

NAS(NATIONAL AEROSPACE STANDARD)3350

STANDARDS

INDUSTRY

3. REQUIREMENTS

3.4.2.9

Test M5 ~ M16 (hexagon nut). However, testing can be performed on size M20 and above using a test jig (results as shown in Table 4).

dimensions

Test Frequency 1,750 ~ 1,800cpm (cycles per minute)

conditions Amplitude 11.43 0.381(amplitude inch plus or minus 0.015)

Test duration 30,000 cycles

However, in the case that the test nut loosens before the completion of the test, halt the test and measure the test time. Measure the test time for the fastened nut and bolt to perform one rotation (judged by observing the rotation angle of the flat washer). After testing, observe the nut at a magnification of X10 and check whether any breakage or cracks are visible.

Standard The bolt and nut should not slide more than 360 (one rotation).

of acceptance After the test is complete, the nut should not exhibit any visible breakage or cracks.

**NAS3354 FIXTURES VIBRATION TEST
(NAS3354 Vibration test-use jig standard)**

Table 3.1 Unified Coarse Thread Test-use Jig Dimensions Table

Size (inches)	Long hole width A	Long hole width B	Washer-tube internal dia.	Washer-tube external dia.	Washer external dia.	Washer thickness	Washer unit weight
	+0.005 -0.002	+0.002 -0.002	+0.002 -0.002	+0.002 -0.002	+0.005 -0.005	+0.002 -0.002	(g)
10	0.328	1.071	0.2	0.322	0.55	0.123	4.28
1/4	0.5	1.245	0.265	0.495	0.75	0.163	7.78
5/16	0.625	1.370	0.328	0.62	0.875	0.163	12.8
3/8	0.75	1.495	0.39	0.745	1	0.163	18.9
7/16	0.875	1.620	0.452	0.87	1.2	0.188	25.9
1/2	1	1.745	0.515	0.99	1.375	0.188	34.5
9/16	1.125	1.870	0.548	1.115	1.55	0.213	44.3
5/8	1.25	1.995	0.64	1.24	1.7	0.213	55.1

Table 4.2 Metre Coarse Thread Test-use Jig Dimensions Table (conversion)

Size (inches) (mm)	Long hole width A	Long hole width B	Washer-tube internal dia.	Washer-tube external dia.	Washer external dia.	Washer thickness	Washer unit weight
	+0.1 -0.05	+0.05 -0.05	+0.05 -0.05	+0.05 -0.05	+0.1 -0.1	+0.05 -0.05	(g)
5	8.3	27.2	5.1	8.2	14.0	3.1	5.28
6	12.7	31.6	6.7	12.6	19.1	4.1	7.48
8	15.9	34.8	8.3	15.7	22.2	4.1	13.6
10	22.2	41.1	11.5	22.1	30.5	4.8	26.9
12	25.4	44.3	13.1	25.1	34.9	4.8	31.4
16	31.8	50.7	16.3	31.5	43.2	5.4	58.4
20	35	54	20.3	35	55	6	96.9
24	44	63	24.4	44	67	6.6	158.2
27	49	68	27.4	49	75	6.6	198.0
30	55	74	30.5	55	84	7.2	272.8
33	60	79	33.5	60	92	7.2	325.6
36	66	85	36.5	66	100	7.8	417.8
39	71	90	39.6	71	109	7.8	493.5

Test sizes range from M5 to M16. For size M20 and above, results given are based on standard tests..

<Reference 1>

f: Vibration frequency c/s $f = \omega / 2\pi$

ω : Angular frequency rad/s $v = a\omega \cos(\omega t + \pi/2)$

v: Vibration velocity cm/s $a = a\omega^2 \cos(\omega t + \pi)$

α : Vibration acceleration cm/s² $F = w\alpha / g$

F: Impact force kg $G = a\omega^2$

g: Gravitational acceleration cm/s² $F_{max} = w a \omega^2$

a: Vibration amplitude mm

w: Empty weight kg

f	s	f	2π	ω	a	v	α	α
Vibration frequency (c.p.m)	Seconds s	Vibration frequency (c.p.s)		Angular frequency rad/s	Vibration amplitude cm	Vibration velocity cm/s	Acceleration cm/s ²	Acceleration G
1800	60	30.0	6.28	188.4	1.9	34.4	67121.7	68
1500	60	25.0	6.28	157.0	1.9	24.0	46678.7	48
1200	60	20.0	6.28	125.6	1.9	15.4	29909.3	31
$a\omega$	G	F	Fmax	W	Please insert the appropriate weight for the empty weight.			
Max. acceleration	Max. acceleration	Impact force	Max. impact force	Empty weight				
cm/s ²	G	kg	kg	kg				
67439.7	68.8	308.2	309.7	4.50				
46833.1	47.8	214.3	215.0	4.50				
29973.2	30.6	137.3	137.6	4.50				

<Reference 2>

Size	Collar weigh	Bolt weight	Nut weight	W	G	Fmax
				Empty weight	Max. acceleration	Max. impact force
	g	g	g	kg	cm/ss	kg
M6	32	7	3	0.042	67440	2.9
M8	55	20	8.6	0.084	67440	5.8
M10	83	45	17.6	0.146	67440	10.0
M12	136	64	27.3	0.227	67440	15.6
M16	227	134	52.8	0.414	67440	28.5
M20	202	230	105	0.537	67440	37.0
M22	219	260	130	0.609	67440	41.9
M24	308	414	180	0.902	67440	62.1
M30	636	950	375	1.961	67440	134.9
M33	554	1100	480	2.134	67440	146.9

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