

New as of:

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inCoris CC

Sintering metal blocks for inLab

Processing manual: Restoration production for crowns and bridges

English



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USA: Rx only

1 General

The inCoris CC product bears the CE mark in accordance with the provisions of Council Directive 93/42/EEC of June 14, 1993 concerning medical devices.

inCoris CC blocks are intended for use in manufacturing individually designed dental restorations, which can be polished or veneered after milling and sintering.

For the USA only

CAUTION: Federal law (USA) restricts sale of this device to or on the order of a physician, dentist, or licensed practitioner.

2 Material

In the case of inCoris CC, blocks comprised of cobalt-chromium alloy are used.

These are initially manufactured in a partially sintered state, then enlarged by the inLab and CEREC CAD/CAM systems; they are individually processed to specification, and finally, densely sintered.

These densely sintered single-unit products are then veneered and/or polished in the usual manner following reworking.

The advantages of inCoris CC include:

- The speed of the process,
- The high quality of work,
- The safety of the process due to wet processing,
- The clean, purely digital workflow

Contraindications

In the case of a proven intolerance, do not use the metals contained in one or more of the alloys.

Warning

inCoris CC contains cobalt and chromium. Specific compounds of these substances have maximum permitted concentrations (COE values) in the workplace. Refurbishment with rotating instruments is to be applied with a wet milling process when the recommended milling and polishing box is used. Alternatively, dry work can be carried out in a suitable milling and polishing box, if effective suction has been completed using a Class H vacuum cleaner. Particular caution is to be exercised during cleaning (wear personal protective equipment). Furthermore, we recommend that a mask is worn to protect the mouth and face. (Lab coat, dust mask with P3 particle filter, gloves, protective goggles).

If a known sensitivity to one of the substances exists in the compound, then this alloy should not be integrated or processed.

- Observe the safety data sheet.
- Avoid activities which may create dust.
- If dust is created, wear personal protective equipment. (Lab coat, dust mask with P3 particle filter, gloves, protective goggles)
- Clean the milling chamber before the material is changed (see "Changing water in the inLab MC XL [→ 11]").
- Do not let this flow into the waste water and do not place in domestic waste: Please observe the information in "Recommendations for recycling inCoris CC milling residues [→ 21]".

Only for dental use.

Keep locked away and out of the reach of children.

Safety precautions

When grinding, use a separate water tank from inCoris CC. By doing so, cross-contaminations are prevented and the inCoris CC material which has been worn off can be recycled separately.

Clean the milling chamber before the material is changed. When doing so, observe the unit's Operating Instructions.

Side effects

Allergic reactions to the metals contained in the alloy may occur, as well as electrochemically induced paresthesia. Systematic side effects to the metals contained in the alloy have been reported in isolated cases.

Interactions

Avoid occlusal and approximal contact with different alloy types.

When working with dental alloys, please ensure that dust and vapors are not inhaled. To protect against dust and vapors, use appropriate vacuum systems as well as facial and respiratory protection.

3 Chemical composition

| Components | Specified as wt%: |
|------------|-------------------|
| Co | Rest at 100% |
| Cr | 28.5 ± 1.5 |
| Mo | 6.0 ± 1.0 |
| Mn | ≤ 1.0 |
| Si | ≤ 1.0 |
| Fe | ≤ 0.75 |
| Ni | ≤ 0.1 |
| C | ≤ 0.02 |

4 Technical data

The following specifications apply to material that is densely sintered in an inFire HTC speed sintering furnace with metal function.

| | |
|--|---|
| Type | NPM ceramic alloy (NPM=Non-Precious Metal) |
| Hardness according to Vickers: | 225 ± 20HV |
| 0.2% yield stress | 480 MPa |
| Tensile strength: | > 850 MPa |
| Elasticity module: | 180 ± 20GPa |
| Elongation at break | > 20% |
| Density | 7.6g/cm ³ |
| Solidus point | 1,360 °C |
| Liquidus point | 1,400 °C |
| Thermal coefficient of expansion, TCE value: (20 - 500°C) | 14.5 ± 0.5µm/m·K |

Measurement performed on samples according to DIN EN ISO 22674

5 Indication of Use, indications, contraindications and preparation instructions

5.1 Indication of Use

The inCoris CC blocks are intended for use in manufacturing individually designed restorations, which can be polished or veneered after milling and sintering.

5.2 Indications

- Crown caps in the anterior and posterior region
- Up to 4-part bridge frameworks in the anterior and posterior regions with max. 2 pontics
- Cone and telescoping crowns

5.3 Contraindications

- Insufficient oral hygiene
- Insufficient preparation results
- Insufficient tooth structure
- Insufficient space available
- as a structure, e.g. mesostructure on uneven metallic alloys (corrosion).

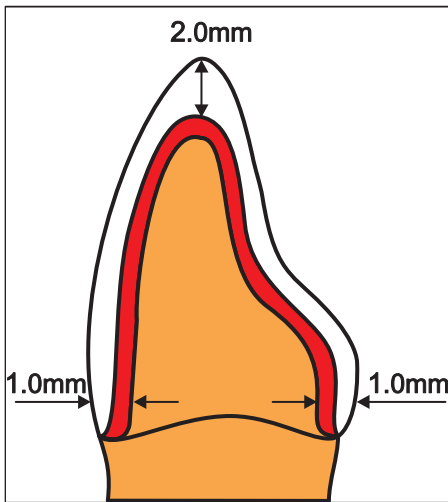


5.4 General preparation instructions

- The preparation must be performed with either a chamfer or a shoulder with rounded internal angle.
- The vertical preparation angle should be at least 3°. All transitions from the axial to the occlusal or incisal areas must be rounded off. Flat or plane surfaces are advantageous.
- The minimum wall thickness of the restoration varies depending on the area of indication.

5.5 Preparation of anterior and posterior tooth crowns

Preparation of anterior teeth

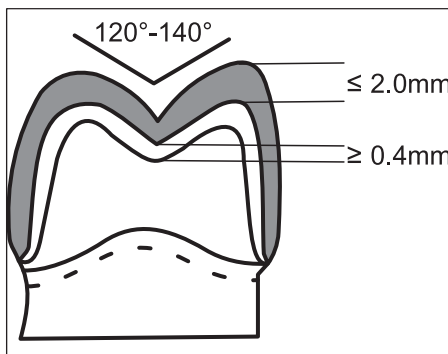


For the preparation of anterior tooth restorations, a taper angle of the axial preparation surfaces of 6° - 8° must be ensured, as well as a minimum circular depth of cut of 1.0 mm. The transitions between the axial, palatal as well as the incisal surfaces must be rounded. The incisal erosion should be 2.0 mm for aesthetic reasons. The minimum width of the incisal angle in the vestibulo-oral direction should be at least 08 - 0.9 mm in restorations produced by CAD/CAM, in order to ensure an exact reproduction of the interior surfaces of the restoration by means of the cutting or milling unit.

Framework dimensions

| | |
|---------------------------------|--------|
| Wall thickness, single crowns | 0.4 mm |
| Margin thickness, single crowns | 0.2 mm |
| Wall thickness, bridges | 0.5 mm |
| Margin thickness, bridges | 0.2 mm |

Preparation of posterior teeth (premolars and molars)



The restoration thickness should be at least 0.4 mm at the deepest point of the main fissure in individual tooth restorations and 0.5 mm for bridges. The margin thickness must be 0.2 all around, for bridges as well as for individual crowns.

For the cusp design in the veneer, a ceramic thickness of at least 2 mm should be ensured.

The tapering crown edge should be 0.2 mm thick. For veneered restorations in the posterior tooth region, the minimum occlusal thickness of the veneer ceramic must be 1.0 mm throughout. Given the minimum coping wall strength requirements, it is advisable to reduce at least 1.5 mm on the occlusal aspect.

Framework dimensions

| | |
|---------------------------------|--------|
| Wall thickness, single crowns | 0.4 mm |
| Margin thickness, single crowns | 0.2 mm |
| Wall thickness, bridges | 0.5 mm |
| Margin thickness, bridges | 0.2 mm |

The taper of the prepared surfaces should be 6° – 8° . Transitions between axial walls and occlusal surfaces should be rounded, with the occlusal profile a simplified representation form of the occlusal surface.

An opening angle of the occlusal surfaces of 120° – 140° ensures an exact reproduction of the internal surfaces of the restoration during milling and facilitates a good internal fit.

Preparation of bridges

For the preparation of bridges, the same recommendations with regard to reductions and design features apply as when preparing for single crowns.

The taper of the preparation is of vital importance for bridges, as it ensures that all die geometries of all bridge abutments have good manufacturability.

Parallel or very steep preparation surfaces can result in an inaccurate fit on reproducing the internal surfaces of the restoration.

The optimum taper of the corresponding conical surfaces of all bridge abutments should be at least 6° .

The following applies to bridges in the posterior tooth region:

- Number of pontics: 2
- Connector cross-section: 9 mm^2
- Cantilever pontic at tooth position (only one pontic, up to one premolar width) up to the second premolar
- Connector cross-section for this cantilever pontic 12 mm^2

The following applies to bridges in the anterior tooth region:

- Number of pontics: 2
- Connector cross-section: 6 mm^2

6 Creating the restoration

6.1 Scanning, designing and milling

| |
|------------------|
| IMPORTANT |
|------------------|

| |
|--|
| For manufacturing reasons, there is no longer a logo on the inCoris CC blocks. This has no influence on the quality of the blocks. |
|--|

inCoris CC blocks **with no logo** can only be processed with the inLab software version 15.0 or above.

inCoris CC blocks **with a logo** can be processed with the inLab software version 4.2 or above.

If you are using inLab software 4.2 or higher, select Sirona / inCoris CC in the material dialog.

Details are documented in the "inLab SW User Manual".

6.2 Changing water in the inLab MC XL

Observe the warning and instructions regarding changing the water in the inLab MC XL operating instructions, chapter "Changing water".

The milling residues should be collected in a container and must be recycled (see also Recommendations for recycling inCoris CC milling residues [→ 21]).

6.3 Reworking the milled restoration

CAUTION

Risk of injury

Wear personal protective equipment when working with diamond burr milling tools.

After the milling process and prior to sintering, separate the restoration with a diamond burr milling tool in a highspeed handpiece with ample irrigation in a milling and polishing box. Subsequently, finish and smooth the connector attachment areas of the connectors, also with ample irrigation. Adequate irrigation is mandatory to avoid dust formation. This process is carried out on an absorbent base. The contaminated base must subsequently be disposed of separately.

Further finishing is not recommended, as the material is very soft before sintering. Use separate diamond cutting and grinding tools for working on inCoris CC.

Once the connector attachment areas are smooth, clean the restoration under running water and blow dry with compressed air. Make sure that there is no milling or grinding residue on the inside of the crowns or bridge abutments.

Any residue would become encrusted during the sintering process and adversely affect the fit of the restoration.

6.4 Sintering

Restorations from inCoris CC must be sintered when dry and in a low-pressure argon atmosphere.

The sintering process should only be performed in Sirona inFire HTC speed with metal function using the pre-programmed inCoris CC program.



- Only use the sintering trays and beads provided when sintering inCoris CC frameworks.
- Ensure that the frameworks are submerged in the beads and protrude from the beads approx. 1 - 1.5 mm with the crown margin.
- No sintering beads must be present inside the crowns, as this would interfere with the sintering shrinkage.
- Remove beads lying interdentally by means of a probe, so that shrinking is unhindered.
- If multiple restorations are sintered at the same time, these may not touch each other.
- Place restorations so that unimpeded sintering shrinkage may take place.
- Place restorations so that they do not touch the sintering tray, as this can damage the restorations and the tray.
- Once the restorations have been positioned correctly, cover the sintering tray with the lid and sintering bell.
- Beads sintered with argon turn gray. This is a desired effect.
- For new sintering beads, perform an initial sintering cycle with argon but with no restorations.



6.5 Reworking the sintered framework

The processing of inCoris CC frameworks should be finished exclusively with cross-cut or spiral-cut tungsten-carbide cutters suitable for use with CoCr. Keep the pressure on the framework material to a minimum and work only in one direction.

Sandblast the outside of the framework with aluminum oxide (250 µm, 3 - 4 bar) and then clean it using a steam cleaner.

NOTE

Sandblasting the inCoris CC frameworks will improve their quality.

- Use only pure abrasive.
- Use only abrasive of the recommended granularity (250 µm).
- Apply the abrasive at the recommended pressure (3 - 4 bar).
- Apply the abrasive from the recommended angle (45°).
- Check the nozzle of your sandblasting unit from time to time. It may be enlarged by the abrasive passing through it, reducing the sandblasting speed and pressure.

6.6 Veneer

As you proceed to veneering the framework with a ceramic veneering material, make sure to follow the Operating Instructions for the veneering material you prefer, which must be appropriate for the framework material.

The thermal transfer coefficient can be found in the “Technical data [→ 7]” table.

For veneering inCoris CC, use veneering material VITA VM 13 or Duceram Kiss from Degudent.

When using other veneering materials, check whether these are permitted by the respective manufacturer in combination with inCoris CC.

IMPORTANT

Oxide firing is **not** required for inCoris CC frameworks. When veneering inCoris CC frameworks with for example, Duceram Kiss from DeguDent or VITA VM13, apply a thin but complete layer of NE Bonder and fire at 980 °C. Please refer to the brochures: Operating Instructions of the respective ceramic materials.

It is recommended to steam down and rinse the framework after each firing and to sandblast it if appropriate. Do not use hydrofluoric acid, do not overheat during polishing.

7 Soldering/laser welding

- Soldering
 - Before firing: e.g. with Degudent solder U1W (1120°C).
 - Flux: Oxynon
- Laser welding
 - e.g. with Biosil[®] laser welding wire or Crypton[®] laser welding wire, from Dentsply.

8 Troubleshooting

Oxide discoloration



The appearance of a grayish to brownish oxide discoloration is normal when sintering inCoris CC frameworks. The frameworks can be sandblasted with a recommended grit of 250 µm at a pressure of 3 - 4 bar and then processed further.

Sintering cycle without argon



- inCoris CC sintering beads will turn gray during sintering cycles in an argon atmosphere. This is a desired effect.
- During a sintering cycle **without** argon, the grayish sintering beads will return to their original white color. The framework will be oxidized completely and exhibit distinct scaling. The result is a greenish to bluish oxide. The fit of the framework is no longer ensured and the framework is **re-made**. Re-sintering is **not** possible.
- Check to see that: the argon bottle is sufficiently filled, that the cables are leak-free and that no parts of the sintering guard are damaged or dirty.
- After a sintering cycle without argon, at least one idle cycle with argon is required. This should ensure that the sintering beads return to gray.
- If the beads remain white, check the filling level of the argon bottle and also check whether different types of sintering beads could have been confused (Al_2O_3 - instead of ZrO_2 sintering beads).
- If the problem persists, contact a service technician.

Further points

- A canceled or interrupted sintering cycle (e.g. due to power failure) cannot be restarted. The fit of the framework is no longer ensured and the framework must be **re-made**.
- If the sintering guard is clogged or stuck after the sintering cycle, AL_2O_3 beads were probably used instead of ZrO_2 beads.
- Under certain circumstances, the sintering beads may leave stains on the sintering object or stick to it. If this effect is pronounced, the sintering temperature of the furnace should be checked by a service technician. If necessary, the furnace must be recalibrated.
- If the object was in contact with parts of the sintering guard during the sintering cycle, the framework will melt at the points of contact, leaving a residue on the guard. This framework residue must be completely removed from the guard by sandblasting. If this is not possible, the affected parts of the sintering guard must be replaced.

9 Recommended tools and materials

- Veneering
 - Duceram Kiss Degudent;
 - VM13 Vita tooth factory.
- Modeling wax
 - Scan wax (Sirona) (suitable for scans with the inLab scanner, not for exposures with inEos)
- Wet grinding turbines:
 - KaVo K-AIR plus (KaVo);
 - IMAGO (Steco-System-Technik GmbH & Co.KG);
 - NSK Presto Aqua (Girrbach);
 - Turbo-Jet (Acurata)
- Grinding tools for reworking with the wet grinding turbine/with handpiece
- Cross-cut or spiral-cut tungsten-carbide cutters
- Preparation sets:
 - Preparation set acc. to Küpper (Hager & Meisinger, Art. No. 2560);
 - Preparation set acc. to Baltzer and Kaufmann (Hager & Meisinger, Art. No. 2531);
- Soldering
 - Before firing: e.g. with Degudent solder U1W (1120°C).
 - Flux: Oxynon
- Laser welding
 - e.g. with Biosil[®] laser welding wire or Crypton[®] laser welding wire, from Dentsply.

10 Fastening instructions

Restorations made from inCoris CC can be fastened non-adhesively with glasionomer or zinc phosphate cements, or adhesively with the self-curing PANA VIA™ 21 TC (Kuraray) composite or the dual-curing PANA VIA™ F composite (Kuraray).

Pre-treatment of the restoration before adhesive bonding:

- Sand-blast the internal surfaces of the restoration in the one-way blasting process with max. 50 µm corundum (Al₂O₃). Pressure < 2.5 bar.
- Do not touch the sandblasted surface if at all possible.

NOTE

Observe usage information

Etching with hydrofluoric acid does not produce a retentive surface. Silanization is not required.

Please observe the information on use of the fastening materials of the corresponding manufacturers.

11 Removal of inserted restorations and Trepination

Removal of inserted restorations

In order to remove a fixed CoCr restoration, we recommend firstly removing the veneer ceramics with a diamond milling unit with ample irrigation.

Trepination

The restoration can be trephined with a coarse-grained, spherical diamond with ample irrigation.

In this case, it is recommended that the instrument is applied in a circular motion at an angle of 45° when drilling through the framework.

12 Recommendations for recycling inCoris CC milling residues

CAUTION

Observe the industrial safety regulations

Wearing waterproof safety gloves (category 3 according to DIN EN 374) is recommended, along with a suitable protective face mask or safety goggles.

NOTE

If the milling machine is used in mixed mode operation with inCoris CC and other materials, a separate tank must be used exclusively for operating inCoris CC in order to ensure disposal of the materials separately.

Unlike ceramic or plastic waste material, the content of the milling machine's water tank should be drained into a special foil bag. The foil bag must be supported by a suitable bin (e.g. the plaster separator bin sold by BDT). The foil insert allows the container to be drained and cleaned easily. A suitable water hose plus Dentabs are also required for more effective separation of the suspended matter. Dentabs also reduce the smell of decay. The filled foil bag is closed using a cable tie. The milling sludge from multiple water changes can be disposed of in one foil bag.

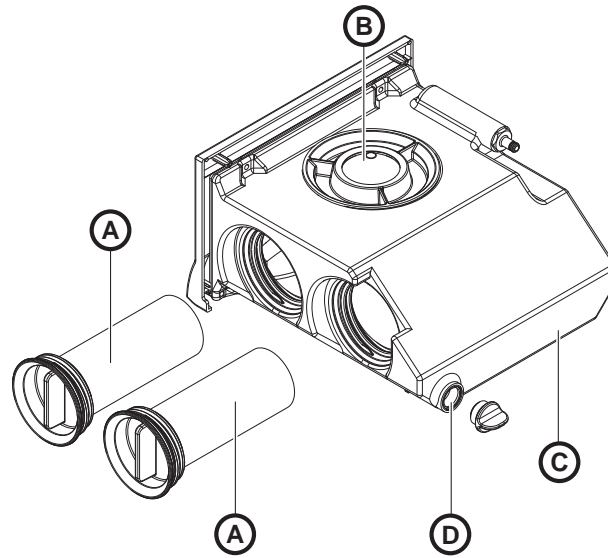
The plaster separator bin, foil bag and Dentabs described here can be obtained from your dental supplier. Used safety gloves and filters from the milling unit can be disposed of via the following waste disposal code: 150202 "Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths and protective clothing contaminated by dangerous substances".

Preparing the container

1. Place the foil insert in the separator bin.
2. Put in a Dentab tablet.



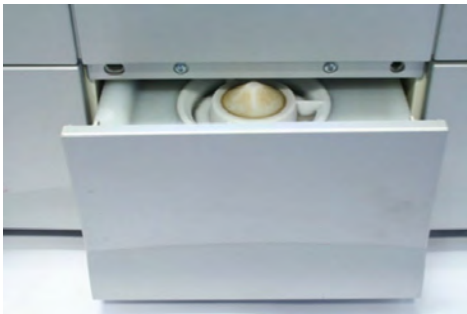
Emptying the water tank



Water tank

| | | | |
|---|----------------|---|------------|
| A | Filter inserts | C | Tank |
| B | Tank cap | D | Tank drain |

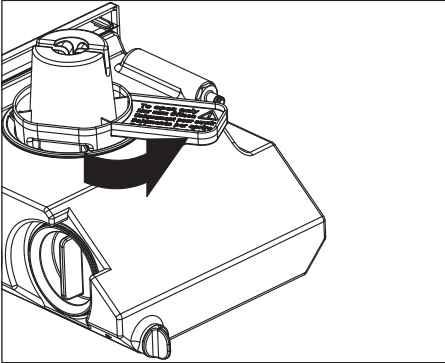
- ✓ The unit is switched on.
- ✓ No milling process is running.



1. Pull out the water tank at the front of the unit.
2. Pan the tank vigorously 5x in circular movements.
3. Open the drain opening (D). Tilt the tank so that no liquid escapes through the drain opening.



4. Empty approx. half of the contents of the tank into the collecting vessel provided. Operating the spring-loaded inlet opening of the tank cap (B) allows the contents to flow out more easily.
5. Close the rear drain opening (D) using the screw cap and pan the tank vigorously 5x in circular movements again.
6. Empty the residual contents into the collecting vessel provided.
7. Close the rear drain opening (D) with the screw cap.



Rinsing the water tank

1. Turn the upper tank cap (B) (using the tank cap opener) and take it off.
2. Fill the tank approx. 1/3 full with water.
3. Close the upper tank cap.
4. Pan the tank vigorously 5 x in circular movements again.
5. Empty the residual contents into the collecting vessel provided as described above.
6. Close the rear drain opening with the screw cap.

Filling with DENTATEC

1. Unscrew and remove the upper tank cover.
2. Add approx. 75 ml of DENTATEC to the tank.
3. Fill the tank with water until the filter inserts are completely immersed (up to the bottom edge of the cover thread, approx. 3 liters).
4. Wait briefly until the filter inserts are fully soaked and top up with the corresponding amount of water (applicable following a filter change in particular).
5. Close the water tank by tightening the upper tank cap by hand. Do not use the tank cap opener for this so as not to damage the seal.
6. Push the water tank back into the housing.

Following the water change

Following the water change a mixture of inCoris CC sediment and water can be found in the collecting vessel. By using the Dentab, the inCoris CC particles dispersed in the water will settle quickly at the bottom of the collecting vessel, resulting in a clear separation between the water and the settled solid matter.



1. Once the bin is completely full drain the clear water from the collecting vessel using the pipe. Ensure that no inCoris CC sediment is released in the process.
2. Put a new Dentab in each time that the water is drained off. Further water changes can then be completed. The milling sludge (solid matter) in the foil insert must not exceed the admissible filling weight for this of 14 kg.
3. Drain the surplus clear water off once the admissible filling weight has been reached for the foil insert. The remaining water level should be at least 2-3 cm above the settled inCoris CC sediment so that the material does not dry out.
4. Close and package the foil insert in accordance with the recycling company's specifications.

Disposal in Germany

In Germany the foil insert with the inCoris sediment can be disposed of either via the local waste disposal company or via the following recycling company:

MSP Metall Service Pedack GmbH

Rueinhafenstr. 12

76189 Karlsruhe

Phone: +49(0)721-16131-0

MSP also provides the shipping containers.

Disposal worldwide (outside Germany)

The statutory disposal regulations for the relevant country and for the local disposal companies apply to the disposal of inCoris CC sediment in other countries.

We reserve the right to make any alterations which may be required due to technical improvements.

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