Process Specification for the Installation of Thinwall Screw Thread Inserts

Engineering Directorate

Structural Engineering Division

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REVISIONS		
VERSION	CHANGES	DATE
--	Original version	6/3/96
A	Formatting, wet Installation references PRC-4004	7/30/99
B	Changed Division name. Revised paragraph 6.1	10/2004
C	Updated document numbers and names in Section 4.0 (References)	2/2007

1.0 SCOPE

This process specification establishes requirements for the installation of thinwall screw thread inserts in aluminum alloy structures.

2.0 APPLICABILITY

This specification shall be applicable whenever the installation of thinwall screw thread inserts is invoked per section 3.0, “Usage”.

3.0 USAGE

This process specification shall be called out on the engineering drawing by using a drawing note. For example:

INSTALL THINWALL SCREW THREAD INSERTS PER NASA/JSC PRC-9004.

Most hole preparation details do not need to be specified because the requirements are covered in this PRC. Through-holes are preferred, but must be specified on the engineering drawing. Use of a plug tap is standard for blind holes. When use of a bottom tap is necessary, it shall be specified on the engineering drawing as follows:

USE BOTTOM TAP.

The minimum drill depth in Table II of MIL-I-45932/1C is actually for use with a bottom tap. The drill hole will be deeper by the equivalent of two incomplete threads when the standard plug tap is used. The tolerance on the minimum drill depth is +.020. Alternate drill hole depths may be used, as long as minimum full thread depth is maintained, but the drill hole depth must be specified on the engineering drawing.

The depth of the drilled hole does not include the material removed by point of the drill. Flat bottom drill bits can be utilized if necessary but must be called out on the engineering drawing.

Wet installation of inserts with corrosion preventative primer is standard. Use the following callout:

SEAL INSERT PER NASA/JSC PRC-4004.

In some design cases, sealant may not be necessary, but the decision not to use sealant should be reviewed in advance with Materials and Processes Branch (ES4) personnel.

Thinwall inserts shall be installed only in aluminum alloy structures.

4.0 REFERENCES

The following references were used to develop this process specification:

SOP-007.1	*Preparation and Revision of Process Specifications*
JPR 8500.4	*Engineering Drawing System Manual*

The following documents are called out as an extension of the requirements given in this specification:

MIL-I-45932	*Insert, Screw Thread, Thin Wall, Locked In: General Specification for*
MIL-I-45932/1C	*Insert, Screw Thread, Thin Wall, Locked In*

5.0 MATERIAL REQUIREMENTS

None identified.

6.0 PROCESS REQUIREMENTS

6.1 WORK INSTRUCTIONS

All work shall be performed to written procedures. The work instructions shall contain sufficient detail to ensure that the manufacturing process produces consistent, repeatable products that comply with this specification.

For work performed at JSC facilities, these work procedures consist of Detailed Process Instructions (DPI's).

For contracted work, the contractor shall be responsible for preparing and maintaining, and certifying written work procedures that meet the requirements of this specification.

6.2 GENERAL REQUIREMENTS

Hole preparation, installation and removal shall meet all requirements of MIL-I-45932/1C, pages 3 and 4, with the following additional requirement:

The counterbore shall be concentric with the tap drill hole within 0.006 inch total indicator reading.

When plug taps are used (standard), an additional length equivalent to two incomplete threads shall be added to the minimum drill depth (column E) in Table II of MIL-I-45932/1C. The tolerance on the minimum drill depth is +.020 in.

Replacement of inserts shall be with same size inserts as specified in MIL-I-45932/1C, page 4.

7.0 PROCESS QUALIFICATION

The thinwall screw thread insert installation process shall be qualified and accepted prior to assembly of production parts. This qualification shall provide documented evidence that the installation procedures are capable of meeting the requirements of this process specification and the engineering drawing. Any change to the procedure or insert type shall require re-qualification.

Torque-out tests shall be performed for qualification only to determine conformance to Table 1 below.

Table 1 -- Torque-Out Requirements (from MIL-I-45932)

Insert Size	Torque-Out Value Inch-Pounds, Minimum (1)
-0400	10
-0600	20
-0800	30
-0003	45
-0004	60
-0005	100
-0006	160
-0007	240
-0008	350

Note: (1) Qualification is to be performed on M45932/1 inserts installed in 2024-53, -TT4, -T6, -T81, or -T851 aluminum alloys.

8.0 PROCESS VERIFICATION

8.1 COUNTERBORE VERIFICATION

Counterbore concentricity shall be measured to determine conformance to 6.2.

8.2 THREAD VERIFICATION

Threads in the parent material shall be measured to verify conformance with the thread form requirements.

9.0 TRAINING AND CERTIFICATION OF PERSONNEL

This process shall be performed by personnel qualified to conduct the process through training or experience.

10.0 DEFINITIONS

None.