

# Renishaw titanium powder Ti DG1

**Ti DG1 is a titanium alloy for fabrication of metal to ceramic dental restorations and other dental structures, Type 4. Ti DG1 powder is processed by Additive Manufacturing.**

**FOR PROFESSIONAL USE ONLY.**

**ISO 9693-1 / ISO 22674**

Availability: A-5983-0312

Standard analysis % by weight (elements)	
C (wt%)	0.02
O (wt%)	0.11
N (wt%)	0.02
H (wt%)	0.0023
Fe (wt%)	0.2
Al (wt%)	6.2
V (wt%)	3.9
Others each (wt%)	< 0.1
Others total (wt%)	< 0.2
Ti (wt%)	Balance

Alloy characteristics (standard values)	
Type (ISO 22674)	4
Density [g/cm <sup>3</sup> ]	4.4
CTE <sub>25-500°C</sub> [10 <sup>-6</sup> K <sup>-1</sup> ]	9.9
Proof stress of non-proportional extension (R <sub>p0.2</sub> ) [MPa]	985/ 910*
Elongation at fracture (ε) [%]	9/8*

\*as machined / after ceramic firings

Size distribution obtained by laser particle diffraction			
	D <sub>v</sub> (10)	D <sub>v</sub> (50)	D <sub>v</sub> (90)
Size (µm)	21.5	31.5	45.6

**Warnings:** If product label becomes lost or illegible (unreadable), do not use. Take note of safety data sheet. Metal dust is harmful to your health. Avoid dust formation. When using the powder, including opening the package, transferring the powder or post-processing, be cautious and use suitable air extraction system / ventilation at the workplace, a NIOSH approved dust mask or filtering face piece, and respirators in accordance with OSHA's respirator standard (29 CFR 1910.134). Use ESD certified safety shoes, gloves approved to the relevant standard (e.g. US: F739) and face and eye protection that complies with OSHA's PPE standard (29 CFR 1910.132 and .133).

Do not inhale or ingest. If inhaled, remove patient to fresh air, and if ingested rinse mouth out and drink plenty of water. Do not induce vomiting. In case of eye contact, rinse with plenty of water and in case of skin contact, wash off with soap and water. Get medical attention if symptoms persist.

Metal powder is flammable. Remove all sources of ignition. In case of fire, use Class D (Dry Powder) extinguishers with spin applicators or dry inert granular material (e.g. sand) for extinction. Use dry clean-up procedures. Collect any spilled material immediately by vacuuming or shovelling. Use non-sparking tools / equipment / natural bristle brushes and take care not to raise dust. Treat waste in accordance with local and national regulations.

Please consider the OSHA regulations regarding weight and frequency restrictions for lifting.

## Directions for use

**Indications for use:** Ti DG1 powder is a metal to ceramic alloy processed by Additive Manufacturing (AM). It is suitable for fabrication of crown and bridge restorations (tooth and implant supported). Do not use for non-AM processes.

**Precautions:** Do not blend powders, contaminate or use contaminated powder. Do not reuse the processed alloy; this may result in changes to mechanical function. In case of occlusal or approximal contact of Ti DG1 with a different alloy, electrochemically based reactions may very rarely occur.

**Contraindications and adverse reactions:** No contraindications are known. However, allergies or other unwanted biological reactions to contents of the alloy or electrochemically based reactions may very rarely occur. If incompatibilities or allergies to contents of Ti DG1 are known, it should not be used. No adverse reactions are known. In the rare case of individual reactions against single components of Ti DG1, the application should not be continued.

**Storage conditions:** Store in a dry place out of direct sunlight and at low humidity. Keep in original container and if storing at temperatures between 15 °C and 35 °C for 6 months, do not stack more than 7 containers high. Stacking time is considerably reduced at temperatures higher than 35 °C. Ensure that the lid is tightly closed to protect the argon atmosphere, by putting the lid on the drum and turning it clockwise until tight, then turn the lid a further 30° clockwise using a tool.

**AM process:** Ensure the machine and its components are clean before use. When modelling parts on design software, consideration should be given to the thickness and geometries of the model. Remove the silica gel packet before first use and sieve the powder before re-use (63 µm sieve). Use AM equipment with a suitable laser to ensure the powder is exposed to sufficient power per unit area to achieve at least 95% unit density in the material. Use protective gas during AM processes (e.g. Argon). Follow the instructions of the AM equipment manufacturer.

**Stress relieving:** Wrap the build plate in stainless steel foil prior to heat treating. Use argon gas when heat treating, and ensure there is enough available to complete the cycle. Turn argon on, heat up to 350 °C over 60 min and hold for 30 min. Heat to 850 °C over 60 min and hold for 60 min. Cool down slowly, turn argon off at 300 °C. Confirmation of the quality of the parts is required if the furnace cycle is interrupted.

**Ceramics:** Use ceramics with a suitable coefficient of thermal expansion, according to ISO 9693-1. Testing to ISO 9693-1 was conducted using Duceratin® Kiss, DeguDent GmbH, and the requirements of the standard were met. Always follow the ceramic manufacturer's instructions. The requirements of ISO 9693-1 apply to the metallic materials and ceramics when used in combination, and compliance may not be claimed for either metallic materials or ceramics alone.

**Acrylic veneering:** Follow the corresponding manufacturer's instructions when processing the veneering systems.

**Customer information:** Renishaw has made considerable efforts to ensure that the content of these instructions for use is correct at the date of publication. Renishaw may update this document or any associated documentation from time to time, so users are advised to ensure they have the latest version by visiting the dental section of our website at [www.renishaw.com](http://www.renishaw.com). To the maximum extent permissible at law, Renishaw excludes liability, howsoever arising, for any inaccuracies in these instructions for use.

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Consult instructions for use



Use-by-date



Catalogue number



Caution



Manufacturer



Batch code



RX only  
For professional use only