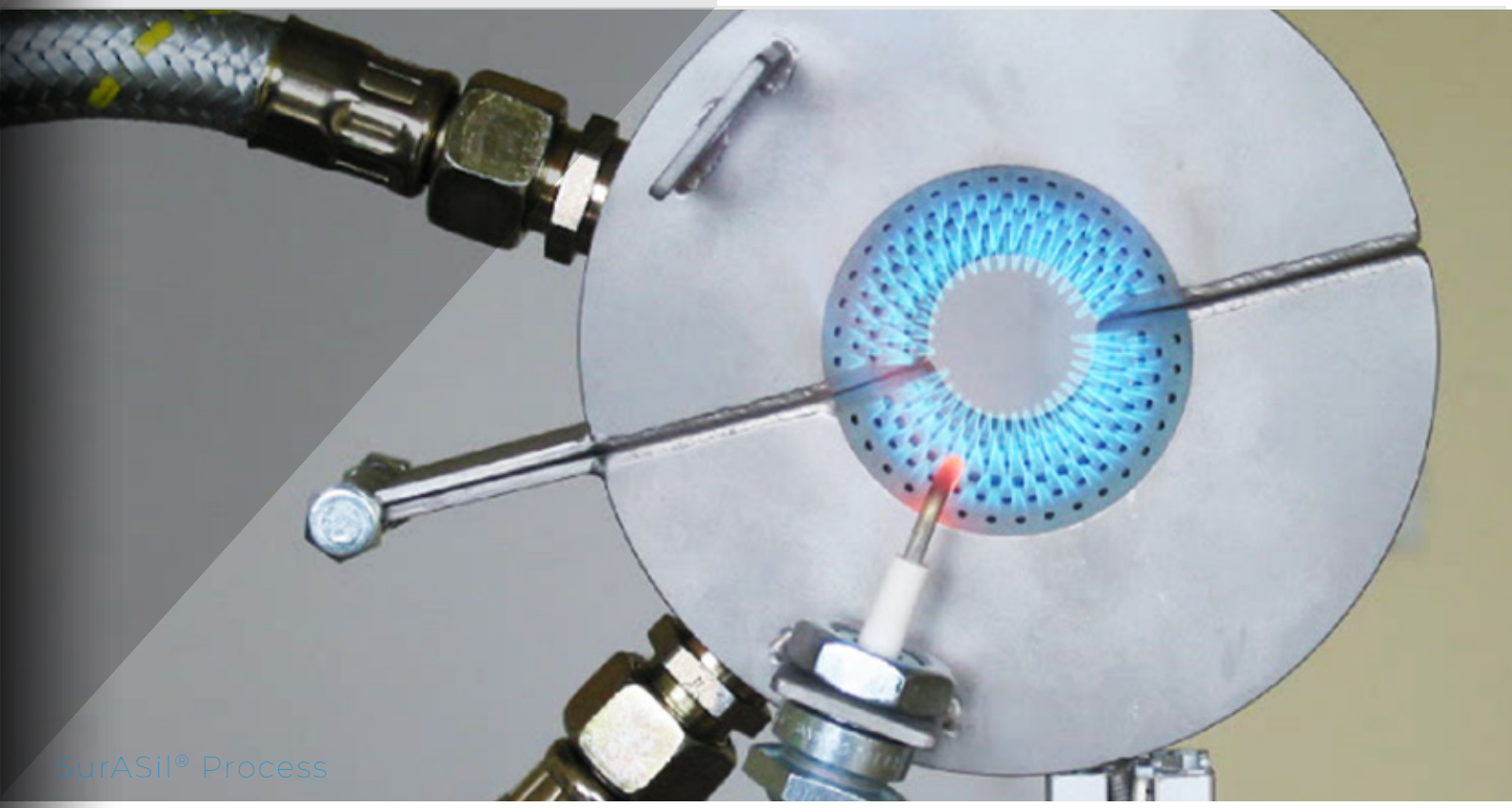
SURA CHEMICALS

www.surachemicals.com



SurASil® Process

SURFACE PRETREATMENT

by means of Surface Silication - combustion chemical vapour deposition (CCVD)

Manual Pretreatment Devices
Silane Dispensing Units
Flame Control Units
Flame Pretreatment Stations
Flame Pretreatment Systems
Transport Technology
Burner Technology

Product Information

SurA Chemicals GmbH
Passion for chemistry

Surface Silication
technology

for the deposition of silicate layers on several 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 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.

Product-

PORTFOLIO

Surface Pretreatment Technology

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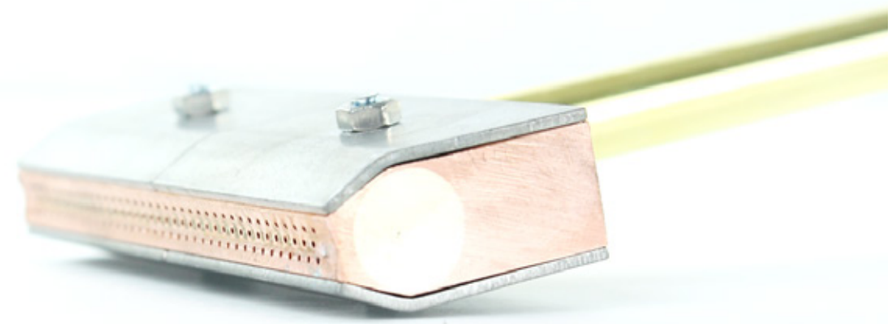
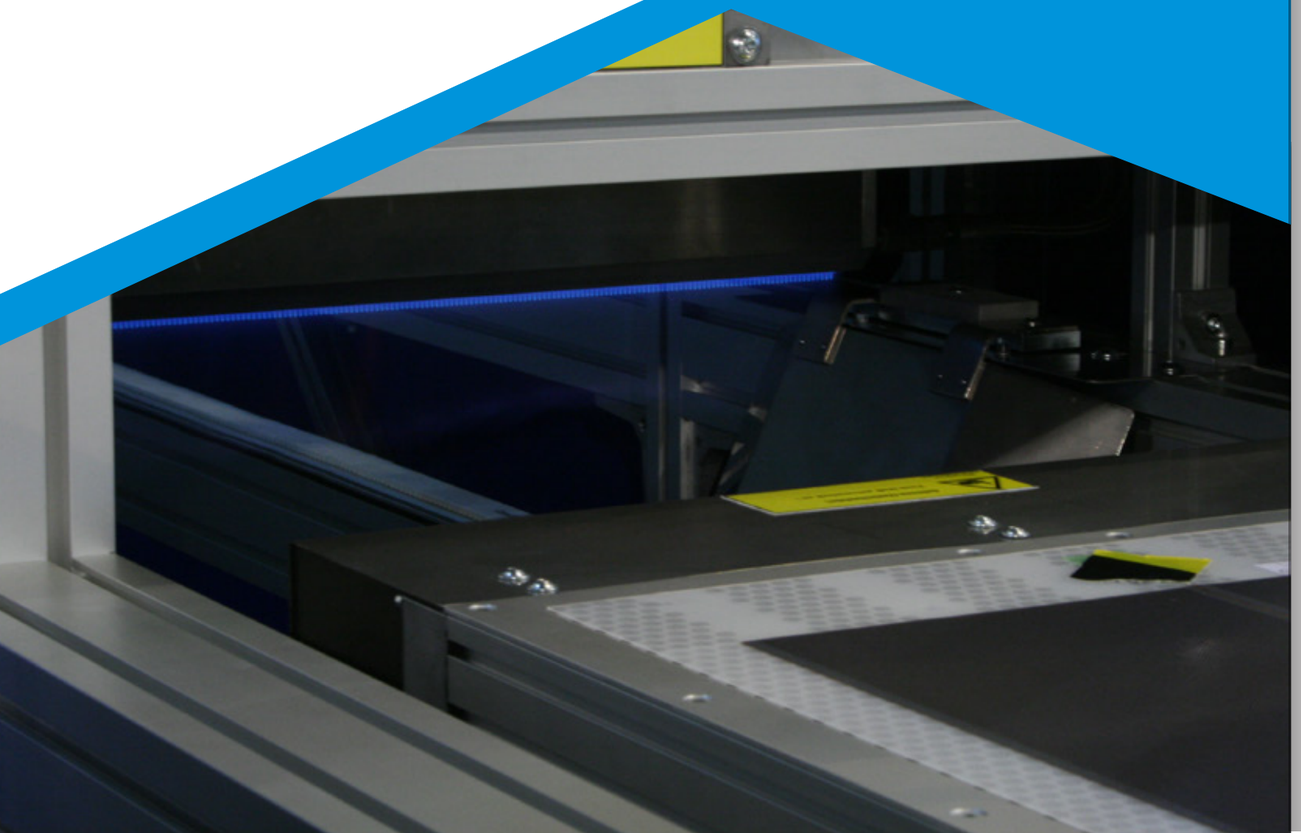


Compliant in accordance to

RoHs & REACH Regulations

Our industrial flame pretreatment systems and their components meet all relevant standards and guidelines, such as 73/23/EEC Low Voltage Directive, 2006/42/EC Machinery Directive, DIN EN 746-2 Industrial Thermoprocessing Systems, DIN EN 12100-1/2 Safety of Machines or DIN EN 60204-1 Electrical Equipment of Machines. SurA Chemicals is a TÜV-certified company according to DIN EN ISO 9001:2015.

CE



Adhesion

Increase

on glass, metallic, plastic
and ceramic material surfaces

This product information is intended to provide an insight into the surface pretreatment technology by means of surface silication and its technological development.

1. Surface Silication - Principle

The pretreatment of surfaces by means of flame pyrolysis for the increase of adhesion of 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.

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.

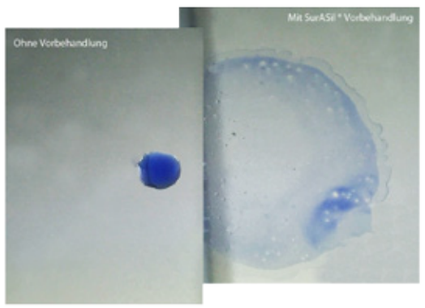
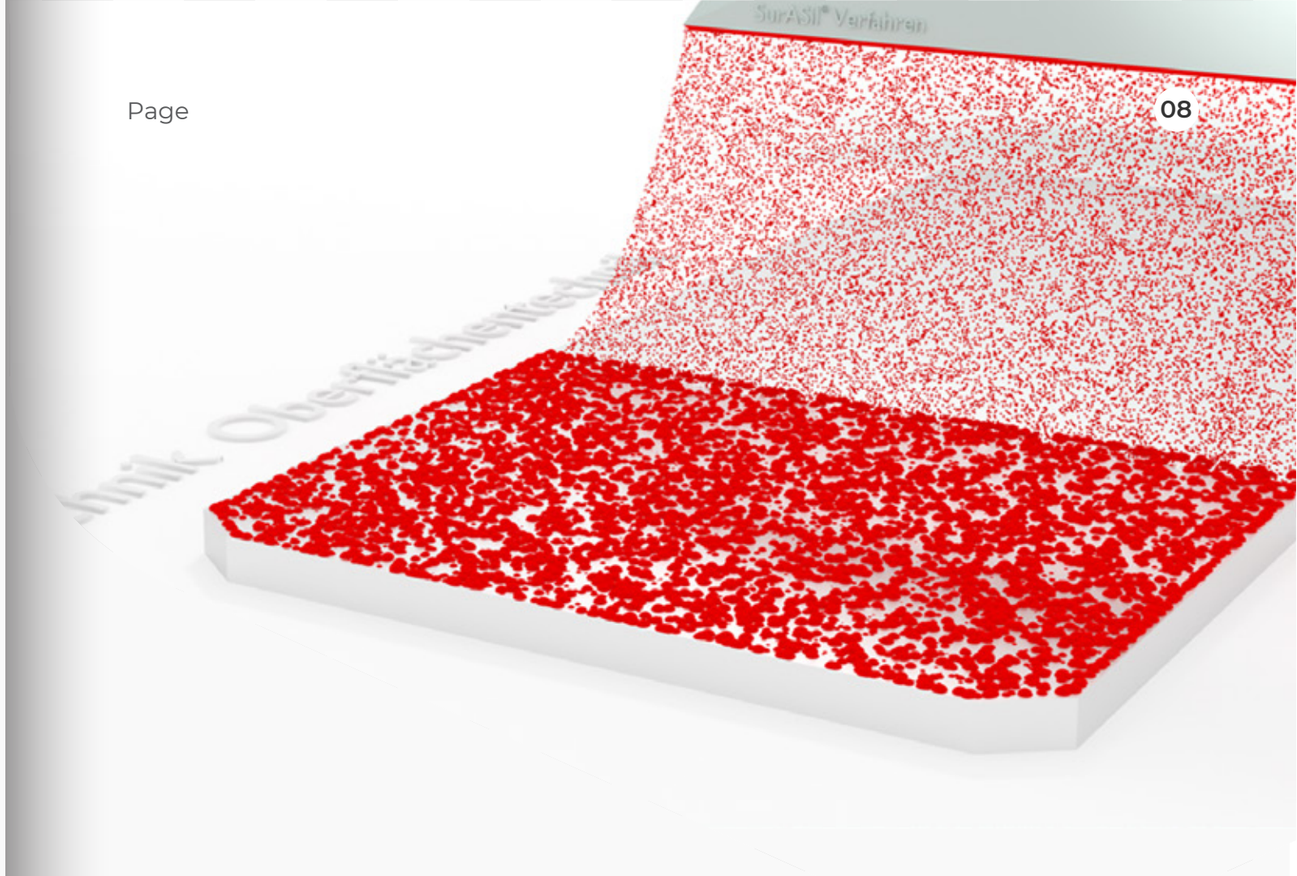


Figure 1: The effect of surface silication and the surface energy on aluminum material



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.

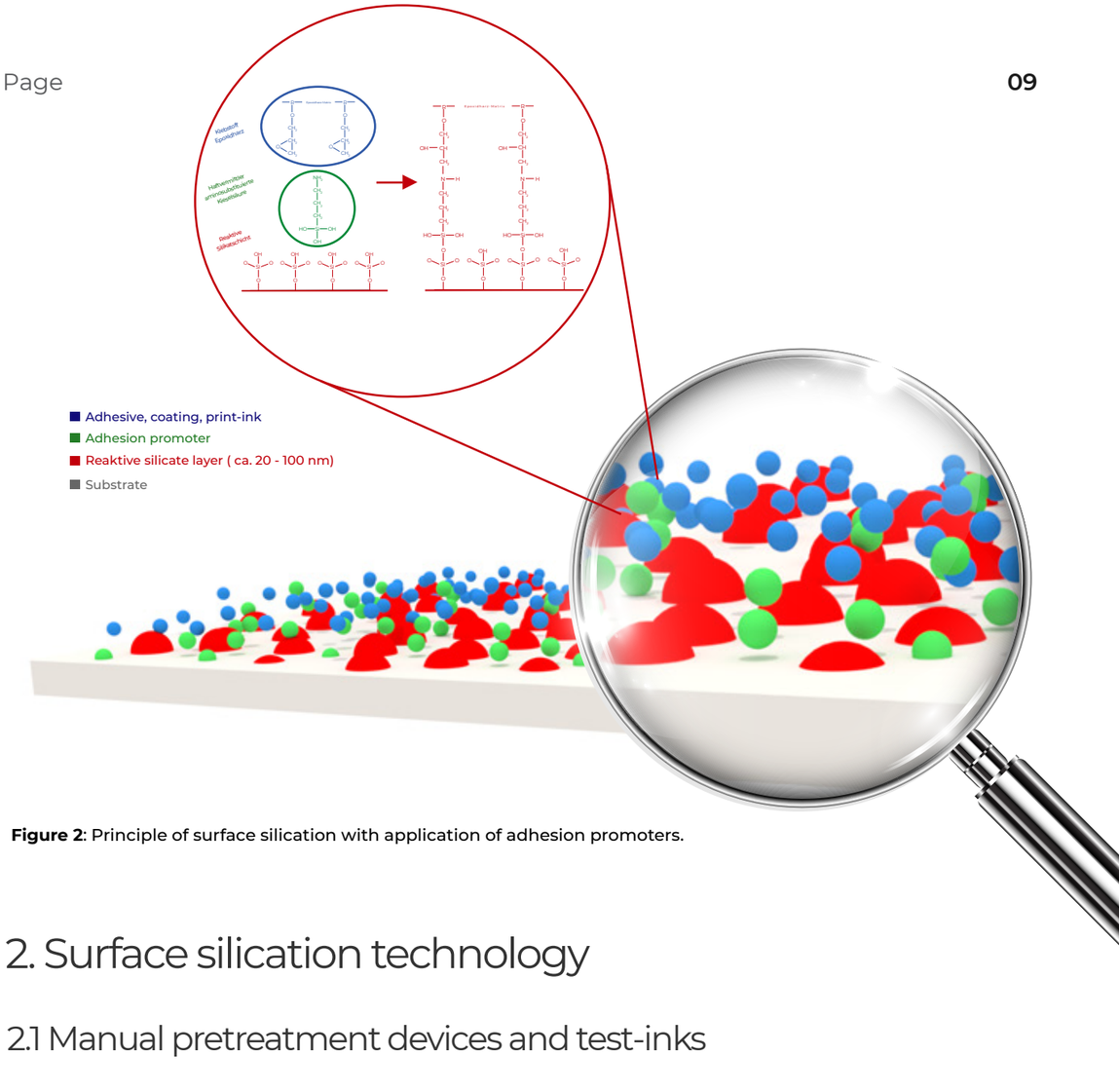


Figure 2: Principle of surface silication with application of adhesion promoters.

2. Surface silication technology

2.1 Manual pretreatment devices and test-inks

I. Pretreatment device SurAChem® VG 03

SurA Chemicals offers pretreatment devices for manual surface silication. The modern, light and inexpensive pretreatment device SurAChem® VG 03 is ideal for the surface pretreatment of materials with an area up to several square meters.

II. Surface Pretreatment Kit SurAChem® VG 02 K

The SurAChem® VG 02 K surface pretreatment kit is a pretreatment-SET for manual surface silication, using a small manual fire torch, ideal for the surface pretreatment of materials with an area of up to DIN-A4.

III. Test-inks Kit SurAChem® TT K

The SurAChem® TT K test-inks kit with six ethanol-based test inks with energies between 25 - 72 mN/m is ideal for the visual and qualitative control of the surface energy.

Surface pretreatment device

SurAChem® VG 03

For the increase of adhesion on several material surfaces

SurAChem® VG 03

The pretreatment device SurAChem® VG 03 is a manual surface silication device that works on the principle of flame pyrolysis. It is ideal for the surface pretreatment of materials with an area up to several square meters.

practical, efficient and inexpensive

SurAChem® VG 02 K

Surface pretreatment kit

for the manual surface pretreatment
of materials with an
area of up to DIN-A4

SurAChem® VG 02 K

The SurAChem® VG 02 K pretreatment kit is a pretreatment-SET, used manually to increase the adhesive strength of material surfaces by depositing amorphous silicate layers by means of surface silication. The SurAChem® VG 02 K pretreatment kit offers a complete solution for the treatment of surfaces with the SurAChem® VG 02 pretreatment device (fire torch), a SurASil 200 refill cartridge (200 ml), an A 5612 refill adapter, three test inks (25 - 66 mN/m) and a transport case .

Test-inks kit

SurAChem® TT K

for the visual and qualitative control
of surface energies between
25 - 72 mN / m

Colorful

test-inks

for the distinctive detection
of surface energies

2.2 Industrial flame pretreatment systems

SurA Chemicals offers highly developed industrial *flame pretreatment stations* (flame control unit SILICOAT® GU with integrated silane dispensing units SILICOAT® DU and customized burners) for the automated deposition of highly reactive silicate layers. The modern SILICOAT® AD flame control stations - available in various performance levels - are technologically advanced and offer significant technical advantages compared to current conventional market solutions. The design of the burner (burner output, width, geometry or material) is individually adapted to the size, shape and material properties of the parts to be pretreated.

SurA Chemicals SILICOAT® AD industrial *flame pretreatment systems* consist of an additional integrated item´s transportation system, constructed according to customer production requirements. These are designed for a semi- or fully automatic or an in-line coating operation.

Technological HIGHLIGHTS

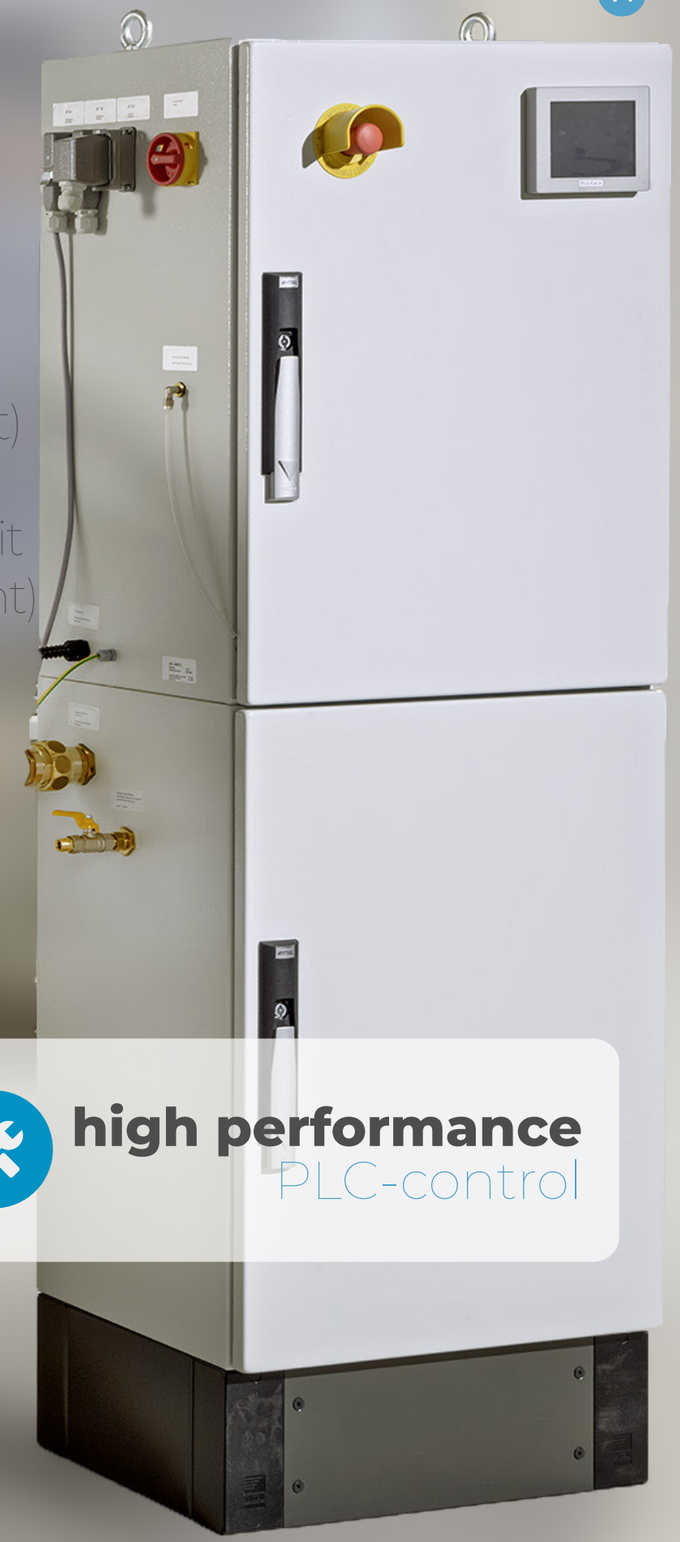
I. Integrated touchscreen display

The flame pretreatment stations SILICOAT® AD are equipped with a user-friendly touchscreen display for quick and easy operation. All the operating buttons and switches are no longer necessary. In addition, the control panel of the touchscreen display offers different password-protected access levels, such as basic screen, parameterization screen, maintenance screen, etc.

SILICOAT® AD

STATION

Flame control unit (lower compartment) with an integrated silane dispensing unit (upper compartment)



high performance
PLC-control

Integrated

TOUCHSCREEN DISPLAY

with different passwort protected access levels

Password protected
for maximum security

II. Regulation of the air and additive quantity

After the readiness notification on the control panel by switching on the SILICOAT® AD flame pretreatment station, parameters such as air volume and SurASil® additive content are set in order to achieve the desired layer morphologies.

Once the parameters have been set, the flame pretreatment station will automatically regulate this "set value". If the burner power is changed, the ratio between air and fuel gas, as also the concentration of the SurASil® additive remain constant.

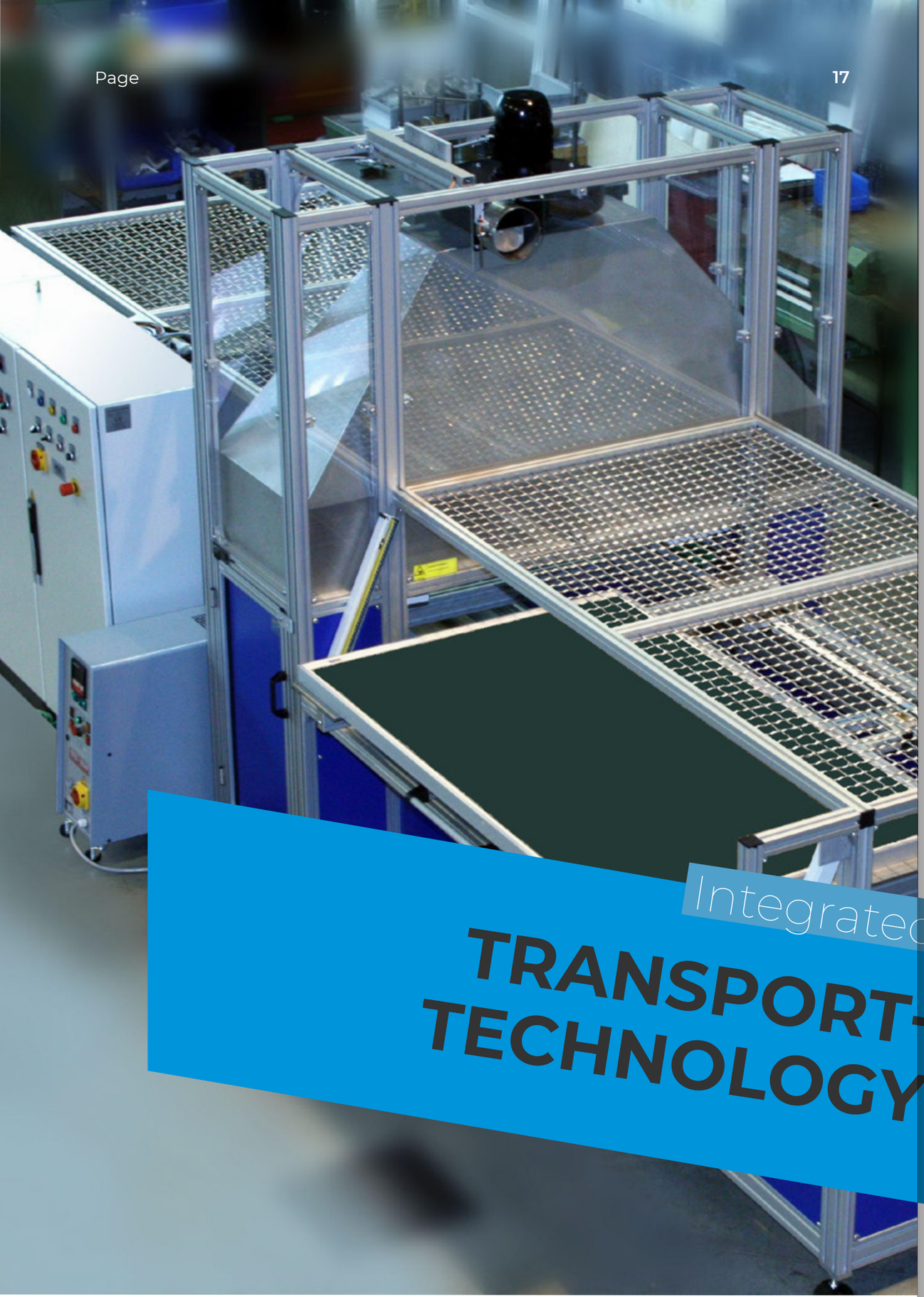
III. Internal compressed air supply

The flame tprereatment stations SILICOAT® AD have an integrated compressed air supply. This completely eliminates the need for external compressed air sources and a compressor connection. Contamination from compressor air containing water or / and oil is also excluded.

IV. Contactless sensor technology

SILICOAT® AD flame treatment stations consist of new contactless sensor technology for recording and monitoring precisely the fill level of the consumable (SurASil® additive) used.

Complete
solutions according to
customer requirements



Integrated

TRANSPORT-TECHNOLOGY

Automatic REGULATION

of air, fuel gas and SurASil® additive concentration

V. Electronic recording and monitoring of the precursor concentration (optional)

To ensure the maintenance of set proportions in the flame, an internal module for spectroscopic recording of the precursor concentration (SurASil® Additiv) can be used. During operation, this device offers the possibility of detecting a lack of the precursor and locking the operation of the system via an error message. This measure prevents faulty coatings and associated follow-up.

VI. Safe precursor refilling process

The precursor is refilled using an internal pump device. This avoids any spillage and overfilling and guarantees a safer and simpler process.

VII. Automatic burner recognition (optional)

If several burners are to be used, a burner interface can be connected as an option, with which the parameters of the respective burner used are automatically recorded and imported by the flame pretreatment station SILICOAT® AD. Manual settings with time-consuming parameterization are therefore no longer necessary.

VIII. Interface connection Profibus or Profinet (optional)

Optionally, communication interfaces according to Profinet and/or Profibus standards are available. Control, process and monitoring parameters as well as warning and fault messages can thus be forwarded to the control center for indipendend and remote monitoring and processing.

Internal **compressed air** supply

no need for external compressors

Figure 3: SILICOAT® DU silane dispensing unit for connection to an external flame control unit

The flame control unit and the silane dispensing unit of the SILICOAT® AD flame pretreatment stations are also separately available. The units are available in different performance levels and can be specially configured for the respective area of application.

I. SILICOAT® DU

SILICOAT® DU is a precise silane dispensing unit for connection to an external flame control unit, through which the dispensing of the (gaseous) precursor is lead into the connected burner.

II. SILICOAT® GU

The SILICOAT® GU is a flame control unit, supplied with propane or natural gas. In compination with a burner it is used for the temporary surface activation of a wide variety of materials by means of flaming.

Innovative

BURNER TECHNOLOGY

Customizable Burner performance and geometry

Surface silication

for three-dimensional surfaces

New

SILICOAT® flame pretreatment stations can be combined with multi-axis robotic technology as also other transport modules and tool peripherals for the pretreatment of three-dimensional objects by means of surface silication. Further in-line processing steps such as cleaning, printing, gluing or coating can also be integrated and controlled centrally.

Integrated

ROBOTIC-TECHNOLOGY

for the pretreatment of three-dimensional objects

SILICOAT® flame pretreatment stations can be combined with multi-axis robotic technology as also other transport modules and tool peripherals for the pretreatment of three-dimensional objects by means of surface silication. Further in-line processing steps such as cleaning, printing, gluing or coating can also be integrated and controlled centrally.

automated and centrally controlled

Surface silication

WITH MULTI-AXIS ROBOTIC TECHNOLOGY

Special
Material transport technology
according to customer requirements

Integrated
TRANSPORT-TECHNOLOGY

Manual
pretreatment devices
and industrial
FLAME PRETREATMENT SYSTEMS
for adhesion increase
on several material surfaces
by means of surface silication

SURA CHEMICALS GMBH

Am Poesener Weg 2
07751 Bucha
Germany

info@surachemicals.de

www.surachemicals.com

Tel.: +49 (0) 3641 352920
Fax: +49 (0) 3641 352929