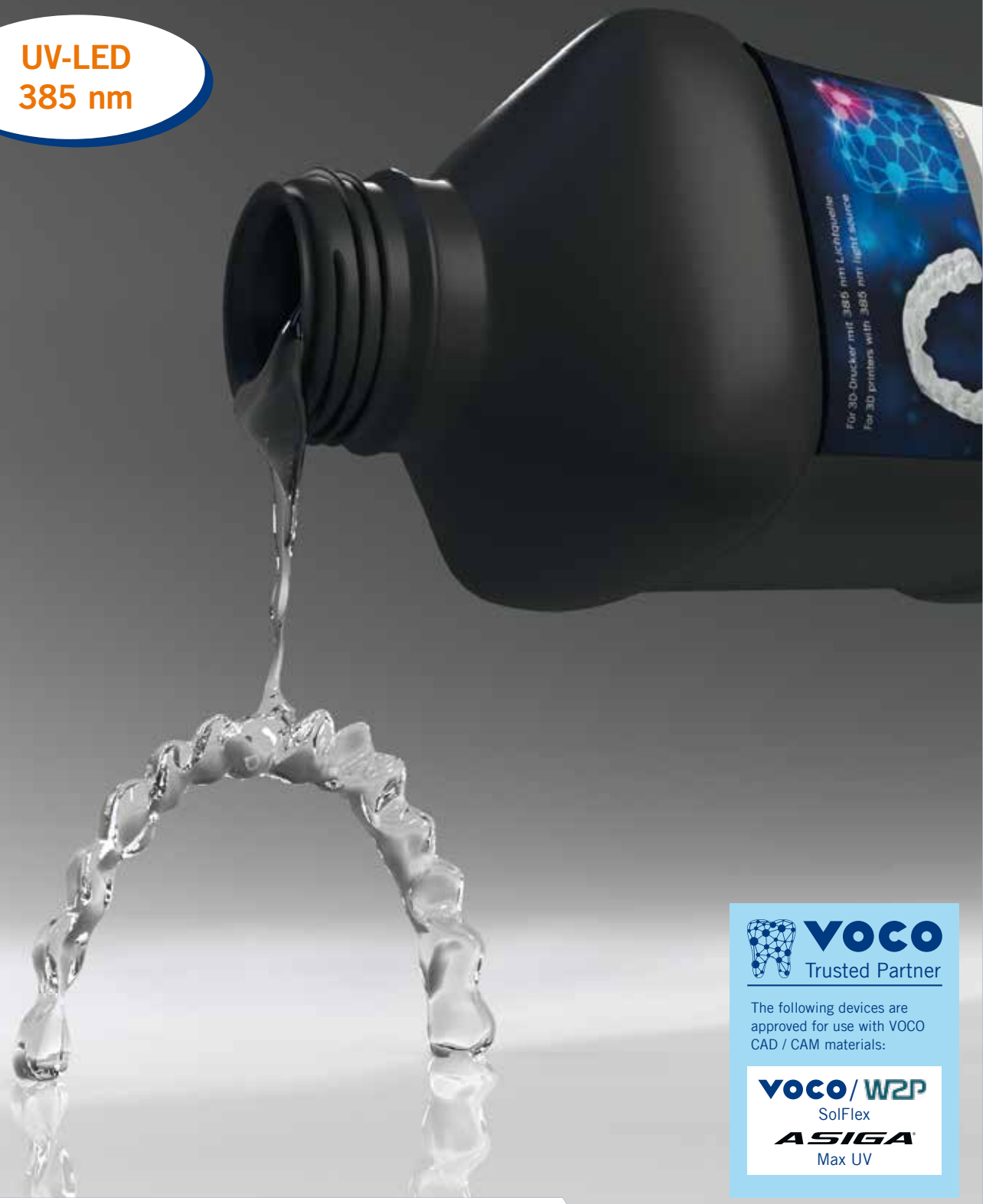


UV-LED  
385 nm



 **VOCO**  
Trusted Partner

The following devices are approved for use with VOCO CAD / CAM materials:

**VOCO / W2P**  
SolFlex

**ASIGA**  
Max UV

# V-Print

MATERIALS FOR 3D PRINTING

# V-Print model · V-Print splint · V-Print SG

## ADDITIVE RESIN EXPERTISE

For more than 30 years, as a dental company that conducts extensive research, VOCO has been known for its expertise in the field of light-curing resins for restorative dentistry. With the increasing digitalisation in dental practices and dental laboratories, VOCO is now transposing this knowledge and experience to the field of additive production. The V-Print materials for 3D printing are developed by an interdisciplinary research team of dental technicians, dental engineers and chemists all along the digital workflow.

Printing materials need to satisfy a range of different requirements in the manufacturing of digitally produced objects. The materials must support the user from printing to post-processing right up to their use in the dental laboratory or patient. The developer teams at VOCO are well aware of the requirements on these materials thanks to their many years of expertise in the dental environment and the result is high-quality, application-friendly products “Made in Germany”.

For example, in combination with V-Print printing materials, the VOCO SolFlex 3D printers allow the highly precise production of dental objects thanks to optimally coordinated processes.

## Printing



### The wavelength

Many printers like the SolFlex 3D printers use proven DLP lighting units with a wavelength of 385 nm. Resins which polymerise at 385 nm can be used in the SolFlex models when the material parameters correspond. This wavelength is not in the visible light range and thus permits production of clear transparent objects.

### Sedimentation stability? A must for the printing process!

Many materials settle during the printing process, but not the V-Print printing materials. The dyes and fillers in a printing material must not settle on the bottom of the vat over the course of the printing as a result of the gravity acting on it. The consequence of sedimentation on the bottom of the vat would be considerable process uncertainty during the printing. Sedimentation prevents the requisite direct polymerisation of the resin on the bottom of the vat.

### Final material properties & viscosity

The focus when developing the V-Print printing materials was on excellent final material properties. The homogeneity of the V-Print materials during the printing process ensures optimal production of dental objects. This furnishes the workpieces with the requisite physical properties. However, the optimal viscosity and thus the flowability of the printing resin is also an important aspect. Immersion of the building platform into the flowable resin displaces it. In all V-Print printing materials, the viscosity has been chosen in such a way that optimal flowing back ensures a high and safe building speed and to facilitate the subsequent cleaning of the vat, for example. Precise coordination of the printers and materials is a prerequisite for the production of indication-appropriate workpieces.

V-Print model · V-Print splint · V-Print SG

SUPPORTS THE WORKFLOW



PRINTING

Transparent printing – 385 nm vs 405 nm

Situation

Not all printing systems can print clear / transparent / colour-stable objects. What about the aesthetics? Customer acceptance?

VOCO solution

The SolFlex system cures at 385 nm in the non-visible wavelength range and thus allows printing of transparent, colourless objects.



Sedimentation-stable

Situation

Important substances may settle in printing resins over time, sinking / separating in the bottle / vat. Is the print successful? Do all the important components polymerise? Does the object attain the requisite properties?

VOCO solution

All V-Prints are sedimentation-stable and do not separate out. Production from homogeneous solution throughout printing process.



No shaking necessary



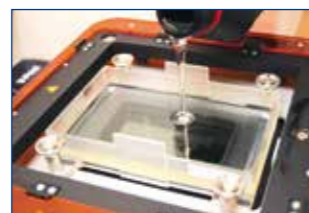
Optimal flow properties and high precision

Situation

The flow properties are important for the resin's printability. Is the printing process optimally coordinated to the resin? It must flow back optimally. Is the printing reliable, fast and precise?

VOCO solution

Optimal determination of resin flow properties for reliable, fast and precise printing.



POST-PROCESSING

Good green strength

Situation

Following printing, the objects must be safely removed from the build platform. Can the object withstand the strain of removal? Is there any deformation?

VOCO solution

Printed objects are already sufficiently strong even without post-exposure. This is called their green strength.



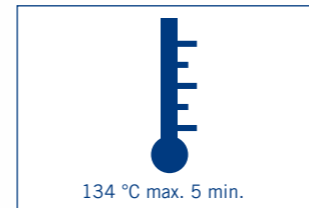
Steam-sterilisable

Situation

Drilling templates come into contact with tissue and blood during implantation. It must be possible to sterilise them whilst retaining their dimensional stability.

VOCO solution

Development of resin which can be steam sterilised and is dimensionally stable after printing for high patient safety. V-Print SG was developed with dimensionally stable steam sterilisation in mind among other aspects.



Scratch-resistant

Situation

Precise models form the basis for optimal restorations. Is the model precise and resilient enough to allow adjustments without modifying the shape for perfectly fitting restorations?

VOCO solution

Scratch-resistant model material with high precision for perfect fit.



APPLICATION

Medical device class IIa

Situation

Printed objects that come into contact with tissue / blood intraorally or are employed for periods of > 30 days are potentially associated with a higher risk. This results in their being classified as a class IIa device.

VOCO solution

As a medical device manufacturer with many years of experience, the products are developed and produced in accordance with all the applicable legal and regulatory requirements.



Biocompatible and neutral in taste

Situation

Printed objects may be employed intraorally and worn for an extended period of time. Do these printed objects have an effect on the organism? Are they well tolerated? Can the patient taste and smell them?

VOCO solution

Post-exposed objects are biocompatible and neutral in taste for patient safety and acceptance/treatment success.



Suitable for deep drawing

Situation

Deep-drawing films are subjected to a thermoforming process requiring generation of heat. Can this result in undesirable modification of the workpiece as a result of the heat exposure?

VOCO solution

V-Print model is a heat-resistant model material which is also suitable for the deep-drawing technique.



## Post-processing



### Good green strength

Safe removal of the not yet cured objects (green parts) from the build platform is ensured by a sufficiently high green strength. The objects only attain their final physical properties once they are fully polymerised. The material must not be too soft before the requisite post-exposure or it will not retain its shape.

### Sterility

During implantation, drilling templates among other items are used for guided implantation. In this case, the finished part comes into contact with blood and tissue. For this reason, the legal requirement is that the corresponding parts must be sterile or sterilisable so as not to introduce any bacteria into wounds. The sterilisation process should not have any effect on the mechanical or geometric properties of the product. Drilling templates made of V-Print SG can thus be steam sterilised at 134 °C for max. 5 min – and without the heat affecting their shape at all.

### Optimally grindable and polishable

Rotary instruments are used for the post-processing. The aim is to remove the material precisely and homogeneously. All V-Print printing materials can be optimally ground and polished in their polymerised state.

## Application



### Medical device class

Many additively produced parts are designed for intraoral use and can therefore also come into contact with bloody tissue or be employed intraorally for longer than 30 days. As such, it is important that the medical device be suitable for this application. For this reason, it is classified as a class IIa medical device, as is the case for V-Print SG and V-Print splint.

### Adjustments without modifying the shape?

A precise model forms the basis for the production of a perfectly fitting denture. The model must not be modified when working on it. If the model were to change when a crown is applied, it would no longer fit correctly in the mouth. High scratch-resistance compared with a high strength and elasticity are just as important in V-Print model beige as the neutral shade.

### Models for the deep-drawing technique

Digital dentistry allows innovative manufacturing processes in which models can be produced using additive techniques. At the same time, they need to be compatible with conventional work steps such as deep drawing. V-Print model beige satisfies the requirement on thermostability in this respect.

### Biocompatible and neutral in taste

Printed objects used in patients must not have any effect on the organism. The corresponding post-exposure gives the printed object its biocompatibility, meaning it can be used in the patient's mouth without any concerns. The neutral taste and odour is of particular importance in products employed intraorally for extended periods of time. Unpleasant tastes and odours result in rejection and thus not the required therapy success. All V-Print objects are of course neutral in taste and odour following the post-exposure.

## V-Print model · V-Print splint · V-Print SG

### MATERIALS FOR 3D PRINTING

#### V-Print model

##### Indications

Dental working and presentation models

##### Advantages

- Workpieces can be ground precisely, without undesirable changes (e.g. as caused by heat influx)
- Non-scratch, very hard surface allows trial fitting without deformation
- Suitable for deep-drawing processes – no deformation caused by heat influx from deep-drawing temperature
- High degree of precision for optimally fitting restorations



##### Presentation

REF 6042 Bottle 1000 g beige

#### V-Print splint

##### Indications

Therapeutic splints  
Auxiliary parts and functional parts for diagnostics  
Bleaching splints (home bleaching)

##### Advantages

- Medical device, class IIa
- Biocompatibility and neutral flavour ensure high level of patient acceptance
- 385 nm wavelength allows aesthetically pleasing clear-transparent print
- High flexural strength for durable objects
- High degree of precision and thus accurate fit for highly comfortable wear



##### Presentation

REF 6044 Bottle 1000 g clear

#### V-Print SG

##### Indications

Dental drilling templates

##### Advantages

- Medical device, class IIa
- Biocompatibility and neutral flavour ensure high level of patient acceptance
- 385 nm wavelength allows aesthetically pleasing clear-transparent print
- Dimensional stability and autoclavability for a high level of patient safety



##### Presentation

REF 6043 Bottle 1000 g clear

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