Cercon® art 3.3.3

Product description and instructions for use

Cercon® art 3.3.3 in conjunction with Cercon® and Compartis®
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1 Indications

1.1 Indications

- Cercon art is a hardware and software system developed for the virtual design of dental crowns and bridges in the dental laboratory.

- Cercon art must be used only for those indications for which it has been approved in the most recent Instructions for Use for Cercon base, Cercon base PMMA for brain, Cercon ht, Cercon Wax, Crypton, Cercon art, Cercon brain, Cercon brain expert, Brain Xpert, or Brain MC XL.

- Cercon art is the CAD module for the DeguDent milling and grinding units Cercon brain, Cercon brain expert, Brain and Brain Xpert MC XL and for Compartis Network Production. With the current software version, Cercon art can be used to design frameworks for crowns and bridges in the materials approved by DeguDent.

1.2 Contraindications

- Cercon art is not suitable for any applications other than those described in the Cercon art, Cercon base/Cercon base disk, Cercon ht, PMMA for brain, Cercon Wax, Crypton and Cercon brain/Cercon brain expert/Brain MC XL Instructions for Use.

1.3 Safety warnings

- Applicable local laws and regulations related to work with display screen equipment must be followed when using with Cercon art.

- Cercon art units are electrical devices with electrical connectors essential to their function. These electrical connectors must conform to all applicable local laws and regulations. They must not be modified by the operator.

- Repairs and interventions must be performed by DeguDent-authorized service technicians only. Interventions by non-authorized personnel will invalidate the warranty.

- Improper repairs or interventions may compromise the integrated safety and protective functions (including electromagnetic protection) of Cercon art and may cause personal injury or damage the system.

- Hardware components must be repaired using original replacement parts only. This is the only way to ensure the stated performance and required operating safety. We recommend entering into a maintenance agreement that includes inspections to the Cercon art units.

- Keep the transport packaging materials. The person or entity responsible for the operation of the unit is also responsible for the proper return of the Cercon art unit, should this become necessary. Return the system only in the original packaging materials, which should be retained for the purpose. DeguDent will not be responsible for any injury or damage caused by improper packaging (i.e., not the original packaging materials).

- Modifications of system components may constitute a direct safety hazard and are therefore prohibited. In addition to the direct safety hazard, indirect hazards may occur, including errors in the dental restorations produced with Cercon art.

- Frameworks produced with Cercon art and Cercon brain/Cercon brain expert/Brain Xpert/Brain MC XL or by the Compartis network production service must be checked for correct fit on the master cast before delivery to the patient.

- Avoid strong magnetic fields in the vicinity of the system, which might interfere with the proper communication between the various components of the unit.

- Before connecting the components, please compare the listed voltages, frequencies and fuse ratings on the rating plates with those of the existing power supply.
1.4 Safety precautions

- Do not operate the system in a moist environment.
- Do not operate the system outdoors for any protracted period.
- Do not operate the system in an explosive atmosphere.
- When installing the unit, ensure adequate cooling by providing sufficient clearance on all sides.
- The system will be electrically safe only when connected to a properly executed installation, including protective earth.
- If you require a longer power cord to connect the system to mains, make sure that the ratings of the cables used and the electrical outlets are compatible with those of the system. In case of doubt please contact a licensed electrician.
- Disconnect the system from mains if not in use for a protracted period. To do so, unplug the mains cables.
- Hazardous fumes or gases may be generated in case of fire.
- Do not attempt to extinguish fire with water. Use a non-residue carbon dioxide extinguisher.

1.5 Manufacturer
DeguDent GmbH
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Subject to change without notice. No warranty for errors. This documentation may not be copied and made available to third parties without our permission.
2.1 On these Instructions for Use

Cercon art is the CAD module for the Cercon system. Crown and bridge frameworks can be designed using the scanner integrated in Cercon brain and Cercon art (only for Cercon art 3.1.7 and below). Cercon art, in combination with the Cercon eye/3Shape scanner (available separately), additionally allows a virtual wax-up of crown and bridge frameworks, copings and custom abutments. The Cercon art software designs the case and controls the Cercon brain/Cercon brain expert unit that takes care of the milling. Alternatively, the CAD data can be transmitted to the Compartis network production service for off-site fabrication. The Cercon art components comply with the requirements of EC Directive 73/23/EEC (Low-Voltage Directive) and EC Directive 89/336/EEC (EMC Directive).

Before connecting and using Cercon art, please read the Instructions for Use carefully. The Instructions for Use and its complements (see below) are applicable to all product components of the Cercon art CAD module. The Instructions for Use and other documentation pertaining to the PC, monitor, USB storage device and PC switch complement the present Instructions for Use and are to be considered an integral part of these Instructions.

2.2 Target group

Cercon eye/Cercon art must only be used for the fabrication of dental components of medical products (dental crown or bridge restorations) when operated and supervised by qualified dental laboratory personnel.

This documentation is intended to be read and followed by the person responsible for the operation and any other operators or users of Cercon brain, Cercon brain expert, Brain Xpert, Brain MC XL, Cercon eye, 3Shape and Cercon art.
The Cercon art AD/CAM software is already installed on the PC and ready for use. It may be necessary to perform a software update to get the latest version of Cercon art.

The software consists of three components: the Cercon art application itself, the Cercon tools configuration and backup tool and the service and analytical tool used by service technicians.

In addition to this chapter, make sure to read separate Instructions for Use for the PC and monitor, the USB storage device and (if applicable) the PC switch.
4 Preparatory steps in Cercon art

4.1 User mode selection

Once the PC has turned on and completed the booting sequence, you will see three symbols.

To start the program, single-click the icon labelled “Cercon art”.

To configure your Internet access, to copy or delete files or to perform a software update, single-click the icon labelled “Cercon tools”. The third icon labelled “Service” is a password-protected access for our service technicians.

4.2 Welcome screen, version 3.3.

After clicking the Cercon art icon, you will briefly be shown the welcome screen while the program is being loaded. The screen also shows the main software version number and subversion (32/64 bit).

4.3 New case, existing case or imported case

You must first decide whether to create a new case (left icon), to continue working on an existing case (right icon) or import an existing STL file.
The list contains all cases stored on the PC, complete with file numbers, restoration types, dentists and patient names, dates and times the cases was last saved and the status of the case file. The status indicates which program phase (chapter) had been reached the last time the case was worked on. By default, the list will be sorted in descending order by case date. Clicking a column header will change the sort order.

To copy a highlighted existing case, check “Open as new case” below the table. In the case of a revision of network production results (see Section 13.5, “Revisions of network production results”), check “Open for revision”.

Click the icon in the upper right corner of the window to enlarge the window. Click the icon again to reduce it.

The “Search” field provides a filtering option for the list of cases. Only cases whose names contain the search string will be shown.
4 Preparatory steps in Cercon art

4.6 Detail view

If the case is selected in list mode, the detail data for this case will be shown in the detail view window (left). If the case was saved with the current version of Cercon art, a preview will additionally appear in the detail view.

By clicking the arrowhead located before the number in the “Case no.” column will show additional case details within the list. If the case was saved with the current version of Cercon art, a preview will additionally appear in the detail list. This preview will be slightly larger than the preview in the detail view.

4.7 Most recent auto-save

When Cercon art is restarted, the most recently auto-saved case is displayed if the program had previously been closed without saving or if it had been irregularly terminated.
4 Preparatory steps in Cercon art

If the original case had already been saved, you will see a comparison of the auto-saved case (left) and the user-saved case (right). It is up to you to decide whether to open the auto-saved copy as a new case or whether to let the auto-saved copy overwrite (replace) the user-saved case.

To create a new case, i.e. a new file, click the corresponding icon.

As the first step of the preparatory phase, the program requires you to enter the name of the patient, dentist and operator to identify the case uniquely and to meet the quality assurance requirements. Additional information about the case may be entered in the text field at the bottom. Replace the name of the patient by a patient code if the case is to be sent to a different laboratory.
4 Preparatory steps in Cercon art

4.10 Scanner selection

When creating a new case, specify the scanner connected to your PC in this step. The choices are Cercon eye scanner and 3Shape.

4.11 Jaw selection

This and the next step determine for what tooth or jaw region the restoration will be fabricated. The jaw selection is the first step.
4 Preparatory steps in Cercon art

4.12 Tooth selection (coping/bridge)

This step lets you select the tooth or jaw region to be restored. In addition, you may also select the adjacent teeth and the counterbite. Click “Delete” if you need to start over. Example: To identify a bridge, single-click each tooth designated as a terminal abutment. Abutment teeth are shown in light red. All teeth between the terminal abutments are automatically designated as pontics (light blue). Clicking a pontic converts it into an abutment.

Click the appropriate tab to select the desired restoration.

The active tab will be highlighted.

- Crowns and bridges
- Abutments
- Adjacent elements
- Conical crowns
- Bite rim/counterbite/antagonist
- Wax-up

Click this little icon to create a connector
4 Preparatory steps in Cercon art

4.14 Tooth selection (gingiva/adjacent teeth)

To select a gingival adjacent element, click this tab and then on the respective gingival position. Gingival elements are shown in light blue.

4.13 Tooth selection (conical/telescopic crowns)

To select a conical/telescopic crown, click this tab and then once on the desired tooth.

Alternatively, to select a bridge, you may also click the first abutment and then select more elements while holding the Shift key pressed; pontics and connectors will be inserted automatically.

4 Preparatory steps in Cercon art

4.15 Restoration type selection

It is now possible to select multiple restoration types (e.g. bridge and crown) in the same jaw.

4.16 Parallel modifications

Parallel modifications – Different families of materials can be selected for the same jaw.
4 Preparatory steps in Cercon art

4.17 Counterbite selection (green)

If you want to create a counterbite scan, click this tab. This will automatically create a counterbite element (shown in white) superimposed on your selected design that is activated by clicking (turns green).

4.18 Antagonist selection (purple)

This selection will be available only if you selected “3Shape scanner” in the previous step. If you want to create an antagonist scan, click this tab. This will automatically create a counterbite antagonist element (shown in white) superimposed on selected design that is activated by clicking (turns green) and interpreted as a counterbite element. Clicking this element again keeps it active, but it is now shown in purple and interpreted as an antagonist element.

4.19 Wax-up selection (blue)

Click this tab if you want to create a wax-up scan. This will automatically create a wax-up (shown in white) superimposed on your selected design that is activated by clicking (turns blue).
4 Preparatory steps in Cercon art

4.20 Selected adjacent elements (yellow)

To select an adjacent element, click the tab and then on the respective tooth. Adjacent elements are shown in yellow.

4.21 Selecting the material

On completion of the dental element selection, you will be taken to the material selection chapter. Select the material for your coping or framework.

4.22 Family of materials

Clicking this arrow assign the first selected material to all restorations.
4 Preparatory steps in Cercon art

4.23 Material selection/Shade

4.24 Changing the material

If you made a mistake when selecting your framework material or if you wish to re-design an already designed object in a different material, backtrack through the menus until you get to the material selection screen. Simply check the selected material.

You will see a message window informing you that the design data will be lost. The scanning data will be retained if the design is valid for the new material, allowing you to re-design the object in the new material selected. Click “Modify” to display the newly selected material in the selection window. Now design your object based on the existing scanning data.

**Exception:** When alternating between ZrO₂, PMMA or Star materials, the design data will retained, but the message will not appear if change occurs within the same family of materials.
If the scanner selected is a Cercon eye, on-screen instructions will explain the steps to be performed on the scanner:

- Turn on the scanner.
- Clamp the cast in place on the scanning platform. Align it roughly according to its path of insertion and also according to its height, using the plastic scanning template. Follow the instructions under “Preparatory steps” of these Instructions for Use.
- Note that, in the case of copings, models must not be changed once in place on the scanning platform.
5 Scanning with Cercon eye

5.4 Aligning the first element

Position the scanning platform on the scanning plate so the crosshairs are positioned in the middle of the die in the case of posterior teeth or at the centre of the incisals edge in the case of anterior teeth.

All three reference marks must be completely visible within the video image frame.

5.5 Magnified preview

In some situations, a magnified preview image may facilitate the exact positioning of the die to be scanned below the crosshead.

To get the magnified preview, simply check the corresponding checkbox below the preview image.

Note that the regular preview image will return after the following scan to ensure that the reference markers are located inside the preview image.

To initiate the scanning process, close the lid until it locks into place.

5.6 Scanning progress

Close the lid to start the scanning process. The upper progress bar will show the scanning progress for the current element. The lower progress bar will show the total scanning progress for all elements.
Once the scan is completed, remove the first die (13) from the base of the cast and insert the next die listed in the top info bar (in this example, gingival element 14).

Individual gingival elements (element 14 in our example) are processed in the same way as die elements. For larger, coherent gingival elements, perform a separate scan for each tooth to be restored. Move the scanning platform so the area of the first pontic is located below the crosshairs. A prompt will be shown following the scan inquiring whether the element has been completely acquired. In this case, another partial scan is needed, so click “Add”. Next, move the scanning platform so the area of the next pontic is located below the crosshairs. If the gingival element has been acquired completely, click Complete when prompted about any additional scans.

Dies 15 and 16 are scanned similarly to the first die. Once the entire bridge situation has been scanned, you will be prompted to scan the adjacent teeth. Proceed in the same manner as for the dies: centre the crosshairs and start the scanning process.
5 Scanning with Cercon eye

5.10 Tilt detection

If the unit detects that the reference marks have moved during scanning, e.g. because the scanning platform was tilted, a warning message to that effect will appear on the screen.

You will be prompted to reposition the element. Once this is done, the scan will be repeated.

5.11 Scanning the counterbite

To acquire the antagonists (counterbite), insert all dies into the base and place the silicone occlusal rim on top. Most of the contest must be sprayed with scanning spray before positioning to improve the acquisition result.

The scanning process is similar to that for larger gingival elements.

When scanning a counterbite, one scan should be performed for each tooth to be replaced (for an example). First, move the scanning platform such that the area of the counterbite above the first pontic is located below the crosshairs. A prompt will be shown following the scan inquiring whether the element has been completely acquired. In this case, another three partial scans are needed, so click Add. Next, move the scanning platform such that the area of the counterbite above the next pontic is located below the crosshairs.
5 Scanning with Cercon eye

Once the counterbite with all antagonists has been completely acquired, the scanning phase is completed, and the calculation phase begins.

Next, the scanning data for the four elements, for the adjacent teeth and for the counterbite are referenced, i.e. the ten point clouds will be perfectly aligned. Messages in the top info bar keep you informed about the progress of the calculation.

When the calculations have been completed, Cercon art will display the resulting point cloud. The points should be distributed fairly evenly up to just below the preparation margin. More extensive discrepancies would indicate that an inappropriate material was used for the cast or that a mistake was made when preparing the cast or when aligning the impression. In the event of discrepancies in the point cloud – such as holes (surrounded by a red line) – repeat the scan for a single die only. This presupposes that the cast has not been moved or in any way modified on the scanning platform.

Simply back up one step using the arrow buttons.
5 Scanning with Cercon eye

A menu will open where you select the objects to be rescanned by clicking them. The selected object to be rescanned is marked.

Realign the object below the crosshead and re-scan.

This presupposes that the cast has not been moved or in any way modified on the scanning platform.

Check the “Rescanning” box.
The re-scanned object will be automatically inserted into the bridge.
The multi-scan option will be available for as long as the case has not been closed. Once the case has been saved and closed, the multi-scan option will no longer be available, and rescanning will no longer be possible.

To reduce the amount of data to be processed and to obtain a well-defined margin, the scanning data must be cropped. To do so, use the first slide control to define the height of the base (blue point cloud). Allow the circumferential chamfer to remain fully visible below the lowest point of the preparation margin.
If you included a bite rim in the scan (green point cloud), use the second slide control to specify how much you want to crop from the scan data.
When done, click the forward arrow in the lower right corner to leave the SCAN chapter.
6 STL Import

6.1 Selection

Select “Import”.

6.2 Data transfer

You will be prompted to connect the USB flash drive containing the STL files to be imported to the PC. Alternatively, you may select a STL import directory to which you copy the STL files to be imported or which already contains the required STL files.

6.3 Network path

Select the local STL import directory as follows: In Cercon tools, open the “Global settings” page. Locate the “Network path for STL import” entry under “Paths”. Accept the default directory path or specify a different directory. If you change the directory path, save this setting. You may now use Windows Explorer to copy the STL files into the newly selected ST import directory if not already present.
Select the STL files to be imported. Up to two STL files can be selected at the same time. In this example, the preparation and antagonist scans have been selected. Proceed by clicking the forward arrow.

The previously selected STL files are loaded and displayed. Enter the required data so that a new case can be created in Cercon art.

Select the jaw for the restoration to be placed in. In this example, it is the maxilla, while the mandible is the antagonist jaw.
6 STL Import

6.7 Selecting the restoration

Select the restoration and, optionally, the adjacent teeth and the counterbite.

6.8 Selecting the material

Select the material and the family of materials. Continue with the forward arrow.

6.9 Aligning the jaw

Align the maxilla and mandible so that the jaw to be manipulated (restoration jaw) is placed on the alignment plane. Keep the left mouse button pressed to rotate the models according to the direction of the arrow that appears.
In this example, the maxilla is the restoration jaw. Therefore, the models have been rotated so that the maxilla is on the alignment plane and the mandible is shown above the maxilla.

In the next step, data not required can be eliminated. Left-click somewhere near the area to be deleted. This will set the first point. Now drag the mouse around the area to be deleted; if changing direction, click to set an additional point. Once a point is placed on top of the first point, the unneeded area will be highlighted and deleted.

With this button, the deleted data (grey) can be made visible again. Areas that were too generously deleted can now be retrieved by selecting.

This button toggles areas as deleted and non-deleted.

This button terminates the process of marking for deletion.

These buttons allow you to redo or repeat a move or to cancel the entire deletion process.
6 STL Import

6.11 Tooth position

In the next step, the individual pontics are assigned to tooth positions by clicking the mouse. Incorrectly assigned teeth can be moved to the correct position at the end.

6.12 Defining die sections

The next step defines the die sections. Depending on the view, the separating discs can be moved to the desired positions by their handles (top, bottom, side, centre), in the direction of the arrow.

Click the forward arrow to initiate CAD mode.
When moving from the SCAN chapter to the CAD chapter of the software, the scan points of the crown or bridge scanned with Cercon brain located above the preparation margins will be used as the basis for calculating and displaying the model surface. If a scanning error becomes evident as you look at the display, please consult Section 13 “Troubleshooting” in these Instructions for Use.

To display a larger part of restoration on the screen, move the window to the right edge of the screen by clicking the thumbnail icon in the upper right corner of the window.

This will move the window aside, and the thumbnail icon will change to look like this: ![Thumbnail Icon]

If you move the mouse over the – still partially visible – window, it will be shown in full size at the original position as long as the mouse remains inside the window. When the mouse leaves the window, the window will be pushed towards the edge again.

Display the window permanently at the original position in full size by clicking the thumbnail icon. This will prevent the window from being moved to the side.
7 CAD/Designing with Cercon art

7.1.2 View tool

Near the lower centre of the screen you will find this new symbol: ☰. Clicking this button opens a new view tool in the lower left window.

Clicking the various buttons lets you show or hide individual aspects of your scanned model, such as gingiva or adjacent teeth.

The first button in a row always refers to the entire situation, the second one to the active design and the third one to the active element.

The buttons in the first row refer to the bite rims and virtual wax-up elements.

The buttons in the second row refer to the designs.

The buttons in the third row refer to adjacent or gingival elements.

This handle can be used to make bite rim representations more or less transparent.

7.1.3 Correcting the preparation margins

If you do not approve of the path of insertion or the preparation margins automatically determined by the system, click “Back” to modify the preparation margin manually.
Here you have the option to modify the preparation margin manually. To move a single point, select it by left-clicking it and dragging it to the desired location. Alternatively, you may move the point using the “Position” slide control.

The control points shown can be selected by left-clicking them and moved by dragging them with the left mouse button pressed. Pressing the “Del” key while clicking a control point will remove that point.

Left-clicking an existing preparation margin will add an additional control point.

Right-click an existing preparation margin or control point will open graphic menu with available options:

In this example, dies 23, 25, 26 and 27 have undercuts at the preparation margins.

The representation of undercuts can be shown or hidden.
7.1.4 Correcting the path of insertion

In the next step you can modify the path of insertion manually, based on the path automatically determined by the system, or to deactivate the automatic path of insertion.

To modify the path of insertion manually, check the corresponding checkbox and change the positions of the two slide controls labelled

- "Orovestibular axis"
- "Mesiodistal axis"

as required. The software supports you in doing so by showing any undercuts in red. To avoid missing undercuts, pay particular attention to any red areas that go beyond the preparation margin. The individual path of insertion is aligned by way of the occlusal plane (blue) and the object plane (orange). The highlighted die will not be moved.

In addition, you can click “Plan view” to check whether all preparation margins are visible when looking at the preparation along the path of insertion.
The next step defines the primary coping parameters:
The second correspond to those for single copings.

- All thickness
- Cementing gap
- Spacer area

Check the appropriate checkbox to specify whether the selected settings are to be applied per coping, for all copings or for all restorations in the jaw.

Click the arrow button on the left bottom of the action window. A new control will appear. It allows you to adjust the cementing gap individually (for the entire die).
If the “Per coping” checkbox is checked, any settings defined will apply only to the selected die, which is identified by the brown colour of the spacer area. Wall thickness may range from 0.5 mm (or 0.4 mm for single crowns) to 1.0 mm in increments of 0.1 mm. The width of the cementing gap may vary between 0 µm and 60 µm. Narrower gaps are recommended for shorter crowns or for crowns with a pronounced conical shape. Wider gaps are recommended for longer crowns or for crowns with a less pronounced conical shape.

The cementing gap is represented on the display by a dark coating, a virtual spacer. The spacer area parameter (in %) determines the width of the cervical margin area intended to be spacer-free. A value of 100% corresponds to complete spacer coverage.

Use the slide control for the base cement gap to change the area under the brown spacer.

Clicking the default button restores the pre-programmed default values for the material used.

### 7.1.7 Automatically suggested framework design

The software will automatically design the copings and pontics.

The following tools are available in the design window for this purpose.

- Library tooth selection
If you want to give the surfaces of copings and pontics their individual fully contoured shape, select the “Library tooth selection” chapter.

Select the object to be designed and check the “Fully contoured library tooth” checkbox.

If you want a fully contoured for all elements, additionally check the “Setting applies to all elements being designed” checkbox.

In the next step you will determine the vestibular alignment of the fully contoured element (tooth axis) relative to the dental arch. To do so, move the “Vestibular alignment” slide control to the desired position. While you do this, the library tooth you are working on is shown as transparent. A correct alignment is a necessary prerequisite for the subsequent reduction step (veneering).
7.1.11 Library tooth modification

Once the vestibular alignment of all library teeth has been determined, the next step is the modification of the library teeth. The active (selected) element will be highlighted in light orange. As you move the mouse over the window, three reference axes are shown for the active element. All operations you perform in the window by means of the slide controls refer to the active (selected) reference axis, which will be highlighted and can be selected by clicking it directly or by clicking the corresponding button.

The following elements will be shown:

- **Button for selecting the reference axis**

- **Translation; select by moving the slide control to the right of this button**

- **Rotation; select by moving the slide control to the right of this button**

- **Size; select by moving the slide control to the right of this button**

As an alternative to the above description, where the slide controls of the window are used for modifying a library tooth, you can achieve the same goal using just the mouse itself.

A manipulator frame is depicted for the currently active elements.

This manipulator frame has several handles that will be displayed in different ways, depending on where in the frame the mouse pointer is located. Using these handles, you can apply certain transformations (translation, rotation, scaling) to the active element.
It is important to know that the manipulator frame is dependent on the current view and is independent of active reference axis referred to in the window. Depending on the view, for example, only a transformation with respect to the mesiodistal axis may be possible, but not with respect to the orovestibular axis. If you do want to apply the transformation with respect to the orovestibular axis, you must to change the view so this becomes possible. In other words: Before you apply a transformation to the active element, make sure you have selected the appropriate view.

Translation:
Position the mouse inside the manipulator frame, so that four displacement arrows appears in the centre of the frame. Left-click and drag the surface of the active element in the desired direction.

Rotation:
Position the mouse on a small handle on the edge of the manipulator frame — — , so that a curved rotation arrow appears in the centre of the frame. Left-click and drag (turn) the surface of the active element to the desired orientation.
In the next step, you will manipulate and modify the lower (base) aspect of the pontics. The window again contains the button for selecting the reference axis and the following slide controls:

- **Position of the basal pole**
- **Wall thickness of the veneer [mm]**
- **Shape of the base**

The basal contours will not be corrected to reflect the (selectable) distance from the gingiva until this step has been completed.

You may also enlarge or reduce the active element uniformly in four directions.

To do so, position the mouse on a small total-scaling handle in a corner of the manipulator frame, so that a scaling handle appears on all four edges of the frame. Now pull the surface of the active element in the direction with the left mouse button pressed.

Setting the size (scaling):

Position the mouse on the edge of the manipulator frame, so that a small scaling handle appears there and at the opposite edge of the frame. Now left-click and drag the surface of the active element in the desired direction. This will uniformly enlarge or reduce the active element in both directions.
The surface modification tools serve to correct the shape and to add material to the abutment copings and pontics. This allows fully contoured shapes to be adapted to the contours of the counterbite.

The bite rim can be displayed by clicking in different representations:

- Counterbite for all designs
- Counterbite for the selected crown/bridge
- Counterbite for the selected structural part

To do so, select the coping (shown in light orange) and click its surface to define the centre of the reduction, whose characteristics such as reduction depth radius can be determined using the slide controls: Keep the left mouse button pressed to subtract material from the crowns or pontics or to add material or smooth the affected surfaces. Click “Undo” to go back and cancel each of the modifications you made, one by one. Click “Cancel” to discard all modifications you have made to the active element.

The window contains the following tools and controls:

- Adding/Smoothing/Removing/Reducing/Morphing
- Build-up height
- Degree of smoothing
- Reduction depth
- Radius
7 CAD/Designing with Cercon art

7.1.14 Checking the surfaces

Once you are done modifying the surfaces of the structures, these surfaces will automatically be checked by the program. For example, the following two checks are performed:

First check:
The program looks specifically for opposing surface areas that are too close together.

This is the case in the example shown.

Use the “Wall thickness diagnostics” (Section 7.1.6) to easily identify such areas.

No surface should get too close to opposite surfaces, as such design cannot be produced properly or may fracture. If such surface areas are found in the designs, a warning message will appear.
Second check:
The surfaces are checked for consistency.

The program might do an automatic correction of the design if the check detects a situation that would make it difficult or impossible to produce the design. This will be the case, for example, if elements overlap or there is no common path of insertion for the individual elements of a bridge.

The example shown has an overlap.

Such overlaps should not occur, as these designs may not be produced correctly. If such overlaps are found in the designs, a warning message will appear.

Only if you accept all warnings shown can you proceed to the next step and continue designing.
7.1.15 Complete reduction

The veneer reduction tool in the manipulation window allows you to reduce library object to create some space to accommodate the veneer.

To reduce the complete element, the “Complete reduction” checkbox must be checked. To reduce only part of the element, this checkbox must be unchecked.

To achieve a complete reduction, select an element (shown in light orange) and use the slide controls to define the desired amount of reduction per tooth axis. Click “Apply” to apply the parameters to the selected element.

If you would like to define the reduction depth in terms of direction rather than in terms of axes, you can do so after clicking “Advanced”.

Reduction by axis (standard reduction features)

- Mesial/distal reduction [mm]
- Occlusal/basal reduction [mm]
- Oral/vestibular reduction [mm]
- Advanced reduction features button

Reduction by direction (advanced reduction features)

- Mesial reduction [mm]
- Distal reduction [mm]
- Occlusal reduction [mm]
- Vestibular reduction [mm]
- Oral reduction [mm]
- Basal reduction [mm]
- Standard reduction features button
Once the selected parameters have been applied to the object, the element will be displayed in its partially reduced form.

For more control, an outline of the original contour can be displayed by clicking “Show/hide anatomic shape”.

To reduce only part of the element for the new veneer, the “Complete reduction” checkbox must be unchecked.

Select an element (shown in light orange) and use the slide controls to define the desired amount of reduction across the occlusal/basal and the mesial/distal area. A preview of the selected area will be shown in bright orange.

The amount of reduction is determined by the vestibular reduction slide control.

Click “Apply” to apply the parameters to the selected element.

Partial reduction features

- Vestibular reduction [mm]
- Occlusal/basal area
- Mesial/distal area
Once the selected parameters have been applied to the object, the element will be displayed in its partially reduced form.

All fully contoured elements of a given situation can be fully or partially reduced in this manner. However, it is not possible to reduce the same element more than once.

The Adding/Smoothing/Reducing surface modification tools can be reapplied to any reduced element after reduction.

By clicking “Show maximum production height”, a plane can be added to the display for zirconia, PMMA, wax, titanium or resin frameworks indicating the maximum production height for the object.

As there is no maximum production height for CoCr frameworks, the button will be greyed out in this case.

If the framework transgresses this plane, both the plane itself and the “Show maximum production height” button would change to red. In this case, correct the height of the object to facilitate its production or select the next disc size.
Click “Analysis” to see a diagnostic tool that can be used to show the current wall thicknesses and the distances from adjacent teeth or antagonists for the active element.

If you activate the colour alerts for wall thicknesses or distances by checking the corresponding checkbox, any values that are less than the minimum will be indicated by the corresponding colour gradient for the object.

In the example shown here, the minimum wall thickness was not reached for element 15. When the corresponding diagnostic tool is activated ("Wall thickness" checkbox checked), this is indicated by a red shade.

The numerical values shown for wall thickness of distance in the diagnostic window refer to that point on the active element that the mouse pointer indicates.

If the minimum wall thickness is not reach for one or more objects, you will receive a warning message to that effect after clicking “Continue”, the corresponding objects will be shown in dark orange. The deficiency can corrected either automatically (by the software) or manually (by the user).
In the example shown here, when the corresponding diagnostic tool is activated ("Distance" checkbox checked), the distances between element 16 on one hand and the counterbite and the adjacent elements of the other is indicated by a green/blue discoloration. Contact points and overlaps are shown in dark blue.

The numerical values shown for wall thickness of distance in the diagnostic window refer to that point on the active element that the mouse pointer indicates.

Distance to the full anatomic contour diagnostics

Distance to the full anatomic contour after reduction. Displays the available space for veneering. In the following example, the distance between the original contour and fully reduced coping should be about 0.8–1.5 mm. This is appropriately shown on the screen when you change the upper limit to 1.5 and the lower limit value to 0.8. Some additional reduction should occur in the blue areas. However, this is not always possible while still comply with wall-thickness requirements. In the green areas, with about 1.1 mm distance from the original contour, the dental technician may decide whether to reduce the design material in a case-by-case basis. In this example, there is no room for a 1.5 mm ceramic veneer anywhere.
The final virtual wax-up step designs the interdental connectors using three slide controls.

Three types of modifications are available:
- Movement oral/vestibular
- Movement basal/occlusal
- Adjusting the cross-sectional area

When designing the connectors, make sure that these do not touch the gingiva and that the minimum requirements for the cross-sectional area (which depends on the material used) are met.

If a connector is selected, both its connector margins will be displayed.

Select a control point by left-clicking it; Move a control point by left-clicking and dragging it. Pressing the “Del” key while clicking a control point will remove that point.
Add a new connector margin segment by pressing “A” on the keyboard while clicking a control point.

Left-clicking an existing connector margin will add an additional control point.

If you right-click an existing connector margin or control point, a context menu with available options will appear:

“Add Segment” adds a new area consisting of several control points to a connector curve. Left-clicking an existing connector margin defines the first control point of the new segment.

Add control points to define the desired course of the connector margin. The last control point of the new segment must be placed directly on the connector margin.

Add control point (1) or segment (2):

Remove control point (3):
This will adapt the existing connector margins at the intersections.

This button hides adjacent (depending on the view) elements. By confirming this function, all obscuring elements in a view perpendicular to the connector margin are hidden.
7 CAD/Designing with Cercon art

7.1.24 Checking the connectors

The software automatically checks whether the connectors have the recommended minimum cross-sectional area. If this is not the case, the connector will be shown in red, and the corresponding message will appear in the top info bar.

In addition, a final plausibility check of the framework will be performed before the milling step. If any connectors do not have the recommended minimum cross-sectional area, a warning message will appear. If you decide not to correct this, the framework in question can only be produced at your own risk.
When moving from the SCAN chapter to the CAD chapter of the software, the scan points of the crown or bridge scanned with Cercon brain that are located above the preparation margins are used as the basis for calculating and displaying the model surface. If a scanning error becomes evident as you look at the display, please consult Section 15, “Troubleshooting” in these Instructions for Use.

After cropping and after the scanning data have been calculated, you have the option to modify the preparation margin manually.

7.2.1 Scanned wax-up

7.2.2 Model representation
(same as for crowns and bridges)

7.2.3 Correcting the path of insertion
(same as for crowns and bridges)
7.2.4 Parameter settings
(same as for crowns and bridges)

The next step defines the primary coping parameters.

7.2.5 Vestibular alignment

With wax-up representation inserted.

In the next step you will determine the vestibular alignment of the fully contoured element (tooth axis) relative to the dental arch.

To do so, move the “Vestibular alignment” slide control to the desired position. While you do this, the scanned wax-up will be shown as transparent. A correct alignment is a necessary prerequisite for a possible subsequent reduction step (veneering).
In the following step, activate the button and select the occlusal surface area to be copied from the scanned wax-up by left-clicking. The lower aspect is designed automatically. This step must be performed for each tooth element.

The points set can be selected and moved with the mouse. Pressing the “Del” key while clicking a control point will remove that point. Clicking an existing curve will add a control point.

On clicking, the automatically designed wax-up will be shown. You can either accept it or make additional modifications.

Use the hide/display tool to hide or unhide the wax-up view.
7 CAD/Designing with Cercon art

### 7.2.9 Modifications with surface tool

After creating the virtual wax-up, you can make further modifications to the bridge with the surface tool, as needed.

### 7.2.10 Automatically designed wax-up/Fully contoured

In this example, the fully contoured wax-up was taken and provided to the connector, which you can modify as needed.

### 7.2.11 Library tooth selection

If you do not approve of the shape of the automatically designed wax-up, replace each element of the tooth structure by a standard or fully anatomical library item. To do this, check the appropriate checkbox in the selection window.
The standard library tooth was selected for tooth 25.

Here, teeth 25 and 26 were selected for complete reduction for subsequent veneering.
8 CAD/Conical crowns

8.1 On-screen representation of the cast

After trimming and calculating the scan data, proceed to the coping parameter settings.

8.2 Modifying the preparation margins

If you do not approve of the path of insertion or the preparation margins automatically determined by the system, use the icon bar in the action window to go to “Modify preparation margin manually”.

Here you have the option to modify the preparation margin manually. To move a single point, left-click and drag it to the desired location. Alternatively, you may move the point using the “Position” slide control. Add a control points by left-clicking a preparation margin. Pressing the “Del” key while clicking a control point will remove that point. Right-clicking an existing preparation margin or control point will open a graphic menu with available options, such as adding or deleting control points. Right-click menu:

 Neu suchen Click “New search” to repeat the automatic preparation margin detection starting from the current situation.

 Neu festlegen Click “New placement” to specify the preparation line directly by left-clicking key points along the preparation margin line.
This step defines the individual path of insertion. You can determine the path of insertion automatically or manually or disable this function.

To modify the path of insertion manually, check the corresponding checkbox and change the positions of the two slide controls labelled “Orovestibular axis” and “Mesiodistal axis” as required. The software supports you in doing so by showing any undercuts in red. To avoid missing undercuts, pay particular attention to any red areas that go beyond the preparation margin. The individual path of insertion is aligned by way of the occlusal plane (blue) and the object plane (orange). The highlighted die will not be moved.

In addition, you can click “Plan view” to check whether all preparation margins are visible when looking at the preparation along the path of insertion. Non-activated areas of the die will be hidden.
8.5 Parameters for copings

The next step defines the coping parameters:
- Wall thickness
- Cementing gap
- Spacer area

If you want the selected settings to apply to all copings, check the “For all copings” checkbox. If different materials were chosen under “Material Selection”, this option will not be available.

Click the arrow button on the left bottom of the action window. A new slide control will appear that allows you to adjust the cementing gap individually (for the entire die).

8.6 Individual coping parameters

If the “Per coping” checkbox is checked, any settings defined will apply only to the selected die, which is identified by the brown colour of the spacer area.

Wall thickness may range from 0.4 to 1.0 mm in increments of 0.1 mm.

The width of the cementing gap may vary between 0 and 50 µm.

Narrower gaps are recommended for shorter copings or for copings with a pronounced conical shape. Wider gaps are recommended for longer crowns or for crowns with a less pronounced conical shape.
This chapter defines the parameters of the copings and the overall path of insertion. The software makes an initial proposal representing a path of insertion optimized for aesthetics. Critical areas, i.e. areas where the cone surfaces would violate the wall-thickness guidelines due to an excessive angle for the path of insertion, will be shown in red. In the next chapter, “Shaping conical crowns”, the cervical shoulder will be automatically widened, but it can still be modified individually.

In the upper area of the action window you can determine the angle and the cervical shoulder width. If you want the selected settings to apply to all conical crowns, check the “For all conical crowns” checkbox.

Choose an angle from 0° to 6°. The 0° angle is the setting for telescopic crowns.

The cervical shoulder comprises an area of 0 to 2 mm and can be adjusted in increments of 0.1 mm. If set to 0 mm, no shoulder is generated.

The bottom of the actions window shows the overall path of insertion. If you approve of the initial proposal by the software, check the “Aesthetic path” checkbox. The software will determine the aesthetic path of insertion by minimizing the wall thickness of the conical crown located farthest mesially in the quadrant.

If you disapprove of the initial proposal by the software, check the “Manual path” checkbox. Next, the controls for “Main axis” and “Transverse axis” will be active and the entire path of insertion can be changed with the two slide controls. Alternatively, you can left-click and drag the manipulation cross along the main and transverse axes.
8 CAD/Conical crowns

8.8 Shaping conical crowns

All copings are now calculated based on the parameters for conical crowns specified in the appropriate chapter. The action window will display about the surface and average height of the selected cone.

Use the “Smoothing” slide control to modify the occlusal or incisal surfaces of the coping.

Use the “Position of the cone margin” slide control to specify the cone height. It can still be changed individually on the object.

You now have a choice between two views:

- If the “Preview” checkbox is checked, all steps will be performed in real time in the preview display.
- If the “Preview” checkbox is not checked, the selected object is shown in a transparent design view on which the design can now be performed manually. The occlusal/incisal surfaces will be represented as flow lines.
At the bottom left of the screen there will be a coordinate system that shows you the current working level as derived from the current view.

You can add points to boundary lines or delete points. Left-click the mouse to place a point where the mouse cursor points to the line. Move the mouse cursor over a point and press the “Del” key to delete the selected point.

If you wish to shape the coping individually, you may modify the shoulder in plan view. Click and drag a point on the outer edge of the shoulder to make the shoulder narrower or wider within the previewed shoulder radius.

Or left-click a point on the upper margin line of the cone surface and drag it to shoulder level.

You will be shown the customized shoulder width.
In the lateral/frontal view, you can move the shoulder height or cone surface up or down. Again, you will be shown the customized cone height.

If the “Combined” checkbox is checked, the predefined values for shoulder width and cone height will be generated automatically when you modify the shoulder height or the position of the cone surface.

The “Combined” checkbox can be quickly toggled by pressing “Q” on the keyboard.
If the minimum wall thickness rules are violated while shaping a crown, the respective area will be shown in red. Click “Correction” to have this corrected automatically by pushing the cone surface outward on the shoulder.
8 CAD/Conical crowns

8.9 Surface modification

This chapter offers three surface modification tools:

- Click the analysis button on the bottom icon bar to visualize the wall thickness of the cone surface relative to the preset wall thickness.

- Click the sectional view button on the bottom icon bar to visualize the selected conical crown in the sectional view.

The adding, smoothing and reducing tools assist in designing the copings. Shoulders and cone surfaces will remain unchanged.
To initiate network production (Compartis) of a case, select the “Network production” icon in the selection window.

If a case consists of multiple restorations, each of those restorations is shown as a separate entry in the list of completed designs. This allows individual restorations to be selected from a more extensive case. Each restoration that is sent to the network production centre is assigned a unique Compartis order number (tracking number). Select the restorations to be produced via Compartis from the list of completed designs. Even if you do not have a separate license for abutments, you can still have already designed one- or two-piece custom abutments from zirconia or titanium produced via Compartis.

Selected cases will be included in the list of cases to be transferred.
You may specify an optional label for each restoration to be produced. This label will be printed on the packaging (box) at the production centre before your restorations are shipped so you can easily identify them.

To specify a label, select the corresponding entry in the list and enter an appropriate designation in the “Identification” field. Here, again, a preview of the restoration will be available, provided the case was saved with the current version of Cercon art.

After selecting all restorations to be produced, you will see a checklist of those restorations.

In the next step, the previously selected restorations will sent to the Compartis production centre for production.
To initiate production of a case on a Cercon brain expert connected to the PC, select the “Cercon brain expert” icon in the selection window. Even if you do not have a separate license for abutments, you can still produce already designed one- or two-piece custom abutments from zirconia on the Cercon brain expert.

When nesting restorations, these will initially be arranged in the blank so that the milling tool can work on all areas of the objects, i.e. all undercuts will be accessible from one or several of the axes as appropriate. An adequate distance is maintained from adjacent objects. There are two positions in which the object can be optimally placed. Toggle between the positions by performing a 180° rotation.

Optimally positioned objects will be indicated by an orange check mark.

An object rotated from its optimal position will be produced in only 3 axes. Undercut areas will be blocked out and need to be relieved later by the dental technician. The nesting distance from the adjacent objects within the blank will be reduced.

Objects rotated away from their optimal position objects are indicated by an orange label.
As you move the mouse over a blank, information about the blank will be shown.

As you move the mouse over a restoration within blank, additional information about the restoration will be shown.

9.4 Exporting to Sirona MC XL

A case can be exported in DXD format so that it can be manufactured with a Sirona MC XL. To do so, click “MC XL” in the selection window.
Select the cases to be exported from the case list.

Then specify where the cases (files) to be exported should be stored. Choices include pre-configured MC XL export folder (that you can specify in Cercon tools) or a USB stick connected to the PC.

If the export was successful, you will see the following message:
9 CAM

9.5 Exporting to Brain CAM and Brain CAM MC XL

A case can be exported in DXD format for re-import by the Brain CAM or Brain CAM MC XL software and subsequent production with a Brain Xpert or Brain MC XL. To do so, click “brain Cam Export” in the selection window.

Select the cases to be exported from the list of cases.

The preview of the cases contained will be useful in helping to identify the cases to be exported in the case list. To display the preview, move the mouse over an entry in the list. However, a preview will only be available if the case was saved with the current version of Cercon art.
Then specify where the cases (files) to be exported should be stored. Choices include pre-configured MC XL export folder (that you can specify in Cercon tools) or a USB stick connected to the PC.

If the export was successful, you will see the following message:
10 Cercon tools

10.1 Cercon tools options

The Cercon tools utility is started via the corresponding button on the welcome screen. It offers miscellaneous options such as language selection, Internet and e-mail settings, file handling and software updates. The corresponding menus are activated by the toolbar at the bottom of the screen.

The icons indicate the following functions (left to right):

- Language
- Internet access
- E-mail settings
- Write to USB stick
- Read from USB stick
- Delete cases
- Backup case data
- Global settings
- Report problems
- Software update via Internet
- Software update via CD/USB
- Scanner
- Terms and conditions

10.2 Versions/Version numbers and PC ID

The lower right corner of the window shows two important details related to your Cercon system:

The PC ID, which is a number that uniquely identifies your Cercon art PC, e.g. when ordering from our network production service.

Below the PC ID will find the version number of the Cercon art software installed on your PC. These ID codes can be important for us when servicing or troubleshooting your system or answering questions. Click the version number to open the window with version details.
Click the flag icon to select the software language. This will cause all texts and prompts in Cercon art and Cercon tools to be displayed in the selected language. In addition, the computer will be configured for the appropriate keyboard layout. For example, if “Italiano” is selected, a keyboard with an Italian layout should be connected for all keys to be assigned properly.

Your PC has an analogue modem, an ISDN adapter and the network adapter. If you want to dial up to the network via the telephone network, enter your access mode, the telephone number of your provider and, if required, your username and password. Additionally, you may configure your Internet access to use your local area network (LAN). A connection test is available for each of these three access modes.

E-mail is used to send Cercon art cases to another Cercon laboratory. You can configure your e-mail settings and the corresponding menu (envelope icon). When sending data for larger or more complex objects, such as bridge cases, make sure your Internet provider supports large e-mail attachments.
10.6 Write to USB stick/Selecting multiple cases

Select “Write to USB stick” to write some or all cases (files) saved on the PC to a USB memory stick for copying or safekeeping. The cases you selected will be highlighted in blue. Click “Save” to copy the selected cases. To this end, a USB stick must be plugged into a USB port on the PC.

Select multiple cases as usual in a Windows environment:
1. Holding the Ctrl key and clicking the case will select/deselect that case, while retaining the selected/deselect status of the remaining cases.

2. Click and holding anywhere within the free space in the “Case No.” column and moving the mouse selects all cases in that area.

3. If a case is selected, holding the Shift key pressed and clicking a different case will select the initially selected case, the case you clicked next and all cases between them.
This option serves to delete cases (files) from the PC's hard disk. Select the cases to be deleted by clicking them.

Note that any cases deleted from your hard disk will be irretrievably lost unless they have been saved to a USB stick first. To alert you to this possibility, the table shown will have a red frame.
10 Cercon tools

10.9 Backup case data

Backing up and restoring case data: It is possible to backup all cases generated before a specified date. Use the “Delete” function to compare all the cases on the USB stick with their PC versions and delete those that are identical on both side from the PC.

Restoring backed-up case data:

This function copies all backed-up cases to your PC. You may specify a date limit.

10.10 Global settings

In the “Global settings” chapter you can configure various settings in the following three categories:
If the Cercon art PC is part of a local network (LAN), it can access a common case folder along with other PCs on the same network. We distinguish between two general situations:

1. If the case folder of the present Cercon art PC is to be made available to other PCs, you must enable Server mode, select the local case folder and assign it a unique share name. Other PCs on the same network can now access this shared case folder.

2. If the present Cercon art PC is to access a shared case folder on another PC on the same network, you must enable Client mode and specify the full pathname of the shared case folder on the network. If the shared case folder requires a user login, you must additionally provide the pertinent username and password. The Cercon art PC will now always access this network drive instead of on the local case folder.

Here you can specify custom keyboard shortcuts for various actions.
Here you can specify various general parameters such as type of tooth chart, degree of detail, navigation mode, CAM settings or folder pathnames.

You can also modify the sprue thickness for copings to keep objects from falling out of the blank during the milling process. Cutting speeds can be also varied, e.g. in order to provide greater safety while milling Cercon base cast blanks.

Under “Tooth chart” the choices are “FDI” and “ADA”.

The “Degree of detail” setting may provide a speed benefit on older and slower PC models.

For the 3D navigation using Cercon move, the mouse and the keyboard, there is a choice of three different modes (“Navigation mode”): “Standard”, “Advanced” and “3Shape”.

10 Cercon tools
Standard mode:
This mode is the default or standard mode of the Cercon art software; Cercon move, can be used here. The standard mode has been used in all previous versions of Cercon art.

Advanced mode:
The Advanced mode is new in version 3.3 of Cercon art. It is similar to the standard mode, except that an additional navigation operation has been added: The view will zoom to the mouse cursor, which represents the zoom centre.

3Shape mode:
This mode is the default or standard mode of the 3Shape software; Cercon move, however, cannot be used here.

### Standard mode:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Cercon move</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt</td>
<td>RWT</td>
<td>Ctrl+LMB</td>
</tr>
<tr>
<td>Rotate</td>
<td>CW</td>
<td>Ctrl+MW</td>
</tr>
<tr>
<td>Move along “clothesline”</td>
<td>RW</td>
<td>Ctrl+RMB</td>
</tr>
<tr>
<td>Pan screen XY</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Zoom to screen centre</td>
<td>LWT</td>
<td>Ctrl+LMB+RMB</td>
</tr>
<tr>
<td>Zoom to mouse cursor</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

### Advanced mode:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Cercon move</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt</td>
<td>RWT</td>
<td>Ctrl+LMB</td>
</tr>
<tr>
<td>Rotate</td>
<td>CW</td>
<td>Ctrl+LMB</td>
</tr>
<tr>
<td>Move along “clothesline”</td>
<td>RW</td>
<td>Ctrl+RMB</td>
</tr>
<tr>
<td>Move Screen XY</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Zoom to screen centre</td>
<td>–</td>
<td>Ctrl+LMB+RMB</td>
</tr>
<tr>
<td>Zoom to mouse cursor</td>
<td>LWT</td>
<td>Ctrl+MW</td>
</tr>
</tbody>
</table>

### 3Shape mode:

<table>
<thead>
<tr>
<th>Operation</th>
<th>Cercon move</th>
<th>Mouse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt</td>
<td>–</td>
<td>RMB or Strg+RMB</td>
</tr>
<tr>
<td>Rotate</td>
<td>–</td>
<td>RMB or Strg+RMB</td>
</tr>
<tr>
<td>Move along “clothesline”</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Move Screen XY</td>
<td>–</td>
<td>CMB or Alt+RMB</td>
</tr>
<tr>
<td>Zoom to screen centre</td>
<td>–</td>
<td>Shift+RMB</td>
</tr>
<tr>
<td>Zoom to mouse cursor</td>
<td>–</td>
<td>MW</td>
</tr>
</tbody>
</table>

### Key:

<table>
<thead>
<tr>
<th>Cercon move</th>
<th>RWT</th>
<th>Right wheel at top</th>
</tr>
</thead>
<tbody>
<tr>
<td>LWT</td>
<td>Left wheel at top</td>
<td></td>
</tr>
<tr>
<td>CW</td>
<td>Centre wheel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mouse</th>
<th>RMB</th>
<th>Right mouse button</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMB</td>
<td>Left mouse button</td>
<td></td>
</tr>
<tr>
<td>CMB</td>
<td>Centre mouse button</td>
<td></td>
</tr>
<tr>
<td>MW</td>
<td>Mouse wheel</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyboard</th>
<th>Ctrl</th>
<th>Control key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift</td>
<td>Shift key</td>
<td></td>
</tr>
<tr>
<td>Alt</td>
<td>Alt key</td>
<td></td>
</tr>
</tbody>
</table>
CAM settings:
Under "Sprue thickness" you can specify the thickness of the sprues for copings within the blank. This can keep objects from falling out of the blank during the milling process.

"Milling speed – ZrO2" and "Milling speed – composite" define the cutting speeds for zirconia and composite processing, respectively. These settings can provide greater safety while milling Cercon base cast blanks.
With this function, you can send troubleshooting data for analysis if prompted to do so by a DeguDent service technician. Here you can choose between case data, log files and registry settings. Use this tool only when told to do so by DeguDent. Give the technician your PC ID to receive the PIN code you need to send your problem data.

This button will let you perform a software update via the Internet. A working Internet connection is a prerequisite. For information on how to configure your Internet access, see Sections 4.1 and 10.4, “Internet access”.

When you start an update via Internet or from a CD or USB stick, you will first receive detailed information about the content of the available updates. Start the installation process by clicking “Next”.

In addition, use this feature to activate future additional Cercon art features by way of a USB stick.
11 Maintenance and care

Regularly check all units for mechanical damage to prevent accidents and technical failure. Regularly clean the screen with an antistatic cloth or appropriate cleaning agent. Immediately remove any stains from the keyboard to ensure proper function.
Help protect our environment!
Defunct devices will often contain valuable raw materials that may be recycled. Return any defunct devices to the nearest DeguDent service point or to an authorized collection site for electrical and electronic equipment.

**Do not dispose of defunct devices with general household or laboratory waste!**
13 In case of problems

13.1 Technical consultants, technical hotline

Both the Cercon® art program and Cercon® brain will alert the user to any operator or device errors and potential remedies. If you have any questions on the application or suspect problems with one of the hardware components, please contact one of our technical consultants.

13.2 Errors, possible causes and potential remedies

<table>
<thead>
<tr>
<th>Topic</th>
<th>Problem</th>
<th>Possible cause</th>
<th>Potential remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compounds</td>
<td>The representation of the die contains occlusal voids (notches).</td>
<td>The dental stone is too dark. Too many scan points are being filtered out.</td>
<td>• Use lighter types of stone (white, yellow, light brown, light grey).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Coat the affected region with Cercon scan spray.</td>
</tr>
<tr>
<td>Die preparation</td>
<td>Too few scan points are left after filtering.</td>
<td>Die spacer has been used; reflexions interfere with the scanning result.</td>
<td>• Avoid the use of die spacer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Coat the affected dies with Cercon scan spray.</td>
</tr>
<tr>
<td>Blocking out</td>
<td>Too few scan points are left after filtering in blockout areas.</td>
<td>The wax or resin reflects light.</td>
<td>• Use Cercon eye blockout wax.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Coat resin with Cercon scan spray.</td>
</tr>
<tr>
<td>Scanning result</td>
<td>The region of the clinical crown contains scan points that are clearly located below the surface of the die.</td>
<td>These points were filtered out by the software because of their low intensity. Calculations do not take these points into account.</td>
<td>• Check the Cercon brain laser. E23</td>
</tr>
<tr>
<td>(Cercon brain)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clamping</td>
<td>Occlusal aspects of the dies are missing.</td>
<td>The position of the dies during scanning was too high.</td>
<td>• Clamp the dies in place as per the recommendations in Chapter 6 and rescan.</td>
</tr>
<tr>
<td>Clamping</td>
<td>Cervical aspects of the dies are missing.</td>
<td>The position of the dies during scanning was too low or out of range.</td>
<td>• Clamp the dies in place as per the recommendations in Chapter 6 and rescan.</td>
</tr>
<tr>
<td>Die orientation</td>
<td>The CAD die exhibits vertical folds on steeper slopes.</td>
<td>Only few points are scanned on steeper slopes.</td>
<td>• No remedies required if the folds are smaller, as they will not become manifest in the milling result.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• If the folds are larger, realign the die and try to arrange the affected slope so it is not so steep.</td>
</tr>
<tr>
<td>Milling process</td>
<td>The coping drops out of the blank during milling.</td>
<td>A new cutter was inserted incorrectly.</td>
<td>• Take out the cutter, clean the chuck with compressed air, clean the cutter shaft, insert the cutter into the chuck as far as it will go and clamp down.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The zero calibration point of the machine may be out of adjustment.</td>
<td>• If the problem persists, contact a DeguDent service technician or call the technical hotline.</td>
</tr>
<tr>
<td>Topic</td>
<td>Problem</td>
<td>Possible cause</td>
<td>Potential remedy</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Preparation margin is not properly detected.</td>
<td>Preparation margin has been drawn on the cast with a pen.</td>
<td>Try not to manipulate the dies in any way.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Preparation margin is not properly detected.</td>
<td>Preparation margin exhibits an excessive chamfer.</td>
<td>Manually modify the preparation margin as described under “Preparatory steps”.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Preparation margin is not properly detected.</td>
<td>Preparation margin exhibits an insufficient chamfer in some areas.</td>
<td>Manually modify the preparation margin as described under “Preparatory steps”.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Preparation margin is not properly detected.</td>
<td>Die axes diverge.</td>
<td>Block out slight divergences in the milling unit.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Preparation margin is not properly detected.</td>
<td>Die exhibits two or more edges.</td>
<td>Block out extra edges in the area of the clinical crown.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Incorrect preparation margin/bad fit</td>
<td>Die exhibits bubbles or voids.</td>
<td>Block out any bubbles or avoids.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Bite rim exhibits large voids.</td>
<td>• The bite in the bite rim is very deep.</td>
<td>• Cut back the bite rim.</td>
</tr>
<tr>
<td>Preparing the cast</td>
<td>Bite rim exhibits large voids.</td>
<td>• The position of the bridge wax up/occlusal rim is too high.</td>
<td>• Check the cast against the scanning template.</td>
</tr>
<tr>
<td>Cast adjustment</td>
<td>Preparation margin is not properly detected.</td>
<td>Cast is not properly aligned for the appropriate path of insertion.</td>
<td>Manually modify the preparation margin as described under “Preparatory steps”.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Scanning data for a specific element appear dislocated or duplicated.</td>
<td>Scanning platform touched the wall during scanning.</td>
<td>Align the cast so no part of the scanning platform protrudes from the template.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Die appears in the wrong position.</td>
<td>Scans are performed in the right sequence.</td>
<td>Follow the instructions in the top info bar.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Gingiva exhibits voids in relevant areas.</td>
<td>Too few individual scans were performed for the gingival element.</td>
<td>As a rule: provide one scan per tooth to be restored.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Bite rim exhibits large voids.</td>
<td>Too few individual scans were performed for the bite rim.</td>
<td>As a rule: provide one scan per antagonist.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Insufficient fit, rocking.</td>
<td>Dies were not completely inserted into the base during scanning.</td>
<td>Make sure the dies are inserted completely.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Insufficient fit.</td>
<td>Scanning platform changed position between scans.</td>
<td>Clamp the scanning platforms firmly in place and be careful while swapping elements.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Voids in the scan data</td>
<td>The pivoting arm with a reference mark cast a shadow on the scanning region.</td>
<td>Observe the correct camera angle of approximately 45°.</td>
</tr>
<tr>
<td>Scanning (bridge)</td>
<td>Scan data are incomplete.</td>
<td>Adjacent elements cast a shadow.</td>
<td>Leave only the actual element to be scanned within the cast.</td>
</tr>
</tbody>
</table>
13 In case of problems

13.3 Cercon brain error messages

The text display is limited to 32 characters and will only display short messages in case of a problem. As with the classic Cercon unit, these messages refer only to errors that are related to Cercon brain.

13.4 PC error messages

If unexpected or incorrect entries are made on the PC, the top info bar will show an explanatory message in white letters on a dark orange background. In case of connection problems between the PC and Cercon brain, a grey window will appear containing suggestions for correcting the problem. If the software no longer accept any input at all, the PC must be restarted. To do so, press the main switch on the PC and keep it pressed for approximately four seconds.

13.5 Revisions of network production results

If the results of your DeguDent network production order are unsatisfactory, send in a revision order for free processing within two weeks from submitting the original order. To do so, open the existing case for revision (by checking the appropriate checkbox) and indicate the reason for your complaint in the window shown. If the fit was unacceptable, check the “New scan” checkbox. You will be guided through the subsequent steps.
Button
Interactive element.

CAD
Computer-aided design.

CAM
Computer-aided manufacturing.

Cercon art
The brand name for all components connected to the Cercon Module, as well as the software that controls them.

Cercon move
A navigator device to three-dimensionally move object on the PC screen. Cercon move facilitates the control of the various movements and reduces the time it takes to complete the design.

Compartis
Brand name for DeguDent network fabrication.

Progress bar
A graphic indicator elements that visualizes how far a process has come in its execution.

Icon
A pictograph or symbol, usually placed on a software button.

Nesting
Arranging milling objects within the blank so it is utilized in the most economical way. Nesting also allows the use of partial blanks left over from a previous procedure (under development).

PC ID
Six-digit number that identifies the Cercon art PC. Can be checked in Cercon tools.

Recovery
Restoring the software version prior to the most recent update.

Referencing
Precise relative alignment of the scan point clouds of digital elements.

Reference marks
Pattern of geometric circles to assist in referencing.

Retreatment
Simplified complaints procedure for Compartis products.

Interface
Connection between two (PC) components.

Update
Installation of the more current software version to replace the previous one.

USB (memory) stick
Storage medium for backing up and transferring data. Connects to a USB port (connector) on the PC.

Wizard
A name for a software concept where the user is guided sequentially through a program, step by step. Cercon art has been designed according to this concept.
Cercon art and Cercon tools use third-party software libraries:

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit.
(http://www.openssl.org/)
This product includes cryptographic software written by
Eric Young (eay@cryptsoft.com).
This product includes software written by Tim Hudson
(tjh@cryptsoft.com).