

SAE
AERONAUTICAL INFORMATION
REPORT

No. 17

STRUCTURAL CHARACTERISTICS
OF AIRCRAFT TUBING



CANCELLED
OCTOBER 1990

MARCH 1, 1948

STRUCTURAL CHARACTERISTICS OF AIRCRAFT TUBING

APPROVED BY SAE AERONAUTICS COMMITTEE

Arthur Nutt, Chairman
Packard Motor Car Company
Aircraft Engine Division

Arthur E. Raymond
Douglas Aircraft Co., Inc.

Erle Martin
Hamilton Standard Propellers

J. B. Johnson
Air Materiel Command

C. E. Mines
Packard Motor Car Company
Aircraft Engine Division

R. D. Kelly
United Air Lines, Inc.

Wright A. Parkins
Pratt & Whitney Aircraft

W. C. Lawrence
American Overseas Airlines, Inc.

Peter F. Rossmann
Curtiss-Wright Corporation

Section 7C of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommend practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

STRUCTURAL CHARACTERISTICS OF AIRCRAFT TUBING

1. INTRODUCTION

This report was prepared at the recommendation of the SAE Aeronautics Committee and coordinated through SAE Committee S-1, Aeronautical Drafting Manual. It contains material which was formerly included in the SAE Handbook. This material, however, has been somewhat expanded over that contained in the Handbook.

The physical properties and sectional characteristics of aircraft round tubing are listed in Section 3. Similar characteristics for aircraft streamline tubing are shown in Section 4, those for oval tubing are shown in Section 5, and formulas for determining dimensions for streamline and oval tubing are shown in Section 6.

2. SYMBOLS

D - diameter of tube

D/t - ratio of diameter to thickness of tube

I - moment of inertia of cross sectional area in inch units

Z - section modulus in inch units

r - radius of gyration in inch units

Data in this report are based on the requirements of ANC-5 Handbook dated October 1944.

3. ROUND TUBING

O.D. Inches	Wall	Area	Weight per Feet Steel	Weight per Feet Aluminum	I	Z	P	D/t
	Decl. Inches							
.1875	.022	.0114	*.0389	*.0139	.00004	.0004	.0590	8.52
	.028	.0140	*.0477	*.0170	.00005	.0005	.0573	6.70
	.035	.0168	*.0570	*.0203	.00005	.0005	.0553	5.36
.2500	.022	.0158	*.0536	*.0191	.0001	.0008	.0809	11.36
	.028	.0195	*.0664	*.0236	.0001	.0009	.0791	8.93
	.035	.0236	*.0804	*.0286	.0001	.0011	.0770	7.14
.3125	.022	.0201	*.0683	.0243	.0002	.0013	.1030	14.20
	.028	.0250	*.0851	*.0303	.0002	.0016	.1010	11.16
	.035	.0305	*.1037	*.0369	.0002	.0019	.0988	8.93
.3750	.022	.0244	*.0829	.0295	.0003	.0020	.1250	17.05
	.028	.0305	*.1038	*.0370	.0004	.0024	.1230	13.39
	.035	.0374	*.1271	*.0453	.0005	.0029	.1208	10.71
	.049	.0502	*.1706	*.0607	.0006	.0036	.1165	7.65
.4375	.022	.0287	.0976	*.0348	.0006	.0028	.1471	19.89
	.028	.0360	*.1225	*.0436	.0007	.0034	.1451	15.63
	.035	.0443	*.1505	*.0536	.0009	.0041	.1428	12.50
	.049	.0598	*.2033	*.0724	.0011	.0052	.1384	8.93
.5000	.022	.0330	.1123	.0400	.0010	.0040	.1691	22.72
	.028	.0415	*.1411	*.0502	.0012	.0048	.1672	17.85
	.035	.0511	*.1738	*.0619	.0014	.0056	.1649	14.28
	.049	.0694	*.2360	*.0840	.0018	.0072	.1604	10.20
	.058	.0805	*.2738	*.0975	.0020	.0080	.1576	8.62
.5625	.022	.0374	.1270	.0452	.0014	.0050	.1913	25.57
	.028	.0470	*.1596	.0568	.0017	.0060	.1892	20.09
	.035	.0580	*.1972	.0702	.0020	.0071	.1869	16.07
	.049	.0790	*.2687	.0957	.0026	.0092	.1824	11.48
	.058	.0919	*.3125	.1113	.0030	.0107	.1796	9.70
.6250	.022	.0417	.1417	*.0505	.0019	.0061	.2133	28.41
	.028	.0525	*.1785	*.0636	.0023	.0074	.2113	22.32
	.035	.0649	*.2205	*.0785	.0028	.0090	.2090	17.85
	.049	.0887	*.3014	*.1073	.0037	.0118	.2044	12.76
	.058	.1033	*.3512	*.1250	.0042	.0134	.2015	10.78
.6875	.022	.0460	.1564	.0557	.0025	.0073	.2354	31.25
	.028	.0580	.1972	.0702	.0032	.0093	.2334	24.55
	.035	.0717	*.2439	.0868	.0038	.0111	.2310	19.64
	.049	.0983	*.3341	.1189	.0050	.0145	.2264	14.03
	.058	.1147	*.3899	.1388	.0057	.0166	.2235	11.85
.7500	.022	.0503	.1711	.0609	.0033	.0088	.2575	34.09
	.028	.0635	*.2159	*.0769	.0041	.0109	.2555	26.79
	.035	.0786	*.2673	*.0952	.0050	.0133	.2531	21.42
	.049	.1079	*.3688	*.1313	.0067	.0179	.2484	15.30
	.058	.1261	*.4287	*.1526	.0076	.0203	.2455	12.94
	.065	.1399	*.4755	*.1693	.0083	.0221	.2433	11.53
.8750	.022	.0590	.2004	.0713	.0054	.0123	.3017	39.77
	.028	.0745	*.2533	.0902	.0067	.0153	.2996	31.25
	.035	.0924	*.3140	*.1118	.0082	.0187	.2972	25.00
	.049	.1272	*.4323	*.1539	.0109	.0249	.2925	17.85
	.058	.1489	*.5061	*.1802	.0125	.0286	.2896	15.09
	.065	.1654	*.5623	*.2002	.0137	.0313	.2873	13.47
	.083	.2065	*.7021	.2500	.0164	.0375	.2814	10.54
1.0000	.028	.0855	.2907	.1035	.0101	.0202	.3438	35.71
	.035	.1061	*.3607	*.1284	.0124	.0248	.3414	28.57
	.049	.1464	*.4977	*.1772	.0166	.0332	.3367	20.40
	.058	.1716	*.5835	*.2077	.0191	.0382	.3337	17.25
	.065	.1909	*.6491	*.2311	.0210	.0420	.3314	15.38
	.083	.2391	*.8129	*.2894	.0253	.0506	.3255	12.05
	.095	.2701	*.9182	*.3269	.0280	.0560	.3217	10.53

* These sizes and gauges of tubing are recommended as AN Aeronautical Standards in the applicable Army-Navy Design Standards. (See Weight Column)