

Contact angle measurements on dental implants

Customer

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Laboratories accredited to ISO 17025 also comply with the principles of the certification according to ISO 9001.

Objective of the investigation

The contact angle with water should be determined at various positions on the specimens.

On-site sampling

The samples were taken on site by the customer.

Sample material and sample preparation

The customer supplied the following sample material for the analysis:

Dental implants (5pcs)

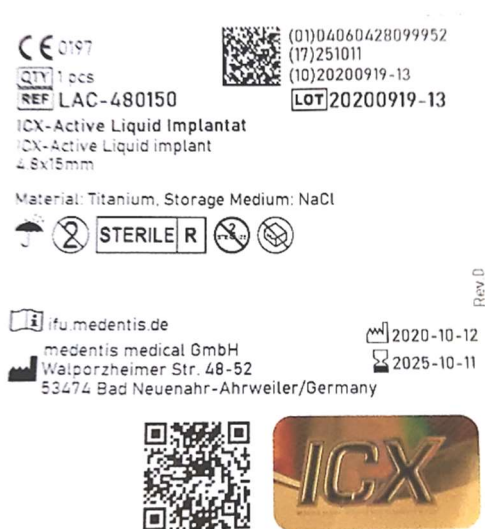


Figure 1: Sample packaging illustration

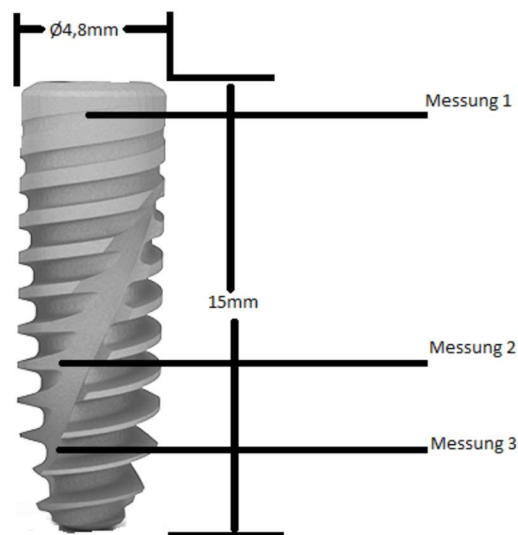


Figure 2: Measuring positions specified by the customer

Samples arrived: 2022-03-14

Investigation period: 2022-03-14 – 2022-03-31

Report of the results

The contact angles of the individual liquids are shown in the following table:

Table 1: Contact angle for water [°]¹

Sample	Contact angle
Implant #1	complete wetting
Implant #2	complete wetting
Implant #3	complete wetting
Implant #4	complete wetting
Implant #5	complete wetting

¹ The measurements were made at 22°C.

Analytical techniques

Contact angle measurement

The contact angle measurements were carried out on the OCA 15 plus contact angle measuring instrument from Dataphysics. The evaluation of the droplets is carried out with the associated SCA20 software.

The measurement was carried out (unless otherwise specified) using the sessile drop method, in which a drop of deionized water with a volume of 10 µl is applied from a cannula to the surface to be examined via a dosing device. The position of the sample under the cannula can be continuously adjusted in all three dimensions via micrometer screws. The image of the drop illuminated from behind is recorded by a digital camera and evaluated in the computer. To calculate the contact angle, the software determines the contour of the drop and calculates the angle.

As a pure observable of wetting, the contact angle with water is used as a measure of the hydrophilicity or hydrophobicity of a solid surface. High water contact angle means hydrophobic, small angle hydrophilic behavior. According to the physical definition, a surface with a contact angle smaller than 90° is hydrophilic (wetable), and larger than 90° is hydrophobic (unwetable).

The following wetting states are possible:

State	Contact angle [°]
spreading or complete wetting	0
good wetting	$0 < \theta < 90$
poor wetting	$90 < \theta < 180$
complete non-wetting	180

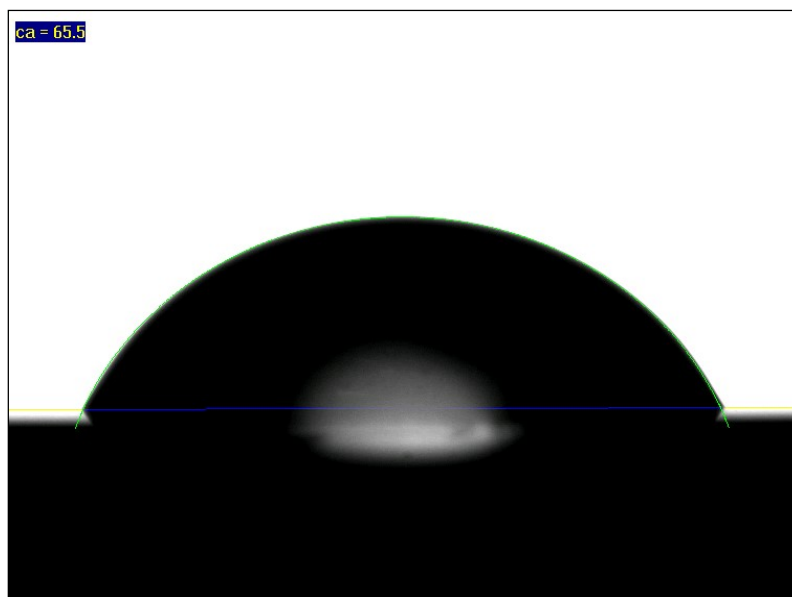


Figure 3: Example image of a sessile drop

Final remark – End of test report

The described measurements have been carried out regarding to the state of the art by appropriate trained personal. Nevertheless, a warranty regarding the derived conclusions cannot be given. Furthermore, we want to point out, that the stated results are only representative for the samples committed to us for analysis. Without the written approval of the laboratory, it is not allowed to reproduce the test report except in full.