

TECHNICAL SPECIFICATION	TS96™	ISSUE 5
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Recommendations for Similar Metallic Material Specifications and Standards		

NOTE: The issue status of this document remains unchanged as there have been no changes to the technical content.

SAE INDUSTRY TECHNOLOGIES CONSORTIA AEROSPACE STANDARDS AND PART QUALIFICATION PROGRAM

FOREWORD

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All references to Standards include reference to RS and TS publications.

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For full details of changes, refer to supplementary SAE ITC Amendment Record.

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TECHNICAL SPECIFICATION

No. TS96

ADS RECOMMENDATIONS FOR SIMILAR METALLIC MATERIAL SPECIFICATIONS & STANDARDS

RATIONALE

Fifth issue of specification.

Revised to add & remove preferred material specifications & standards & to delete Appendix 1.

For full details of changes, refer to supplementary ADS Amendment Record document TS96-AR.

Issued by: **Technical Standards Committee**
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ADS Technical Specification No. TS96

ADS RECOMMENDATIONS FOR SIMILAR METALLIC MATERIAL SPECIFICATIONS & STANDARDS

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1. **SCOPE**

This document provides a list of potential alternative metallic material specifications & standards for British Standard (BS) Aerospace & General Engineering & MoD Directorate of Technical Development (DTD). It is not, however, a design document & carries no design authority.

2. **REFERENCED DOCUMENTS**

2.1 **Informative References**

The following documents, in whole or in part, are informatively referenced in this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

TS95	ADS Recommendations for Metallic Material Specifications & Standards to be used for New Designs.
TS260	Metallic Materials - List of Alternative Material Specifications & Standards Only Authorised for Use on ADS Standard Parts.
EN 2032-1	Metallic materials - Part 1: Conventional designation
ESDU 00932	Metallic Materials Data Handbook.

2.2 **Listed Publication bodies**

EN	European Committee for Standardization (CEN). Available from National Standards Bodies e.g. British Standards Institution (BSI).
ESDU	IHS Global Inc.
TS	ADS Group Limited.

3. **INTRODUCTION**

- 3.1 In view of the difficulty in obtaining material supplies for both new & established designs, the ADS Metallic Materials Special Interest Group (MMSIG) was requested to formulate tables of similar materials to provide Potential Alternatives.
- 3.2 The MMSIG is aware that many of the larger Companies already possess lists of alternatives appropriate to their own products, but it is hoped that the Tables will be of help to those smaller manufacturing organisations who do not possess approved Design Teams.
- 3.3 The attached tables are the result of the MMSIG effort, but it is emphasised that considerable care must be taken before any specific substitution is made. In every case, it will be necessary to obtain local design & quality control approval; additionally the concurrence of the prime Contractor may be required.
- 3.4 Before any decision is taken to use an alternative material for a specific part, consideration must be given to all relevant mechanical & metallurgical properties, including:
Strength, Ruling Section & Hardenability, Weldability, Formability, Processing Response

- 3.5 The ASD-STAN designations quoted are those allocated in accordance with EN 2032-1.
- 3.6 Design properties for some of the materials included in this document are available in ESDU 00932.
- 3.7 A list of preferred specifications for new designs is contained in TS95.
- 3.8 A list of alternative materials for ADS standard parts with design authority for these parts is contained in TS260.
- 3.9 Reference to any EN material standard means the National implementation of that standard e.g. BS EN.
- 3.10 Reference to any prEN material standard means an ASD-STAN Prestandard.

4. INDEX OF SPECIFICATIONS

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MATL SPEC REFERENCED	FORM	TABLE	MATL SPEC REFERENCED	FORM	TABLE
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BS L 124	Castings	2A	BS S 105	Bar & Forging Stock	3B
BS L 125	Castings	2A	BS S 106	Bar, Forgings & Forging Stock	3B
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BS L 128	Castings	2A	BS S 113	Bar	3B
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MATL SPEC REFERENCED	FORM	TABLE	MATL SPEC REFERENCED	FORM	TABLE
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BS S 126	Bar, Forgings & Forging Stock	4B	BS S 529	Sheet & Strip	4A
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BS S 159	Bar & Forging Stock	4B	BS TA 2	Sheet & Strip	6A
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MATL SPEC REFERENCED	FORM	TABLE
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BS TA 58	Plate	6A
BS TA 59	Sheet & Strip	6A

MATL SPEC REFERENCED	FORM	TABLE
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DTD 161	Rod, wire	4E
DTD 167	Tube	3C
DTD 189	Wire, Rivets & Split Pins	4E
DTD 246	Forgings & Forging Stock	1E
DTD 253	Tube	7
DTD 271	Strip	4E
DTD 297	Bar & Section	1C
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DTD 372	Bar & Section	1C
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DTD 5023	Sheet & Strip	6A
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DTD 5025	Castings	2A
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DTD 5035	Castings	2A
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DTD 5142	Tube	3C
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DTD 5232	Bar, Forgings & Forging Stock	3B
DTD 5273	Bar	6B
DTD 5283	Forging Stock	6D
DTD 5289	Castings	4D
DTD 5293	Forgings	6D
DTD 5363	Castings	6C
DTD 5636	Forgings & Forging Stock	1E
DTD 5638	Bar & Wire for Fasteners	5E
DTD 5639	Bar & Wire for Fasteners	5E

5. BS / DTD SPECIFICATIONS SUPERSEDED BY OTHER BS & DTD SPECIFICATIONS

SUPERSEDED SPECIFICATION	REFER TO		SUPERSEDED SPECIFICATION	REFER TO	
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L 3	L 166	1A	S 521	S 526, S 527	4A
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L 39	L 102	1C	S 523	S 530, S 531	4A
L 40	L 168, L 77	1C, 1E	T 4	L 105	1D
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L 62	L 105	1D	T 58	T 68, T 69	4C
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L 65	L 168, L 77	1C, 1E	T 65	T 77	3C
L 67	L 116	1D			
L 70	L 156	1A	TA 29	TA 45	6B
L 71	L 157	1A	TA 30	TA 47	6D
L 72	L 163, L 164	1A	TA 31	TA 48	6D
L 73	L 165	1A	TA 32	TA 46	6B
L 76	L 103	1E	TA 33	TA 47	6D
L 89	L 166	1A	TA 34	TA 48	6D
L 90	L 167	1A	TA 35	TA 46, TA 49	6B
L 104	L 157	1A	TA 36	TA 47, TA 50	6D
L 106	L 156	1A	TA 37	TA 48, TA 51	6D
L 107	L 164	1A			
L 108	L 166	1A	DTD 1	S 82	3B
L 150	L 157	1A	DTD 2	S 15	3B
L 151	L 164	1A	DTD 3	S 157	3B
L 152	L 165	1A	DTD 4	S 204	3E
L 153	L 164	1A	DTD 5	S 202	3E
L 501	L 512	2B	DTD 7	S 97	3B
L 502	L 513	2B	DTD 8	S 97	3B
L 506	L 514	2B	DTD 10	HR 205	5A
L 507	L 515	2B	DTD 12	S 511	3A
S 2	S 95, S 154	3B	DTD 14	B 21	7
S 3	S 510	3A	DTD 18	L 103	1E
S 4	S 514	3A	DTD 19	S 28	3B
S 6	S 93	3B	DTD 21	S 61	4B
S 11	S 95, S 154	3B	DTD 22	S 62	4B
S 19	S 62	4B	DTD 23	DTD 161, DTD 189	4E
S 35	S 1	3B	DTD 42	S 526, S 527	4A
S 65	S 97	3B	DTD 43	S 129, S 130	4B
S 69	S 95, S 154	3B	DTD 49	S 111	3B
S 81	S 97	3B	DTD 57	S 524, S 525	4A
S 84	S 511	3A	DTD 59	L 121	2A
S 86	S 514	3A	DTD 76	S 80	4B
S 90	S 157	3B	DTD 88	L 513	2B
S 94	S 154	3B	DTD 89	T 45	3C
S 96	S 154	3B	DTD 100	S 514	3A
S 103	S 148	3B	DTD 105	T 80	4C
S 107	S 157	3B	DTD 110	L 37	1G
S 108	S 125, S 126	4B	DTD 111	L 163, L 164	1A
S 109	S 127, S 128	4B			

SUPERSEDED SPECIFICATION	REFER TO	
	SPECIFICATION	TABLE
DTD 113	T 64	3C
DTD 124	S 514	3A
DTD 126	S 92	3B
DTD 127	L 512	2B
DTD 130	L 83	1C, 1E
DTD 133	L 51	1F
DTD 137	S 516	3A
DTD 138	S 517	3A
DTD 141	S 511	3A
DTD 144	S 526, S 527	4A
DTD 148	L 36	1G
DTD 149	DTD 167	3C
DTD 156	S 129, S 130	4B
DTD 166	S 524, S 525	4A
DTD 171	S 526, S 527	4A
DTD 176	S 129, S 130	4B
DTD 178	T 53	3C
DTD 187	S 513	3A
DTD 188	S 114	3B
DTD 197	B 23	7
DTD 203	T 80	4C
DTD 207	T 66, T 67	4C
DTD 209	L 80	1A
DTD 211	T 68, T 69	4C
DTD 213	L 59	1A
DTD 215	S 201	3E
DTD 233	HC 402	3D
DTD 239	S 203	3E
DTD 247	S 131	3B
DTD 252	L 168	1C
DTD 254	T 57	3C
DTD 259	L 512	2B
DTD 265	B 24	7
DTD 276	L 78	1F
DTD 278	L 80	1A
DTD 281	L 124	2A
DTD 285	L 125	2A
DTD 287	L 51	1F
DTD 289	L 122	2A
DTD 292	L 80	1A
DTD 293	L 83	1C, 1E
DTD 289	L 122	2A
DTD 299	S 91	3B
DTD 303	L 58	1G
DTD 306	S 106	3B
DTD 310	L 56	1D
DTD 323	B 27	7
DTD 327	L 86	1G
DTD 328	HR 208	5A
DTD 330	DTD 5092, DTD 5102	3B
DTD 331	S 99	3B
DTD 342	L 165	1A
DTD 347	T 77	3C
DTD 348	L 503	2B
DTD 351	L 165	1A

SUPERSEDED SPECIFICATION	REFER TO	
	SPECIFICATION	TABLE
DTD 356	L 157	1A
DTD 359	T 53, T 77	3C
DTD 363	L 170	1C
DTD 364	L 168	1C
DTD 390	L 163, L 164	1A
DTD 408	T 60	3C
DTD 410	L 83	1C, 1E
DTD 412	HC 502	7
DTD 423	L 85	1C, 1E
DTD 463	S 80	4B
DTD 464	L 63	1D
DTD 473	S 98	3B
DTD 480	S 95	3B
DTD 485	HC 403	
DTD 490	S 154	3B
DTD 493	S 531	4A
DTD 498	B 25	7
DTD 500	S 99	3B
DTD 504	B 26	7
DTD 519	S 157	3B
DTD 525	S 124	4B
DTD 529	S 125, S 126, S 127, S 128	4B
DTD 546	L 165	1A
DTD 600	S 95	3B
DTD 603	L 156	1A
DTD 606	L 81	1A
DTD 610	L 164	1A
DTD 619	L 514	2B
DTD 622	L 505	2B
DTD 626	L 504	2B
DTD 634	L 80	1A
DTD 646	L 157	1A
DTD 650	S 112	3B
DTD 653	L 60	1A
DTD 666	HC 9	3D
DTD 683	DTD 5024, DTD 5114	1C, 1E
DTD 687	L 88	1A
DTD 703	HR 203	5A
DTD 705	HC 8, HC 10	3D
DTD 708	L 126	2A
DTD 710	L 166	1A
DTD 712	S 536	4A
DTD 713	T 79	3C
DTD 715	S 137	3B
DTD 719	HC 404	4D
DTD 721	L 127	2A
DTD 723	T 78	3C
DTD 726	L 505	2B
DTD 729	L 514	2B
DTD 730	S 132	3B
DTD 736	HR 1	5B
DTD 743	T 72, T 73	4C
DTD 746	L 167	1A
DTD 747	HR 2	5B
DTD 748	L 128	2A



SUPERSEDED SPECIFICATION	REFER TO	
	SPECIFICATION	TABLE
DTD 749	L 512	2B
DTD 5001	L 515	2B
DTD 5002	S 133	3B
DTD 5003	DTD 5273, DTD 5283	6B, 6D
DTD 5006	S 205	4E
DTD 5007	HR 3	5B
DTD 5011	L 508	2B
DTD 5012	S 134	3B
DTD 5016	T 72, T 73	4C
DTD 5017	HR 4	5B
DTD 5019	B 27	7
DTD 5020	L 93	1B
DTD 5021	L 509	2B
DTD 5022	S 135	3B
DTD 5026	HR 650	5E
DTD 5027	HR 202	5A
DTD 5028	L 99	1F
DTD 5033	TA 1	6A
DTD 5046	S 538	4A
DTD 5047	HR 207	5A
DTD 5050	L 95	1B
DTD 5054	DTD 5114	1C
DTD 5060	DTD 5110	1B
DTD 5063	TA 6	6A
DTD 5067	HR 4	5B
DTD 5072	HC 8, HC 10	3D
DTD 5074	L 170	1C
DTD 5076	HR 650	5E
DTD 5077	HR 601	5E
DTD 5080	L 113	1A
DTD 5087	HR 506	5E
DTD 5090	L 97, L 98	1B
DTD 5103	TA 45, TA 46, TA 47, TA 49, TA 50	6B, 6D
DTD 5104	L 171, L 172	1E
DTD 5113	TA 25	6B
DTD 5123	TA 22, TA 23	6B, 6D
DTD 5124	L 170	1C
DTD 5133	TA 21	6A
DTD 5153	TA 48, TA 51	6D
DTD 5163	TA 59, TA 10	6A
DTD 5172	HC 7, HC 9	3D
DTD 5173	TA11, TA12	6B, 6D
DTD 5183	TA 2	6A
DTD 5192	S 163	3B
DTD 5193	TA 6	6A
DTD 5199	HC 1	3D
DTD 5203	TA 38, TA 39, TA 40, TA 41	6D, 6E
DTD 5209	HC 2	3D
DTD 5212	S 162	3B
DTD 5219	HC 3	3D
DTD 5223	TA 42	6D
DTD 5229	HC 4	3D
DTD 5233	TA 52	6A
DTD 5239	HC 5	3D

SUPERSEDED SPECIFICATION	REFER TO	
	SPECIFICATION	TABLE
DTD 5243	TA 53	6B
DTD 5249	HC 6	3D
DTD 5253	TA 54	6D
DTD 5259	HC 103	4D
DTD 5263	TA 55	6D
DTD 5269	HC 104	4D
DTD 5279	HC 105	4D
DTD 5299	HC 101	4D
DTD 5309	HC 102	4D

6. TABLES OF MATERIALS & SPECIFICATIONS

TABLE 1A - ALUMINIUM ALLOY - SHEET & STRIP

SPECIFICATION & DESCRIPTION				SIMILAR SPECIFICATIONS	
				PREFERRED	OTHERS
BS / DTD	STATUS	ASD-STAN ALLOY DESIGNATION	TEMPER	ASD-STAN prEN / EN	USA
L 16	Current	AL-P1200-	H14/H24	3996	AMS 4003
L 17	Current		0	-	AMS 4001
L 59	Withdrawn	AL-P3103-	H16/H26	4004	-
L 60	Withdrawn		H12/H22	-	-
L 61	Withdrawn		0	-	AMS 4006
L 80	Current	AL-P5251-	0	-	-
L 81	Current		H16/H26	-	-
L 88	Withdrawn	AL-P7075- clad	T6/T62	2092	AMS 4049
L 109	Withdrawn	AL-P2024- clad	T3	2090	AMS-QQ-A-250/5 - T3 AMS 4041
L 110	Withdrawn		T42	2703	AMS-QQ-A-250/5 - T42
L 113	Withdrawn	AL-P6082-	T6/T62	4007	-
L 156	Withdrawn	AL-P2014A	T4/T42	2395	-
L 158	Withdrawn		T6/T62	2089	AMS 4029
L 157	Withdrawn				
L 159	Withdrawn				
L 163	Withdrawn	AL-P2014A clad	T3	-	-
L 164	Current		T4/T42	2088	AMS-QQ-A-250/3 - T4/T42
L 166	Withdrawn				
L 165	Current		T6/T62	2087	AMS-QQ-A-250/3 - T6/T62
L 167	Withdrawn				
DTD 5070	Withdrawn	AL-P2618A clad	T62	3552	-

TABLE 1B - ALUMINIUM ALLOY – PLATE

SPECIFICATION & DESCRIPTION				SIMILAR SPECIFICATIONS	
				PREFERRED	OTHERS
BS / DTD	STATUS	ASD-STAN ALLOY DESIGNATION	TEMPER	ASD-STAN prEN / EN	USA
L 93	Current	AL-P2014A	T651	2124	AMS 4029
DTD 5010	Withdrawn	-	T4	-	-
L 95	Current	AL-P7075-	T651	2126	AMS -QQ-A-250/12 - T651 AMS 4045
L 97	Withdrawn	AL-P2024-	T351	2422	-
L 98	Withdrawn	AL-P2024-	T42	4247	AMS-QQ-A-250/4 - T42
L 115	Withdrawn	AL-P6082-	T651	4202	-
DTD 5030	Withdrawn	AL-P2014A clad	T4	-	-
DTD 5040	Withdrawn		T6	-	-
DTD 5100	Withdrawn	AL-P2024- clad	T351	4211 (T42)	AMS-QQ-A-250/5 - T351 AMS 4034
DTD 5110	Withdrawn	AL-P7075- clad	T6	-	AMS 4049
DTD 5120	Withdrawn	AL-P7010-	T7651	2684	AMS 4204
DTD 5130	Withdrawn		T7451	2687	AMS 4205