Instrumark
An Altrax Group Company

Report on Effectiveness of Laser Parameters when Marking Surgical Instruments

Lasers are commonly used to mark surgical instruments but the effects of the parameters used in this application are not always fully appreciated.

The requirements for a mark on surgical stainless steel are clarity, durability and minimum invasiveness into the parent material. This last requirement is due to the decontamination processes which instruments are subjected to after every operation. These processes include exposure to highly caustic wash chemicals followed by high temperature steam sterilisation which test the resistance of the particular alloys which are used in the manufacture of instruments.

It is vital therefore that the marking has as little effect as possible on the natural resistance of surgical alloys. Traditionally, instruments have been marked using what is known as Anneal Marking which is a dark heat affected zone on the surface of the metal but as this process is usually conducted at frequencies below 100KHz it is accompanied by a degree of surface melting. This melted region does have an undesirable effect upon the corrosion resistance of some stainless alloys.

Instrumark compared the performance of low frequency annealed marks with the high frequency Dark Marking proposed by Tony Hoult of IPG in his article of the same name.

These tests were performed using a YLP 200Khz IPG laser and the results can be summarised as follows:

Dark Marking gave the following benefits compared to lower frequency Anneal marks:

Superior definition of mark, rendering finer detail and improving the clarity of smaller marked details.

Improved resilience of mark to decontamination processes

Increased corrosion resistance compared to lower frequency marking

A virtually smooth surface finish with no adverse effects on the 'cleanability' of the instrument

Faster marking performance compared to lower frequency marking

To conclude, the high frequency Dark Marking capabilities of the IPG YLP laser are now the default parameters used by Instrumark when marking Surgical Instruments for our Clients.

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