RENISHAW
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Laboratory guidelines – crown work

Smile...
first impressions
matter

incise™
precision fit ceramics

Overview

incise™ frameworks are produced as part of a precision process for restorative dentistry. The system design is supported by accurate measurement technology and dental industry research.

These guidelines will help you to use the incise™ system to create world class products offering:

- Accurate fit and marginal adaptation preserves gingival health and minimises micro leakage
- A restoration that exceeds clinical strength requirements
- Excellent aesthetics achieved by using zirconia
- Greater longevity of restoration as a result of material stability and good marginal fit.

Fitting a poorly designed or manufactured crown can lead to gingival disease, secondary caries and loss of tooth vitality, fractured crowns and/or fractured porcelain, de-bonding of cement or an unsightly restoration.

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incise™ process overview

The incise™ frameworks are manufactured in the UK using high precision CAD/CAM equipment designed by Renishaw. It is important that strict procedures are followed to ensure best results. You can be confident that these procedures and recommended materials are backed up by stringent scientific evaluation. Following these guidelines will ensure that you receive the best possible coping.

DENTIST

1. First appointment: consultation and diagnosis

Refer to incise™ indications

2. Second appointment: preparation

Prepare teeth
Register occlusal relationship
Make temporary crown/bridge
Retract gingiva
Take impression
Fit temporary crown

Send disinfected impressions, bite registration and prescription to laboratory

LABORATORY

3. Model preparation and coping design

Pour stone models from impressions
Section model and ditch margins
Scan preparations and define margins using incise™ software

Raise order and send to Renishaw

RENISHAW MILLING CENTRE

4. Coping manufacture

Manufacture coping
Accuracy analysis

Send coping to laboratory

LABORATORY

5. Restoration completion

Porcelain build-up and glaze

Return final restoration together with the impressions and models, to the dentist

DENTIST

6. Third appointment: fitting

Remove temporary restoration
Try incise™ restoration to check colour, fit and occlusion
Permanently cement the restoration

7. Fourth appointment: check-up and follow ups

Accurate model production

incise™ recommended materials:-

DIE STONE	Renishaw dental stone
WATER	De-ionised water

ALWAYS FOLLOW THE MATERIAL MANUFACTURER'S INSTRUCTIONS

The recommended values below ensure the final model is hard and durable, and meets the necessary accuracy requirements.

Guidelines for a controlled process

1 **Preparing the stone**

A ratio of 100 g powder to each 20 ml of de-ionised water should be used. Stone should be measured to the nearest 1 g, water to the nearest 0.5 ml. These ratios minimise the geometric deformation whilst ensuring excellent stacking and a durable master model. Larger quantities can be mixed as long as the ratios are scaled accordingly.

2 **Mixing the stone**

Mix thoroughly with a plastic spatula then vacuum mix for 30 seconds.

3 **Pouring the stone**

It has been demonstrated that excellent dies are produced when no surface modifiers or surfactants are used, and generous vibration is employed. Other techniques may produce accurate results but will not have been validated for the recommended materials.

4 **Trimming the model**

After the model has been dry trimmed, air blast the surface to remove any loose debris.

This process is critical to successful scanning.

Preparing the master model for scanning

incise™ recommended materials

MARGIN LINE MARKER	Graphite pencil
PROFESSIONAL DIE HARDENER	Kerr die hardener to protect the die from moist porcelain.
	Super glue and other products are not recommended as die hardeners.

ALWAYS FOLLOW THE MATERIAL MANUFACTURER'S INSTRUCTIONS

Section model as appropriate.

1. *Ensure that the ridge is trimmed as close to the dies as possible.*

2. *Carefully under-cut below the margin line to form a defining edge. A minimal under-cut is recommended to avoid chipping the margin.*

3. *To maintain the integrity of the margin, it is recommended that a graphite lead pencil is used to mark around the margin line.*

Graphite is insoluble in die hardener and will not smear, unlike some margin marker.

In order to protect the die from moist porcelain, a die hardener should then be applied using a brush.

4. *Re-assemble the trimmed and sectioned model.*

It is recommended that a Pindex® model system is used with the incise™ process. Movement in the location mechanism will result in a framework that is smaller than desired. Moving dies should be supported with wax.

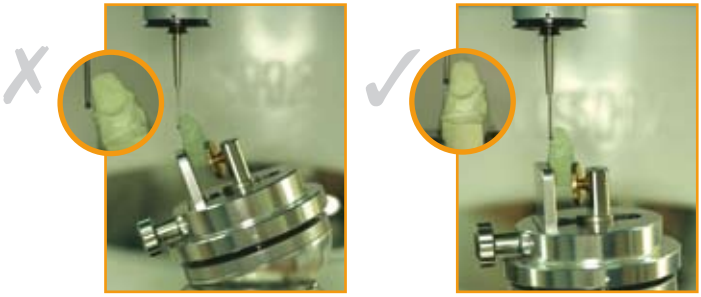
Scanning

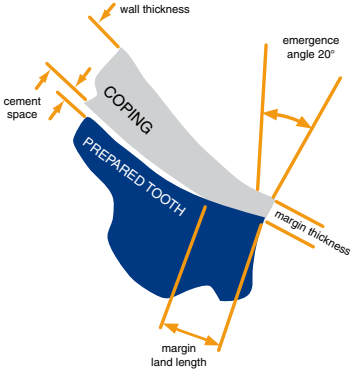
Setting up the stone master model

The incise™ software provides step-by-step instructions to setting up the work pieces for successful scanning.

Undercuts

The model must be set up so that there are no vertical or undercut faces to be scanned.

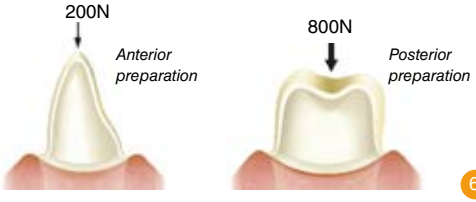




The wall thickness and cement space can be chosen and specified in the incise™ software. For details on these specifications, please visit www.renishaw.com/dental

If an anterior unit is selected in the incise™ software, the framework will be designed to meet the clinical requirements of an anterior restoration. The framework will NOT be suitable for a posterior restoration.

Anterior copings are thinner to meet the lower loads and more challenging aesthetic requirements of this zone. Posterior copings must be thicker so that they can withstand the higher loads encountered nearer the TMJ. The diagram below shows typical loads.



Spigot location

Before commencing scanning, you should choose the least intrusive position for spigot to be placed, from a porcelain build point of view. The chosen coping surface must be at least 3 mm high. The master model should be placed on the scanner with the chosen position on the centre line to the back of the machine, as shown in figure 5.

Once machining is complete, the coping is left attached to the material by means of a connector or 'spigot' (figure 3).

The spigot is ground off to leave a 'pip' where the material remains slightly thicker than the rest of the coping (figure 4).

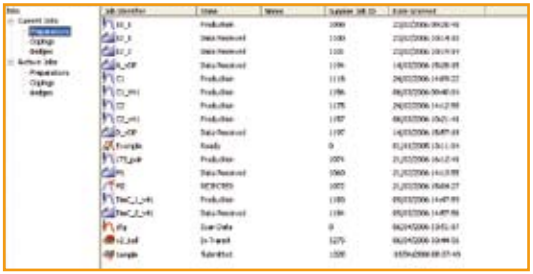
Die scanning and margin line generation

When set-up is complete, follow the on-screen step-by-step instructions to scan the die and then generate the margin line. Figure 6 shows the margin line generation.

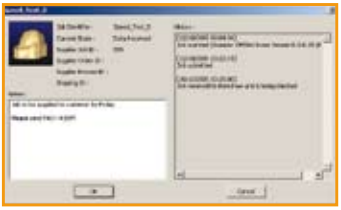
figure 5

figure 6

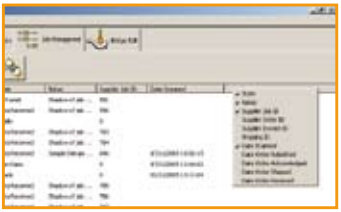
Transferring the scan data



After scanning, the data files appear in the job management system. They can then be sent electronically to Renishaw's milling centre by following the on-screen instructions.



The 'properties' option allows you to add individual notes to a job. To access the properties section, highlight a job line and either right click and choose properties, or simply select the properties icon from the main screen.



With the job management system, you can select what information you wish to display on your jobs. To access these options, right click on the empty grey box on the menu bar.

Porcelain work

incise™ recommended materials:-

To prevent cracking, it is necessary to select a porcelain with a coefficient of thermal expansion (CTE or TEK) matched to the zirconia core.

The porcelain used must have a CTE of $(9.8 \pm 0.5) \times 10^{-6} K^{-1}$

The following systems have been tested by Renishaw show adequate bond strength to incise™ zirconia:

- NobelRondo™
- 3M ESPE Lava™
- GC initial

incise™ recommended tools:-

- Edenta CeraGloss HP *(Part no. 301HP)* diameter 25 mm x 2 mm thick
- Edenta SuperMax *(Part no. 9007.220HP)* 22 mm x 2.5 mm thick
- Edenta 'Keramik Tool Set' *(Part no. 900.410SO)*
- Grit blasting – 50 µm alumina at 5 bar air pressure

ALWAYS FOLLOW THE MATERIAL MANUFACTURER'S INSTRUCTIONS

Crown framework preparation

The supplied copings have already been grit blasted in a controlled environment. If modification of a framework is necessary, the above tools should be used at high speed using light pressure and water is desired. Modified frameworks should be grit blasted again using the information above.

Do NOT sterilise the restoration using steam. This may have long-term implications on the strength of the material.

Additional information

Product returns

In the unlikely event that it is necessary for a prosthesis to be returned to Renishaw, it must be appropriately sterilised, and this must be clearly indicated on the primary (external) packaging.

Please refer to BS EN 980:2003, Graphical symbols for use in the labelling of medical devices, for recommended labelling symbols.

Renishaw plc

New Mills, Wotton-under-Edge,
Gloucestershire GL12 8JR
United Kingdom

T +44 (0) 1453 524524
F +44 (0) 1453 524901
E uk@renishaw.com

www.renishaw.com

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