

## Introduction

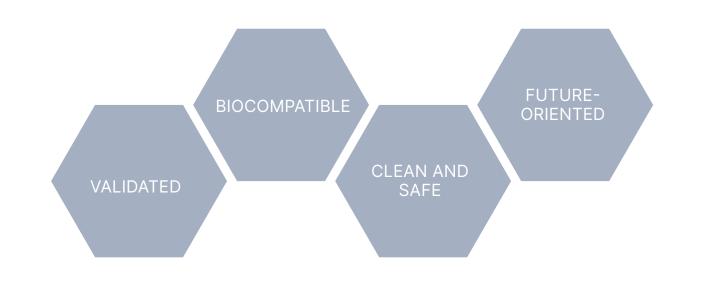
Dentsply Sirona enables an easy and delegable additive manufacturing workflow

The process starts with a scan, either with Primescan® or a third-party scanner. After designing with CEREC® or inLab® CAD Software the data is transferred into the inLab CAM Software. Alternatively, the design service DS Core™ Create can be used for ready-to-print designs or an import of a third-party STL file. The inLab CAM Software prepares the file for the manufacturing part of the process, which includes printing and post-processing. The printing process is based on photopolymerization using a fast 385 nm DLP light engine. The properties of the final product depend, among other factors, on the post process. Post-processing takes place in a fully automated and validated process in the Primeprint PPU (Post Processing Unit) with two washing cycles, air drying and light curing. After washing, the application must be post-cured in an oxygen-free environment to reach a fully cured and biocompatible condition. Primeprint PPU enables this by flooding the light curing chamber with nitrogen automatically.

Materials play an important role in this process. In addition to in-house material development, Dentsply Sirona maintains close relationships with material partners like DETAX and Dreve. The processes for each material are fully validated and enable biocompatible, reproducible and accurate results<sup>1</sup>. An excellent long-term documentation collects the parameters for each 3D printing process (e.g. manufacturing date, material temperature etc.).

Reich S, Berndt S, Kuhne CH, Herstell H. Accuracy of 3D-Printed Occlusal Devices of Different Volumes Using a Digital Light Processing Printer Appl. Sci. 2022, 12(3), 1576; https://doi.org/10.3390/app12031576
Berndt S, Herstell H, Reich S, Kuhne CH, Reich S. Accuracy of 3D-Printed Master Cast Workflow Using a Digital Light Processing Printer. Appl. Sci. 2022, 12(5), 2619; https://doi.

Primeprint Solution's material cartridge system enables a safe working environment: The user is to no point of time in contact with uncured resins. On the following pages consolidated information around the materials for Primeprint Solution is collected. The portfolio is constantly being expanded with more materials in cooperation with existing and new partners as well as in-house research.





Do you want to experience our biocompatible and reproducible results? Ask your sales rep for the master model.

Find out more >

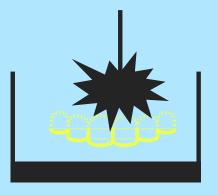




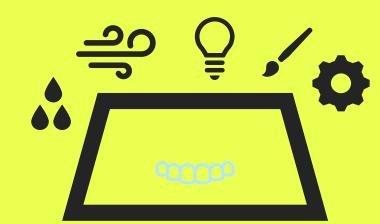
CREATION OF DATA



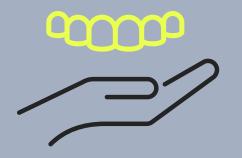
CAD/CAM PREPARATION



ADDITIVE MANUFACTURING



POST-PROCESSING



FINISHED COMPONENT

## Product overview

3D printing material delivered in validated DS Cartridges

Primeprint comes with validated materials and RFID-supported, automated material management. The Primeprint material concept offers user-friendly support with its color-coded material cartridge system. Each print material type is associated with a different color, which is mirrored in the inLab CAM Software for quick orientation, for correct material selection and easily identifiable storage. Once the cartridge is inserted into its Material Unit, the inLab CAM Software automatically pairs and identifies them as a unit. Thanks to the RFID tags, the software monitors the fill level of each material unit to indicate when a replacement is required.

Find out more >

Click on each material to learn more

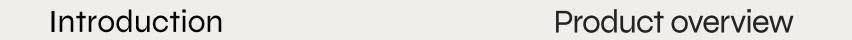












## Light-curing formulation for the 3D printing of hard splints.

**Colour:** clear-transparent

Wavelength: 385 nm

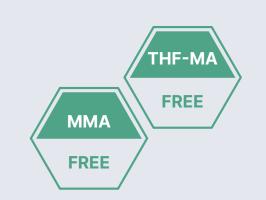
**Medical Device Class MDR IIa Medical Device Class FDA I** 

Easy to polish

Very high bending & breaking strength

• High accuracy of fit

• MMA- & THF-MA-free, odorless and tasteless



Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 20795-21)	MPa	> 80
Flexural modulus	DIN EN ISO 20795-21)	MPa	> 2000
Water sorption	DIN EN ISO 20795-2 <sup>1)</sup>	μg/mm³	< 32
Water solubility	DIN EN ISO 20795-21)	μg/mm³	< 5
Hardness	_	Shore D	> 82
Biocompatibility	DIN EN ISO 10993-1 <sup>2)</sup>	_	complies



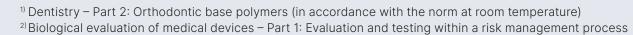




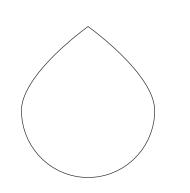








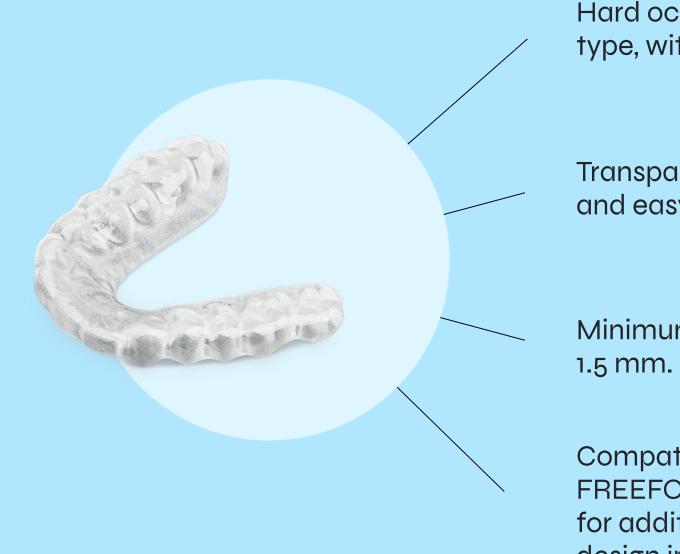
Primeprint Splint 1000g, SKU: 6740240



## Primeprint Splint

Hard Splints

Materials



Hard occlusal splint, rigid type, with high efficiency.

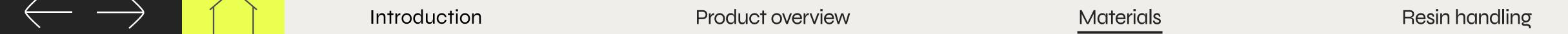
Resin handling

Transparent, mouth-resistant and easy to clean.

Minimum wall thickness:

Compatible with FREEFORM® plast/gel for additional occlusal design in practice.

- Very easy to polish
- Expandable with FREEFORM® gel by DETAX
- Easy detachment of the support structure Wearing time follows the recommendation for class IIa resins
  - Splints can be repaired with FREEFORM® gel by DETAX



## Light-curing formulation for the 3D printing of flexible splints.

**Colour:** clear-transparent

Wavelength: 385 nm

#### **Medical Device Class MDR IIa Medical Device Class FDA I**

- Flexible and fracture-resistant
- High, tension-free wearing comfort
- Easy to polish
- MMA-, THF-MA- & TPO-free, odorless and tasteless



Property	Standard	Unit measurement	Result
Tensile strength	DIN EN ISO 527-11)	МРа	> 25
Tensile elongation	DIN EN ISO 527-11)	_	> 50%
Tear propagation resistance	DIN EN ISO 34-1 <sup>2)</sup>	N/mm	< 110
Hardness	_	Shore D	> 65
Water absoration	DIN EN ISO 20795-23)	μg/mm³	< 32
Solubility	DIN EN ISO 20795-23)	µg/mm³	< 5











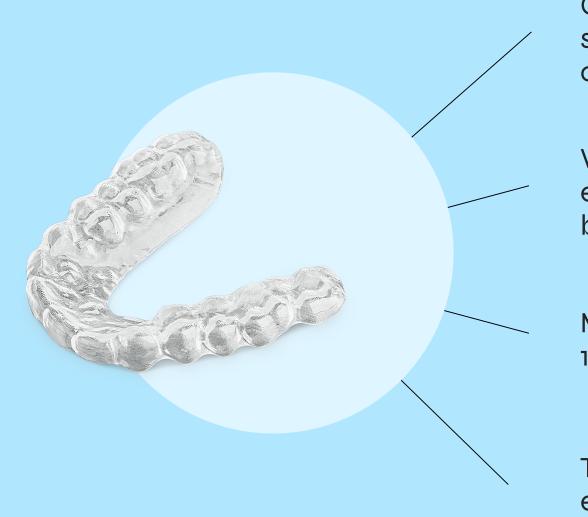


<sup>1)</sup> Resins: Determination of tensile strength (in keeping with the standard at room temperature)



## Primeprint Splint SF

Splints, Repositioners, Mouthguards and Nightguards



Clear-transparent, flexible splints for pleasant wearing comfort.

Wide range of applications, e.g. bite splints, mouthguards, bite plates.

Minimum wall thickness: 1 mm.

The flexible splints are extremely easy to maintain, clean and polish.

- Easy detachment of the support structure
- Very easy to polish
- Wearing time follows the recommendation for class IIa resins
- Only compatible with Material Unit Type S

<sup>&</sup>lt;sup>2)</sup> Thermoplastic elastomers: Determination of tear propagation restistance (in keeping with the standard at room temperature)

<sup>&</sup>lt;sup>3)</sup>Dentistry: Orthodontic resins (in keeping with the standard at room temperature)



## Light-curing formulation for the 3D printing of tough splints.

**Colour:** clear-transparent

Wavelength: 385 nm

#### **Medical Device Class MDR IIa Medical Device Class FDA I**

- Flexible and fracture-resistant
- High, tension-free wearing comfort
- Easy to polish
- MMA-, THF-MA- & TPO-free, odorless and tasteless



Property	Standard	Unit measurement	Result	
Tensile strength	DIN EN ISO 527-1 <sup>1)</sup>	MPa	> 40	
Tensile elongation	DIN EN ISO 527-1 <sup>1)</sup>	_	> 20%	
Tear propagation resistance	DIN EN ISO 34-1 <sup>2)</sup>	N/mm	< 140	
Hardness	_	Shore D	> 75	
Water absoration	DIN EN ISO 20795-2 <sup>3)</sup>	µg/mm³	< 32	
Solubility	DIN EN ISO 20795-23)	μg/mm³	< 5	













<sup>&</sup>lt;sup>1)</sup> Resins: Determination of tensile strength (in keeping with the standard at room temperature)



## Primeprint Splint ST

Splints, Repositioners, Mouthguards and Nightguards



Clear-transparent, flexible splints for pleasant wearing comfort.

Wide range of applications, e.g. bite splints, mouthguards, bite plates.

Minimum wall thickness: o.8 mm.

The flexible splints are extremely easy to maintain, clean and polish.

- Easy detachment of the support structure
- Very easy to polish
- Wearing time follows the recommendation for class IIa resins
- Only compatible with Material Unit Type S

<sup>&</sup>lt;sup>2)</sup> Thermoplastic elastomers: Determination of tear propagation restistance (in keeping with the standard at room temperature)

<sup>&</sup>lt;sup>3)</sup>Dentistry: Orthodontic resins (in keeping with the standard at room temperature)

## Flexibility of choice

Choose the splint material which fits your needs best

	Splint ST	Splint SF	Splint
Wall thickness	Thinnest printable with minimum wall thickness of 0.8 mm	Thin printable with minimum wall thickness of 1 mm	Printable with minimum wall thickness of 1.5 mm
Support structure	Easier removable supports	Easier removable supports	Easy removable supports
Flexibility	Medium flexibility	High flexibility	Low flexibility
Hardness	Medium hardness	Low hardness	High hardness
Indication	Splints, Repositioners, Mouth- & Nightguards	Splints, Repositioners, Mouth- & Nightguards	Splints

Resin handling

## Light-curing formulation for the 3D printing of surgical guides.

**Colour:** clear-transparent

Wavelength: 385 nm

**Medical Device Class MDR IIa Medical Device Class FDA I** 

• Validated for autoclave sterilization according to EN ISO 17664!

Very high mechanical stability

• Compatible with FREEFORM® plast

• MMA-free, tasteless



Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 20795-2 <sup>1)</sup>	MPa	> 75
Flexural modulus	DIN EN ISO 20795-21)	MPa	> 1650
Water sorption	DIN EN ISO 20795-21)	μg/mm³	< 32
Water solubility	DIN EN ISO 20795-2 <sup>1)</sup>	µg/mm³	< 5
Hardness	_	Shore D	> 82
Biocompatibility	DIN EN ISO 10993-12)	-	complies







Primeprint Guide 1000g, SKU: 6740232





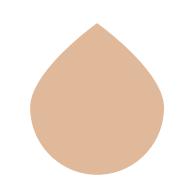


Watch how to finalize a Primeprint Guide



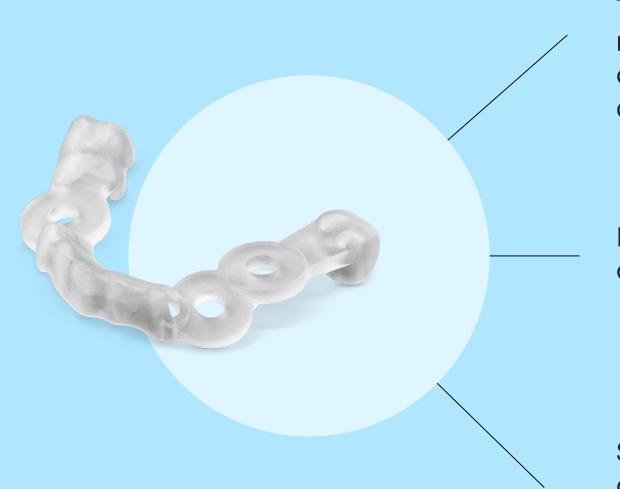


<sup>1)</sup> Dentistry – Part 2: Orthodontic base polymers (in accordance with the norm at room temperature) <sup>2)</sup>Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process



## Primeprint Guide

Surgical Guides

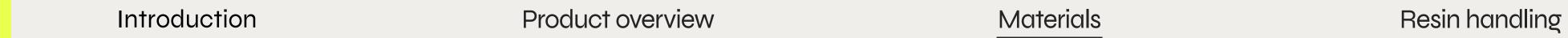


The crystal-clear material allows reliable control of the working area during drilling.

For printing hard plastic parts of orthodontic appliances.

Supports precise positioning and fixation of the drill sleeves enable safe positioning for the patient.

- Approved sterilization in autoclaves with: 121°C for 15 min according EN ISO 17664
- Expandable and compatible with FREEFORM® plast by DETAX
- Drill sleeves can be easily implemented
- Primeprint Guide is validated for the "W&H Lisa 522, Program UNIVERSAL 121" sterilization process (see "technical data on sterilization process [1.10]")
- Steam sterilization may only be performed with equipment that complies with the standards EN 13060 and EN 285



## Light-curing formulation for the 3D printing of temporary crowns & bridges.

Colours: A1, A2, A3

Wavelength: 385 nm

#### **Medical Device Class MDR IIa Medical Device Class FDA I**

- High breaking strength
- Short post-processing
- Low material consumption
- MMA- & THF-MA-free



Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 104771)	MPa	> 100
Flexural modulus	DIN EN ISO 104771)	MPa	> 2300
Water sorption	DIN EN ISO 104771)	µg/mm³	< 40
Water solubility	DIN EN ISO 104771)	µg/mm³	< 7,5
Hardness	_	Barcol	> 40
Biocompatibility	DIN EN ISO 10993-1 <sup>2)</sup>	-	complies













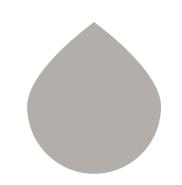
Watch how to finalize a Primeprint Temp

Primeprint Temp 1000g,



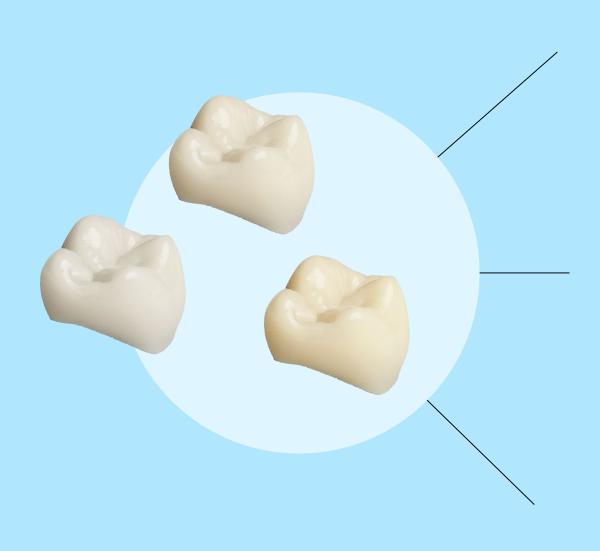


<sup>1)</sup> Polymer-based crown and bridge materials (in according with the norm at room temperature) <sup>2)</sup>Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process



## Primeprint Temp

Temporary Crowns and Bridges as well as **Anterior and Posterior Tooth Restorations** 



The natural-looking translucent colours (according to VITA classical A1-A3 shade guide) can be aesthetically modified for single crown and bridge restorations.

Temporary restorations provide a high level of oral stability and in conjunction with tempolink®, enable excellent marginal seal during a period of wear.

Easy polishing results in very high surface quality with exceptional abrasion resistance.

- Easy detachment of the support structure Primeprint Temp contains fluorescent
- Very easy to polish
- Expandable with SMARTREPAIR® SYSTEM by DETAX or composite
- properties for natural light effects
- Indicated for the use up to 30 days

# Light-curing formulation for the 3D printing of dental master and working models.

Colour: caramel

Wavelength: 385 nm

#### **Technical Product**

Fast-printing

• Extremely high surface hardness

• Dimensionally stable

• BPA- & MMA-free



Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 178 <sup>1)</sup>	MPa	> 70
Flexural modulus	DIN EN ISO 178 <sup>1)</sup>	MPa	> 1500
Hardness	-	Shore D	> 80

















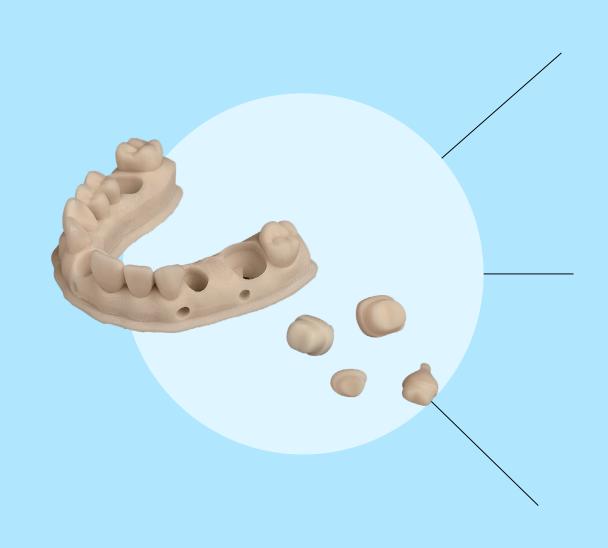
<sup>1)</sup> Plastics: Determination of flexural properties (in accordance with the norm at room temperature)

Primeprint Model 1000g, SKU: 6740257



## Primeprint Model

Model Production, Working Models, Situation Models and Control Models



Haptics and stability meet the high requirements in model making.

High mechanical strength helps to ensure the functionality and loading of the models.

Excellent detail reproduction due to plaster-like colour "caramel".

- Easy detachment of the support structure
- Hollow models help to save material and achieve better curing results
- Not suitable for thermoforming

## Light-curing formulation for the 3D printing of dental models for the thermoforming technique.

Colour: light blue

Wavelength: 385 nm

#### **Technical Product**

• High temperature resistance

Very high edge strength

• Plaster-like appearance & haptics

• Precise detail reproduction

MMA-free

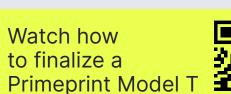


Property	Standard	Unit measurement	Result
Working temperature for thermoforming	g foils	°C	< 195
Flexural strength	DIN EN ISO 178 <sup>1)</sup>	MPa	> 80
Flexural modulus	DIN EN ISO 178 <sup>1)</sup>	MPa	> 1700
Hardness	_	Shore D	> 83



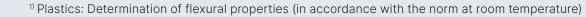


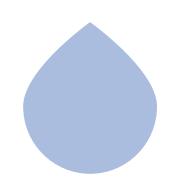






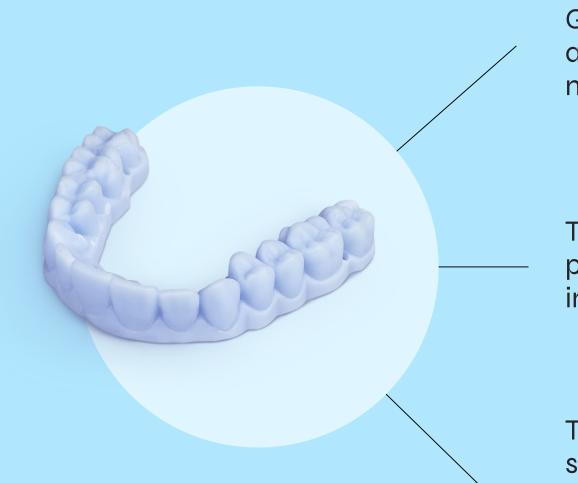






## Primeprint Model T

Model Production and Thermoforming Technique



Great surface hardness and edge strength of the models.

The stability of the models is preserved even during heating in thermoforming.

The pronounced intrinsic stability enables manufacture of hollow thermoformed models.

- Easy detachment of the support structure The model does not distort during
- No further treatment necessary
- Suitable and validated for thermoforming sheets up to 195°C (short contact)
- thermoforming process (hollow models) and can also be used multiple times



## Light-curing resin for the manufacturing of dental gingiva masks.

Colour: pink

Wavelength: 385 nm

#### **Technical Product**

• To simulate the moving oral mucosa

Fast-printing

Fast post-processing

• TPO-, BPA-, MMA- & THF-MA-free



Property	Unit measurement	Result
Final hardness	Shore A	approx. 70
Viscosity	Pa s	approx. 2
Tensile strength	MPa	> 2.5





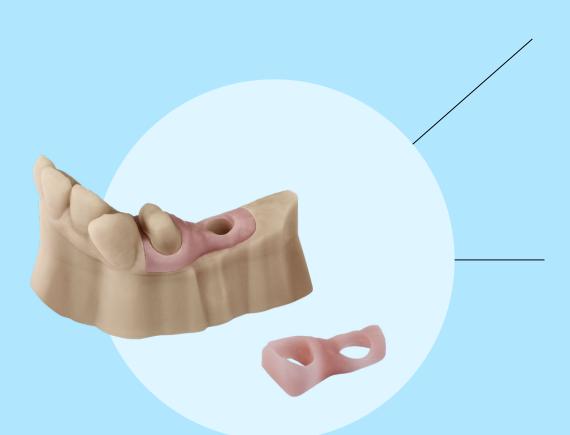






## Primeprint Gingiva

Dental gingival masks



Permanently soft and flexible.

Very well combinable with working models printed with Primeprint Model material.

- Design data from inLab Model App or 3<sup>rd</sup> party STL
- Good grindability
- Only compatible with Washing Containers 2.0



# Light-curing formulation for the 3D printing of high precision casting objects.

**Colour:** red-transparent

Wavelength: 385 nm

#### **Technical Product**

• Residue-free burning out

• Distortion-free and precise, even for delicate constructions

• Suitable for phosphate-bonded embedding materials

• Low viscosity for fast cleaning

• MMA- & THF-MA-free



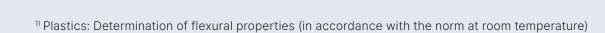
Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 178 <sup>1)</sup>	MPa	> 70
Flexural modulus	DIN EN ISO 178 <sup>1)</sup>	MPa	> 1700
Heating temperature	_	_	1 h @ 800 °C
Cauterisation residual ash content	_	_	< 0.1 %

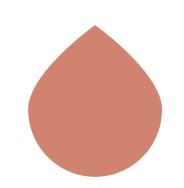






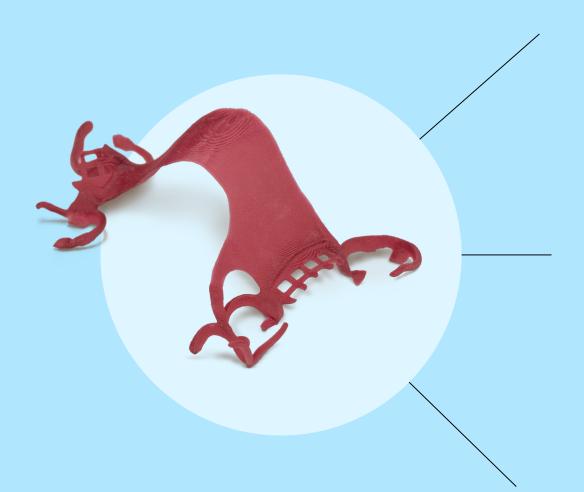






## Primeprint Cast

Casting Objects



Allows reliable precision for cast objects.

Any corrections or repairs after printing are possible with easyform gel® LC.

Distortion-free and stable, even with delicate frameworks. Enables direct FIT CHECK.

- Preheating temperature of 800 °C for 30-45 minutes, depending on the mold size
- Adjustments or repairs possible with easyform gel LC by DETAX



# Light-curing formulation for the 3D printing of individual impression and functional trays, base plates.

Colour: green

Wavelength: 385 nm

#### Medical Device Class MDR IIa Medical Device Class FDA I

- High bending and breaking strength
- Low viscosity
- Printable with 200 µm layer thickness
- MMA- & THF-MA-free, tasteless

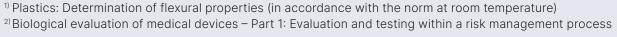


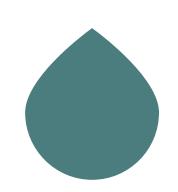
Property	Standard	Unit measurement	Result
Flexural strength	DIN EN ISO 178 <sup>1)</sup>	MPa	> 90
Flexural modulus	DIN EN ISO 178 <sup>1)</sup>	MPa	> 1900
Hardness	_	Shore D	> 84
Biocompatibility	DIN EN ISO 10993-1 <sup>2)</sup>	_	fullfilled



Primeprint Tray 1000g, SKU: 6740216

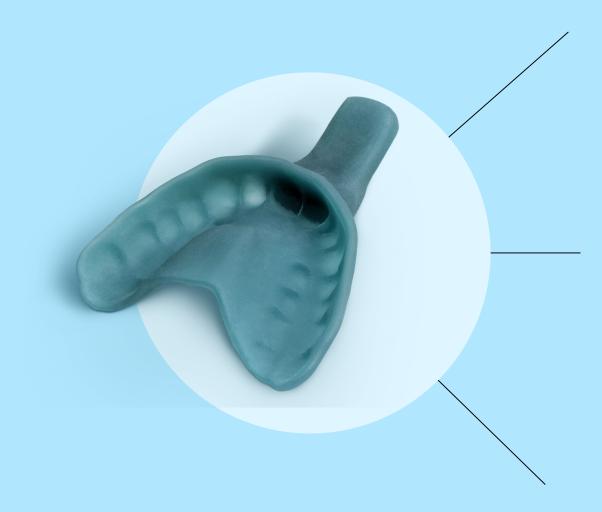






## Primeprint Tray

**Individual Impression Trays** 

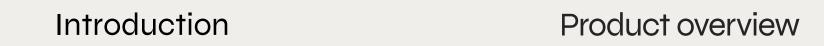


Very high dimensional stability and torsional rigidity for accurate and distortion-free impressions.

Very suitable for implant impression taking within the digital workflow.

Compatible for many tray adhesives and impression materials.

- Easy detachment of the support structure
- No further re-work necessary
- Only steam and clean





Resin handling





## Light-curing formulation for the 3D printing of denture base.

Colours: Original, Light, Light Reddish Pink, Dark Reddish Pink

Wavelength: 385 nm

Medical Device Class MDR IIa (registration pending)

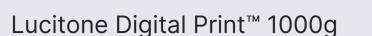
**Medical Device Class FDA II** 

High impact denture base

• Available in 4 gingiva shades: Original, Light, Light Reddish Pink, Dark Reddish Pink

Property	Standard	Unit measurement	Result
Work of fracture (BAM) <sup>1)</sup>	ISO 20795-1	J/m <sup>2</sup>	3047
Work of fracture	ISO 20795-1	J/m²	1529
Fracture toughness	ISO 20795-1	MPa√m	2,5
Flexual strength	ISO 20795-1	MPa	68
Flexural modulus	ISO 20795-1	МРа	2193
Biocompatibility	ISO 10993-1:2018 and ISO 405:2018	_	complies

**Dentsply Sirona** 



SKU: Original: 906401, Light: 906402,

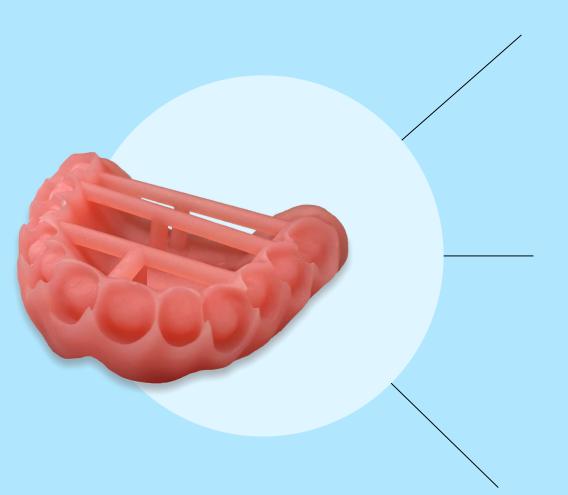
Light Reddish Pink: 906403, Dark Reddish Pink: 906404





## Lucitone Digital Print™

3D Denture Base

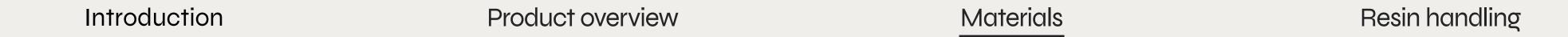


A high impact denture base material can resist the stresses of chewing and the rigors of everyday patient handling without fracturing.

Accuracy: ensuring very good fit, function and comfort for the patient.

Created with BAM! smart polymer technology - a **Body-Activated Material that** doubles its resistance to fracturing upon reaching body temperature.

- Bond to Lucitone Digital IPN premium denture teeth with Lucitone Digital Fuse materials
- Do not steam clean Lucitone Digital Print Denture appliances



## Light-curing formulation for the 3D printing of premium denture teeth.

Colours: A1, A2, A3, A3.5, B1, B2, C1, BL3

Wavelength: 385 nm

Medical Device Class MDR IIa (registration pending)

**Medical Device Class FDA II** 

• Excellent wear resistance

• 8 tooth shades

Highly esthetic

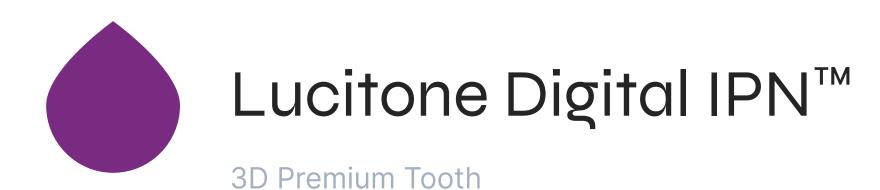
Property	Standard	Unit measurement	Result
Wear resistance	3-Body	mg/400,000 cycles	0,09
Flexual strength	ISO 10477	MPa	135
Flexural modulus <sup>1)</sup>	ISO 10477	MPa	2900
Compressive strength <sup>1)</sup>	ISO 604/ASTM D695	MPa	145
Biocompatibility	ISO 10993-1:2018 and ISO 7405:2018	-	complies

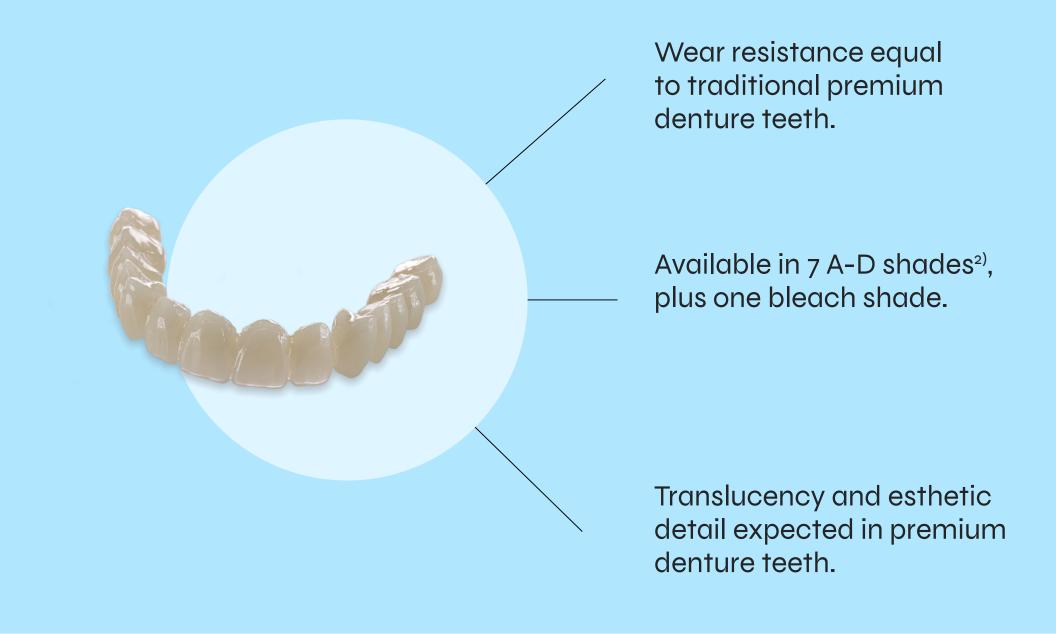
**Dentsply Sirona** 



<sup>&</sup>lt;sup>1)</sup> Tested for comparison purposes. Not related to or required for denture teeth.

Lucitone Digital IPN™ 500g





- Bond to Lucitone Digital Print denture base with Lucitone Digital Fuse materials
- For best premium esthetics, design with Dentsply Sirona Highly Characterized Genios or Portrait denture tooth libraries
- Do not steam clean Lucitone Digital Print Denture appliances

<sup>2)</sup> The A1-D4 designations correspond to the VITA classical A1-D4® shade guide which is meant to be a guide, not a match. VITA classical A1-D4 is a registered trademark of VITA Zahnfabrik H. Rauter GmbH & Co.



Introduction Product overview Materials

## Light-curing formulation for the 3D printing of try-in appliance.

Colour: A1

Wavelength: 385 nm

Medical Device Class MDR IIa (registration pending)

**Medical Device Class FDA II** 

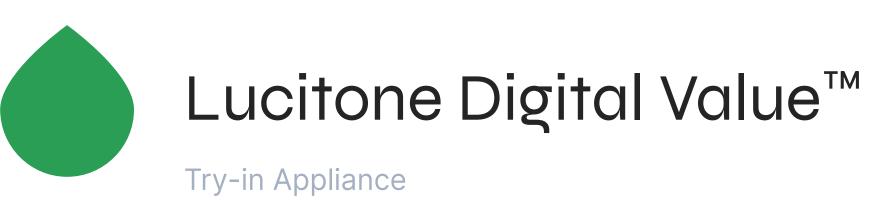
• Try-in appliance used to evaluate fit, phonetics, function, and esthetics

Property	Standard	Unit measurement	Result
Work of fracture	ISO 20795-1	J/m <sup>2</sup>	1529
Fracture toughness	ISO 20795-1	MPa√m	2,5
Flexual strength	ISO 20795-1	MPa	68
Flexural modulus	ISO 20795-1	MPa	2193
Biocompatibility	ISO 10993-1:2018 and ISO 7405:2018	_	complies

**Dentsply Sirona** 

Primeprint Try-in 1000g, SKU: 906405







- Evaluate fit, phonetics, function, and esthetics
- Do not steam clean Lucitone Digital Print Denture appliances
- Trial placement denture that you can take home for emergency use







## Resin handling recommendations

#### Storage

Exposure of photopolymer plastics to any type of solar radiation or light should be strictly avoided. Resin-filled cartridges should always be stored between 15 °C und 28 °C irrespective of whether their seal has been broken. The storage instructions are printed on the packaging and the cartridge.

The resin has an expiry date printed on the packaging and the cartridge. Primeprint detects when the expiry date of the resin in the cartridge or vat has been exceeded and notifies the user.

Here you can find the Primeprint Material IFUs at a glance.

Product overview

### Opened cartridges

Once the seal label has been opened, the ventilation opening is exposed. The cartridge must be stored with its ventilation opening facing upward, as resin can otherwise leak.

> Avoid applying pressure to the cartridge.

### Material Units

Store the Material Unit only with a cartridge inserted. Do not expose it to sunlight and take basic steps to prevent UV light incidence on the Material Unit filled with resin.

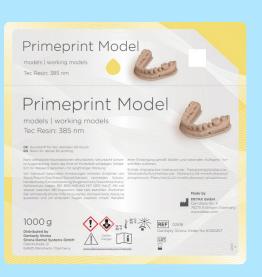


Figure 1: Packaging label



Figure 2: Cartridge label



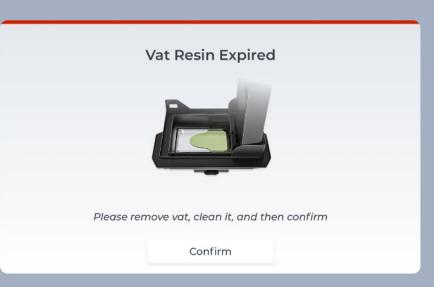


Figure 3: Message on the display



Figure 4: Message on the display

#### Comissioning

There are a few steps to follow when installing a new cartridge. Primeprint will guide the user through the necessary steps.

1.

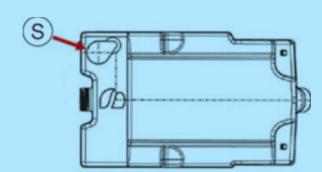
Shake the cartridge for about 10 seconds so that the contents are well mixed.

2.

The valve must be pressed in once to relieve the outlet valve for the first time. To do this, stand the cartridge upright and briefly press the valve in. The valve tappet should then move back to its original position.

3.

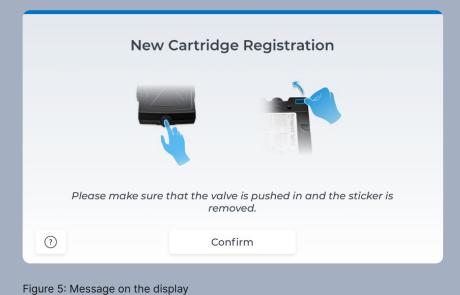
Remove the seal label (S) from the cartridge.



4.

Insert the cartridge into the Material Unit. With an RFID tag on Cartridge and Primeprint Material Unit, the unit automatically pairs these two components. The name of vat assigned ex works can be found on the white sticker on the right side of the material unit vat. The name corresponds to the numerical value assigned to the RFID code.





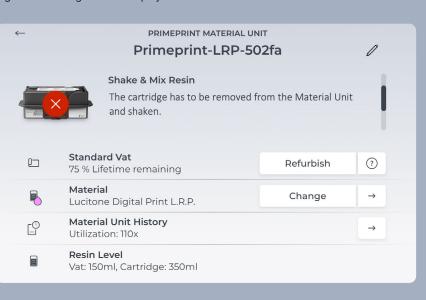


Figure 6: Message on the display

#### Shelf lifetime

The shelf lifetime is at least 24 months. Primeprint detects when the shelf life has been exceeded and notifies the user. To achieve reliable printing results, the printing resin is heated to a defined minimum temperature and the resin is automatically conditioned in the tank for every printing process. The resin in the cartridge is mixed through the intelligent design of the cartridge when the cartridge is tilted up in the unit. The minimum resin temperature for printing is currently about 30°C. Resin temperatures above 30°C do not affect the printing result.

If a combination of cartridge and material unit has not been used in Primeprint for more than 1 month, a notice to shake the cartridge appears on the display and an increased conditioning of the resin in the tray takes place compared to the normal printing process.

#### Disposal

Liquid resin is classified as hazardous waste and must therefore not be disposed of down the drain or in household waste. Disposal of the resin and isopropanol must be carried out in accordance with local, regional, national and international regulations. Information on disposal is included in the Safety Data Sheet of the resin and can be obtained from local authorities. In some cases, small containers can be disposed of free of charge if the safety data sheet is submitted. Cooperation with disposal service providers is also often possible. Contaminated packaging must be treated in the same way as the material.

Cured resin can be disposed of in normal waste. Curing of the resin can be induced by exposure to sunlight. Resin bound in isopropanol can also be cured under the exposure to sunlight and then filtered out of the isopropanol. Gloves and paper towels contaminated with resin can also be cured under the exposure to sunlight and then disposed of with household waste.



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