

AIRCRAFT MECHANICAL TUBING, CARBON AND ALLOY STEEL SEAMLESS ROUND

AIRCRAFT MECHANICAL TUBING DESIGNATES TUBING PRODUCED EITHER HOT ROLLED OR COLD DRAWN FROM STEEL USUALLY SUBJECT TO MAGNETIC PARTICLE INSPECTION, HAVING INTERNAL STEEL QUALITIES SUITABLE FOR HIGHLY STRESSED PARTS SUCH AS AXLES, SHOCK ABSORBERS, LANDING GEAR MECHANISMS, MOTOR PARTS OR SIMILAR APPLICATIONS; THEREFORE, SUFFICIENT ALLOWANCE SHOULD BE MADE FOR MACHINING TO FINISH DIMENSIONS. STOCK ALLOWANCE FOR CLEANUP PURPOSE IS TO BE NEGOTIATED WITH PRODUCER WHEN REQUIRED. STOCK ALLOWANCE IS REQUIRED IN ORDER TO COMPLETELY REMOVE SURFACE CONDITIONS OCCURRING DURING MANUFACTURING AND PERMIT MAGNETIC PARTICLE OR OTHER EXTRA QUALITY INSPECTION.

HOT FINISHED:

OUTSIDE DIAMETER, TOLERANCE

NOMINAL OD INCHES	NOMINAL WALL THICKNESS INCH	OD TOLERANCE, INCH, PLUS AND MINUS	
		HOT ROLLED, ANNEALED, OR NORMALIZED	QUENCHED AND TEMPERED
1.50 TO 3.00 EXCL	ALL WALL THICKNESS	.023	.030
3.00 TO 5.50 EXCL	ALL WALL THICKNESS	.031	.045
5.50 TO 8.00 EXCL	ALL WALL THICKNESS	.047	.060
8.00 TO 10.75 INCL	5% OF OD AND OVER	.047	.060
8.00 TO 10.75 INCL	UNDER 5% OF OD	.063	.075

WALL THICKNESS TOLERANCE

NOMINAL WALL THICKNESS INCH	WALL THICKNESS TOLERANCES, PERCENT, PLUS AND MINUS
.134 TO .172 INCL	15
.173 TO .203 INCL	14
OVER .203	12-1/2

COLD FINISHED:

OUTSIDE DIAMETER, TOLERANCE

NOMINAL OD INCHES	NOMINAL WALL THICKNESS INCH	AS FINISHED OR (a) STRESS RELIEVED, INCH		ANNEALED (a) OR NORMALIZED, INCH	
		PLUS	MINUS	PLUS	MINUS
.500 TO 1.500 EXCL	ALL	.005	--	.005	.005
1.500 TO 3.500 EXCL	ALL	.010	--	.010	.010
3.500 TO 5.500 EXCL	ALL	.015	--	.015	.015
5.500 TO 8.000 EXCL	UNDER 5% OF OD	.030	.030	.060	.060
5.500 TO 8.000 EXCL	5-7.5% INCL, OF OD	.020	.020	.040	.040
5.500 TO 8.000 EXCL	OVER 7.5% OF OD	.030	--	.030	.030
8.000 TO 10.750 INCL	ALL	.035	.035	.070	.070

(a) TUBES WITH WALL THICKNESS LESS THAN 3% OF THE NOMINAL OD WILL BE ALLOWED AN OVALITY TOLERANCE OVER AND UNDER EQUAL TO .5% OF THE NOMINAL OD IN ADDITION TO TOLERANCE INDICATED IN TABLE 1, BUT THE MEAN OD SHALL BE WITHIN THE INDIVIDUAL MEASUREMENT TOLERANCES SPECIFIED IN THE TABLE.

Ⓐ CANCELED AFTER 5 MAY 1967. USE AMS 2253D.

NOMINAL OD INCH	NOMINAL WALL THICKNESS INCH	QUENCHED AND TEMPERED OD TOLERANCE, INCH PLUS AND MINUS
.187 TO .500 INCL	ALL	.010
OVER .500 TO 1.500 INCL	ALL	.015
OVER 1.500 TO 3.000 INCL	OVER .094	.030
OVER 3.000 TO 3.250 INCL	OVER .094	.045
OVER 3.250 TO 5.500 INCL	3% OF OD OR MORE	.045
OVER 5.500 TO 8.000 INCL	3% OF OD OR MORE	.060
OVER 8.000 TO 10.750 INCL	3% TO 5% EXCL OF OD	.075
OVER 8.000 TO 10.750 INCL	5% OF OD OR MORE	.060

WALL THICKNESS

WALL THICKNESS OF ALL TUBES SHALL VARY NOT MORE THAN PLUS AND MINUS 10% EXCEPT:

- FOR TUBES WITH INSIDE DIAMETER LESS THAN 50% OF OUTSIDE DIAMETER OR WITH WALL THICKNESS MORE THAN 25% OF OUTSIDE DIAMETER, OR WITH WALL THICKNESS OVER 1-1/4 INCH; OR WEIGHING MORE THAN 90 POUNDS PER FOOT, WHICH CANNOT BE SUCCESSFULLY DRAWN OVER A STATIONARY MANDREL, THE WALL THICKNESS MAY VARY 12-1/2% OVER OR UNDER THAT SPECIFIED.
- FOR SIZES OVER 10-3/4 INCH OUTSIDE DIAMETER, THE VARIATIONS ARE COMMONLY NEGOTIATED BETWEEN THE PURCHASER AND PRODUCER.
- FOR TUBES WITH INSIDE DIAMETER LESS THAN 1/2 INCH (OR LESS THAN 5/8 INCH WHEN THE WALL THICKNESS IS MORE THAN 20% OF THE OUTSIDE DIAMETER), WHICH CANNOT BE SUCCESSFULLY DRAWN OVER A STATIONARY MANDREL, THE WALL THICKNESS MAY VARY 15% OVER OR UNDER THAT SPECIFIED.

LENGTH (ALL TYPES): THE LENGTH SHALL NOT VARY MORE THAN PLUS 1/8 INCH, MINUS 0. THIS IS A DESIGN STANDARD. NOT TO BE USED AS A PART NUMBER. Ⓐ FOR CHANGES SEE SHEET 1.

NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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MILITARY STANDARD

TOLERANCES - SEAMLESS STEEL TUBING, MECHANICAL, ROUND

MS33536(ASG)

PROCUREMENT SPECIFICATION

SUPERSEDES:

SHEET 1 OF 2

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STRAIGHTNESS:**AS FINISHED, ANNEALED, NORMALIZED, OR STRESS BELIEVED (ALL TYPES):**

NOMINAL OD INCHES	NOMINAL WALL THICKNESS, INCH	MAX CURVATURE (DEPTH OF ARC)	
		INCH IN ANY 3 FEET	INCH PER FOOT FOR SHORTER LENGTHS
5.0 AND UNDER	OVER 3% OF OD BUT NOT OVER .5 INCH	.045	.015
OVER 5.0 TO 8.0 INCL	OVER 4% OF OD BUT NOT OVER .75 INCH	.060	.020
OVER 8.0 TO 10.75 INCL	OVER 4% OF OD BUT NOT OVER 1.0 INCH	.075	.025

QUENCHED AND TEMPERED (ALL TYPES):

TUBES 5 INCHES OR LESS NOMINAL OD SHALL BE OF SUCH STRAIGHTNESS THAT THE MAXIMUM CURVATURE (DEPTH OF ARC) SHALL NOT EXCEED .060 INCH IN ANY 3 FEET OF LENGTH OR .020 INCH TIMES THE LENGTH IN FEET FOR SHORTER LENGTHS.

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APPROVED 28 Apr 1953 REVISED A FOR CHANGES SEE SHEET 1.

CUSTODIANS Navy-BuAer Air Force	OTHER INT. A - N - AF -	MILITARY STANDARD	MS33536 (ASG)
	Procurement Classification	TOLERANCES - SEAMLESS STEEL TUBING, MECHANICAL, ROUND	
SUPERSEDES:			