DAkkS
Deutsche
Akkreditierungsstelle
D-PL-17042-01-00

Report SEM / EDX:	**RP_5698_TA-Dent_617529_T4-Switch_3,3x12_asm**
Client:	**TA-Dent GmbH** Dr. Tilmann Beck Moltkestrasse 78 **77654 Offenburg - Germany**
Date of Order:	05 August 2016
Concern:	SEM analysis - implant / abutment connection
Speciemen designation:	T4-Switch 3,3x12,0 implant with TA-Dent abutment D4 Gh2 A0 implant LOT: 617529 implant REF: K154-01-33012 abutment LOT: 38721 abutment REF: K154-70-102040

Order number: **5698**

Date of examination: 25 August 2016

Examination specification: **AA-Diagnostics_02**

Display of specimen surfaces via secondary electrons (SE) - SEM.

The following should be taken into consideration when examining the spectra and interpreting the results (only for EDX analysis):

Overlapping of lines:
Lines of different chemical elements, which are located in the spectra close together, overlap on lower deviation of EDX detektors dissolution of energy. Partially line overlapping become dissolved by expansion of the spectra. Element selection takes place on the basis of experience for the probably arising element.

Detection limit:
Due to the actuating voltage and other system parameters, like for example acceleration voltage and beam current, the detection of element concentrations lower than 0,1 masspercent is impossible.

Depth of information:
The information depth which causes the largest part of the analysis signal, depends on the penetration depth of the electron beam and on the distance which the x-ray beam can go through the sample. It reaches from one to some micrometers.

Quantification:
To the quantification of the speciemen - due to the rough surface - the fundamental-parameter-based quantitative P/U-ZAF method is used, which is based on the evaluation of the characteristic x-ray and the brake radiation underground. The local peak-to-underground conditions (P/U) are received into the modified ZAF matrix correction.

Examination results: See following pages.

25 August 2016

Christoph Stoll
- General Manager -

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State of speciemen:	unsterile assembly (see figure 1-4)
Examination procedere / equipment:	The examination is done with a Zeiss EVO MA15 REM (Software SmartSEM V05.04.03.00 16-Apr.-10) under high vacuum conditions. The high voltage of the SEM is set to 15keV with a cathode current of 60pA for high resolution image or 1000pA for EDX scanning. (**AA-Diagnostics_02**) The element analysis of the examination surface is done with a BRUKER X-Flash 5010 EDX detctor, equipped with a light element window type slew AP3.3. (Software Esprit 1.9 - Quantax 200). The slew AP3.3. allows the detection of elements with an ordinal number >= 5 (Boron).

Figure no. 1: components of the assembly

Figure no. 2: embeded assembly

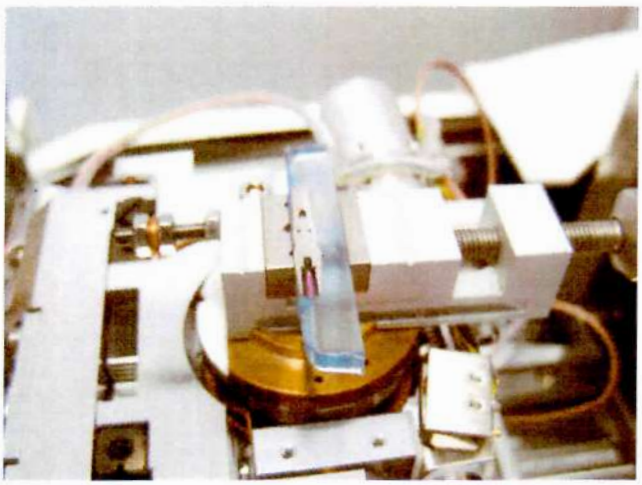

Figure no. 3: embeded assembly in SEM table

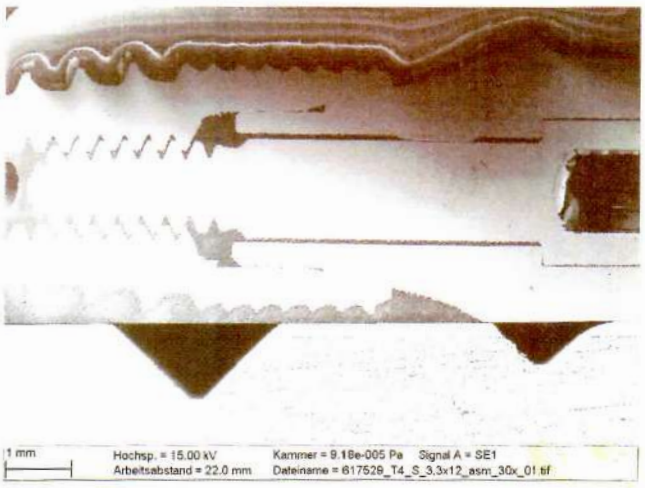

Figure no. 4: SEM survey - embeded assembly 30x

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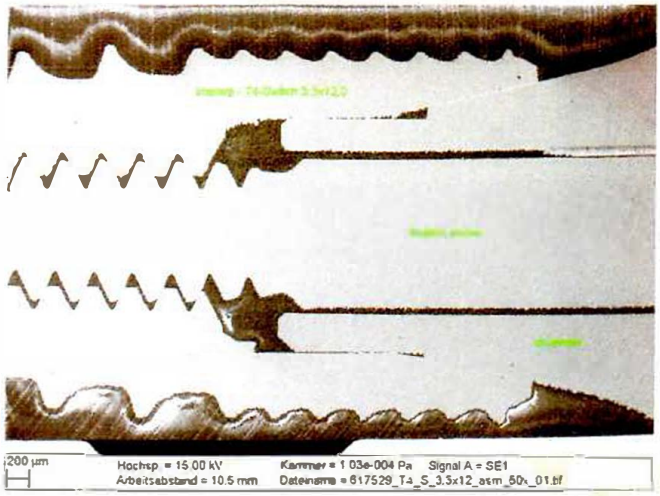

Figure no. 5: SE image - implant / abutment / fixation screw; magnification: 50x

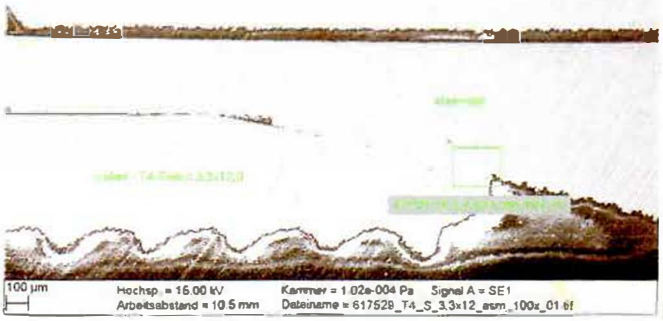

Figure no. 6: SE image - implant / abutment / fixation screw; magnification: 100x

Figure no. 7: SE image - detail implant / abutment gap - see figure no. 6; magnification: 500x

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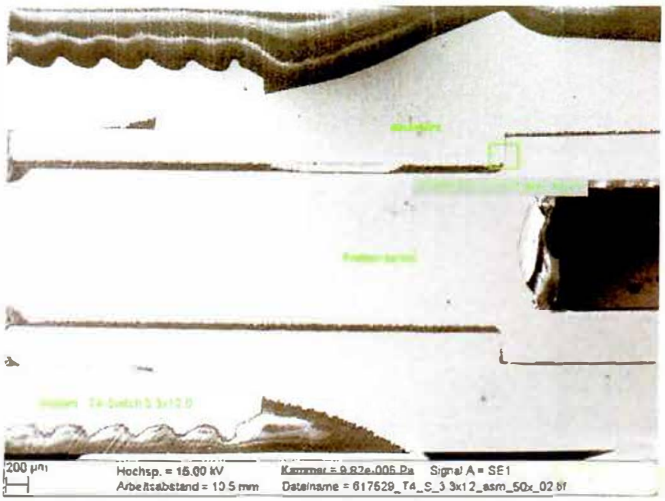

Figure no. 8: SE image - abutment / fixation screw; magnification: 50x

Figure no. 9: SE image - detail - head of the fixation screw - see figure no. 8; magnification: 1000x

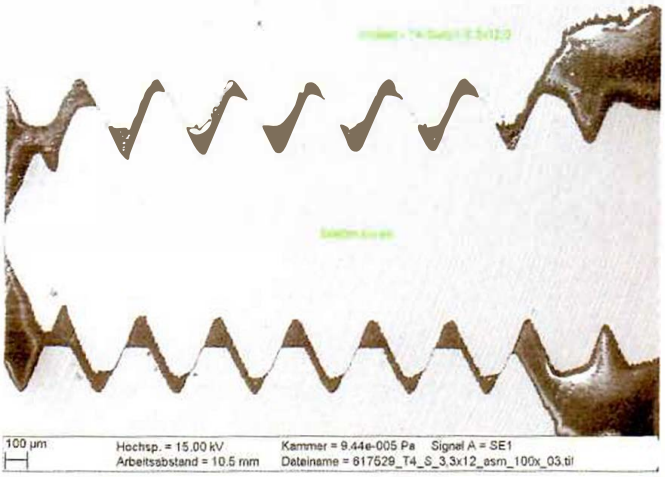

Figure no. 10: SE image - survey of the thread (implant and fixation screw); magnification: 100x