1.0 Hole Diameters - General

1.1 This standard specifies hole diameters to be used for the installation of bolts and screws in aircraft structures. Hole diameters for solid rivets, blind rivets, blind bolts and permanent two piece fastener are **generally not specified on drawings**, but are specified in the applicable Production Process Standards (PPS). Note - there are some exceptions to this, for example - PPS 2.68 specifies that the hole diameter for Hi-Lite pins installed in stacks over 4D must be specified on the drawing (D = pin diameter).

2.0 Tolerance

2.1 The tolerance on hole diameters, which basically defines the acceptable limits of clearance between the bolt shank and the hole, is dependent on the design requirements for the particular application, and is expressed in terms of Usage Type as listed in Table 1.

3.0 Hole Sizes For Bolts and Screws

3.1 The applicable hole size and tolerance listed in Table 2 for the particular size bolt and Usage Type, as determined from Table 1, shall be called up on the drawing as follows:

NOMINAL HOLE SIZE + TOLERANCE e.g. **.5625** $^{\textbf{-.0005}}_{\textbf{+.0005}}$

(A) 4.0 Hole Sizes For Anchor Nut Screw Holes

4.1 Pre-drill and final hole size for anchor nut screw holes, are specified in PPS 2.17. For these assemblies, the drawing notation shall be as follows for the type of installation required:

Standard Hole - Where the anchor nut attaches or secures parts in a non-structural application (e.g. electrical box covers)

Drawing Flagnote: **INSTALL ANCHOR NUT TO PPS 2.17**

Class 1 Hole - Where the anchor nut assembles parts in structural applications designed to carry shear loads.

Drawing Flagnote: **INSTALL ANCHOR NUT TO PPS 2.17, CLASS 1 FIT**

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SEE ENGINEERING STANDARDS APPROVAL RECORD FOR ORIGINAL SIGNATURES AND CHANGE SUMMARY

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HOLE DIAMETERS, BOLTS AND SCREWS

DS 126

SHEET: 1 of 3

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REV: A - 2 DEC 98

APPROVED: 27 JUN 1996

(A) SECT 4.0 ADDED

Dimensioned Tolerance Hole - Where the anchor nut hole size is selected for a specific application.

Drawing Flagnote: **INSTALL ANCHOR NUT TO PPS 2.17, HOLE SIZE .XXX - .XXX**

5.0 References

NAS 618 - Fastener - Recommended Shank, Hole and Head-to-Shank Fillet Radius Limits For

TABLE 1: DESCRIPTION OF USAGE TYPES

Usage I	Usage II	Usage III	Usage IV
Precision Manufactured Hole Used in highly loaded joints subject to reverse or rapidly applied loads or where minimum looseness is required. Generally limited to three or less fasteners in the joint. (e.g. main wing and landing gear joints, control rods, etc.) FINISH: Ra 63 (1)	General shear and tension applications for four or more fasteners where minimum looseness is required. Shear attachments subject to reverse or rapidly applied loads. FINISH: Ra 125 (2)	General Purpose Hole Also can be used in primary structure provided the joint is not a critical structural shear joint, or where the joint is purely in tension FINISH: Ra 125 (2)	Clearance Hole For general bracket and equipment attachments (e.g. fairleads, clamps, brackets, etc.) FINISH: Ra 125 (2)

NOTES:
1. Finish notation required on drawing for Usage 1 holes.
2. Finish notation not required on drawing for usages II, III, or IV, except where Ra63 finish is specifically requested by Stress Engineering.

TABLE 2: HOLE SIZE AND TOLERANCE - BOLTS AND SCREWS

BOLT (1)		USAGE I		USAGE II		USAGE III		USAGE IV	
SIZE	NOM. DIA.	HOLE SIZE	TOLERANCE	HOLE SIZE	TOLERANCE	HOLE SIZE	TOLERANCE	HOLE SIZE	TOLERANCE
#4	.1120	-	-	-	-	.120	- .003 + .003	.145	- .005 + .005
#6	.1380	-	-	-	-	.146		.171	
#8	.1640	-	-	.1660	- .0020 + .0020	.172		.197	
#10	.1900	.1900	- .0005 + .0005	.1920		.198		.223	
1/4	.2500	.2500		.2520		.259		.285	- .006 + .006
5/16	.3125	.3125		.3145		.325		.348	
3/8	.3750	.3750		.3770		.388		.410	
7/16	.4375	.4375		.4400	- .0025 + .0025	.455		.473	
1/2	.5000	.5000		.5025		.518	- .004 + .004	.535	
9/16	.5625	.5625		.5650		.581		.600	- .009 + .009
5/8	.6250	.6250		.6275		.643		.662	
3/4	.7500	.7500		.7535		.769	- .005 + .005	.787	
7/8	.8750	.8750		.8785		.894		.912	
1	1.0000	1.0000		1.0050	- .0050 + .0050	1.021	- .006 + .006	1.037	

NOTES:
1. SEE ENGINEERING STANDARDS FOR TOLERANCES APPLICABLE TO LARGER SIZES.