NobelProcera™
Crown and Bridge Titanium

Fact Sheet Version 3

Overview
- Biocompatible.
- High strength cement-retained solutions on teeth and implants.
- A new marginal contact surface design resulting in an optimal framework fit.
- Excellent framework design capabilities within the software such as cut-back function for optimum veneering support.
- Light in weight.
- Titanium alloy exhibits marginal stability when fired.
- Cost effective.
- Conventional or temporary cementation.
- Precision Milled Restoration manufacturing process employing 5-axis milling of a solid Titanium alloy monobloc.

Material characteristics

<table>
<thead>
<tr>
<th>Alloy type:</th>
<th>Biocompatible surgical grade Titanium according to ASTM F136</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTE (25–500°C):</td>
<td>CTE 10.16</td>
</tr>
<tr>
<td>Melting point:</td>
<td>1640°C</td>
</tr>
<tr>
<td>Composition:</td>
<td>Titanium-6Aluminum-4Vanadium (Ti6Al4V) ELI.</td>
</tr>
<tr>
<td></td>
<td>Nitrogen ≤ 0.05%, Carbon ≤ 0.08%,</td>
</tr>
<tr>
<td></td>
<td>Hydrogen ≤ 0.012%, Iron ≤ 0.25%,</td>
</tr>
<tr>
<td></td>
<td>Oxygen ≤ 0.13%, Aluminum 5.50 – 6.50%,</td>
</tr>
<tr>
<td></td>
<td>Vanadium 3.50 – 4.50%. Titanium = balance.</td>
</tr>
<tr>
<td>Tensile strength:</td>
<td>860 MPa</td>
</tr>
<tr>
<td>Yield strength:</td>
<td>795 MPa</td>
</tr>
<tr>
<td>Elongation:</td>
<td>10%</td>
</tr>
</tbody>
</table>
Veneering

– Can be veneered with resin or porcelain.
– All commercially available veneering materials designed for use with titanium with a CTE of 10.16 are suitable.
– For long-term clinical success follow the recommendations and handling instructions of the veneering material manufacturer.
– A thin bronze colored oxide layer may appear which has no impact on veneering.
– The oxide layer can be removed from the intaglio surface area by sandblasting and it will not reappear intraorally.

Our recommended partners for veneering of NobelProcera Crowns & Bridges Titanium are:

Veneering with Porcelain
– Our recommended partner for porcelain veneering of NobelProcera Titanium Crowns and Bridges is VITA, who have certified VITA Titankeramik for NobelProcera Crowns and Bridges Titanium.
– VITA Titankeramik is available in VITA SYSTEM 3D-MASTER and VITA classical A1–D4 shades.
– VITA recommends sandblasting prior to veneering with 130 micrometer Al₂O₃ with 2–3 bar pressure and normal cooling after firing.

Additional veneering material recommendations and supporting guidelines are available from VITA on www.vita-zahnfabrik.com/vm-working-instructions.

Veneering with Resin
– Our recommended partner for acrylic veneering of NobelProcera Crowns and Bridges Titanium is Ivoclar Vivadent, who have certified SR Adoro Veneering Composite for NobelProcera Crowns and Bridges Titanium.
– The microfilled composite SR Adoro is available in A-D und Chromascope shades.
– Ivoclar Vivadent recommends an air abrasive process with 80–100 micron AL2O3 at 3 bar and the application of SR Link as an bonding agent before opaquer application.

Additional veneering material recommendations and supporting guidelines are available from Ivoclar Vivadent on www.ivoclarvivadent.com
NobelProcera™ Crown and Bridge Titanium

Indications

- Crowns and bridges up to 14 units.
- Minimum thickness 0.4 mm.
- Any position in the mouth.
- The connector dimension of a multi-unit framework depends on the distance between the supporting teeth (see table below). The design is supported by real-time feedback through warning function in the NobelProcera Software.
- A modifiable contact surface is available for long span bridges and short preparations.

<table>
<thead>
<tr>
<th>Type – any position</th>
<th>Maximum length</th>
<th>Minimum connector and cross section</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a=Arc length [mm]</td>
<td>e=Extension length [mm]</td>
</tr>
<tr>
<td>Free hanging arc</td>
<td>a ≤ 21.0</td>
<td>3.0 × 2.5 / 6.0</td>
</tr>
<tr>
<td>Free hanging arc</td>
<td>21.0 &lt; a ≤ 35.0</td>
<td>4.0 × 3.0 / 9.4</td>
</tr>
<tr>
<td>Extension</td>
<td>e ≤ 10.0</td>
<td>4.0 × 3.0 / 9.4</td>
</tr>
</tbody>
</table>

Contraindications

- Cases with lengths that exceed the maximum limits.
- Bridges must be designed to fit into a block of 80 mm × 80 mm × 30 mm (length × width × height).
- Titanium crowns and bridges should not be modified below the minimum thickness in the marginal areas.

Additional information

Titanium alloy is a standard and proven prosthetic material, which has been widely used in the dental industry for several years.

NobelProcera – guaranteed and certified quality

NobelProcera Precision Milled Restorations on teeth and implants are guaranteed for five years; the NobelProcera Product Warranty covers the NobelProcera products and does not include any additional costs. NobelProcera also provides certificates of material authenticity.
Titanium and titanium alloys are currently used in medical devices that enable the replacement of degenerated tissues, assist malfunctioning organs or repair traumatized tissues and bones. The widespread use of titanium and titanium alloys is related to a combination of unique properties like biocompatibility, corrosion resistance, and osseointegration to the bone. For the NobelProcera Crowns and Bridges, Nobel Biocare decided to use the Titanium-Aluminium Vanadium alloy as the base material. The Ti-6Al-4V alloy fulfils the requirements of ASTM F136 for a wrought material suitable for use in surgical implants. This alloy has high mechanical properties which makes it ideal for high precision milling of prosthetic solutions particularly crowns and bridges. The strength of the Titanium alloy ensures marginal stability during firing and is of particular relevance for requirements needed for connector dimensions. Although successfully used in millions of devices on an annual basis, there is always a foreign body response to the material since it is naturally not present in the human body. Therefore the biocompatibility of the alloy is of crucial importance. For titanium alloys a titanium oxide layer is rapidly formed on the surface. This normal passivation layer prevents the release of metal ions which could cause adverse affects to the surrounding tissues or the gingiva (prosthetic components). This passivation layer makes the material inert with respect to tissue reactions. From in-vitro and in-vivo tests no toxic responses have been reported.

From the implantation tests there is a known and acceptable foreign body response which makes titanium and the titanium alloy the material of choice for patients having a metal (nickel) allergic reaction to traumatology or orthopaedic implants. Therefore it can be concluded that the Ti-6Al-4V alloy provides one of the best available combinations of corrosion resistance, biocompatibility and mechanical strength which is ideal for high precision milling of prosthetic restorations.

References

[1] ASTM F136-02a standard “wrought 6-aluminiumum 4-vanadium ELI (extra low interstitial) alloy for surgical implant applications”

www.nobelbiocare.com