Guidelines
H-5489-8500-05-A

RENISHAW
apply innovation™

Technical and laboratory guidelines

Renishaw part no: H-5489-8500-05-A

First issued: April 2010

Revised: December 2013

Revised: June 2014

Revised: September 2014

Revised: May 2015

RENISHAW
apply innovation™

Contents

Section 1: Before you begin

Section 2: General guidelines

Section 3: Technical guidelines

Section 4: Laboratory guidelines

This page is left intentionally blank

Section 1: Before you begin

Disclaimer

RENISHAW HAS MADE CONSIDERABLE EFFORTS TO ENSURE THE CONTENT OF THIS DOCUMENT IS CORRECT AT THE DATE OF PUBLICATION BUT MAKES NO WARRANTIES OR REPRESENTATIONS REGARDING THE ACCURACY OF ITS CONTENT. RENISHAW EXCLUDES LIABILITY, HOWSOEVER ARISING, FOR ANY ERRORS IN THIS DOCUMENT TO THE FULL EXTENT OF THE LAW.

Trade marks

RENISHAW and the probe symbol used in the RENISHAW logo are registered trade marks of Renishaw plc in the United Kingdom and other countries. **apply innovation**, inciseCAD, inciseCAM, LaserPFM and names and designations of other Renishaw products and technologies are trade marks of Renishaw plc or its subsidiaries.

All other brand names and product names used in this document are trade names, trade marks, or registered trade marks of their respective owners.

Warranty

This describes the warranty contained in Renishaw's DENTAL PRODUCTS – CONDITIONS OF SALE that govern Renishaw's sales of dental frameworks to dental laboratories:

For a period of ten years after any cobalt chrome or zirconia framework has been delivered to the dental laboratory, Renishaw will provide a replacement framework (for the dental laboratory to use to create a restoration to the patient's personal requirements) at no charge if a defect in the framework arises from faulty materials or workmanship. A free of charge replacement will only be supplied if the faulty framework is returned to Renishaw. This warranty does not apply to any defects caused by the finishing work or misuse or mishandling of the frameworks by the dental laboratory (including failure to follow the Clinical and Laboratory Guidelines contained in this document). This is Renishaw's sole liability under the warranty which does not cover any associated costs, losses or expenses of any kind.

Product returns

In the unlikely event of a product failure, solely attributable to Renishaw's defective materials or workmanship, it is requested that the clinician take an impression of the fractured surface and surrounding tissue before revision or explantation of the damaged restoration. This will enable detailed investigation and understanding of the failure.

WARNING: If an explanted restoration or any parts are to be returned, they must be appropriately decontaminated and sterilised and this must be clearly indicated with the method of decontamination/ sterilisation and marked as Biohazard ☣ on all the packaging.

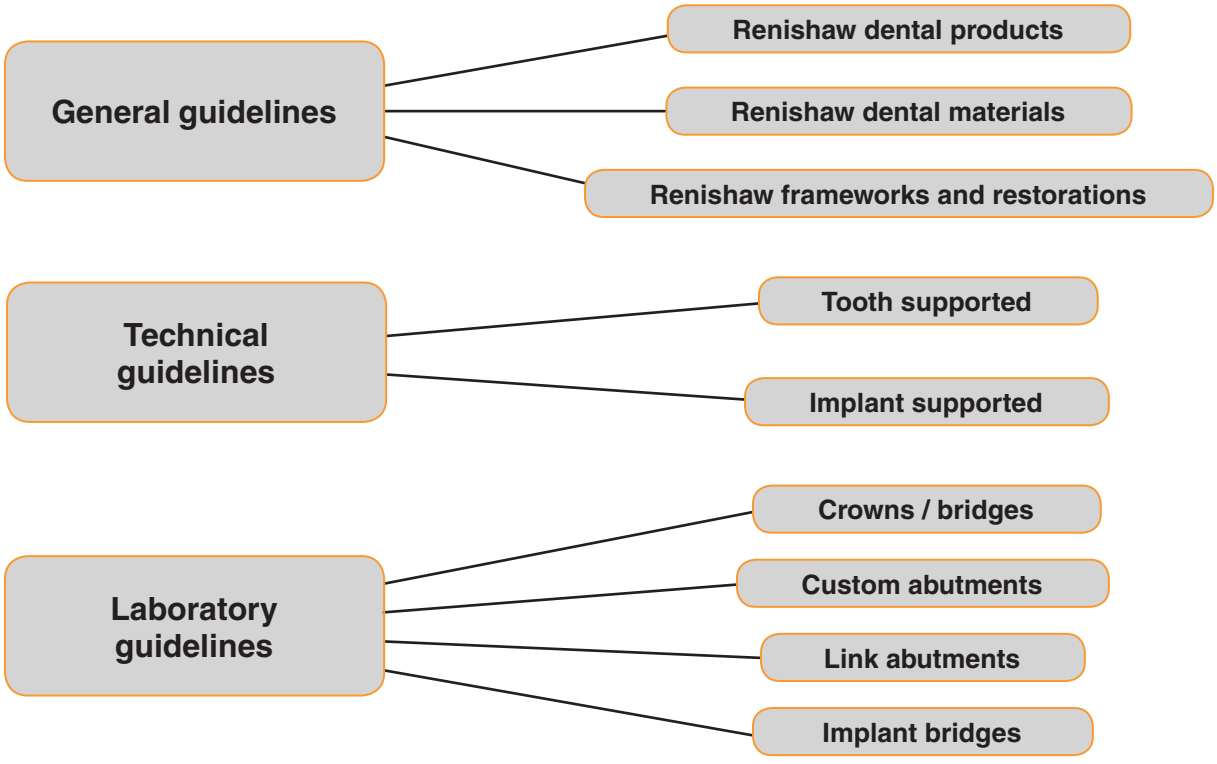
Quality

For the up to date quality statement, please refer to www.renishaw.com/dental.

Document scope

The technical and laboratory guidelines are general and specific instructions for Renishaw dental products and services. With the fast moving advancements in Renishaw dental technologies, we recommend that you always ensure you have the latest copy available from www.renishaw.com/dental.

The document is split into the following format:



Section 2: General guidelines

Renishaw dental products

Hardware

Product	Description
Renishaw DS10	Dental contact scanning machine for exceptionally precise form analysis of all dental models. Also referred to as the contact scanner, incise scanner, or scanning machine.
Renishaw DS20	Non-contact dental scanner particularly good for full jaw and soft material scanning. Leading edge technology allowing scanning with exceptional speed and accuracy. Also referred to as the non-contact scanner and Identica scanner.
Renishaw DS30	Non-contact dental scanner particularly good for full jaw and soft material scanning. Leading edge technology allowing scanning with exceptional speed and accuracy. Also referred to as the non-contact scanner and Identica Blue scanner.
Renishaw DM10	Dental milling machine for precise machining of frameworks from a selection of Renishaw dental billets. Also referred to as the mill or milling machine.

Software

Product	Description
Renishaw inciseCAD™	Used alongside the Renishaw DS10 to design frameworks and submit them for manufacture. Also referred to as CAD.
Renishaw Dental Studio	Advanced CAD software combining both optical (DS20/DS30) and contact scanning (DS10). Also referred to as RDS or Exocad.

Materials

Materials	
CoCr DG1™	LaserPFM™ cobalt chrome frameworks manufactured centrally, by Renishaw, using a unique metal 3D printing process. Also referred to as CoCr or cobalt chrome. Also used for LaserAbutment™ and LaserBridge™ products.
Renishaw Zr100™	Zirconium dioxide frameworks manufactured locally in-lab or centrally by Renishaw using the Renishaw DM10. Also referred to as ZrO_2, zirconia, Zirconia 0-5 (various shades) or Y-TZP.
Renishaw Realistic™	Zirconium dioxide fabricated in such a way to give extra translucency for full-form restorations that can be manufactured locally in-lab or centrally by Renishaw. New improved second generation now available. Also known as full contour zirconia.
Renishaw PM100™	Polymethylmethacrylate frameworks manufactured centrally by Renishaw for temporary crowns or bridges. Also referred to as temporary PMMA, Temporary PMMA 1-4 (various shades) or PMMA.
Renishaw WX100™	Investment wax frameworks manufactured centrally by Renishaw for lost-wax casting of semi-precious or precious metals. Also referred to as burnout wax or wax.

Frameworks and restorations

Frameworks	
Crown/bridge	Can be centrally manufactured by Renishaw in cobalt chrome, Zr100, Realistic or PM100 or locally manufactured (in-lab) in Zr100, Realistic or WX100.
Renishaw LaserAbutments™	Custom-made single-piece structure intended for aiding prosthetic functional and aesthetic rehabilitation. Also referred to as custom abutment or screw-retained crown.
LinkAbutment™	A two-piece abutment comprising a titanium base and a Renishaw supplied customised top portion. Also known as two-piece or two-part abutment.
Renishaw LaserBridges™	Custom-made implant bridges intended for aiding prosthetic functional and aesthetic rehabilitation. Also referred to as implant bridges.

Indications for use

Renishaw LaserPFM™

Renishaw cobalt chrome frameworks are suitable for anterior or posterior restorations and are generated using an additive manufacturing process.

CoCr DG1 is an alloy of cobalt, chromium, molybdenum and tungsten. The material composition meets the requirements of ISO 22674 type 4; its biocompatibility meets the requirements of ISO 7504 and ISO 10993-1; its chemical and thermal characteristics meet the requirements of ISO 9693.

Standard analysis % by weight (elements)	
Co (wt%)	63.9
Cr (wt%)	24.7
Mo (wt%)	5
W (wt%)	5.4
Si (wt%)	<1
Density	
Relative density	Approximately 100%
Density	8.5 g/cm^3

WARNING: It is the responsibility of the dental practitioner to determine the suitability of cobalt chrome restorations for patients suffering from bruxism or significant malocclusion.

Renishaw Zr100™ and Realistic™

The zirconia frameworks are suitable for anterior or posterior restorations and are machined from pre-sintered yttria-stabilised tetragonal zirconia (Y-TZP). The material composition and physical properties (when sintered) meet the requirements of ISO 13356 and ISO 6872; its biocompatibility meets the requirements of ISO 7405 and ISO 10993-1; the porcelain shear strength meets the requirements of ISO 9693.

Zr100

Chemical composition	White	Coloured
ZrO_2 / HfO_2 / Y_2O_3 (wt%)	> 99.00	> 99.00
Al_2O_3 (wt%)	< 0.3	< 0.3
Fe_2O_3 (wt%)	< 0.1	< 0.3
Physical properties		
Density (g/cm^3)	> 6.05	> 6.00
Flexural strength (MPa)	1200 ± 200	1000 ± 200
Open porosity (vol %)	0	0
Thermal expansion coefficient (10^{-6} K^{-1})	10.5 – 10.8	10.5 – 10.8

Contraindications: Zr100 restorations are not suitable for patients suffering from bruxism or significant malocclusion.

Realistic

Chemical composition	
ZrO_2 / HfO_2 / Y_2O_3 (wt%)	> 99.00
Al_2O_3 (wt%)	< 0.3
Fe_2O_3 (wt%)	< 0.3
Physical properties	
Density (g/cm^3)	> 6.07
Flexural strength (MPa)	1200
Open porosity (vol %)	0
Thermal expansion coefficient (10^{-6} K^{-1})	10.7

Renishaw WX100™

WX100 is offered to enable CAD restorations to be cast or pressed.

Material composition	
Hydrocarbon resin mixture (wt%)	≥ 75
Paraffin wax (wt%)	≤ 25
Physical properties	
Melting point (°C)	138 – 154
Boiling point (°C)	> 230

Renishaw PM100™

PM100 is offered for temporary crowns and bridges. It can also be used for the verification of the plaster model prior to manufacture of the final frameworks.

Material composition	
PMMA (wt%)	99.85
Pigment (wt%)	0.15
Physical properties	
Flexural strength (MPa)	114
Vickers hardness (HV)	26.6
Young's modulus (MPa)	2771
Residual monomer (%)	< 1

Availability

By material

Material	Central manufacture	In-lab manufacture
CoCr DG1	✓	×
Zr100	✓	✓
Realistic	✓	✓
PM100	✓	×
WX100	✓	✓

By restoration

Restoration type	CoCr DG1	Zr100	Realistic	PM100	WX100
Crown/bridge	✓	✓	✓	✓	✓
Custom abutment	✓	×	×	×	×
Link abutment	✓	✓	✓	✓	✓
Implant bridge	✓	×	×	×	×

Section 3: Technical guidelines

All restorations

Try-in

A 'try in' test is recommended to ensure a good fit before cementation of the restoration.

Cementation

Zr100 and Realistic

The recommended material to use with zirconia frameworks is Kuraray Panavia™ resin cement.

CoCr DG1

The recommended material to use with cobalt chrome frameworks is Kuraray Panavia™ resin cement.

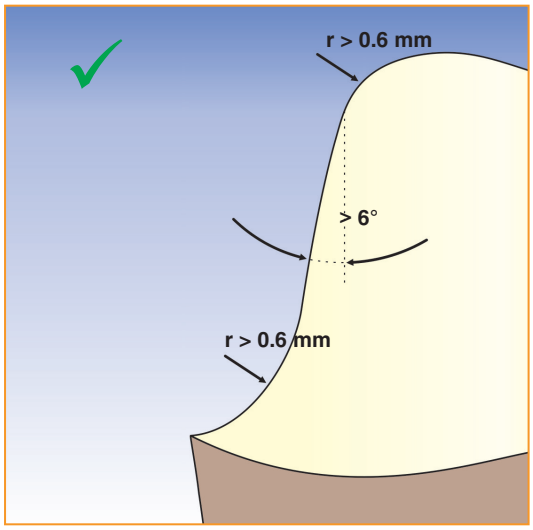
PM100

Use a temporary cement such as Bredent Visio, Telio CS Link or 3M ESPE RelyX™ Temp NE.

Tooth supported restorations

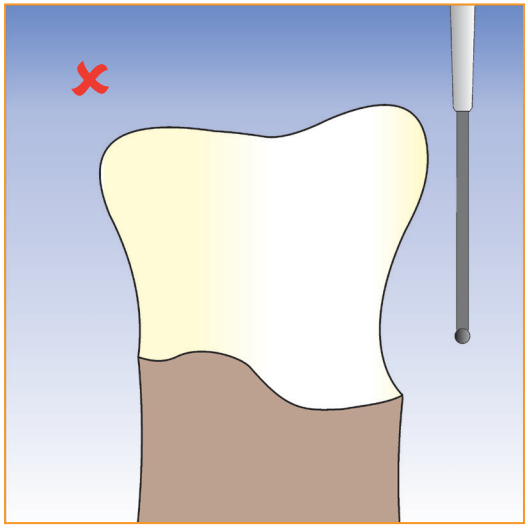
Preparations – recommended features

- Taper angle of > 6°.
- All corners should have a radius of > 0.6 mm.
- A tapered shoulder/chamfer is required.



Preparations – features to avoid

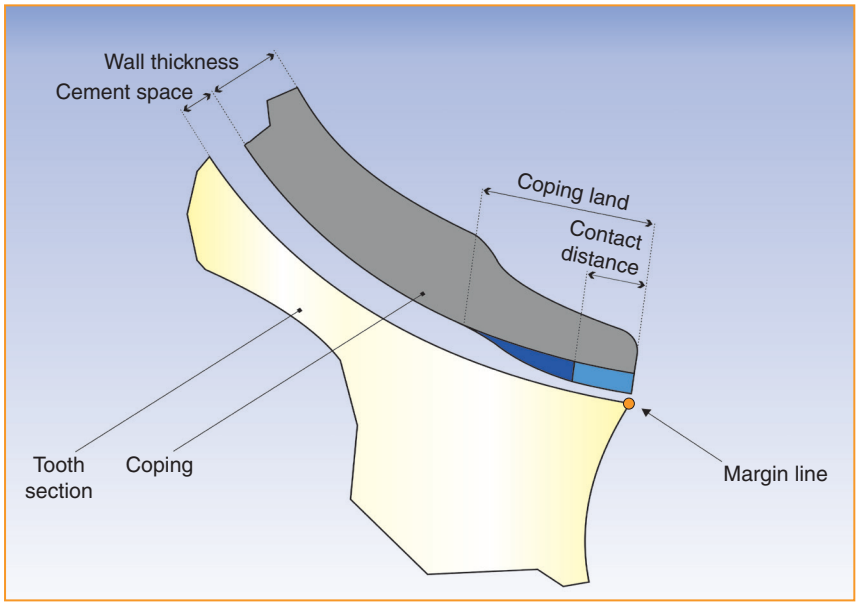
- Overhung margins.

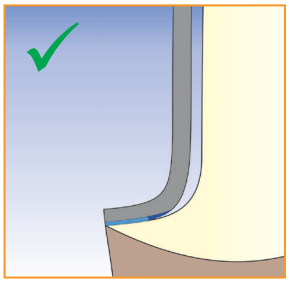


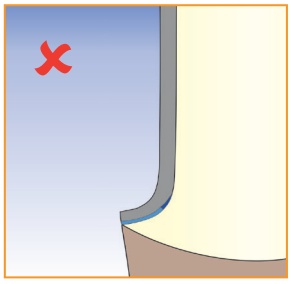
Overhung margins are the most common error when creating bridge preparations and must be avoided. The upper section of the preparation overhangs the margin, obstructing the probe from reading the vertical portion. The resulting coping would have a large gap at the margin. Undercut margins will lead to gaps between the restoration and the tooth.

- Insufficient margin land.

In the areas where the distance from the margin line to a vertical surface is less than the contact distance, the cement space will reduce to zero and consequently the framework may not fit.



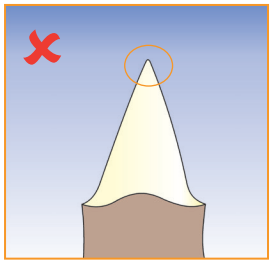




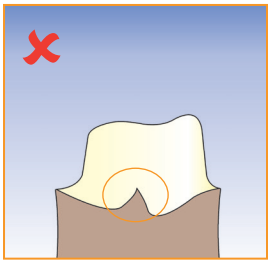
In both inciseCAD and Dental Studio, the default contact distance is 0.5 mm.

Preparations – defects

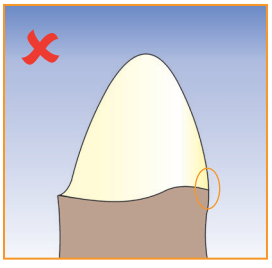
Preparations should be crafted, avoiding the following defects, to ensure good marginal adaption and to attain the best aesthetics.



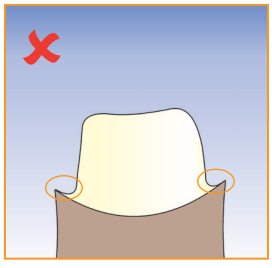
Sharp corner (incisal)



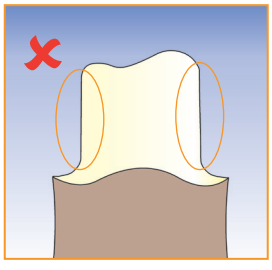
Marginal crest



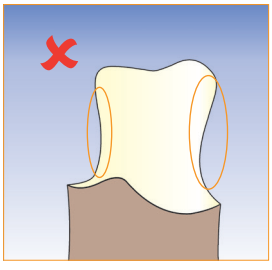
Feather-edge margin



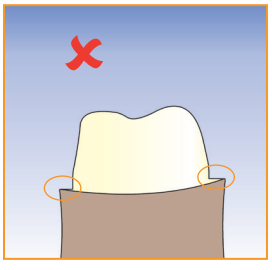
Guttered margin



Parallel walls



Undercuts



90° sharp shoulder

Implant supported restorations

Renishaw implant restorations are custom-made devices intended for aiding prosthetic functional and aesthetic rehabilitation. They are manufactured by Renishaw to designs from the dental laboratory that can be created using a range of third-party scanners and CAD software packages. In such circumstances, the manufacture by Renishaw of such customer-supplied designs is in accordance with the applicable essential requirements of the Medical Devices Directive (93/42/EEC as amended) and under a quality management system that complies with ISO 13485.

Clinicians should exercise their professional judgment to determine whether Renishaw implant supported restorations are suitable for a particular patient. Any reshaping of the restoration is therefore a clinical determination.

Implant restorations are supplied with screws that are specific to the design submitted. These screws are not interchangeable with the equivalent original equipment manufacturer's (OEM's) implant screws but can be secured using the implant OEM driver. The screws are single use only. Follow the implant manufacturer's instructions and do not over-tighten or under-tighten them.

WARNING: Parts are not supplied sterile - please refer to the steam sterillisation instructions given on page 3.6.

Supported implant types

For an up to date and comprehensive list of the implant systems to which Renishaw implant supported restorations can be secured, see document H-5489-8705 – *LaserAbutments™ and LaserBridges™ supported implants and pin kits*.

Indications

LaserAbutments	LaserBridges
Cement or screw-retained crown	Screw-retained implant bridge
Cement retained bridge	Anterior and posterior restorations
Anterior and posterior restorations	A range of implant systems (see above)
A range of implant systems (see above)	

Contraindications

LaserAbutments	LaserBridges
Do not use if allergic to any of the following: Co, Cr, Mo, W, Si, Fe, Mn	Do not use if allergic to any of the following: Co, Cr, Mo, W, Si, Fe, Mn
Implant and abutment offset angle exceeding 30°	Angle between implants exceeding 60° (subject to the implant interface limitations)
Patients suffering from bruxism or significant malocclusion	Patients suffering from bruxism or significant malocclusion
Implant systems other than those stipulated by Renishaw	Implant systems other than those stipulated by Renishaw

Steam sterilisation

A full steam sterilisation cycle of 134 °C for 18 minutes was validated based on the “Overkill” concept as described in EN ISO 17665, producing a Sterility Assurance Level (SAL) for the device of at least 10^{-6}.

WARNING: Modification of finished bridge frameworks
The use of diamond discs to open the embrasures and aesthetically separate each unit is not recommended. This technique can drastically compromise the framework strength and result in failure.

WARNING: Modification of any Renishaw products
No modifications to any of the Renishaw products referred to in this document are advised. If any modification is made, to any of these products, it will be under the sole responsibility of the modifier.

This page is left intentionally blank

Section 4: Laboratory guidelines

Crowns and bridges

Scanning and designing

For detailed instructions and working examples of how to produce crowns and bridges see H-5489-8405 – *Renishaw inciseCAD™ training manual*.

Bridge spans

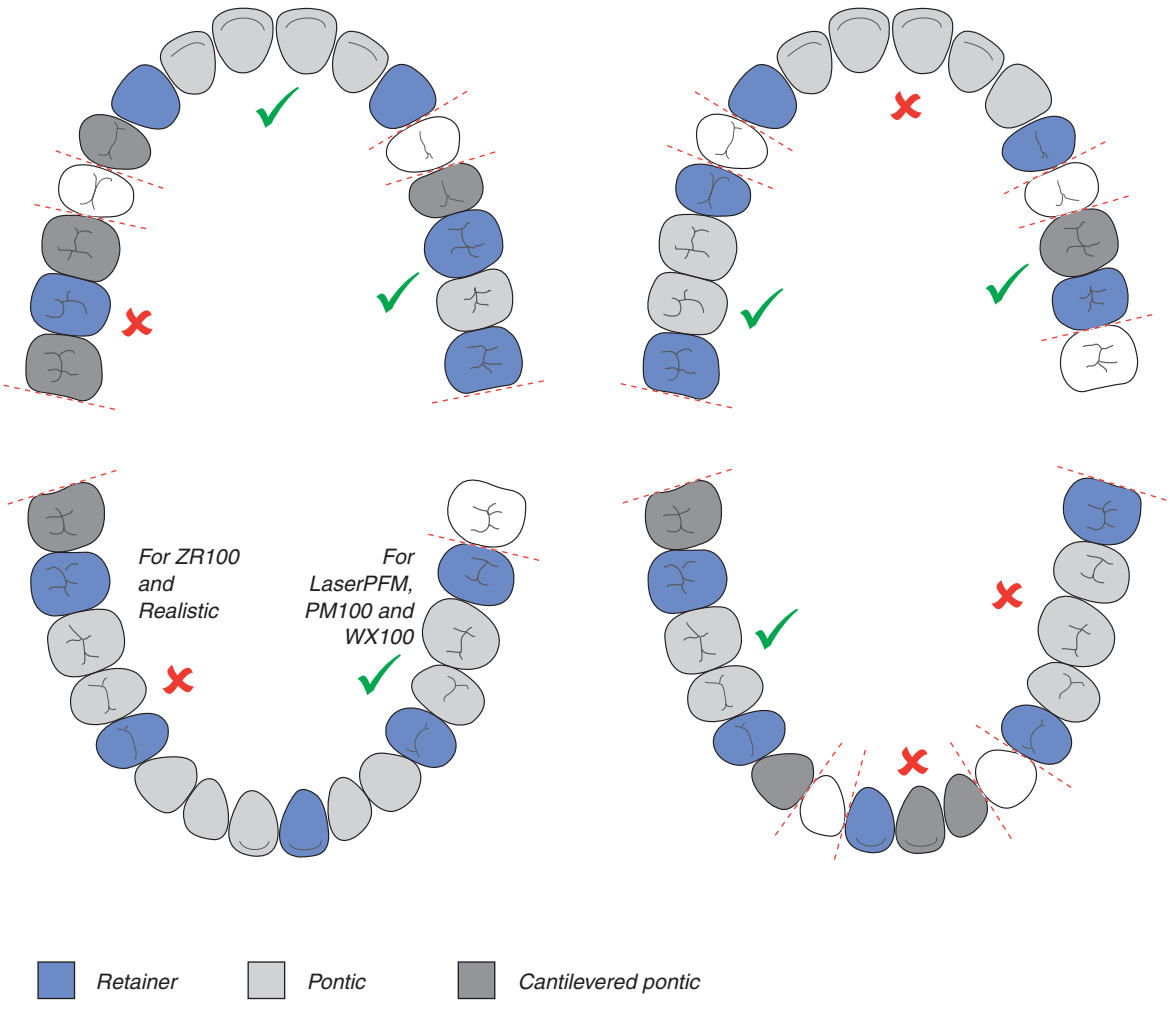
The maximum span for bridges is 8 units for Zr100 and Realistic and 16 units for CoCr DG1, PM100 and WX100.

Bridge configuration

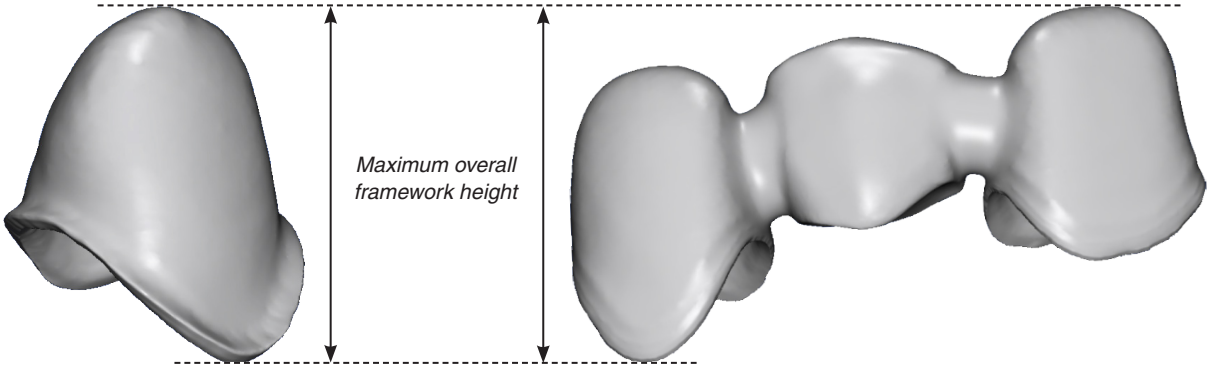
The maximum number of pontics between retainers is 4 between teeth UR3 to UL3 or LR3 to LL3 and 2 elsewhere. A maximum of 1 cantilevered pontic is allowed on the same retainer. Frameworks designed outside of these recommendations will be manufactured but will not be covered by the warranty.

Examples

Here are several examples of both legitimate and illegitimate bridge configurations.



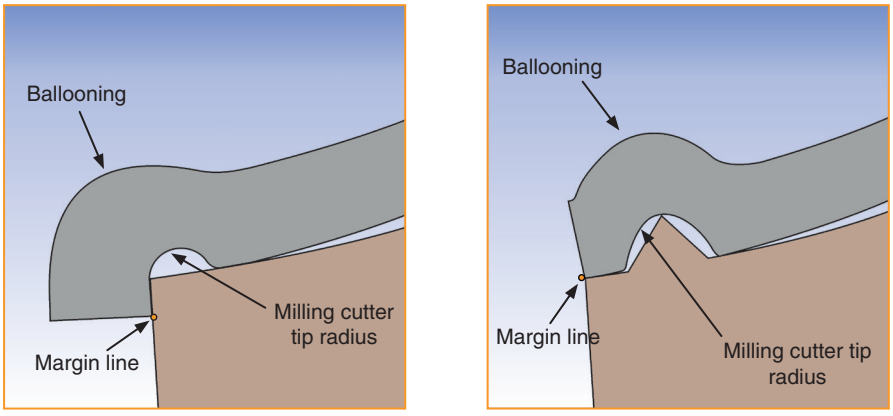
Framework height



Material	Central manufacture	In-lab manufacture
Zr100	19.7 mm	15.8 mm
Realistic	15.8 mm	15.8 mm
PM100	19.7 mm	Not available
WX100	15.8 mm	15.8 mm
CoCr DG1	No height restriction	Not available

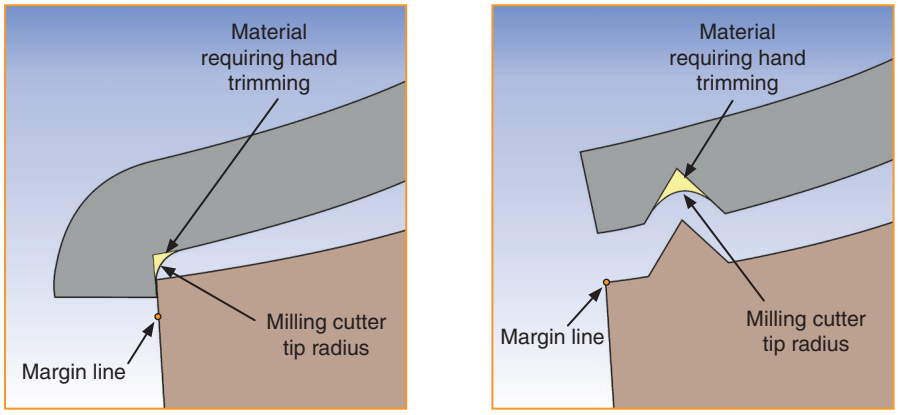
Tool compensation (Realistic, Zr100, WX100 and PM100)

Tool compensation or 'ballooning' is material added to maintain minimum thickness of the coping when the margin line is over the edge of the preparation, or if there is a sharp feature close to the edge of the preparation. It is added because the milling tool has a radiused tip and therefore cannot cut sharp corners. The software compensates for this by adding extra material at the design stage so that when it is cut, the minimum thickness is maintained. The gap will be filled with cement during the luting process.



Margin Line Material Tool Compensation ON using inciseCAD

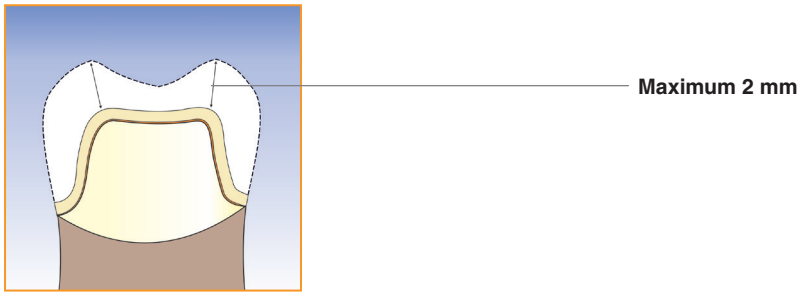
It may not be desirable to have the ballooning and the gap that it creates. We recommend that 'Margin Line Material Tool Compensation' is set to 'Off' (default setting). This does mean that manual trimming may be necessary following the milling process but will ensure ballooning does not occur.



Margin Line Material Tool Compensation OFF

Design alterations

Excessive porcelain masses generate thermal stresses. They may chip or crack in service. When designing, ensure there is enough support from the underlying coping to withstand high loads, especially in cusp areas.



The 'blocking-out' technique is not required with Renishaw's CAD systems. It should be avoided as it will introduce larger spaces between the prepared tooth and framework, meaning more cement will be required which will reduce the strength of the crown or bridge.

Machining, staining and firing

Milling (Zr100, Realistic and WX100)

For full information on using the DM10 milling machine and inciseCAM system, see document H-5489-8415 – *Renishaw inciseCAM training manual*.

Staining Realistic

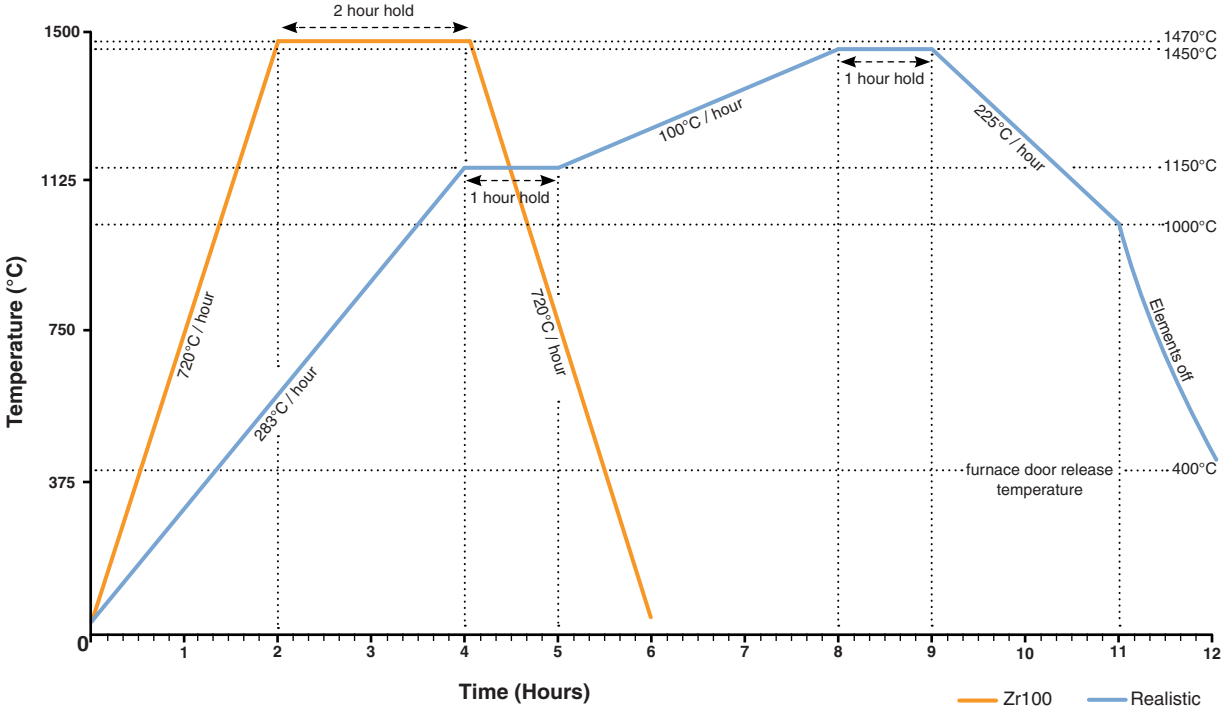
Use pre-sintered stains for zirconia or full contour zirconia. Always follow the original instructions for the stain.

Sintering of Zr100 and Realistic frameworks

WARNING: If you are firing bridges with five units or more, they must be fired in a sintering frame. The frame should be placed on a furnace tile.

Use the operating instructions supplied with the furnace along with the guidelines below.

- Ensure the framework is clean.
- Ensure the crucible has a layering of around 10 mm alumina grit at the bottom.
- Sinter the framework to the profile below.



Finishing

PM100

Trimming

It is recommended to use burrs designed for acrylic when trimming the material.

Polishing

If polishing, use a polishing paste with soft hair brushes. Be careful not to overheat the material. A high shine can be achieved with a polishing or cotton buff.

Zr100 and Realistic

Steam cleaning

This can be effective however, we recommend grit blasting for cleaning instead.

WARNING: Do not sterilise Zr100 or Realistic frameworks or restorations using steam. This can reduce the long-term strength of the restoration.

Grit blasting

The supplied frameworks have already been grit blasted in a controlled environment. Contamination on the surface can be cleaned by grit blasting for a maximum of 10 seconds at a pressure of 5 bar (73 psi) with 50 µm alumina grit at an approximate distance of 10 mm.

CoCr DG1

Grit blasting

If internal surface roughness is unacceptable, grit blast with 50 µm alumina grit at 5 bar (73 psi) using a pencil nozzle.

Oxide firing

Oxide firing is not recommended (if you wish to check the surface, fire for 5 minutes at 950 °C – 980 °C with vacuum).

Soldering

Soldering prior to firing with the flame: Wirobond® solder (REF 52622) and Fluxsol flux (REF 52531). Soldering after firing in the furnace: WGL solder (REF 61079 and Minoxyd flux (REF52530). Cool down normally.

Laser welding

Filler material: Wiroweld wire Ø 0.35 mm (REF50003) or Ø 0.5 mm (REF50005).

Modifications

Connector size

Modification prior to veneer application should be avoided as it decreases framework strength. The design strength is less than the material's flexural strength to allow for a factor of safety. The use of lower values may result in a framework which cannot be manufactured or that cannot withstand intra-oral forces.

Material	Design strength MPa	Flexural strength MPa
CoCr DG1	900	1200
Zr100	900	1200
Realistic	900	1200
PM100	96	114

If modification of a framework is necessary, the tools listed below can be used at high speed; low pressure and water is desirable.

Tools	For Renishaw Realistic and Zr100	For Renishaw LaserPFM
Edenta CeraGloss HP, diameter 25 mm × 2 mm thick (Part no. 301HP)	✓	✓
Edenta SuperMax, diameter 22 mm × 2.5 mm thick (Part no. 9007.220HP)	✓	✓
Edenta 'Keramik Tool Set' (Part no. 900.410SO)	✓	✓
Jota K & M pink trimming stones (Skillbond Catalog no. SJT 069)	×	✓

Veneer application

We recommend a porcelain veneer for Zr100 and CoCr DG1 which should have a maximum thickness of 1.5 mm.

A composite veneer for PM100 is recommended.

All porcelain and composite products should only be used according to the manufacturer's instructions and recommendations.

For situations where you need to build up the coping to control veneer thickness, you should use the wax-up or anatomical techniques available in inciseCAD or the extensive design options in Renishaw Dental Studio.

Porcelain recommendations for Zr100 and Realistic

Use ISO 9693 porcelains with firing temperatures up to approximately 980 °C.

The Zr100 has a CTE (25 °C – 500 °C) of (10.5 – 10.8) × 10^{-6} K^{-1}.

A range of porcelains that have been tested with zirconia frameworks are detailed below. This is not an exhaustive list and other porcelains with a similar CTE may be used.

Veneering material	Manufacturer
VM9®	Vita Zahnfabrik H. Rauter GmbH & Co. KG
Initial Zr™	GC Corporation
Lava Ceram™	3m ESPE

All restorations including anatomical and monolithic designs should have porcelain applied to prevent excessive wear on the opposing dentition. Realistic is recommended for full-form anatomical restorations only, using a thin glaze of minimal thickness and characterisation stain suitable for this product.

Porcelain recommendations for cobalt chrome

Use ISO 9693 porcelains with firing temperatures of up to approximately 980 °C.

CoCr DG1 has a coefficient of thermal expansion (CTE) (25 °C– 500 °C) of (14.0 – 14.5) × 10^{-6} K^{-1}.

A range of porcelains that have been tested with these types of CoCr frameworks are detailed below. This is not an exhaustive list and other porcelains with a similar CTE may be used.

Veneering material	Manufacturer
VM 13®	Vita Zahnfabrik H. Rauter GmbH & Co. KG
Omega 900®	Vita Zahnfabrik H. Rauter GmbH & Co. KG
Duceram® KISS	DeguDent GmbH / Dentsply International, Inc.
HeraCeram®	Heraeus Kulzer GmbH
Vintage	Shofu Inc.
Vintage Halo	Shofu Inc.
IPS d. Sign®	Ivoclar Vivadent AG
Initial MC	GC Corporation
EX3	Noritake Dental Supply Co., Ltd.
Reflex®	Wieland Dental + Technik GmbH & Co. KG
Creation	Creation Willi Geller International GmbH

- Always apply opaque material in two firings. Firstly apply a thin first layer (wash) followed by a second opaque layer.
- Wash the part under running water before applying the next ceramic coating.
- Remove the porcelain mechanically only. Acid removal will cause corrosion of the metal.

Composite recommendations for PM100

If composite is to be applied to the framework, the surface should be roughened using 100 µm alumina grit at a maximum pressure of 2 bar (29 psi).

WARNING: Modification of finished bridge frameworks
The use of diamond discs to open the embrasures and aesthetically separate each unit is not recommended. This technique can drastically compromise the framework strength and result in failure.

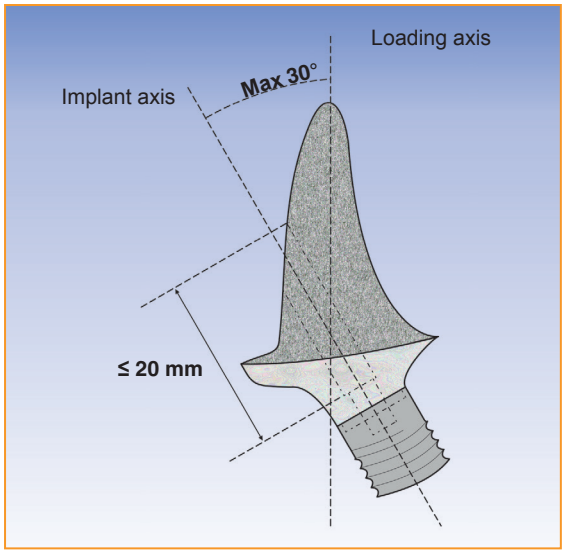
WARNING: Modification of any Renishaw products
No modifications to any of the Renishaw products referred to in this document are advised. If any modification is made, to any of these products, it will be under the sole responsibility of the modifier.

LaserAbutments™

LaserAbutments have minimal design constraints due to the high flexibility afforded by the hybrid manufacturing process used. Your customised design is 3D printed in CoCr DG1 alloy, with the connecting geometry subsequently milled into the abutment base.

Notes:
Designs for LaserAbutments are created using Renishaw Dental Studio or Renishaw's scan service. A range of third-party scanners and CAD software can also be used; please visit the Renishaw website for more information.
As CoCr DG1 is the material used in Renishaw LaserPFM™, LaserAbutments™ and LaserBridges™ products, the same guidelines for applying veneering materials should be followed for all of these products.

Recommended design features



- Screw access holes must have a wall thickness of at least 0.4 mm around them.
- The loading axis of the abutment should not exceed 30° to the implant axis.
- The screw access hole must not exceed 20 mm in length.

Screws

- Only Renishaw supplied screws to be used with this product.
- Screws used clinically are intended for single use only.
- Laboratory screws can be re-used multiple times.
- All screws supplied by Renishaw are clean, non-sterile components.
- Do not use screws destined for clinical fitment to temporarily secure the abutment for laboratory purposes.

Supported implant types

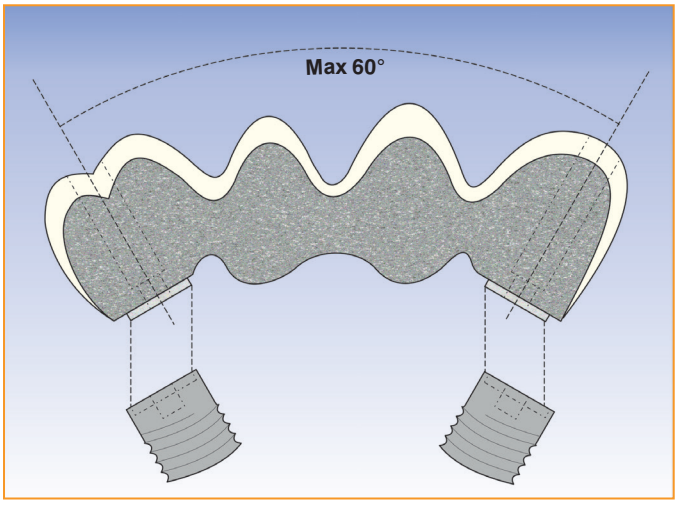
For an up to date and comprehensive list of the implant systems to which LaserAbutments can be secured, see document H-5489-8705 – *LaserAbutments™ and LaserBridges™ supported implants and pin kits*.

LaserBridges™

LaserBridges have minimal design constraints due to the high flexibility afforded by the hybrid manufacturing process used. Your customised design is 3D printed in CoCr DG1 alloy, with the connecting geometry subsequently milled into the bridge.

Notes:
Designs for LaserBridges are created using Renishaw Dental Studio or Renishaw's scan service. A range of third-party scanners and CAD software can also be used; please visit the Renishaw website for more information.
LaserBridges can contain multiple implant types if necessary.
As CoCr DG1 is the material used in Renishaw LaserPFM™, LaserAbutment™ and LaserBridge™ products, the same guidelines for applying veneering materials should be followed for all of these products. LaserBridges™ are equally suitable for acrylic/composite and porcelain veneering.

Recommended design features



- Screw access holes must have a wall thickness of at least 0.4 mm around them.
- The angle difference between the two most extreme implants should not exceed 60° *.

* Some implant system manufacturers impose more constraints on this angle. Please contact Renishaw dental support for advice.

Screws

- Only Renishaw supplied screws to be used with this product.
- Screws used clinically are intended for single use only.
- Laboratory screws can be re-used multiple times.
- All screws supplied by Renishaw are clean, non-sterile components.
- All Renishaw LaserBridges are supplied with two full sets of screws. One set can be used for laboratory work and one set sent on to the clinician.
- Do not use screws destined for clinical fitment to temporarily secure the bridge for laboratory purposes.

Supported implant types

For an up to date and comprehensive list of the implant systems to which LaserBridges can be secured, see document H-5489-8705 – *LaserAbutments™ and LaserBridges™ supported implants and pin kits*.

LinkAbutments

Designing

LinkAbutment design constraints are the same as those of crowns and bridges.

When using inciseCAD, all materials are available. The hole size is fixed at 2.8 mm.

When using Renishaw Dental Studio, designs can be based on library geometry or based on a scanned link. The following link libraries are available:

- Dentsply Ankylos Titanium Base.
- Medentika (2nd generation).

The following constraints apply:

- single retainer frameworks based on library geometry can be manufactured in any material;
- single retainer frameworks based on a scanned link can only be manufactured in LaserPFM;
- if a framework has more than one retainer, it can only be manufactured using the LaserPFM process;
- both custom and screw retained frameworks can be designed and manufactured.

Bonding

Resin cement with suitable primers should be used for bonding. We recommend Kuraray Panavia™ with Clearfil Ceramic Primer and Alloy Primer for bonding link abutments to links.

Attaching link to abutment

1. Grit blast the bonding surfaces of link using 50 µm alumina at a maximum pressure of 6 bar (87 psi) for up to 10 seconds. Take care not to affect implant/tissue contacting surfaces.
2. Check the fit of the abutment to the link. If it is too tight, it can be eased by grit blasting the abutment internal surface.
3. Steam clean the link to remove any unwanted deposits.

Priming abutment

1. Hold the abutment with forceps so that the internal surface is accessible.

2. If not already done, grit blast the bonding surface of link using 50 µm alumina at a maximum pressure of 6 bar (87 psi) for up to 10 seconds. Take care not to affect implant/tissue contacting surfaces.

3. Clean the internal surface of the abutment in an ultrasonic bath for 2 minutes. For cobalt chrome, cleaning with steam is a suitable alternative. For Zr100 and Realistic, steam can be used although it is not preferred.

4. Ensure it is clean under magnification.

5. Prime according to the manufacturer's instructions using a primer that is appropriate to the abutment material.

6. Ensure the surface is covered and dry under magnification.

Priming link

1. Prime according to the manufacturer's instructions using a primer that is appropriate to the link material.

2. Ensure the surface is covered under magnification.

3. Allow to dry.

Cementation

1. Dispense and mix according to the manufacturer's instructions.

2. Apply the cement evenly to the bonding surface of the link avoiding the access hole for the screw.

3. Insert the link into the abutment and twist gently to evenly distribute the cement.

4. Rotate the abutment to correct its orientation relative to the model (non-engaging link only).

5. Using magnification and cotton buds, ensure any surplus cement is removed.

6. Cure for 30 minutes, or as recommended by the manufacturer.

7. Remove the lab screw and replace in kit.

8. Using magnification, ensure the mounting face is free of adhesive.

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

RENISHAW
apply innovation™

For worldwide contact details, visit
www.renishaw.com/contact

H-5489-8500-05

Issued 05.2015

Part no. H-5489-8500-05-A