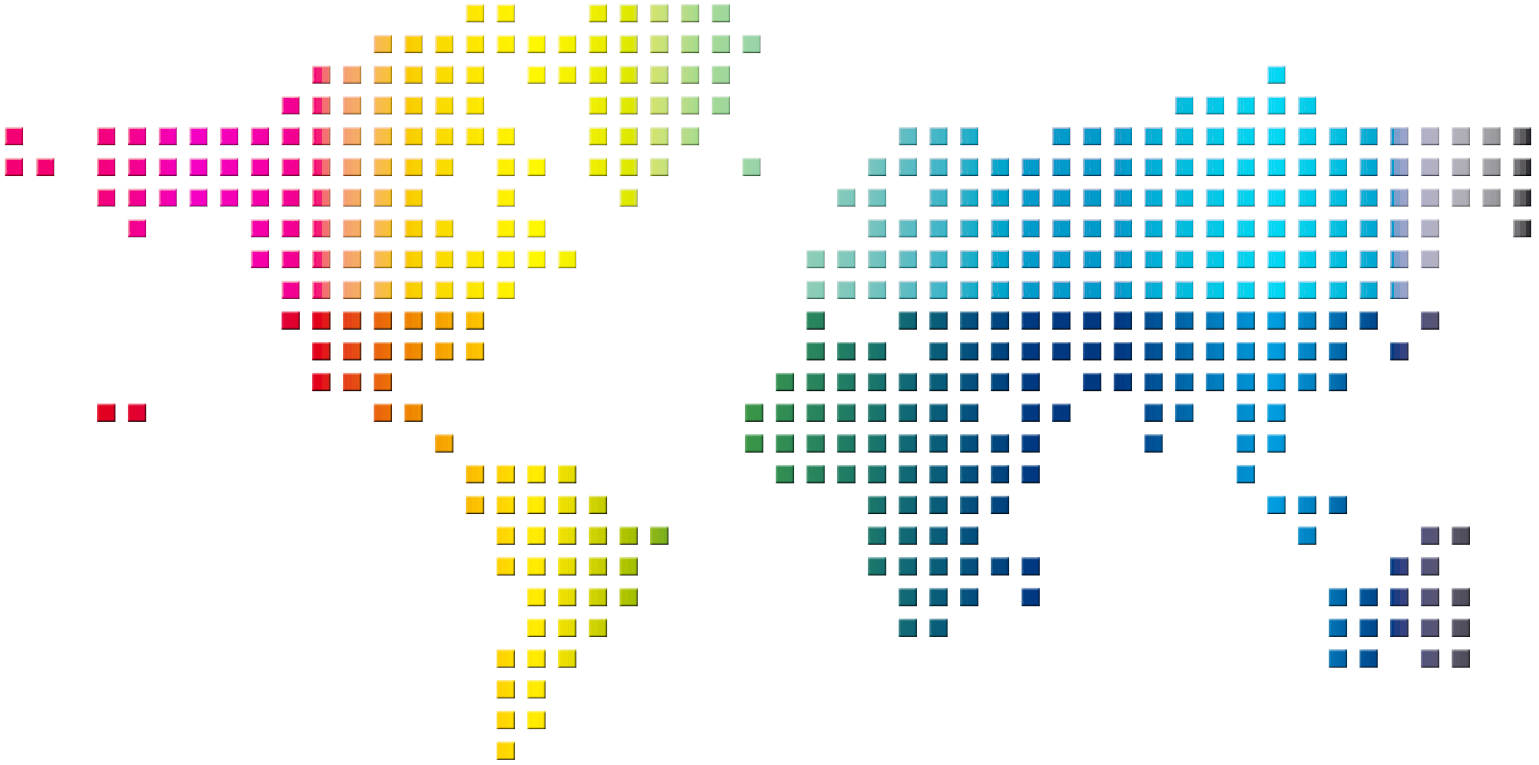
PRODUCT INSERT HYCERAM®



HyCeram®
HybridCeramic System

invicon
chemical solutions

PRODUCT INSERT – DETAILS

Definition symbols

Symbols used in this document are defined as follows.

Symbol for risk of danger:
- risk to life
- risk of physical injury
- risk of minor personal injury

Symbol for risk of danger:
- risk of property damage
- risk of environmental contamination

Symbol for useful tip or information

▶ Symbol for action required

Intended use

Use of this equipment in ways other than those described in this User Guide may result in injury to persons or damage to property. Use this equipment only as described in this User Guide.

invicon cannot be responsible for injuries or damages resulting from unintended applications of its equipment. Unintended uses may result from taking the following actions:
- Making changes to equipment that has not been recommended in the User Guide
- Using incompatible or damaged replacement parts
- Using unapproved accessories or auxiliary equipment

Change of Product name

Glycerine - following branded as Thermo Liquid

PRODUCT INSERT – CONTENTS

1. THE SYSTEM

HyCeram® is an integrated system for high-quality colouring of surfaces. It is based on a pressure/heat-curing material technology and is aimed at professional users.

HyCeram® can be used easily and efficiently:

- Sandblast or laser after preparing the design area.
- Then apply the double bond with Link and Bond.
- The next step is to apply the HyCeram® design material from the syringes or cartridges and deep-harden for 60 minutes in the CeraPower 2.0 at 120 °C and 4 bar of pressure.
- Then further process the surfaces mechanically.

HyCeram® is also suitable for use in workshops or in manufacturing, as well as in industrial fields.

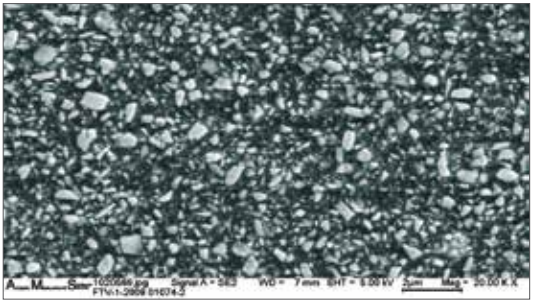
2. MATERIAL

2.1 HyCeram® material

HyCeram® is a new design material that combines the properties of high-quality microscopically ground ceramics with the properties of modern three-dimensionally crosslinked polymers.

This basic technology allows highly opaque colour designs to be created with wonderful clarity, a high surface quality and high level of durability.

The processing is structured and rational.



HyCeram microscopic image

2.2. Properties

Physical properties

Ceramic content:	60 % GEW
Micro hardness:	520 N/mm²
Bending strength:	140 N/mm²
Compressive strength:	380 N/mm²
Water absorption:	< 1 %
Water solubility:	< 0.01 %
Compound strength:	
on gold 750	31 N/mm²
on gold 585	29 N/mm²
on silver 935	28 N/mm²
on aluminium	27 N/mm²

Stability

Thermal stability:	
Thermostable up to 160 °C	> 10 hours
Thermostable up to 200 °C	< 1 hour
Chemical stability*:	
Citric acid solution 5 %	stable
Acetic acid solution 10 %	stable
Peracetic acid solution 2 %	stable
Salt acid solution 0.1 N	stable
Phosphoric acid 5 % solution	stable
Sulphuric acid 99.9 %	unstable
Sulphuric acid solution 0.1 N	stable
Oxidising acid concentrate solution	unstable Caustic
soda up to pH 11	stable
Caustic soda ph > 11	unstable
Caustic potash up to pH 11	stable
Caustic potash ph > 11	unstable
Hydrogen peroxide 3 % solution	stable

Tests

Biocompatibility:	confirmed by ARC (Austrian Research Centers)
Standards:	conforms to REACH and RoHS
Certification:	by the Swiss Watchmaking industry

*This test was performed at room temperature and in a contamination time of 24 hours.

2. MATERIAL

2.3 Advantages

- High-coverage design effects – also in thin coats (minimum coating density 0.6 mm)
- Shockproof, scratch- and wear-resistant surfaces
- Unlimited coating densities feasible in one working step
- Colour- and UV-resistant
- Chemical- and solvent resistant
- Gloss or matt polishable finishes
- Biocompatible
- Colorstable during electroplating (see also 4.1 Electroplating)

2.4 Material cartridges

HyCeram® is packaged in 8 g or 50 g cartridges and available in MV and HV standard viscosity (for details see point 3.5).

Key advantages

- More precise and faster product application
- No contamination of material
- High yield of material

3. USE

3.1. Preparation

Dust and humidity negatively affect the HyCeram® working process. Therefore ensure clean and dry working conditions.

3.2 Sandblasting/Lasing

- Rough the working surfaces by sandblasting or lasing
  Sandblasting: With 100 µm of corundum and a pressure of 3-5 bar

Also sandblast the endwalls; for delicate objects alternatively sandblast with a pressure of 2 bar.

Lasing: Rough the working surfaces with the laser, ideally in a diamond pattern

Tip: Clarify the ideal laser pattern where necessary in advance with the support of Invicon chemical solutions gmbH

3.3 Cleaning

Cleaning process includes the following steps:

- Step 1: Clean the sandblasted or lasered objects with a scrubber and soapy water and then rinse under running water

- Step 2: Rinse with distilled water

- Step 3: Rinse with Ethanol

Tip: Alternatively you can clean the objects in an ultrasonic bath

Do not touch the working surface after cleaning

3. USE

3.4 Bonding

An ideal bond between HyCeram® and metal is realised in two steps by applying both HyCeram® Link and HyCeram® Bond.

▶ Step 1: Apply HyCeram® Link onto the working surfaces using the application pen and leave it a while until the solvent inside it is volatised.

- Apply to the entire surface including the edges.
- Always close the application pen after use, do not leave open (to prevent the material from unnecessarily evaporating).
- Replace the pen if the tip is no longer moist when wiped.

▶ Step 2: Apply a thin layer of HyCeram® Bond onto the working surface including the edges with a brush, and then harden it with blue light.

Duration of light exposure Light for 5 seconds per exposed surface with TwinLux P20 UV high-energy light unit

- Keep the TwinLux P20 UV light unit at a distance of approx. 2.5 cm from the HyCeram® Bond. There is a risk of Bond "burning" if the distance is less than this.
- Do not apply too much to the corners and edges otherwise there is a risk that Bond will remain visible on the end product.
- Applying a thin continuous bonding application.
- Always keep the Bond syringes closed, otherwise the Bond risks hardening, if necessary use the light protection box made from red Plexiglas.
- After the light curing, the tip of the HyCeram® Bond has a slightly sticky layer. Carefully wipe the inhibiting layer with a foam roller. **Do not under any circumstances** wipe the layer with solvent.

3. USE

3.5 Layering

- HyCeram® is available in two different consistencies
- HyCeram® MV (medium viscosity), suitable for all common applications (e.g. stickers).
- HyCeram® HV (high viscosity), suitable for filling round objects (e.g. rings) or use in thick layers.

Filling

HyCeram® MV/HV 8 g cartridge

- ▶ Step 1: Attach cannula to the material cartridge
- ▶ Step 2: Connect the cartridge to the 8 g adaptor for the dosing system
- ▶ Step 3: Activate the dosing system to apply the desired amount of HyCeram®

HyCeram® MV/HV 50 g cartridge

- ▶ Step 1: Attach cannula to the material cartridge
- ▶ Step 2: Connect the cartridge to the 50 g adaptor for the dosing system
- ▶ Step 3: Activate the dosing system to apply the desired amount of HyCeram®

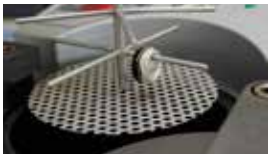
- Always overfill the areas slightly to compensate for the material shrinking during the curing process.
- It is possible to burst air bubbles left in the material with the tip of a probe or with a flame (lighter) (more air bubbles could appear if a heater is used).
- Heating the HyCeram® makes it flow more thinly and enables it to reach corners more easily.
- During storage rests of material may cure at cannulas (whipe off with cloth)

3.6 Deep-hardening

Preparation for first use

- Step 1: Connect the CeraPower 2.0 device to the compressed air (see the instructions for use CeraPower 2.0).
- Step 2: Use the adjustable screw to adjust the standard working pressure to 4 bar.
- Step 3: Fill the pressure chamber with approximately 8-9 cm of thermo liquid (approx. 1.7 litres). Do not fill above the marked line in the pressure chamber.

Deep-hardening



- Step 1: Set the working temperature to 120 °C and preheat the thermo liquid.
- Step 2: Load the object holder with the objects and carefully insert them into the pressure container. It helps to gently turn the object container, to remove any possible air bubbles.
- Step 3: Close the lid of the CeraPower device.
- Step 4: Adjust the hardening time to 60 minutes and press the start button.
- Step 5: After the process has ended and the pressure has dropped, open the lid of the CeraPower device, carefully remove the object container and leave the thermo liquid for a few minutes to dry. Alternatively let the objects cool to room temperature in the pressure container and then remove them.
- Step 6: Rinse the thermo liquid under lukewarm water.

The thermo liquid risks burning if the temperature reaches 120 °C . Proceed with considerable caution, protective goggles and protect yourself by wearing protective gloves and clothing.

3. USE

- Only use the Original HyCeram® thermo liquid or waterless Glycerin with a purity level greater than 99,5 %.
- If the thermo liquid appears cloudy, replace it and do not use it again (thermo liquid can be used approx. 60-80 times on average).
- Incorrect fillings can be removed after the curing process using an industrial dryer (400-450 °C).
- Carefully check that the set alloy can withstand the set temperature without being deformed.

3.7 Finish

▶ Step 1: Grind the HyCeram® surface or twist at a higher speed.

▶ Step 2: Polish the HyCeram® surface with a gloss or matt finish as usual.

4. FURTHER PROCESSING

4.1 Electroplating (electroplated coating)

Exposed metal parts can be electroplated even if the objects have already been covered with HyCeram®. As there are different electroplating baths, we recommend you test the electroplating on a test sample first.

4.2 Engraving and lasing

Letters, figures, logos or other graphic designs can be lasered or engraved onto the finished HyCeram® elements. Refill with HyCeram and cure after cleaning process. (show 3.3 step 1). Finish with a grind and polish.

No bond application is required for refilling.

4.3 Crystal setting

Stones can be set into finished HyCeram® elements. Depending on the size of the stones, a hole is drilled, filled with super glue and the stone placed inside.

4.4 Diamond setting

Diamonds can be set ino finished HyCeram® elements. Depending on the size of the diamond a hole is drilled with little less diameter compare to the stone, followed by pressing in of the diamond.

5. SYSTEM OVERVIEW

HyCeram® material

Standard colours

- Material versions
  All HyCeram® colours are available in two consistencies (exception Luminex colors, available exclusively in HV). Always specify the desired consistency when ordering:
  - HyCeram® MV (medium viscosity)
  Honey-like free-flowing consistency suitable for all objects with flat surfaces (e.g. stickers)
  -HyCeram® HV (High Viscosity)
  Honey-like stable consistency suitable for all three-dimensional objects (e.g. rings)

- Availability
  All standard colours are available from stock.
  Delivery units: 8 g/50 g cartridges,
  20 g cans (Luminex colours HV)

- Colours
  - Opaque designs (opaque effect)
  HyCeram® MV + HV
  Impress using intensive colour optics – even in thin coats.
  - Pearl designs (iridescent effect)
  HyCeram® MV + HV
  Provides a refined, patterned effect and expressive design elements
  - Luminex (luminescent effect)
  HyCeram® HV
  Fascinating colour elements in daylight and luminescent effect at night

Current overview of colours at
www.invicon.at/en/products/hyceram/standard-colours

5. SYSTEM OVERVIEW

Special colours

- Material versions
  All HyCeram® colours are available in two consistencies.
  Always specify the desired consistency when ordering:
  - HyCeram® MV (medium viscosity)
  Honey-like free-flowing consistency suitable for all objects with flat surfaces (e.g. stickers)
  -HyCeram® HV (High Viscosity)
  Honey-like stable consistency suitable for all three-dimensional objects (e.g. rings)

- Availability
  Special colours are produced individually on demand.
  Minimum order volume: 250 g (5 x 50 g cartridge)
  Delivery time: approx. 4 weeks

- Colours
  - Opaque designs (opaque effect) and pearl designs (iridescent effect)
  HyCeram® MV + HV
  Impress using intensive colour optics – even in thin coats.

Current overview of colours at
www.invicon.at/en/products/hyceram/special-colours

5. SYSTEM OVERVIEW

Desired colours

- Material versions
  All HyCeram® colours are available in two consistencies.
  Always specify the desired consistency when ordering:
  - HyCeram® MV (medium viscosity)
  Honey-like free-flowing consistency suitable for all objects with flat surfaces (e.g. stickers)
  -HyCeram® HV (High Viscosity)
  Honey-like stable consistency suitable for all three-dimensional objects (e.g. rings)

- Availability
  We also develop desired colours or effects especially for you from opaque colours and different pigments – according to Pantone or RAL specifications.
  Our Pantone and RAL numbers are only used for guidance, slight deviations are possible.
  Colour development: approx. 2 weeks
  Minimum order volume: 250 g (5 x 50 g cartridge)
  Delivery time: approx. 4 weeks
  - Lead time color matching: 2 weeks (test material for approval)
  - Lead time material production: 2 weeks after approval

Ask for your individual offer

5. SYSTEM OVERVIEW

Heating plates

Hand-held device to warm the HyCeram® material to 60 °C

Link

Self-curing primer to chemically bond HyCeram® design material and metal.

Bond

Light-curing bond to strengthen adhesion and balance tension

TwinLux P20 UV

Powerful TwinLux P20 UV for the HyCeram® Bond to cure faster

Heating plates

Link

Bond

TwinLux P20 UV

Dispenser

Material/metal cannulas (0,4 and 0,6 mm)

HyCeram® adapter 8 g cartridges

HyCeram® adapter 50 g cartridges

5. SYSTEM OVERVIEW

Dosing system 100

Electronic dosing system for precise application from the 8 g, 50 g cartridges

Thermo liquid

2.5 l of 99 % filling liquid to harden HyCeram® objects in the CeraPower 2.0 device.

CeraPower 2.0

Powerful pressure/heat device to efficiently deep-harden HyCeram® materials.

Object holder

- Object holder „tree", suited for rings
- Object holder, 3-flats punched- suited for flat objects
- Object holder, 3-flats stutted, suited for flat object and reduces air bubbles at HyCeram® surfaces.
- Object holder, 1-flat punched, suited for big size objects

Processing tools

- Processing tool „Probe"
- Processing tool „Spatula"
- Ultra-brush (100 x brushes)
- Micro-brush (100 x brushes)

Dosing system 100

CeraPower 2.0

Thermo liquid

Object holder „tree"

Object holder 3-flats punched

Object holder 3-flats stutted

Object holder 1-flat punched

Probe and Spatula

Ultra-brush/Micro-brush

6. STORAGE/TRANSPORT

6.1 Storage temperature

Store HyCeram® Design materials at room temperature 15 °C – 28 °C.

6.2 Storage stability

HyCeram® material: 2 years at room temperature
HyCeram® Link: 2 years at room temperature
HyCeram® Bond: 2 years at room temperature

HyCeram® do not leave materials in direct sunlight!

6.3 General instructions

- Do not use products after expiry date has passed.
- Observe storage instructions on labels and packaging
- Store out of reach of children.

More informations at www.invicon.at/en/products/hyceram/system

7. REACH COMPLIANT

In accordance with the EU Regulation on chemicals, REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals), which is based on the principle of direct industrial responsibility, chemical products since 2007 have only been able to be put on the market in Europe if they have been previously registered (EU Regulation 1907/2006 dated 18 December 2006).

In view of our products and the quantities we process, we are a "downstream" user and not subject to this registration requirement. Nevertheless, we fully identify with REACH and, in close cooperation with our suppliers, we ensure that we comply with all requirements of the regulation, working exclusively with raw materials that are registered accordingly.

This also applies to materials that are included in the list of substances of particular concern in accordance with Annex XIV of the REACH Regulation. To our knowledge and based on information from our suppliers, the materials we use do not contain any substances from the Candidate List (SVHC as at 16/12/2013) in a concentration of more than 0.1 % w/w.

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