SAE INTERNATIONAL

AEROSPACE STANDARD

AS50141™ REV. C

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Superseding AS50141B

Tube, Pneumatic Tire, Aircraft

RATIONALE

This revision updates/incorporates valve configurations as documented in the TRA Aircraft Year Book.

1. SCOPE

This SAE Aerospace Standard (AS) establishes requirements for manufacturing, testing, identification, packaging, and quality of tubes for application in commercial and military aircraft wheel assemblies.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 Tire and Rim Association Publications

Available from The Tire and Rim Association, 4000 Embassy Parkway, Suite 390, Akron, OH 44333, www.us-tra.org.

Aircraft Year Book

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D412 Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers Tension

ASTM D746 Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact

ASTM D5118 Standard Practice for Fabrication of Fiberboard Shipping Boxes

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For more information on this standard, visit
https://www.sae.org/standards/content/AS50141C/

2.1.3 American Society for Quality Control Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (United States or Canada) or +1-414-272-8575 (International), www.asq.org.

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

2.2 Definitions

2.2.1 LOT

Unless otherwise specified, a lot shall include all tubes of the same size manufactured during one continuous production run.

2.2.2 TUBE

A tube is defined as a flexible gas-retaining chamber with an access port, inserted inside a pneumatic tire/wheel assembly, to hold inflation gas at an elevated pressure.

3. REQUIREMENTS

3.1 Qualification

The tubes furnished under this specification shall be products that are authorized by the procuring activity. Changes in plants, construction, materials, or processes that affect performance of the tube shall require requalification per this specification. Qualification testing of a specific tube size need not be re-accomplished if the contractor has been granted approval by the procuring activity and the materials and processes for that tube size have not changed.

3.2 Materials

The materials shall meet the performance requirements specified both herein and by the pertinent reference documents.

3.2.1 Physical Properties of Tube Material

The physical properties of the material used in the tube body shall comply with the requirements of Table 1, if all natural rubber, or Table 2, if butyl or butyl blends.

Table 1 - Tube physical properties using all natural rubber

Property	Before Aging	After Aging
Minimum Tensile Strength (psi)	2100	N/A
Minimum Elongation (percent)	550	N/A
Maximum Set Stretch (percent)	N/A	18
Minimum Tensile Strength of Splice (psi)(1)	1200	N/A

(1) Based on cross-sectional area of the rubber adjacent to the splice (see 4.5.3).

Table 2 - Tube physical properties using butyl or butyl blends

Property	Before Aging	After Aging
Minimum Tensile Strength (psi)	1000	N/A
Minimum Elongation (percent)	350	N/A
Maximum Set Stretch (percent)	N/A	22
Minimum Tensile Strength of Splice (psi)(1)	500	N/A

(1) Based on cross-sectional area of the rubber adjacent to the splice (see 4.5.3).

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3.2.2 Operating Temperature Range

The selected materials shall maintain their intended properties within a temperature range of -58 to 125 °F (-50 to 52 °C). The tube and valve core materials shall satisfactorily pass the low temperature test specified in 4.5.6.

3.3 Physical Characteristics

Tube gauge, weight, static imbalance, and valve configuration/components shall comply with Table 3 requirements. Each tube's service valve shall be provided with a TR VC-5 cap.

3.3.1 Vent Ridges

Vent ridges shall be provided to prevent air entrapment between the tire casing and tube. It is recommended that the ridge groups be spaced at 6-inch intervals (approximate) and be molded 0.015 inch deep and 0.030 inch wide.

3.3.2 Balance

Tubes do not require an individual balance check, but shall be manufactured such that the balance requirements specified in Table 3 are met.

3.3.3 Thickness

Recommended gauge thickness values are given in Table 3. Tubes made from alternate materials may be thinner in gauge provided the performance characteristics of 3.2.1, Table 2, and 4.5 can be achieved.

3.4 Leakage

All tubes shall be gas-tight.

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Table 3 - Physical characteristics

Size	Recommended Thickness (Inches) (Reference Only) Crown	Base	Maximum Weight (Pounds)	Maximum Static Imbalance (Inch-Ounces)	Valve TR No.*
8.00	0.060	--------	0.53	(1)	87
10.00	0.060	--------	0.80	(1)	12, 13, 67
14.50	0.060	--------	1.6	(1)	20, 25
27	0.060	0.080	5.3	6	25
30	0.060	0.080	7.0	8	13, 25
44	0.080	0.115	17.2	25	176A
47	0.080	0.115	23.4	28	176A
56	0.120	0.160	39.3	40	93
2.80/2.50-4	0.060	0.060	1.3	(1)	87
5.00-4	0.070	0.075	1.35	4	21AC, 60, 67A, 87
5.00-5	0.060	0.060	1.4	4	67, 87, 88
6.00-6	0.060	0.060	2.12	4	20, 87
6.50-8	0.060	0.060	3.0	6	13, 15
6.50-10	0.060	0.090	4.24	8	25
7.00-6	0.060	0.060	3.25	5	20
7.00-7.5	0.060	0.060	3.25	6	4
7.00-8	0.060	0.085	3.25	7	15
7.50-10	0.060	0.100	4.8	8	14M, 25, 193(2)
7.50-14	0.070	0.100	5.0	8	150, 176A
8.00-4	0.090	0.090	2.1	4	12
8.00-6	0.060	0.060	3.25	5	20
8.00-7	0.060	0.060	(1)	(1)	60
8.50-6	0.060	0.060	4.0	8	20
8.50-10	0.060	0.100	5.1	8	25
8.90-12.50	0.080	0.090	8.0	12	15, 25
9.00-6	0.070	0.100	4.0	8	69
10.00-7	--------	--------	6.35	9	25
11.00-12	0.090	0.090	8.0	12	13
12.50-16	0.070	0.110	14.0	18	101
15.50-20	0.090	0.140	21.2	26	92
17.00-16	0.090	0.140	21.2	26	91
20.00-20	0.100	0.120	34.0	20	193
16x4.4	0.085	0.085	2.8	4	60, 67
18x4.4	0.090	0.100	3.25	4	67
18x5.5	0.080	0.100	3.5	4	15, 67
20x4.4	0.090	0.150	3.5	5	67
24x5.5	0.090	0.150	4.5	8	67
24x7.7	0.090	0.100	6.0	8	14M, 25
25x6.0	0.090	0.100	4.5	15	68
26x6.6	0.090	0.100	6.0	17	176A
30x6.6	0.090	0.150	7.0	10	168
32x8.8	0.080	0.100	8.5	21	150, 176A
34x9.9	0.090	0.125	10.0	27	176A
15x6.0-5	0.060	0.060	1.4	(1)	67, 88
15x6.0-6	0.060	0.060	2.12	4	13, 20, 60, 67A(3), 87
17.5x6.25-6	0.060	0.060	2.12	4	20
19.5x6.75-8	0.060	0.060	3.0	6	15
22x7.25-11.50	0.065	0.090	3.75	6	150
22x8.0-8	0.060	0.085	3.25	7	15
29x11.0-10	0.070	0.095	5.9	20	15, 25, 150, 193
36x13.0-12/15.00-12	0.090	0.090	14.0	(1)	13
355x150-4	0.060	0.060	1.4	(1)	5
380x150-5	0.060	0.060	1.4	(1)	67, 68
380x150-6	0.060	0.060	2.12	4	67
420x150/6.00-6.5	0.060	0.060	2.12	4	67

(1) Defined by procuring activity.
(2) For OV-10 nose wheel, use valve TR 193.
(3) For H-60 tail wheel tube, use valve TR 67A.
* Refer to TRA Aircraft Year Book.

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3.5 Age

Tubes shall be not more than 36 months old from the date of manufacture to the initial date of delivery.

3.6 Identification

3.6.1 Tubes

Each tube shall be legibly and permanently marked with the following information on an external surface:

a. Size.

b. Specification (AS50141).

c. Name or trademark of qualified manufacturer.

d. Date of manufacture, including, at a minimum, month and year.

e. Appropriate TR valve number.

3.6.2 Valves

Each valve shall be legibly and permanently marked with the appropriate TR number on an external surface.

3.7 Surface Treatment

Each tube shall be partially inflated and folded in a manner that will minimize sharp creases. The tubes shall be protected from damage by the metal valve stem, or components thereof, by means of a suitable noncorrosive material. Prior to packaging, each tube shall be treated with powdered soapstone, talc, or a suitable substitute to prevent rubber-to-rubber adhesion.

3.8 Workmanship

The tube shall be free from defects that affect proper functioning in service.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection and Testing Responsibility

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection and testing requirements as specified herein. The supplier may utilize its own or any other facilities suitable for the performance of the requirements specified herein unless disapproved by the procuring activity. The procuring activity reserves the right to perform any of the inspections or tests set forth in this specification if deemed necessary to ensure conformance to prescribed requirements.

4.2 Classification of Tests

The inspection and testing of tubes shall be classified as follows:

a. Qualification tests (4.3).

b. Acceptance tests (4.4).

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