

- Prevents the formation of corrosion and flush rust on brake discs
- Based on a transparent clear coat system
- The protection removes automatically by brake applications
- Silicon free
- Tested by TÜV NORD
- Attractive and beneficial appearance of the vehicle for automobile trade
- No visual interference of high-quality alloy rims
- No need to disassemble the wheels and clean the brake discs before vehicle running
- Safe to use in body shops
- The protection does not effect the vehicle safety by intended use

Applications

Depending on the weather conditions, brake discs tend to build corrosion and flash rust even after a short period of vehicle inactivity. With the KENT rust protection sprayed onto the visible surface of the brake disc, the coating prevents the development of both, corrosion and flash rust, and the initial appearance of it will stay as it is.

Instructions

1. Prior to preservation clean the brake discs with KENT BRAKE PARTS CLEANER 2 (83920) and allow to dry.
2. Shake well before use.
3. Spray the product with the extended straw from a distance of 10 - 15 cm evenly until a sealed protective coating is existing on the brake disc and allow to dry.

Note

1. Don't spray the KENT BRAKE DISC RUST PROTECTION onto a hot brake disc.
2. The protection will be removed automatically after a short series of brake applications. During this procedure a cranking sound can be noticed caused by the release of the brake pads which could be lightly adhered to the brake disc. However, the performed TÜV test (test report AL340.0) confirmed that the rust protection did not effect vehicle safety during the TÜV NORD test procedure under the specified test conditions. The deceleration values were within the acceptable deviation range when compared to the deceleration values without the KENT protection spray. To ensure that the friction level will be recovered to its initial value, it's recommended to clean the brake discs through a series of 5 brake applications with an initial velocity of 50 km/h. After completion of the 5 stops the brake components were re-conditioned and thereby any possible spray residues and noise generation by breakaway force eliminated.
3. Excess product in moist condition on other surfaces can be removed easily with a cloth.

DS670

Hints & Tips



Certificate No. 1427
ISO 9001:2008

BRAKE DISC RUST PROTECTION

**Technical Information**

Appearance:	Colourless, clear coating	
Consistency:	Aerosol – after evaporating solid coating	
Odour:	Specific solvent	
Density at 20°C:	0,760 - 0,790 g/cm ³	
Dust Dry:	After approx. 5 minutes at 20°C / rF: 50 %	} Depending on the weather, the drying times can be differ.
Grip Dry:	After approx. 15 minutes at 20°C / rF: 50 %	
VOC:	627,1 g/L	
Customs Tariff Code:	320 820 90	
Accessoires:	Second nozzle with 200 mm straw	
Shelf Life:	36 months	
SDS:	Yes	
Product Availability:	86416 (S/C: BDRP) - 500 ml with label code 10, 23 and 42	

In order to provide you with the most appropriate Personal Protective Equipment when using our products, KENT advises that you follow the guidelines on the packaging of the product before use. The guidelines are there for your protection and KENT provides a range of Personal Protection Equipment such as clothing, eye glasses, goggles, face shields and breathing apparatus, complying with the latest European legislation. If you require further advice then please phone our freephone number and we will be pleased to help you.
Telephone: 0800 / 136925

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T: Freephone 0800 / 136 925 between 08:30 - 17:30 Monday - Thursday, 09:00 - 15:00 on Fridays.
For out of hours queries please Fax us on 01383 / 735829 or Email: KENTsales.UK@kenturope.com

Safety data sheet according to 1907/2006/EC, Article 31

Printing date 26.06.2015

Version number 2

Revision: 26.06.2015

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name: **Brake Disc Rust Protection**

Article number: 86416

1.2 Relevant identified uses of the substance or mixture and uses advised against

No further relevant information available.

Application of the substance / the mixture Coating material

1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier:

KENT (United Kingdom) Ltd

Pitreavie Crescent

Pitreavie Business Park

Dunfermline

Fife

KY11 8UQ

Tel: +44 1383 737393 / +44 800 136925

Fax: +44 1383 620079

Monday - Thursday 8.30am - 5.30pm, Friday 9.00am - 3.00pm

SDS@kenteurope.com

1.4 Emergency telephone number:

Tel: 01383 737393 During normal office hours - Monday - Thursday 8.30am - 5.30pm, Friday 9.00am - 3.00pm

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008



GHS02 flame

Flam. Aerosol 1 H222-H229 Extremely flammable aerosol. Pressurised container: May burst if heated.



GHS07

Eye Irrit. 2 H319 Causes serious eye irritation.

STOT SE 3 H336 May cause drowsiness or dizziness.

Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC



F+; Extremely flammable

R12: Extremely flammable.

R52/53-67: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Vapours may cause drowsiness and dizziness.

Information concerning particular hazards for human and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Warning! Pressurised container.

Has a narcotising effect.

Classification system:

The classification is in line with current EC lists. It is expanded, however, by information from technical literature and by information furnished by supplier companies.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 The product is classified and labelled according to the CLP regulation.

(Contd. on page 2)

Safety data sheet

according to 1907/2006/EC, Article 31

Printing date 26.06.2015

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Revision: 26.06.2015

Trade name: Brake Disc Rust Protection

(Contd. of page 1)

Hazard pictograms

GHS02 GHS07

Signal word Danger**Hazard-determining components of labelling:**

Hydrocarbons, C9-C10, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Hazard statements

H222-H229 Extremely flammable aerosol. Pressurised container: May burst if heated.

H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness.

H412 Harmful to aquatic life with long lasting effects.

Precautionary statements

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P251 Do not pierce or burn, even after use.

P211 Do not spray on an open flame or other ignition source.

P261 Avoid breathing mist/vapours/spray.

P280 Wear protective gloves / eye protection.

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P410+P412 Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Other hazards**Results of PBT and vPvB assessment****PBT:** Not applicable.**vPvB:** Not applicable.**SECTION 3: Composition/information on ingredients****3.2 Chemical characterisation: Mixtures****Description:** Mixture of the substances listed below with harmless additions.**Dangerous components:**

CAS: 64742-48-9 EINECS: 265-150-3 Reg.nr.: 01-2119471843-32	Hydrocarbons, C9-C10, n-alkanes, isoalkanes, cyclics, < 2% aromatics Xn R65 R52/53-66-67 Flam. Liq. 3, H226; Asp. Tox. 1, H304; STOT SE 3, H336; Aquatic Chronic 3, H412	25-50%
CAS: 106-97-8 EINECS: 203-448-7 Reg.nr.: 01-2119474691-32	Butane (containing < 0.1 % butadiene (203-450-8)) F+ R12 Flam. Gas 1, H220; Press. Gas C, H280	10-25%
CAS: 74-98-6 EINECS: 200-827-9 Reg.nr.: 01-2119486944-21	Propane liquefied F+ R12 Flam. Gas 1, H220; Press. Gas C, H280	5-15%
CAS: 67-63-0 EINECS: 200-661-7 Reg.nr.: 01-2119457558-25	Propan-2-ol Xi R36; F R11 R67 Flam. Liq. 2, H225; Eye Irrit. 2, H319; STOT SE 3, H336	5-15%
CAS: 75-28-5 EINECS: 200-857-2 Reg.nr.: 01-2119485395-27	isobutane F+ R12 Flam. Gas 1, H220; Press. Gas C, H280	<3%

Additional information For the wording of the listed risk phrases refer to section 16.**SECTION 4: First aid measures****4.1 Description of first aid measures****After inhalation** Supply fresh air; consult doctor in case of symptoms.**After skin contact** Instantly wash with water and soap and rinse thoroughly.**After eye contact** Rinse opened eye for several minutes under running water. Then consult doctor.**After swallowing** In case of persistent symptoms consult doctor.

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- **4.2 Most important symptoms and effects, both acute and delayed** No further relevant information available.
- **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

SECTION 5: Firefighting measures

- **5.1 Extinguishing media**
- **Suitable extinguishing agents** CO₂, sand, extinguishing powder. Do not use water.
- **For safety reasons unsuitable extinguishing agents** Water with a full water jet.
- **5.2 Special hazards arising from the substance or mixture** No further relevant information available.
- **5.3 Advice for firefighters**
- **Protective equipment:**
Do not inhale explosion gases or combustion gases.
Wear self-contained breathing apparatus.
- **Additional information**
Cool endangered containers with water spray jet.
Collect contaminated fire fighting water separately. It must not enter drains.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective equipment. Keep unprotected persons away.
Keep away from ignition sources
Ensure adequate ventilation
- **6.2 Environmental precautions:**
Inform respective authorities in case product reaches water or sewage system.
Do not allow to enter drainage system, surface or ground water.
- **6.3 Methods and material for containment and cleaning up:**
Ensure adequate ventilation.
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose of contaminated material as waste according to item 13.
- **6.4 Reference to other sections**
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling** Ensure good ventilation/exhaustion at the workplace.
- **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Pressurized container: protect from sunlight and do not expose to temperatures exceeding 50 °C, i.e. electric lights. Do not pierce or burn, even after use.
Do not spray on flames or red-hot objects.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage**
- **Requirements to be met by storerooms and containers:**
Store in cool location.
Observe official regulations on storing packagings with pressurised containers.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**
Store in cool, dry conditions in well sealed containers.
Protect from heat and direct sunlight.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see item 7.

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· 8.1 Control parameters

· Components with limit values that require monitoring at the workplace:

106-97-8 Butane (containing < 0.1 % butadiene (203-450-8))

WEL Short-term value: 1810 mg/m³, 750 ppm
 Long-term value: 1450 mg/m³, 600 ppm
 Carc (if more than 0.1% of buta-1.3-diene)

67-63-0 Propan-2-ol

WEL Short-term value: 1250 mg/m³, 500 ppm
 Long-term value: 999 mg/m³, 400 ppm

· DNELs

64742-48-9 Hydrocarbons, C9-C10, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Oral	Acute-systemic	125mg/kg bw/day (Consumer)
Dermal	Acute-systemic	125 mg/kg (Consumer)
	Long term systemic	208mg/kg bw/day (Worker)
Inhalative	Acute-local	900 mg/m ³ (Consumer)
	Long term systemic	871 mg/m ³ (Worker)

67-63-0 Propan-2-ol

Oral	Long term-systemic	26 mg/kg bw/day (Consumer)
Dermal	Long term systemic	319mg/kg bw/day (Consumer)
		888mg/kg bw/day (Worker)
Inhalative	Long term systemic	89 mg/m ³ (Consumer)
		500 mg/m ³ (Worker)

· PNECs

67-63-0 Propan-2-ol

PNEC	140.9 mg/L (Aqua (freshwater))
	140.9 mg/L (Aqua (intermittent))
	140.9 mg/L (Aqua (marine water))
	552 mg/Kg (Freshwater sediment)
	552 mg/Kg (Marine water sediment)
	28 mg/Kg (Soil)

· **Additional information:** The lists that were valid during the compilation were used as basis.

· 8.2 Exposure controls

· Personal protective equipment

· **General protective and hygienic measures** Wash hands during breaks and at the end of the work.

· Breathing equipment:

Only during spraying without adequate removal by suction.

Short term filter device:

Filter AX.

· Protection of hands:

Protective gloves.

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

· Material of gloves

Wear suitable gloves tested to EN 374.

Nitrile rubber, NBR

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

· Penetration time of glove material

Value for the permeation: Level ≤ 480 min (level 6)

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection: Tightly sealed safety glasses.

· Body protection: Protective work clothing.

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SECTION 9: Physical and chemical properties

· 9.1 Information on basic physical and chemical properties

· General Information

· Appearance:

Form:	Aerosol
Colour:	Colourless
Odour:	Characteristic
Odour threshold:	Not determined.

· pH-value: Not determined.

· Change in condition

Melting point/Melting range:	Not determined
Boiling point/Boiling range:	Not applicable, as aerosol

· Flash point: Not applicable, as aerosol

· Inflammability (solid, gaseous) Not applicable.

· Ignition temperature:

Decomposition temperature: Not determined.

· Self-inflammability: Product is not selfigniting.

· Danger of explosion: Product is not explosive. However, formation of explosive air/steam mixtures is possible.

· Critical values for explosion:

Lower:	Not determined.
Upper:	Not determined.

· Vapour pressure: Not determined.

· Density at 20 °C 0.77 g/cm³

· Relative density Not determined.

· Vapour density Not determined.

· Evaporation rate Not applicable.

· Solubility in / Miscibility with

Water: Not miscible or difficult to mix

· Partition coefficient (n-octanol/water): Not determined.

· Viscosity:

dynamic:	Not determined.
kinematic:	Not determined.

· Solvent content:

Organic solvents: 627g/l VOC

· 9.2 Other information No further relevant information available.

SECTION 10: Stability and reactivity

· 10.1 Reactivity

· 10.2 Chemical stability

· Thermal decomposition / conditions to be avoided: No decomposition if used according to specifications.

· 10.3 Possibility of hazardous reactions No dangerous reactions known

· 10.4 Conditions to avoid No further relevant information available.

· 10.5 Incompatible materials: No further relevant information available.

· 10.6 Hazardous decomposition products: No dangerous decomposition products known

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

LD/LC50 values that are relevant for classification:

64742-48-9 Hydrocarbons, C9-C10, n-alkanes, isoalkanes, cyclics, < 2% aromatics

Oral LD50 >5000 mg/kg (Rat)

Dermal LD50 >3000 mg/kg (Rabbit)

Inhalative LC50 (4hr) 4951 mg/m3 (Rat)

106-97-8 Butane (containing < 0.1 % butadiene (203-450-8))

Inhalative LC50 (4hr) 658 mg/m3 (Rat)

67-63-0 Propan-2-ol

Oral LD50 4570 mg/kg (Rat)

Dermal LD50 13400 mg/kg (Rabbit)

Inhalative LC50 (4hr) 30 mg/m3 (Rat)

Primary irritant effect:

• **Serious eye damage/irritation** No irritant effect.

• **Respiratory or skin sensitisation** No sensitizing effect known.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic toxicity:

64742-48-9 Hydrocarbons, C9-C10, n-alkanes, isoalkanes, cyclics, < 2% aromatics

EL50 (72hr) >1000 mg/l (Pseudokirchneriella subcapitata)

ELO (48hr) 1000 mg/l (Daphnia magna)

LL50 (96hr) >1000 mg/l (Oncorhynchus mykiss)

NOELR 100 mg/l (Pseudokirchneriella subcapitata) (72 hrs)

67-63-0 Propan-2-ol

EC50 (48hr) 13299 mg/l (DAP)

LC50 (24hr) 9714 mg/l (Daphnia magna)

LC50 (96hr) 4200 mg/l (FSH) (dynamic)

LOEC (8 days) 1000 mg/l (Algae)

• **12.2 Persistence and degradability** No further relevant information available.

• **12.3 Bioaccumulative potential** No further relevant information available.

• **12.4 Mobility in soil** No further relevant information available.

Ecotoxicological effects:

• **Remark:** Harmful to fish

Additional ecological information:

General notes:

Water danger class 3 (German Regulation) (Self-assessment): extremely hazardous for water.

Do not allow product to reach ground water, water bodies or sewage system, even in small quantities.

Danger to drinking water if even extremely small quantities leak into soil.

Harmful to aquatic organisms

12.5 Results of PBT and vPvB assessment

• **PBT:** Not applicable.

• **vPvB:** Not applicable.

• **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

• **Recommendation** Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

SECTION 14: Transport information

· 14.1 UN-Number

· ADR, IMDG, IATA UN1950

· 14.2 UN proper shipping name

· ADR 1950 AEROSOLS
 · IMDG AEROSOLS
 · IATA AEROSOLS, flammable

· 14.3 Transport hazard class(es)

· ADR



· Class 2 5F Gases.
 · Label 2.1

· IMDG, IATA



· Class 2.1
 · Label 2.1

· 14.4 Packing group

· ADR, IMDG, IATA Void

· 14.5 Environmental hazards:

· Marine pollutant: No

· 14.6 Special precautions for user

Warning: Gases.
 · Kemler Number: -
 · EMS Number: F-D,S-U

· 14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

· Transport/Additional information:

· ADR

· Limited quantities (LQ) 1L
 · Excepted quantities (EQ) Code: E0
 Not permitted as Excepted Quantity
 · Transport category 2
 · Tunnel restriction code D

· IMDG

· Limited quantities (LQ) 1L
 · Excepted quantities (EQ) Code: E0
 Not permitted as Excepted Quantity

· UN "Model Regulation":

UN1950, AEROSOLS, 2.1

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SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

National regulations

Technical instructions (air):

Class	Share in %
NK	38.0

Water hazard class: Water danger class 3 (Self-assessment): extremely hazardous for water.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases

H220 Extremely flammable gas.

H225 Highly flammable liquid and vapour.

H226 Flammable liquid and vapour.

H280 Contains gas under pressure; may explode if heated.

H304 May be fatal if swallowed and enters airways.

H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness.

H412 Harmful to aquatic life with long lasting effects.

R11 Highly flammable.

R12 Extremely flammable.

R36 Irritating to eyes.

R52/53 Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R65 Harmful: may cause lung damage if swallowed.

R66 Repeated exposure may cause skin dryness or cracking.

R67 Vapours may cause drowsiness and dizziness.

Department issuing data specification sheet: Environment protection department

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

DNEL: Derived No-Effect Level (REACH)

PNEC: Predicted No-Effect Concentration (REACH)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

Flam. Gas 1: Flammable gases, Hazard Category 1

Flam. Aerosol 1: Flammable aerosols, Hazard Category 1

Press. Gas C: Gases under pressure: Compressed gas

Flam. Liq. 2: Flammable liquids, Hazard Category 2

Flam. Liq. 3: Flammable liquids, Hazard Category 3

Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2

STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

Asp. Tox. 1: Aspiration hazard, Hazard Category 1

Aquatic Chronic 3: Hazardous to the aquatic environment - Chronic Hazard, Category 3

Data compared to the previous version altered. *