1.300 FASTENER TORQUE REQUIREMENTS

WARNING

Proper torque is critical. Always use calibrated wrenches and undamaged, properly lubricated (where applicable) hardware. Ensure all clamping surfaces are clean, and clamp only bare metal or wet-primed surfaces. Improper torque or dirty or painted clamping surfaces may result in loss of clamp-up, hardware or part damage, and premature failure.

1.310 General

Fasteners shall be torqued to standard dry values listed in Section 1.320 unless otherwise specified. If torque is applied by rotating bolt, increase torque value by 10% to account for higher friction at bolthead and shank.

For example, the torque wrench setting for an NAS1305 bolt used with an NAS1068 nutplate is determined as follows:

NAS1305 bolt (5 indicates 5/16 inch size) dry torque per Table 1	240 in.-lb
Add 10% because torque must be applied at bolt head	24 in.-lb
Torque wrench setting	264 in.-lb

A secondary locking mechanism is required on all critical fasteners. B330 stamped nuts (palnuts) serve as secondary locking mechanisms in most areas on the helicopter, and are torqued per Table 1. The IPC lists secondary locking mechanisms for specific fasteners.

WARNING

Assembly of flight controls is critical and requires inspection by a qualified person. If a second person is not available, the installer must take a 5-minute break prior to inspecting flight control connections he has assembled.

CAUTION

Never substitute AN bolts for NAS bolts. NAS bolts have higher tensile strength.

NOTE

A critical fastener is one which, if removed or lost, would jeopardize safe operation of the helicopter. This includes joints in the primary control system, and non-fail-safe structural joints in the airframe, landing gear, and drive system.

Torque seal (paint) is applied to all critical fasteners after palnut installation in a stripe extending from the fastener's exposed threads across both nuts onto the component (reference Figure 2-1). Any subsequent rotation of the nut or bolt can be detected visually. Approved source for torque seal is given in Section 1.460.

Any nut damaged due to handling or whose nut drag has deteriorated appreciably must be replaced.

1.310 General (continued)

WARNING

Two threads minimum must be exposed beyond nut on any installation to insure proper locking of a threaded fastener; four threads maximum may be exposed. More than four threads exposed may allow nut to seat against fastener shank, resulting in insufficient joint clamping.

CAUTION

Never substitute AN bolts for NAS bolts. NAS bolts have higher tensile strength.

Torque Requirements

1. Damaged hardware must be replaced.
2. Bolt and nut are to be clean and dry except when assembly procedure specifies anti-seize or thread-locking compound.
3. If chattering or jerking occurs, disassemble and re-torque fastener.
4. If special adapters which change effective length of torque wrench are used, final torque value must be calculated using formulas in Figures 1-9 and 1-10.
5. Proper thread engagement requires 2-4 threads exposed beyond primary self-locking nut (palnuts excepted).
6. Torque wrenches must be calibrated annually, when dropped, or when a calibration error is suspected.
7. Any self-locking nut whose drag has deteriorated appreciably must be replaced.
8. Replace palnuts when removed.

1.320 Standard Torques

FASTENER SERIES	SIZE	EXAMPLE FASTENER	DRY TORQUE (IN.-LB)
NAS 1300 Bolts NAS 6600 Bolts NAS 600 THRU 606 Screws NAS 623 Screws NAS 1351 Screws NAS 1352 Screws	10-32	NAS6603	50
	1/4-28	NAS6604	120
	5/16-24	NAS6605	240
	3/8-24	NAS6606	350
	7/16-20	NAS6607	665
	1/2-20	NAS6608	995
AN3 Bolts AN4 Bolts AN6 Bolts AN8 Bolts AN502 Screws AN503 Screws AN509 Screws AN525 Screws MS24694 Screws MS27039 Screws	10-32	AN3	37
	1/4-28	AN4	90
	3/8-24	AN6	280
	1/2-20	AN8	795
STAMPED NUTS (PALNUTS)	10-32	B330-7 (MS27151-7)	6 to 15
	1/4-28	B330-13 (MS27151-13)	11 to 25
	5/16-24	B330-16 (MS27151-16)	20 to 40
	3/8-24	B330-19 (MS27151-19)	29 to 60
	7/16-20	B330-21 (MS27151-21)	42 to 85
	1/2-20	B330-24 (MS27151-24)	54 to 110
TAPERED PIPE THREADS	1/8-27	N/A	60
	1/4-18	N/A	85
	3/8-18	N/A	110
	1/2-14	N/A	160
	3/4-14	N/A	230
ROD END JAM NUTS (AN315 and AN316)	10-32	AN315-3	15
	1/4-28	AN316-4	40
	5/16-24	AN316-5	80
	3/8-24	AN316-6	110

1. Values include nut self-locking torque.
2. Increase values 10% if torqued at bolt head.
3. For elbow & tee fittings which require alignment, torque to indicated value then tighten to desired position.
4. Values ± 10% unless range is specified.
5. Unless otherwise noted, thread sizes 8-32 & smaller are not used for primary structure & do not require specific torque.