B18.3-2003 Interpretation Request

Subject: Table 6, Dimension “J” Excess Safety Wire Hole Deburring on the Socket Side and Table 1F, Note 3

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Question 1: ASME B18.3-2003, Table 6, dimension "J" is the socket width across the flats. The subject table lists the nominal value and the tolerances for this dimension. Is this tolerance to be met for the entire minimum key engagement depth?

Background: The question arises due to the ongoing problem of stripping the heads of socket head cap screws, with drilled holes, prior to reaching a minimum torque value (head strips at 40 in-lbs for a #10 screw per NAS 1351). Further investigation revealed that the safety wire holes were being deburred on the inside of the socket. Some of the deburring was so excessive that the corners of the socket were removed (see attached diagram). This left only a small area at the top and bottom of the socket for the tool to interact with, thereby reducing the amount of torque that could be applied prior to the lead stripping.

Response 1: Yes. The width across the flats is intended to be met for the minimum key engagement depth.

Question 2: ASME B18.3-2003, Table 1F, Note 3, no burrs are allowed for screws used in aerospace components. This would suggest that each screw, including the inside of the socket, must undergo some type of deburr operation. The deburr tool is a high speed ball end drill. This operation is performed manually and tends to form a “crater” around the safety wire hole. ASME B18.3-2003 does not address an allowable deburr "crater" or corner break dimension on the inside of the socket. Is it required that the width across the flats tolerance covers any corner break on the inside surface of the socket?

Response 2: No. The notes under Table 1F, specifically Note (3), address burrs, and refer to aircraft quality screws.
Spherical deburr region

Excess deburring results in localized areas that exceed the flat to flat dimensional requirement.

Flat to flat dimension within specification allowance at top of socket.

Excess deburring around safety wire holes destroy socket corners and reduce tool contact area.

VIEW A-A