Straumann® Screw Retained Bridge/Bar

Design Guideline for 3Shape

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1. General Information

To be able to create and order an Implant Bridge or Bar (SRBB) on Straumann Implants you will need to import the “Straumann-SRBB.dme” File, located at:


Please read the attached document about the country specific availability of the products.

This Library contains all Implant Systems and Materials (see Chapter Implant Systems and Materials). Please see http://ifu.straumann.com for:
SRBB IFU700996

DESIGN OUTSIDE PARAMETER RECOMMENDATIONS

A designed SRBB may be outside the Straumann design recommendations and is therefore a customized product.
As you proceed, multiple parameter limits according to Straumann Design recommendations will not be tested in the software. Therefore, please follow the constraints in this document in order to produce a reliable customized product.
In production, your order will be identified as “out of specification” and will be assessed for production feasibility. You will be notified if your design cannot be produced.
2. Order Creation

A Straumann Implant Bridge or Bar can be produced in different Materials and with different Implant Systems. Choose the desired material and implant configuration for every tooth position.

**NOTE:** The Implant Systems (Ti-Base or direct to implant) and Materials cannot be mixed in a single bridge/bar.

The Materials with the naming "...for Implant Bridge" are the correct materials for a Straumann direct to implant Bridge/Bar.

**NOTE:** Make sure you choose the Materials with (Ti-Base) for a Variobase Bridge/Bar Prosthesis.
3. Model Measurement

To insure the best-fit for an Implant Bridge/Bar, Straumann provides a measurement service of the master-cast model.

The model is sent to Straumann Production where the implant analog positions are measured with a coordinate measurement machine and corrections are applied to the measured scanbody positions if needed. If there is a significant difference in scanbody positions and these accurate measurements, then you will be contacted, to determine if you want to re-scan the master-cast model and re-design the prosthesis, so you can optimize the designed prosthesis with respect to the measured implant positions.

Furthermore, the final restoration will be fit-checked on the master-model as the final step of a quality controlled process.

If you would like to utilize this measurement service, please follow these Steps:

Open the Order creation and choose create an Implant Bridge/Bar using the Straumann Implant Bridge/Bar Implant System:

Choose one of the two Direct to Implant Metal Materials (Straumann coron for Implant Bridge or Straumann ticon for Implant Bridge).

**WARNING:** Ensure that Straumann Scanbodies are used, to maximize the positioning accuracy of the implant/abutment interfaces and fit of the prostheses.

If you do not use Straumann Scanbodies, then please ensure that you send the model to Straumann for measurement as shown below.
Choose an option out of the **additional order options**:

**True**: No model measurement  
**False**: With model measurement and fit check

**NOTE**: This is an automated process.  
If no measurement service is requested, the order will be processed with the Scanned Implant positions. The precision of the Scan will influence the Fit of the Direct to Implant Bridge/Bar.
4. Implant Systems

Straumann has different solutions for an Implant Bridge/Bar. The prosthetics can be screw retained (direct to implant) or cemented (Variobase for Bridge/Bar and/or Variobase for Bridge/bar Cylindrical).

**Note:** A screw retained implant system cannot be mixed with a Variobase implant system.

4.1. Screw Retained Bridges/Bars

The Straumann Screw Retained Implant System allows the User to screw the Implant Bridge/Bar directly to the Implant. This is possible with the Implants:

- NC – Narrow Crossfit
- RC – Regular Crossfit
- RN – Regular Neck
- WN – Wide Neck

The Straumann Screw Retained Abutment is an abutment System to overcome large Implant angular divergence. These Abutments come in different angles (0°, 17° & 30°), gingiva heights and are screwed into an NC or RC Implant. Since the Implant Bridge/Bar is screwed to the Abutment it is still a screw-retained solution.

Straumann also provides Analogs and Scanbodies for the SRA (Screw Retained Abutment), this is also part of the Screw-Retained Implant System, and are named as:

- SRA-35 – Screw Retained Abutment 3.5mm
- SRA-46 – Screw Retained Abutment 4.6mm
4.2. Variobase for Bridge/Bar

Straumann provides ti-base abutment Systems for a cement retained Bridge/Bar solution. The Variobase for Bridge/Bar Implant system has conical shaped Abutments that are cemented (extra-orally) and the" two-piece" restoration is then fixed intraorally to the implants and SRAs with screws.

This System has a wide range of Materials (see Section 7).

The Variobase for Bridge/Bar is available for these Implants (with country-dependent availability):

NC – Narrow Crossfit  
NNC – Narrow Neck Crossfit  
RC – Regular Crossfit  
RN – Regular Neck  
WN – Wide Neck  
SRA-35 – Screw Retained Abutment 3.5mm  
SRA-46 – Screw Retained Abutment 4.6mm
4.3. Variobase for Bridge/Bar Cylindrical

Additionally, the Variobase for Bridge/Bar Cylindrical is also available, this has a bridge interface that is based on the Single Unit Variobase for Crown (with country-dependent availability).

**Note:** The two Variobase for Bridge/Bar implant systems (Variobase for Bridge/Bar and/or Variobase for Bridge/bar Cylindrical) can be mixed as preferred.

The Variobase for Bridge/Bar allows larger inter-implant angular deviation (up to 30°) in comparison to the Variobase for Bridge/Bar Cylindrical that allows 10° deviations between 2 implants. A mixture of the two types with Variobase for Bridge/Bar Cylindrical for implants with small angular deviations and Variobase for Bridge/Bar for larger deviations provides good flexibility and resistance to chewing forces in larger bridges.
4.4. Straumann Cementable (Stock) Abutments

The Straumann® dme is now extended to Straumann® BL cementable and TL® synOcta® cementable abutments. Starting from an implant level impression, whether it is digital or conventional, it is now possible for Dental Labs to design and order crowns and bridges restorations via the Straumann® Centralized Milling facility for non-modified cementable stock abutments.

Crowns and 3-units bridges designs with Implant deviations up to 8° are possible. Bridges designs are possible using only Cementable Abutments, no mixing with Straumann Variobase, Medentika or Neodent Ti-Base is allowed. For Crowns and bridges on cementable abutments no screw channel holes can be made.

5. Materials

The Straumann Milling facilities utilize different high quality materials for various restoration solutions. To make it easy for the User to choose from the different materials (with country-dependent availability), they have been grouped into screw and cement retained restorations.

NOTE: To get more Information about the Materials please use the CARES Guide!
6. Direct to Implant screw-retained Restorations

Straumann provides two Materials that can be used for a direct to implant connection:
- Straumann Coron for Implant Bridge (CoCr)
- Straumann Ticon for Implant Bridge (Titanium)

7. Cemented to Variobase Restorations

Straumann provides 8 Materials that can be used for Variobase restorations:

- Straumann Coron for Implant Bridge (Ti-Base) CoCr
- Straumann Ticon for Implant Bridge (Ti-Base) Titanium
- Straumann zerion LT for Implant Bridge (Ti-Base) Zirconia in 9 Shades
- Straumann zerion ML for Implant Bridge (Ti-Base) Multi-Layered Zirconia in 3 Shades
- Straumann zerion UTML for Implant Bridge (Ti-Base) Ultra Translucent Multi-Layered Zirconia in 5 Shades - Max 3 Units
- Straumann zerion GI for Implant Bar (Ti-Base) Gingiva Shaded Zirconia in 2 Pink Shades
- Staumann 3M ESPE Lava Plus Zirconia for Implant Bridge (Ti-Base) Zirconia in 18 Shades
- Straumann polycon ae for Implant Bridge(Ti-Base) PMMA in 5 Shades
- Straumann 3M Lava Esthetic for Implant Bridge(Ti-Base) Zirconia in 5 Shades
- Straumann JUVORA PEEK for Implant Bridge(Ti-Base) PEEK in 2 Shades

**NOTE:** Only Bars for Fixed Prosthetics (i.e. no patient removable dentures) can be produced with Zirconia Materials (see chapter Bars for Fixed Prosthetics).
8. Milling Restrictions

8.1. Inter Implant Angle divergence

Do to physical geometrical thresholds for easy and safe insertion of the Straumann Implant System, there are limits on the maximum angular deviation between implants. The maximum angle is $15^\circ$ from the common insertion axis.

**Measurement Method** – Mechanical measurement on model if angulation appears to be large.

**WARNING:** It is Important that you do not create restorations with larger inter-implant angle divergence. The likelihood of a Bridge/Bar not fitting in the Patient’s mouth or that it can’t be Milled is very high when these Angles are exceeded.

**Note** - If the angle between implants is too large, it may also not be possible to mill the SRBB. It is recommended to split the bridge in two parts or in collaboration with your customer (dentist) use SRA interfaces with angulation on BL implants, see Section 4.1.
8.2. Material Blank Size

To insure that the Implant Bridge/Bar can be milled correctly it must fit the Material Blank. The maximum design height can be found in the table below. 

Note for Zirconia these values are the sizes after sintering.

<table>
<thead>
<tr>
<th>Material</th>
<th>Max Design Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coron &amp; Ticon (Ti-Base or not)</td>
<td>19.5mm</td>
</tr>
<tr>
<td>zerion LT</td>
<td>15.3mm</td>
</tr>
<tr>
<td>zerion ML, zerion UTML, zerion GI</td>
<td>13.9mm</td>
</tr>
<tr>
<td>3M ESPE Lava Plus Zirconia</td>
<td>23.2mm</td>
</tr>
<tr>
<td>Polycon ae</td>
<td>15.8mm</td>
</tr>
<tr>
<td>JUVOR PEEK</td>
<td>19.2mm</td>
</tr>
<tr>
<td>3M Lava Esthetic</td>
<td>16.8mm</td>
</tr>
</tbody>
</table>

**NOTE:** Check the design height in the dental manager before sending the order to Straumann production, to ensure it can be manufactured:

<table>
<thead>
<tr>
<th>Items</th>
<th>Material</th>
<th>Status</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar 33-43</td>
<td>Straumann con...</td>
<td>Designed</td>
<td>6.03 mm</td>
</tr>
<tr>
<td>Screw retained</td>
<td>Straumann 3M...</td>
<td>Designed</td>
<td>9.61 mm</td>
</tr>
<tr>
<td>Screw retained</td>
<td>Straumann con...</td>
<td>Designed</td>
<td>14.38 mm</td>
</tr>
</tbody>
</table>
9. Safety Relevant Design Restrictions

9.1. General Information

To be able to create a product with minimal risk the patient, there are some Restrictions that need to be held.

**WARNING:** A patient and product risk exists if the User does not follow these recommended rules and restrictions. In addition, there may be delays to production of the device when deviations from these restrictions are observed.

**Maximum Inter-Implant Distance:** The maximum number of Gaps between two Implants is 3 Pontics/Tooth positions, this corresponds to a maximum distance of 35 mm.

**Maximum Length of Free End:** A maximum of one tooth can be placed at a free-end or in the case of a bar, a maximum length of 15mm from the implant center is allowed.

The Wall thickness (Thickness to screw channel) for Cantilever Pillars must be at least 1.2mm for Metals and 1.6mm for Zirconia, use the measurement function, shown below to measure this:
Use the Measuring Grid and place the center of the grid at the edge of the Screw Channel to measure the material thickness to the outer limit of the Pillar.
9.2. Connector/Bar Cross-section area

Independent of the Material or Cemented/Screw-Retained, Straumann recommends these Connector / Fixed Bar cross sections (in a bridge, the pontics should also not be smaller than these cross-sections):

<table>
<thead>
<tr>
<th>Region</th>
<th>1 Missing Tooth</th>
<th>2 Missing Teeth</th>
<th>3 Missing Teeth</th>
<th>Free End / Cantilever</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front &amp; Premolar</td>
<td>5 mm²</td>
<td>5 mm²</td>
<td>8 mm²</td>
<td>13 mm²</td>
</tr>
<tr>
<td>Premolar-Molar</td>
<td>5 mm²</td>
<td>8 mm²</td>
<td>13 mm²</td>
<td>17 mm²</td>
</tr>
<tr>
<td>Molar</td>
<td>5 mm²</td>
<td>8 mm²</td>
<td>13 mm²</td>
<td>17 mm²</td>
</tr>
</tbody>
</table>

Note: The only exception from these design rules, is for the lower incisors, where it is possible to have 4 Pontics/Tooth positions between the implants and a minimum connector/pontic cross-section of 5 mm².

For Bridges with connectors, the Cross-sections are shown in the connector designer and the observation plane should be moved along the tooth arch to check the cross-section area:
For Bars, to measure the cross-section use the Area Function in the 2D Cross section view:

The cross-section when using natural connectors should also follow the guidelines and can be measured with the same tool.
9.3. **Labial/Buccal Shift**

The User can offset the Bridge or Bar contour from the Jaw arch to create a better anatomic situation.

**Note:** The Offset of the Bridge between two Implants in Labial direction should not be larger than 8mm and in the buccal direction should not exceed 5mm.

![Diagram of Labial/Buccal Shift](image)

9.4. **Bar to Pillar contact area**

This contact area between the bar and pillar is crucial for the stability of the Implant Bar. The minimal contact area between the Bar and the Pillar should be:

- 2.5mm² for all Bars for removable Prosthetics

- The same size as the connector min. Cross section for that region for Bars for fixed prosthetics (see table in Section 9.2 for the required cross-section)
**Measurement Method** – Use the ruler as shown in Section 1.1, to measure the height and width of the contact area. The top view shows the limited contact of a bar with a pillar, the length in red is then multiplied by the height to give the contact area.

**9.5. Gingiva subtraction**
The User is able to adapt components to the Gingiva surface.

**Warning:** After reducing the size of Pontics, Connectors and Bars to compensate for the gingiva penetration, make sure the remaining cross-section is fulfilling the minimal cross-section values (see Section 9.2).
9.6. Rounding Corners Between Bar and Pillar

The connection between the bar and pillar should be smooth. Use the wax smoothing tool as shown in the rectangular box with a radius of 1mm. Carefully fill the transition area between the bar and pillar with material as shown in the picture.

The red circled additive waxing tool can also be used to smooth the transition. **Note:** If the radius tool decreases the bar width then use the additive waxing to smoothly restore the thickness.

**Warning** – failure to have a smooth transition between bar and pillar (see picture below), made by adding material, can reduce the strength of the bar.
9.7. Design Guide

When the User designs a screw-retained Bridge/Bar, the design constraints must be considered.

NOTE: A mix between Bars for removable and fixed restorations is not possible.

10. Bars for removable restorations

Straumann provides various solutions of Bars for removable restorations. These Bars can be designed using either of the Implant Systems (Screw Retained or Variobase).

NOTE: Bars for removable restorations can only be made in Metal (Coron and Ticon), see following Table.
All Straumann Bars for removable restorations can be found in the order form:

**WARNING:**
When designing a Straumann Implant Bar, **DO NOT** use any attachments
The Bar **MUST** be designed in Linear mode (selected with right mouse click on the bar).
Warning: The required Minimal Width for the Milled Bar is 2mm and the minimal height is 3mm, use the ruler in the 2D Cross section to ensure these values are achieved.

11. Bars for fixed prosthetics

Straumann Bars for fixed restorations can also be found in the order form:

WARNING: When designing a Straumann Implant Bar, make sure not to use ANY attachments and to inspect the Design (for intersections and mesh errors) before sending to Straumann production:
Lambda Bar:
Besides the regular Horizontal/Vertical scaling and rotation handles, the Lambda Bar also has handles on each “Leg” to create an individual and anatomically appropriate design.

**Warning**: Use the cross-section measurement tool and ensure the cross-section fulfills the values as given in Section 9.2.

Trapezoid Bar:
Besides the regular Horizontal/Vertical scaling and rotation handles, the Trapezoid Bar also has handles on each Side to create an individual and anatomically appropriate design.

**Warning**: Use the cross-section measurement tool and ensure the cross-section fulfills the values as given in Section 9.2.

Cross Bar:
The Cross Bar can be scaled using the Horizontal/Vertical scaling tools.

**Warning**: Use the cross-section measurement tool and ensure the cross-section fulfills the values as given in Section 9.2.

For fixed bars, it is possible to place a shoulder on the pillars to define the finishing line for acrylic coverage.

**Note** The shoulder width (green arrow) should be less than 2 mm to ensure it can be milled.
### CARES® Screw-retained restorations

<table>
<thead>
<tr>
<th>Shape</th>
<th>one-piece</th>
<th>two-piece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Fixed Bar</td>
<td></td>
<td>Basic Fixed Bar</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARES® X-Stream™</th>
<th>on Variobase® Coping (on SRA)</th>
<th>on Variobase® Abutment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>one-piece</th>
<th>two-piece</th>
</tr>
</thead>
<tbody>
<tr>
<td>cor0n®</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>Titanium Grade 4</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>jetron® LT GI</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>3M™ ESPE™ Lava™ Plus zirconia</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>Komet M1 zirconia</td>
<td></td>
<td>×</td>
</tr>
<tr>
<td>polycon® ae</td>
<td></td>
<td>×</td>
</tr>
</tbody>
</table>

× = available
(x) = available, but usually not used in this indication
SRA = Screw-retained Abutment
12. Bridges

Straumann can provide a wide range of materials for the Bridges. Bridges can be designed using either of the Implant Systems (Screw retained or Variobase for Bridge/Bar). The range of Materials is listed below:

**Warning**: Use the cross-section measurement tool and ensure the cross-section fulfills the values as given in Section 9.2.
13. **Local Support**

If you have questions about the Workflow or any of the Products, feel free to contact your local support.

You can find your local support here: