SURA CHEMICALS

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SurAChem® VG 03

PRETREATMENT DEVICE

2021

Product and application information

SurA Chemicals GmbH

Passion for chemistry

SurAChem® VG 03

Surface Pretreatment Device

For the increase of adhesion on various material surfaces

Our company

Welcome to SurA Chemicals GmbH. The company has a long experience and an extensive know-how in the fields of protective and decorative coatings, adhesives, special chemicals such as hydrophobic agents and adhesion promoters, systems and equipment for surface pretreatment, as well as contract manufacturing for the development and production of customer-specific products.
The focus of our technologies and innovative products is on the sectors of chemical industry, automotive, micro/-electronics, electrical engineering, healthcare, optics, glass & metal industry, plastics processing, printing and graphics industry, as also solar technology.
The company is TÜV certified according to DIN EN ISO 9001: 2015. Our products comply with the RoHS directive and are registered according to the REACH regulation. The devices manufactured in our house are CE-marked.
Furthermore, we are partners in international and national research projects and cooperate with large companies and institutes from various countries.

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Compliant in accordance to RoHS & REACH regulations

The SurASil® refill cartridges are compliant in accordance with the EU directive 2011/65/EC. All starting substances have been pre-registered according to the REACH regulations (EC) No. 1907/2006. The pretreatment device SurAChem® VG03 is CE cetrified. SurA Chemicals GmbH is certified with DIN EN ISO 9001:2015.

This product and application information is intended to ensure the correct use of the Pretreatment Device SurAChem® VG 03 and to prevent eventual mistaces that can lead to quality insufficiencies or adverse effects.

1. Surface silication

The pretreatment of surfaces by means of flame pyrolysis for the increase of adhesion on coatings, adhesives and printing media has been an established process in numerous industrial fields. A further significant improvement of the adhesive strength can be achieved by depositing a reactive silicate layer produced by flame pyrolysis. The combustion of a silane additive in a fuel gas atmosphere creates high-density and bonded silicate layers with high surface energy on a wide variety of material surfaces, such as metals, glass, ceramics and plastics.

Surface Silication

With the SurASil®-Process

By the SurASil® process, a gaseous, silicon-containing precursor is fed into the fuel gas mixture of a burner. The combustion energy of the flame creates highly reactive compounds that are deposited on the surface of the material. As a result, very dense and firmly bonded silicate layers (layer thickness approx. 20 - 100 nm) with high surface energy are formed on various material surfaces, such as metals, glass, ceramics, plastics and composite materials.

The environmentally friendly

& cost effective alternative

to common harmful chromate coatings and primer applications

Combustion Chemical Vapour Deposition (CCVD) is a very effective and cost-saving in-line procedure to enhance the wettability of surfaces by depositing highly reactive amorphous silicate layers (layer thickness approx. 20 - 100 nm). The surface silication is an environmentally friendly alternative to common harmful chromate coatings and primer applications! The effect of the SurASil® pretreatment of surfaces is shown in figure 1. The surface energy of the pretreated surface (figure 1 - right) is much higher than that of the untreated surface (figure 1 - left). Here are used the testing inks SurAChem® for qualitative testing of the surface energy. In combination with adhesion promotors with appropriate functionalities, this layer represents the basis for long-term, water- and solvent-stable adhesives, coatings and prints. Further applications of this technology are temporary corrosion protection as well as generation of diffusion barrier layers.

Figure 1: The effect of surface silication and the surface energy on aluminum material

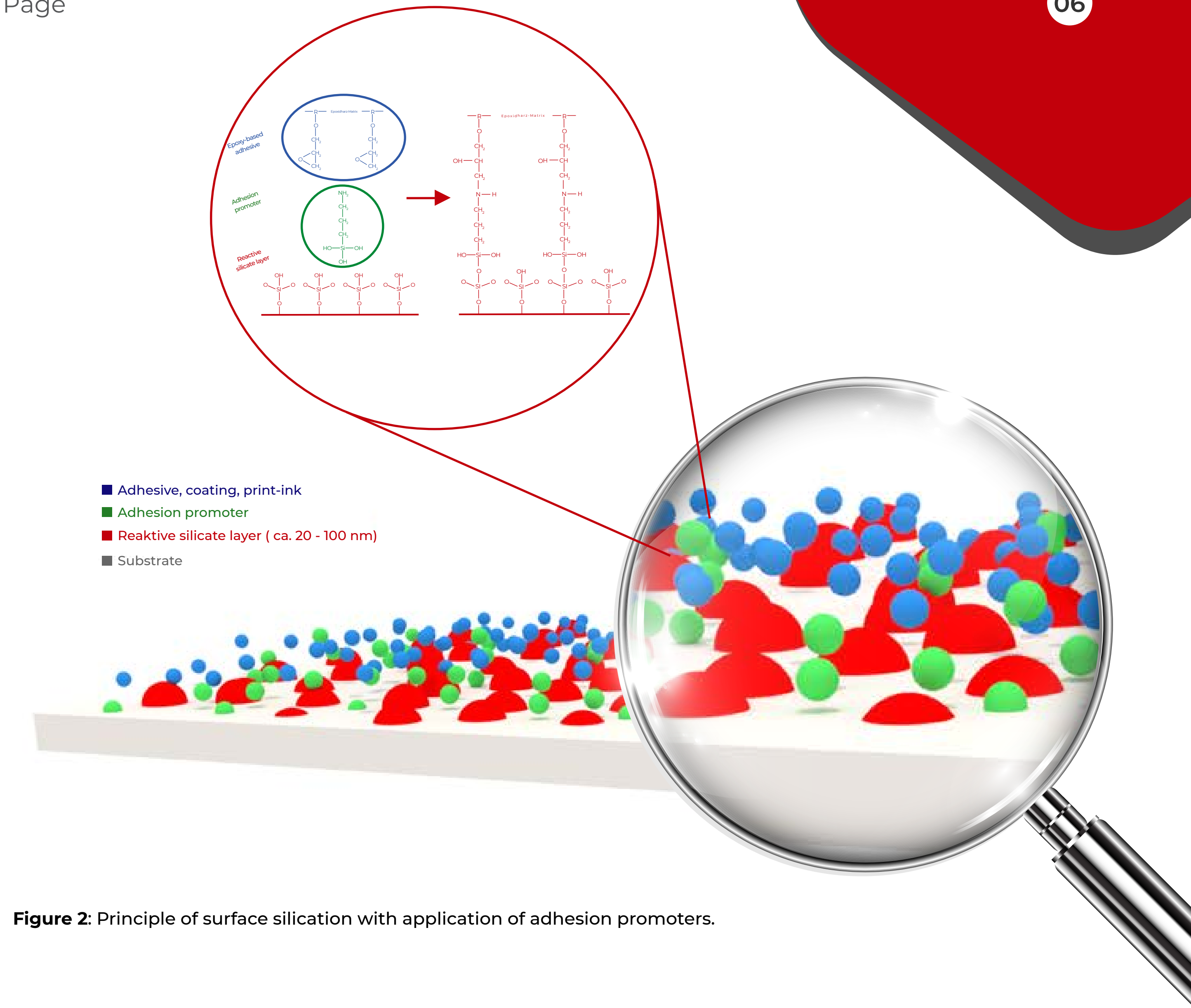

Figure 2: Principle of surface silication with application of adhesion promoters.

2. Pretreatment device SurAChem® VG 03

The new Pretreatment Device SurAChem® VG 03 is a device for surface silication, which works on the principle of flame pyrolysis. The new generation of Pretreatment Devices SurAChem® VG 03 offers smaler, more compact and lighter devices (>50 % lighter compared to previous model) to provide an easyier mobility of the device. The special burner holder with integrated fall protection allows safe and comfortable use. The L-arm with cartridge guiding serves also as handle during mobile use of the device. The modern design was optimized in ergonomics. Additionally, the powder-coated surface can be ordered in numoerous colors (ask for available range of colors).

Adhesion
Increase

on glass, metallic, plastic
and ceramic material surfaces

2.1. Scope of delivery

The Pretreatment Device SurAChem® VG 03 consists of a) a stand-mounted unit with burner connection and regulating valve for gas flow as well as a special L-arm with integrated cartridge guiding, b) a burner with a width of approx. 6.5 cm with flame regulating valve, c) a burner holder with integrated fall protection, d) an approx. 1.5 m long propane pressure hose (this can also be supplied in other lengths), as well as e) a refill cartridge SurASil® 600 (600 ml) with special silane additive. Product information and declaration of conformity for the device are included in delivery (available as printed instructions or in digital form). Under 2.6. Technical data you can find the technical characteristics of the Pretreatment Device SurAChem® VG 03.

2.2. Handling and preparing for use

2.2.1 General information

Before using the new Pretreatment Device SurAChem® VG 03 the following intructions and suggestions should be carefully studied. The observance of the handling instructions is part of of the guarantee. Changes in the factory-set adjustments and any interventions into the device invalidate the warranty.

2.2.2 Preparing for use

The stand-mounted unit should be placed on a stable surface (lab bench, workbench, etc.) or floor. By continuous usage of the pretreatment device is highly recommended an exhaust hood for suction of the generated combustion gas. For attachment of the propane pressure hose, figure 3 (7) to the basic unit as well as to the burner, use two open-ended spanners 19 und 17 mm (left-hand thread). The pressure hose can be removed from the basic unit for transport or exchange. Before restarting, the pressure hose is to tighten by left-hand turn. Never exchange the hose or the burner if the flame burns, the burner is hot or the basic unit is under pressure. When not in use, the burner connected to the basic unit by pressure hose, should be placed to the burner holder. The provided 600 ml SurASil® cartridge should be shaken shortly and after it is turned up side down it should be fitted and appropriately screwed into the basic unit. The device is ready for use.

2.3 Initial operation

In principle, the Pretreatment Device SurA-Chem® VG 03 has to be used at room temperature in the temperature range from +15 °C to +35 °C. For starting the burner, initially open the regulating valve for gas flow at the basic unit, figure 3 (2), rotation direction „+“ and afterwards the regulating valve for flame at the burner, figure 3 (5), rotation direction „+“. After pulling the hand lever (setting for operation), figure 3 (6), the burner can be ignited by a lighter or similar. The burner runs with tightened hand lever after igniting the flame, which is factory-set adjusted for optimal work. The release of the lever resets the burner to adjustment of pilot flame. Warning! The flame is not extinguished completely by released handle. Take care when putting down the burner – risk of fire! For short breaks the burner should be placed to the burner holder. Never let the ignited burner unsupervised. For longer breaks the burner has to be extinguished by closing the regulating valve for flame at the burner handle. After a continuous usage of the device (approx. 75 min / cartridge) the flame treatment has to pause for approx. 20 min.

2.3.1 Flame regulation

By turning the regulating valve for flame at the burner, figure 3 (5), rotation direction „+“ or rather „-“ the size of the flame can be enlarged or reduced slightly. The pilot flame can be enlarged turning the adjusting screw of the burner, figure 3 (4), clockwise. The adjusting screw is factory-set adjusted for optimal work. Warning! If the pilot flame is adjusted too small, it can extinguish and gas can release unburned.

Available in **numerous** colors

Ask for the available color palette

2.3.2 Turning off the burner

The regulating valve for gas at the basic unit, Figure 3 (2), will be closed, rotation direction „-“ and after completely extinguishing of the flame (approx. 1 min on full flame – pulled hand lever, figure 3 (6)) the regulating valve for flame at the burner, figure 3 (5), will be closed. If the work is interrupted for a longer period or at the end of work, the SurASil® refill cartridge should be unscrewed and the gas pressure in the device should be reduced in this manner. Only store the device with reduced pressure. Warning! After work the nozzle of the burner, figure 3 (3), is hot. The burner should be placed to the holder immediately.

Practicable, efficient and cost-effective

With special
burner holder
and integrated
fall protection

For secure and practicable application

Figure 3: Pretreatment device SurAChem® VG 03

2.4 Application

For immediate use, the actual workpiece is briefly treated by the outer (oxidizing) part of the flame (see figure 4). Never use the inner, blue (reductive) part of the flame. If necessary, reduce the lightning of the workplace for better recognition of the flame. In case of very small, thin-walled or heat-sensitive substrates it is advisable to repeat the treatment in small time intervals. Avoid local overheating. In general, the surface temperature of the substrates should not be higher than 150 to 200 °C. In case of heatsensitive polymers, e.g. PVC, the surface temperature should be lower than 60 - 80 °C. Large substrates should be preheated to approx. 50 °C+ before flame treatment to avid water condensation on the surface.

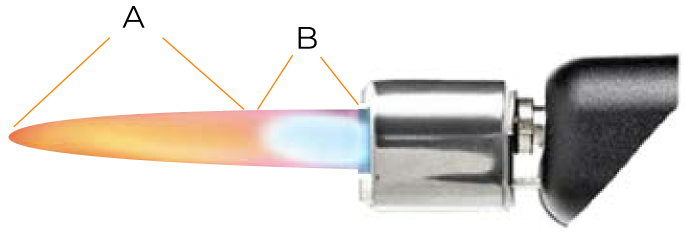

Figure 4: Flame A - oxidizing part (application part)
Flame B – reductive part

Pretreatment device

SurAChem® VG 03 for the increase of surface energy on various material surfaces

2.4.1 Pretreatment parameters

The duration of surface treatment highly depends on the type of the material being treated as also the treatmentspeed. It is suggested to preheat the substrates before treatment to approx. 50 °C. For metals, glass and ceramics as well as thick-walled plastics the treatment speed should be in the range of 10 and 50 cm / s. In case of thin-walled or temperature-sensitive in particular thermoplastic substrates, it is advisable to use a treatment speed of 50 to 100 cm / s and to repeat treatment in small time intervals if necessary. Avoid local overheating. In general, the desired effect is achieved at temperatures up to 150 °C. An exhaust hood should be used in any case. The most effective treatment speed and number of repetitions

2.4.1.1 Additional information regarding surface pretreatment of fluorine-containing polymers

Take care when treating the surface of PTFE and other fluoropolymers. Fluoropolymers start to decompose at temperatures above 350 °C. Some of these decomposition products are very toxic by inhalation. Therefore, it is essential to ensure that the surface pretreatment is carried out according the instructions at point 2, with permanent fanning and avoiding of substrate temperatures higher than 200 °C.

2.5 Refill cartridges SurASil®

The refill cartridges SurASil® are propane-butane gas mixtures, that are doped with a special precursor. The refill cartridges SurASil® are readyfor-use for the manual application onto different material surfaces using small manually operated flame treatment devices. The Pretreatment Device SurAChem® VG 03 includes 1 piece of refill cartridge SurASil® 600, suitable for metal, plastics and ceramics. Other refill cartridges SurASil® (with a volume of 600 ml) may be also acquired in combination with the Pretreatment Device SurAChem® VG 03 (see table 1).

Article	Content	Application	Additional properties
SurASil® 600	600 ml	Ideal for metal, glass and ceramic	suitable also for plastic
SurASil® 600 K	600 ml	Ideal for plastic	suitable also for metal, glass and ceramic
SurASil® 600 L	600 ml	Ideal for plastics with low adhesion properties	suitable also for metal, glass and ceramic
SurASil® 600 XL	600 ml	Ideal for plastics with very low adhesion properties	suitable also for metal, glass and ceramic

Table 1: Characterization of the refill cartridges SurASil® with content 600 ml

2.5.1 Storage

The storage stability of the SurASil® refill cartridges after delivery is under cool and dark conditions at least 12 months.

2.6 Technical data

Refill cartridges SurASil® (600 ml) - Technical data

Dimentions	H x D: 26 x 5 cm
Nett weight	600 ml / 330 g
Pressure	ca. 5 bar – max 10 bar at 50 °C

Pretreatment devide SurAChem® VG 03 - Technical Data

Flame temperature:	ca. 1300 °C
Operating temperature:	15 - 35 °C
Fuel gas:	Propan / Butan-mixtures with additives
Operating period:	ca. 75 min / refill cartridge
Dimenstions basic unit:	B x H x T: 300 x 470 x 120 mm
Weight basic unit:	ca. 2,4 kg
Treated area surface:	ca. 15 - 45 m^2

2.7 Safety and transport information

Information regarding hazards, labeling, safeguards, transport and disposal are given in the product-specific safety data sheets.

Our verbal and written application-technical consultation is the best to our knowlegde and belief and is a non-binding notice, also with regard to any third party property rights. However, this advice does not release the user of our products from carrying out their own testing for the intended purpose. Any liability only relates to the value of the products supplied by us and used by the user. Of course, we guarantee the perfect quality of our products in accordance with our sales and delivery conditions.

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