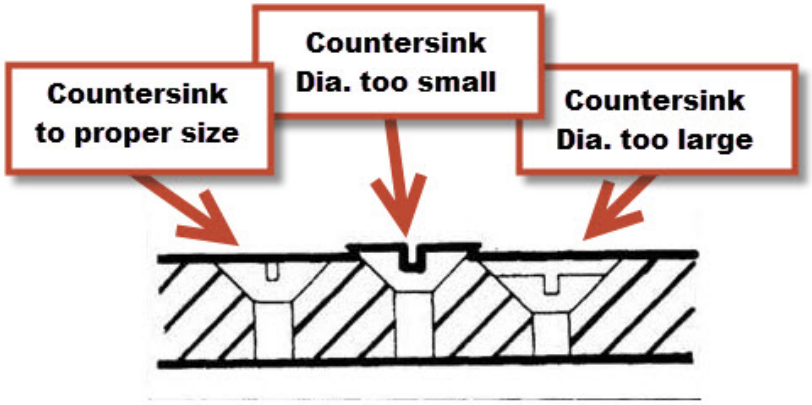
1.1 Name: Machining – Countersinks

1.2 Workmanship Standards Category: Metal Fabricated Materials

1.3 Purpose/Description (why/when/how): To illustrate acceptable and unacceptable countersinks produced in machining that could create issues to the subsequent function and quality of assembled components.

1.4 Illustration:

The following illustrations depict “Acceptable” and “Unacceptable” workmanship results.

Acceptable Workmanship	Acceptable Notes
	Counter sinks are round and to print size without chatter, ragged edges, or burrs.
	Countersinks made to print tolerances allow the proper designed fit with the mating screw. A countersink made under print tolerance can lead to the mating screw set high allowing for scratching and poor fit of mating parts. A countersink made over print tolerance can lead to the mating screw set low and can create a weaker then designed assembly.

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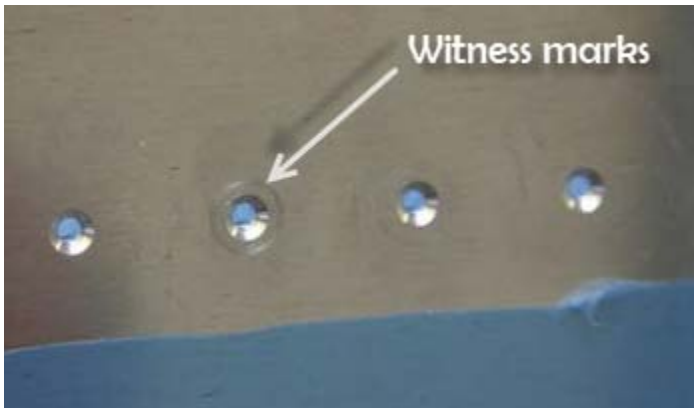
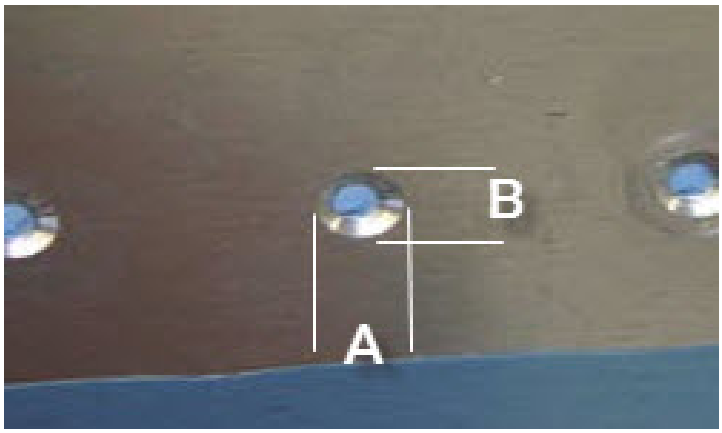
Unacceptable Workmanship	Unacceptable Notes
	Witness marks on the surface of the finished component are unacceptable as it can be perceived as poor quality.
	Unacceptable chatter marks that exceed the print surface finish can lead to less than full contact of mating surfaces.
	Torn or ragged edges where the hole breaks through the metal can lead to holes that are larger than tolerance. They can also lead to chips that contaminate the system.



Oblong hole where one side (A) is larger than the other (B) can lead to less than full contact of mating surfaces can create poor assembly.

2 REVISION HISTORY & APPROVAL

REVISION HISTORY			
Rev	**Description of Change**	**Author**	**Effective Date**
A	Initiated	Jim Fischer	3/11/13

APPROVAL OF CURRENT REVISION		
Name / Function	**Signature**	**Date**
Stephen Jordheim / Workmanship Standards Process Owner	(approval on file)	
Alan Rivers / Workmanship Standards Co-Pilot	(approval on file)	