Phibo®

CAD-CAM

Procedure

Porcelain Veneering on Phibo® Cobalt-Chrome Frameworks

phibo

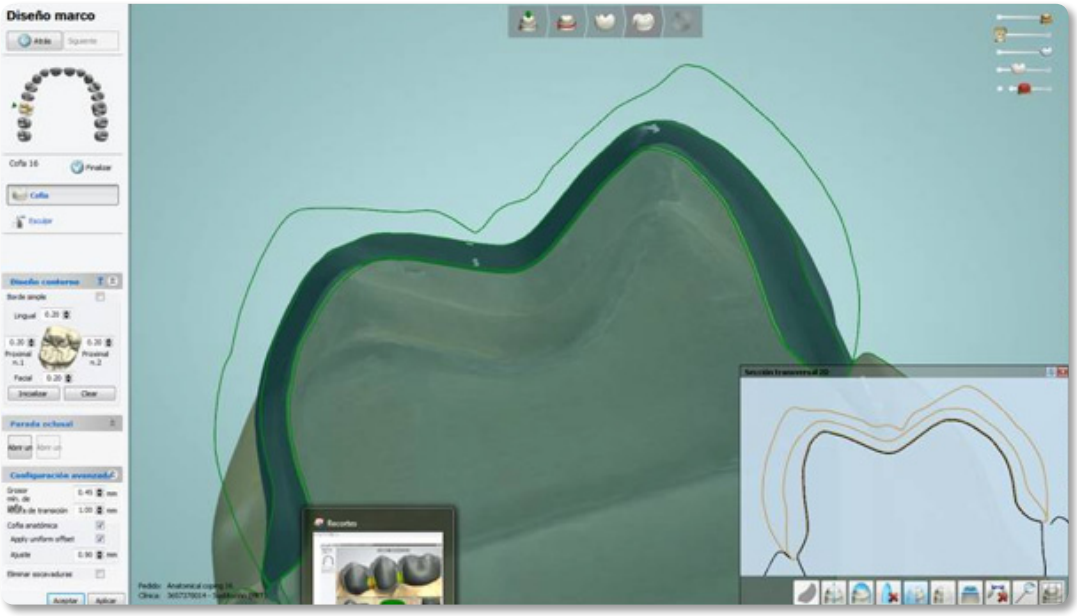
We decode nature.

Table of Contents

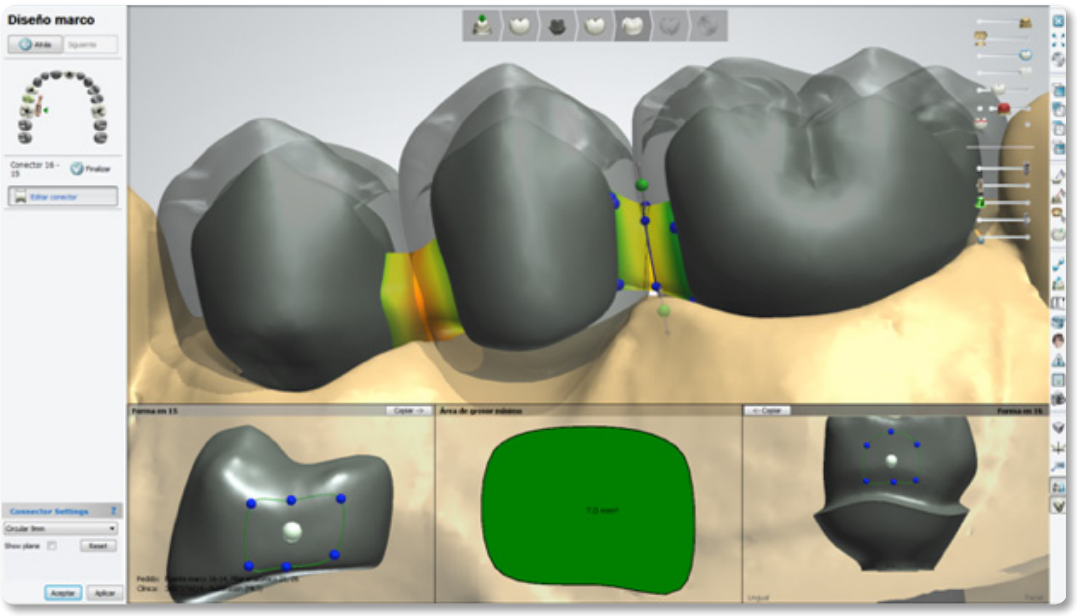
1. Initial Considerations

To successfully fuse porcelain veneering onto Cobalt-Chrome frameworks, the following aspects of framework design must be taken into account:

- Frameworks reproduce the final shape of the reduced tooth and their design may affect the success or failure of the porcelain-fused-to-metal restoration.
- Frameworks to be veneered must be designed for wall thickness to be at least 0.40mm.
- Porcelain veneering needs to be applied in a single uniform layer ranging from a minimum of 0.8mm to a recommended maximum of 2mm in thickness.
- Avoid sharp angles and thin areas in framework design.



- Multiple element frameworks must be designed for stability in the connectors between dies and pontics. The minimum cross-section for connectors is 7mm^2:



- The CTE (coefficient of thermal expansion) of the porcelain veneer needs to be close to that of the Phibo® Cobalt-Chrome framework (CTE: 14.0-14.5 x 10-6 K-1).
- Asepsis must be maintained throughout the process to prevent framework contamination.

2. Equipment

Oven

Porcelain (Opaquer/Dentin/Incisal/Glazing)

Sandblaster

Steam Machine

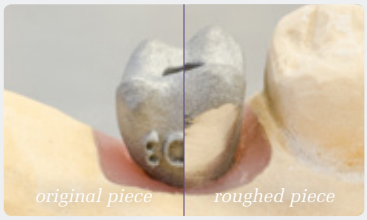
Aluminum Oxide (125µm – 250µm and 50µm) and glass beads

Tungsten carbide (for metal) and diamond-tipped drills (for porcelain)

3. Procedure

Step 1

Roughen down the framework using clean tungsten carbide drills to eliminate id tag and any excess metal, where necessary. **Do not use diamond-tipped instruments.** Diamond particles can stick to the metal and cause bubbling in the porcelain veneer when fired.



Step 2

Sandblast the Cobalt-Chrome framework with aluminum oxide (special for dental use) from 125 to 250 microns at 3-4 bars. Do not use recycled aluminum oxide as it can contaminate the framework surface (in screw-retained frameworks, the framework connection must be protected).

Clean structure with steam. Let dry fully. Do not use compressed air as it could contain impurities that would contaminate the metal.

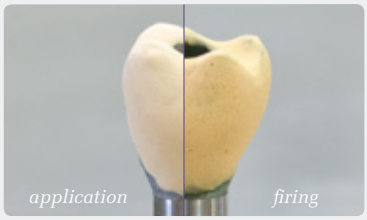
Step 3

1st Opaquer firing: Apply a thin layer of opaquer to the framework and fire in accordance with porcelain manufacturer instructions. There are three different ways to apply opaquer, depending on the manufacturer:

Paste: Apply using a brush or a glass instrument.

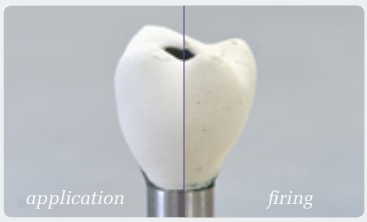
Powder: Powdered opaquer is mixed with opaquer liquid and applied using a brush or a glass instrument.

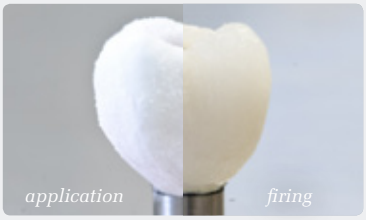
Spray: Powdered opaquer is mixed with opaquer liquid in a glass container and then uniformly sprayed over the surface of the structure.



Step 4

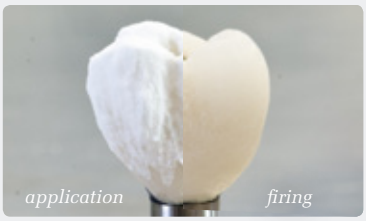
2nd Opaquer firing: Apply opaquer to framework and perform a second firing in accordance with porcelain manufacturer instructions.





Step 5

1st Firing of dentin and incisal: Apply dentin and incisal and fire in accordance with porcelain manufacturer instructions. After firing, perform minor shape corrections with **diamond-tipped drill**. Steam clean and let dry, or dry with absorbent paper.



Step 6

2nd Firing of dentin and incisal: Apply dentine and incisal and fire in accordance with porcelain manufacturer instructions. After firing, go over the framework to create the final form of the tooth to be restored.

Step 7

Finishing: Eliminate dust from final check with steam and dry. Apply glaze and stain, and then fire in accordance with porcelain manufacturer instructions.

Step 8

Finishing of metal area: Perform final sandblasting on the metal area using: aluminum oxide (50 µm) at 1.5 bars, for cemented frameworks, or glass beads at 1.5 bars for screw-retained frameworks.

Step 9

Final result: Model of finished tooth is shown at left.

NOTE: *Use clean tungsten carbide drills in case that you decide to brush the framework. Do not use diamond-tipped instruments. Diamond particles can stick to the metal and cause bubbling in porcelain veneer during firing. Afterwards, sandblast to make the surface rough enough for the porcelain veneer to adhere to.*

4. Comments

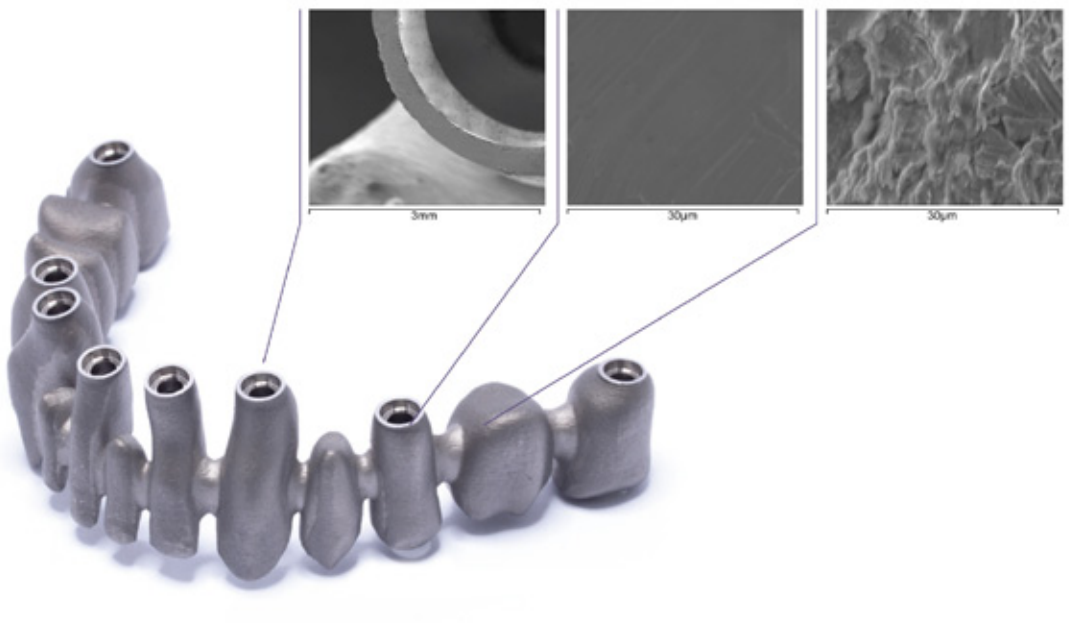
- Best results are obtained when the CTE of the porcelain veneer is slightly lower than the CTE of the framework material.
- Use only **pure aluminum oxide** to sandblast the framework surface. If the metal surface is dirty, bubbling may occur during the porcelain firing process.
- After cleaning, the framework must not be touched manually. Only handle with clean tongs.
- If oxidation firing is performed (procedure to check whether the framework is contaminated), item must be sandblasted again with pure aluminum oxide (125-250µm), at 3-4 bars of pressure.
- Problems can arise if opaquer dries too quickly. If the recommended times for pre-drying and heating are not adhered to, small holes may form or the opaquer may flake off (opaquer evaporates too quickly).
- Do not dry by using compressed air (impurities can contaminate framework).
- Do not dip framework into hydrofluoric acid.

5. Material: Phibo® Cobalt-Chrome

Cobalt-Chrome powder is in compliance with Medical Device Directive 93/42/EEC class IIa.

CHEMICAL COMPOSITION	
Cobalt (Co)	61.8 - 65.8 %
Chrome (Cr)	23.7 - 25.7 %
Molybdenum (Mo)	4.6 - 5.6 %
Tungsten (W)	4.9 - 5.9 %
Silicon (Si)	0.8 - 1.2 %
Iron (Fe)	Máx. 0.50 %
Manganese (Mn)	Máx. 0.10 %

PROPERTIES	UNITS	VALUES
Density	ρ (g/cm³)	8.5
Coefficient of thermal expansion (25-500ºC)	α (m/m°C)	14.0 - 14.5 x 10-6
Coefficient of thermal expansion (20-600ºC)	α (m/m°C)	14.2 - 14.6 x 10-6
Melting interval	T_S (°C)	1380 - 1440
HV10 Hardness		402 HV
Deformation	A (%)	9.8
Maximum load	R_m (GPa)	1.2025
Elasticity limit	Rρ0.2 (MPa)	813
Elasticity modulus	E (GPa)	184.283
Outer roughness	R_a (µm)	5.9
Inner roughness	R_a (µm)	3.6



6. Recommended Porcelain Manufacturers*

PORCELAIN	MANUFACTURER
VM 13 (2005)	Vita
Omega 900*	Vita
Duceram KISS (2004)	Degudent /Dentsply
HeraCeram (2001)	Heraeus Kulzer GmbH
Vintage (1986)	Shofu
Vintage Halo (1997)	Shofu
IPS d.Sign (1999)	Ivoclar
Initial MC	GC
EX3	Noritake
Reflex	Wieland
Creation (1989)	Geller
Synsspar (1987)	Jeneric Pentron

__NOTE__: The above manufacturers are recommended by EOS (Phibo® Cobalt-Chrome supplier), not by Phibo®. Phibo® recommends following each manufacturer's instructions.*

All trademarks shown are the property of their respective owners.

Procedure
Porcelain Veneering on Phibo® Cobalt-Chrome Frameworks

Phibo® Headquarters
P. I. Mas d'en Cisa
Gato Pérez, 3-9
08181 Sentmenat
Barcelona | Spain
T +34 937 151 978
F +34 937 153 997
info@phibo.com

Phibo® Benelux
Hal Trade Center
Bevelandseweg 34
1703 AZ Heerhugowaard
Nederland
T +31 (0)20 2209021
info.benelux@phibo.com

Phibo® Colombia
Avda Carrera 15 #100-69
Of. 304 Edificio Vanguardia
Bogotá, D.C.
Colombia
T (571) 7563956
info.colombia@phibo.com

Phibo® Chile
Calle Apoquindo 6314
Oficina 501
Comuna de Las Condes
Ciudad de Santiago | Chile
M (56 9) 8 1609615
info.chile@phibo.com

Phibo® Deutschland
Schwanheimer Str. 157
64625 Bensheim
Deutschland
T +49 1726024671
F +49 17260246710
info.germany@phibo.com

Phibo® Mexico
World Trade Center
Montecito 38, Col. Nápoles,
Piso 15, Of. 16
C.P. 03810 México D.F.,
México
T +52 55 9001 0508
info.mexico@phibo.com

Phibo® France
Immeuble "Le Michel Ange"
17 Boulevard du Mont d'Est
93160 NOISY-LE-GRAND
France
T +33 1 49 89 38 90
info.france@phibo.com

Phibo® Italy
Centro Direzionale
Milanofiori
Strada 4, Palazzo A5
20090 Assago | Milano | Italy
T +39 02 66594857
F +39 02 6122682
info.italy@phibo.com

Phibo® Middle East North Africa
Dubai Airport Free Zone
Office 5WA 226
Dubai
United Arab Emirates
T +971 528 350 676
info.emirates@phibo.com

Phibo® Portugal
P. D. Nuno Álvares Pereira,
nº 20, Fracção BC
4450-218 Matosinhos
Portugal
T +351 22 099 56 00
F +351 22 099 56 69
info.portugal@phibo.com

REF: PROTCERCOCREN_rev001

This document was reviewed and approved on 2014-06-09

www.phibo.com

phibo

We decode nature.