**DEPARTMENT OF HEALTH AND HUMAN SERVICES**
FOOD AND DRUG ADMINISTRATION

| DISTRICT ADDRESS AND PHONE NUMBER | DATE(S) OF INSPECTION |
|---|---|
| 300 River Place, Suite 5900<br>Detroit, MI 48207<br>(313) 393-8100 Fax:(313) 393-8139<br>Industry Information: www.fda.gov/oc/industry | 12/03/2013 - 12/10/2013*<br>FEI NUMBER<br>3005718816 |

NAME AND TITLE OF INDIVIDUAL TO WHOM REPORT ISSUED

**TO:** Bryan L. Crutchfield, Managing Director

| FIRM NAME | STREET ADDRESS |
|---|---|
| Materialise USA LLC | 44650 Helm Ct |
| **CITY, STATE, ZIP CODE, COUNTRY** | **TYPE ESTABLISHMENT INSPECTED** |
| Plymouth, MI 48170-6061 | Manufacturer |

This document lists observations made by the FDA representative(s) during the inspection of your facility. They are inspectional observations, and do not represent a final Agency determination regarding your compliance. If you have an objection regarding an observation, or have implemented, or plan to implement, corrective action in response to an observation, you may discuss the objection or action with the FDA representative(s) during the inspection or submit this information to FDA at the address above. If you have any questions, please contact FDA at the phone number and address above.

*The observations noted in this Form FDA-483 are not an exhaustive listing of objectionable conditions. Under the law, your firm is responsible for conducting internal self-audits to identify and correct any and all violations of the quality system requirements.*

**DURING AN INSPECTION OF YOUR FIRM I OBSERVED:**

## OBSERVATION 1

Process validation activities and results have not been adequately documented.

Specifically, process validation activities and results were not adequately documented on your firm's selective laser sintering (SLS) machines used to manufacture your firm's Class II orthopedic and cranial maxillofacial patient specific surgical guides. For example:

(A) The temperature setting (i.e., parameter) used during the following installation qualifications (IQ) performed was not documented:

- IQ dated 9/17/10 for SLS Machine #(b) (4)
- IQ dated 9/21/10 for SLS Machine #(b) (4)

(B) Your firms management stated the scan spacing hatching, scan speed hatching, and laser power hatching parameters were not able to be retrieved for the process qualification (PQ) dated 6/1/10 for SLS Machine #(b) (4)

(C) Your firm's management stated worst case operating parameters are established during IQ. However, the requirement established for the calculated laser energy density parameter ($J/mm^2$), which is based on scan spacing hatching, scan speed hatching, and laser power hatching, includes only a minimum value but no maximum.

## OBSERVATION 2

There is no documentation of the review and evaluation of a process and revalidation of a process performed in response to changes or process deviations.

Specifically, there is no documentation of the review/evaluation and revalidation (where appropriate) of your firm's selective laser sintering (SLS) machines when changes were made to the process parameters originally established during the installation (IQ) and/or performance qualifications (PQ). For example, as recently as 12/9/13 (Build # (b) (4), the scan

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spacing hatching and laser power hatching parameters for SLS #(b) (4) were set above the values validated during the IQ dated 9/17/10. Also, as of 12/9/13 (Build #(b) (4) the scan spacing hatching and laser power hatching parameters for SLS #(b) (4) were set above what was validated during the IQ dated 9/21/10.

As another example, the temperature settings established during the IQ dated 9/15/11 for SLS #(b) (4) were (b) (4) °C to (b) (4) °C. However, builds from 9/4/13 to 11/6/13 (b) (4) total builds) and 11/24/13 to 12/4/13 (b) ( total builds) were run at (b) (4)C, which is above what was established during IQ.

Your firm's procedures titled "Process Validation Medical Production - Manufacturing" (P-MPROD-031; Rev.1-3; Effective: 2/22/12, 4/9/13, 9/27/13) (sections 3.2 for Rev.1; 3.4 for Rev2-3) and "Process Validation" (PM-MGMT-011; Rev.1; 1/9/09) (section 3.1.6) refer to revalidation as a possibility when process changes occur and P-MPROD-031 requires the evaluation for revalidation to be documented.

Notably, SLS machines are used to manufacture your firm's Class II orthopedic and cranial maxillofacial patient specific surgical guides.

**OBSERVATION 3**

Procedures to ensure equipment is routinely calibrated have not been established.

Specifically, section 3.1 of the procedure titled "Maintenance" (P-MPROD-016; Rev.4; Effective: 11/23/12) allows (b) (4) ." As such, P-MPROD-016 requires "(b) (4) . However, the following calibrations scheduled on the preventive maintenance schedule were not performed within +/- 7 days of the due date or at all with no documented justification for the reason:

A) Per the preventive maintenance schedule titled "PM Calendar: Scanner and QI Room" (F-MPROD-021-02, Rev.4), the January 2013 scan calibration for your Optical Scanner #(b) (4) was performed on 1/4/13, 27 days earlier than the original due date of 1/31/13. Similarly, the February 2013 scan calibration for Optical Scanner #(b) (4) was performed on 2/15/13, 13 days earlier than the original due date of 2/28/13. The dates of these calibrations were not within the +/- 7 day time frames of the due date allowed by P-MROD-016; the reasoning was not documented on F-MPROD-021.

B) Per the preventive maintenance schedule titled "Machine ID:(b) (4) (F-MPROD-021-02, Rev.4), the 9/20/13 IR calibration for your selective laser sintering (SLS) machine #(b) (4) was not performed. No reasoning was documented on F-MPROD-021 for not performing the calibration.

Further, the results of the IR calibration were not recorded on F-MPROD-021 for the following dates although required by P-MPROD-016:

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- 01/25/13
- 05/03/13
- 10/04/13
- 10/18/13
- 11/01/13
- 11/15/13
- 11/29/13

**OBSERVATION 4**

There is no record maintained of a correction or removal action that was not required to be reported to FDA.

Specifically, on 12/1/11 your firm performed a replacement of a label (lot # 56552131) with a new label (lot # 56524885) for your Class II patient specific CR-Flex Pin Guides (Item # 00-5970-000-1) which were orignially shipped from your firm to your partner on 11/30/11. However, your firm's management stated there was no record with documented justification for not reporting this correction to the FDA.

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**Observation Annotations**

| | | | |
|---|---|---|---|
| Observation 1: | Promised to correct. | Observation 2: | Promised to correct. |
| Observation 3: | Promised to correct. | Observation 4: | Reported corrected, not verified. |

*** DATES OF INSPECTION:**
12/03/2013(Tue), 12/04/2013(Wed), 12/05/2013(Thu), 12/06/2013(Fri), 12/10/2013(Tue)

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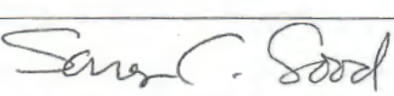
| | Sargum C Sood, Investigator  | 12/10/2013 |