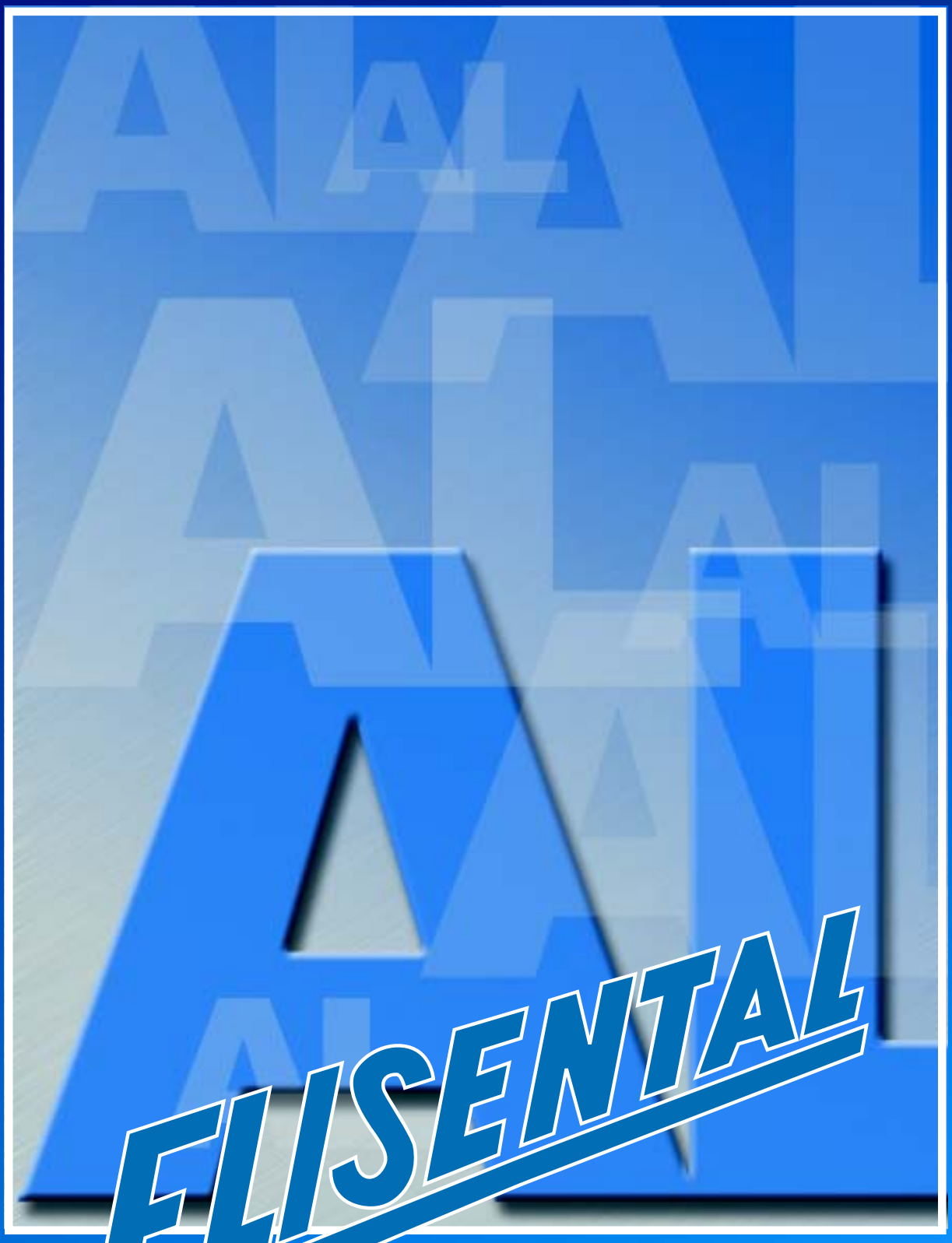
Material



Aluminium welding fillers

Materials – Technical Data

Designation of welding fillers		Chemical composition)[1])[2])[3])		Physical properties		Welding material values (20° C)			Permits
numerical (works name)	chemical	Alloy constituents %	Allowable admixtures %	Melting range °C ≈	Density g/cm³ ≈	0.2 - Yield limit N/mm	Tensile strenght N/mm	Elongation (A5) %	
R 1098 A)[6] (DE50)	R - Al 99.98	Al min. 99.98	total of 0.02 wich Si 0.010 Fe 0.006 Cu 0.003 Zn 0.015 Ti 0.003 other single 0.003	660	2.70	–	≧ 40	≧ 43	TÜV
R 1080 A (DE51)	R - Al 99.8 (A)	Al min. 99.80	total of 0.2 wich Si 0.15 Fe 0.15 Cu 0.03 Mn 0.02 Mg 0.02 Zn 0.06 Ti 0.02 other single 0.02	658	2.70	–	≧ 60	≧ 40	TÜV DB
R 1450 (DE53)	R - Al 99.5 Ti	Al min. 99.50 Ti 0.1 to 0.2	total of 0.5 wich Si 0.25 Fe 0.40 Cu 0.05 Mn 0.05 Mg 0.05 Zn 0.07 other single 0.03	647 to 658	2.71	≧ 20	≧ 65	≧ 35	TÜV DB
R 2319)[6] (DE 71)	R - AlCu6Mn (A)	Cu 5,8 to 6.8 Ti 0.10 to 0.20)[4] V 0.05 to 0.15 Zr 0.10 to 0.25 Al residual	Si 0.20 Fe 0.30 Mn 0.20 Mg 0.02 Zn 0.2 other single 0.05	543 to 643	2.84	75)[7]	170)[7]	18)[7]	
R 3103 (DE54)	R - AlMn1	Mn 0.9 to 0.15 Al residual	Si 0.50 Fe 0.7 Cu 0.10 Mg 0.30 Cr 0.10 Zn 0.20 Ti+Zr 0.10 other single 0.05	648 to 657	2.73	≧ 35	≧ 90	≧ 24	
R 4018 (DE68)	R - AlSi7Mg	Si 6.5 to 7.5 Mg 0.50 to 0.8 Al residual	Fe 0.20 Cu 0.05 Mn 0.10 Zn 0.10 Ti 0.20 other single 0.05	550 to 625	2.70	≧ 80	≧ 140	≧ 2	
R 4043 A (DE59)	R - AlSi5 (A)	Si 4.5 to 6.0 Al residual	Fe 0.6 Cu 0.30 Mn 0.15 Mg 0.20 Zn 0.10 Ti 0.15 other single 0.05	573 to 625	2.68	≧ 40	≧ 120	≧ 8	DB

R 4046 (DE61)	R - AlSi10Mg	Si 9.0 to 11.0 Mg 0.20 to 0.50 Al residual	Fe 0.50 Cu 0.03 Mn 0.40 Zn 0.10 Ti 0.15 other single 0.05	570 to 610	2.65	≧ 70	≧ 140	≧ 4	
R 4047 A (DE60)	R - AlSi12 (A)	Si 11.0 to 13.0 Al residual	Fe 0.6 Cu 0.30 Mn 0.15 Mg 0.10 Zn 0.20 Ti 0.15 other single 0.05	573 to 585	2.65	≧ 60	≧ 130	≧ 5	DB
R 5249 (DE57)	R - AlMg2Mn0.8Zr	Mg 1.6 to 2.5 Mn 0.50 to 1.1 Zr 0.10 to 0.20 Al residual	Si 0.25 Fe 0.40 Cu 0.05 Cr 0.30 Zn 0.20 Ti 0.15)[4] other single 0.05	615 to 650	2.71	≧ 80	≧ 190	≧ 20	TÜV DB
R 5754 (DE56)	R - AlMg3	Mg 2.6 to 3.6 Mn + Cr 0.10 to 0.6 Al residual	Si 0.40)[5] Fe 0.40 Cu 0.10 Mn 0.50 Cr 0.30 Zn 0.20 Ti 0.15)[4] other single 0.05	615 to 642	2.66	≧ 80	≧ 190	≧ 20	GL DnV TÜV DB
R 5356 (DE58)	R - AlMg5Cr (A)	Mg 4.5 to 5.5 Mn 0.05 to 0.20 Cr 0.05 to 0.20 Ti 0.06 to 0.20)[4] Al residual	Si 0.25 Fe 0.40 Cu 0.10 Zn 0.10 other single 0.05	575 to 633	2.64	≧ 120	≧ 250	≧ 8	GL. DnV ABS, BV TÜV, DB
R 5556 A (DE 70)	R - AlMg5Mn	Mg 5.0 to 5.5 Mn 0.6 to 1.0 Cr 0.05 to 0.20 Ti 0.05 to 0.20)[4] Al residual	Si 0.25 Fe 0.40 Cu 0.10 Zn 0.10 other single 0.05	574 to 638	2.66	≧ 140	≧ 275	≧ 15	
R 5183 (DE63)	R - AlMg4.5Mn0.7 (A)	Mg 4.3 to 5.2 Mn 0.50 to 1.0 Cr 0.05 to 0.25 Al residual	Si 0.40)[5] Fe 0.40 Cu 0.10 Zn 0.25 Ti 0.15)[4] other single 0.05	574 to 638	2.66	≧ 125	≧ 275	≧ 17	GL. DnV ABS, BV LR, TÜV DB, BWB
R 5087 (DE64)	R - AlMg4.5MnZr	Mg 4.5 to 5.2 Mn 0.7 to 1.1 Cr 0.05 to 0.25 Zr 0.10 to 0.20 Al residual	Si 0.25 Fe 0.40 Cu 0.05 Zn 0.25 Ti 0.15)[4] other single 0.05	574 to 638	2.66	≧ 125	≧ 275	≧ 17	GL TÜV DB BWB
Brazing solder (DE76)	L - AlSi12 (DIN 8513/4)	Si 11.0 to 13.0 Al residual	Fe 0.5 Cu 0.03 Mn 0.1 Mg 0.1 Zn 0.07 Ti 0.03)[4] other single 0.03	575 to 590	2.65	–	–	–	–

)[1] The content of beryllium is to be limited to 0.0008% (a reduction by the EAA is planned).)[2] Single values in the chart are maximum values.
)[3] The sum of other elements max. 0.15%.)[4] The Ti-content can be completely or partially substituted by other fine-grain-supporting elements.
)[5] In order to restrict the risk of weld cracks, an Si-content of ≦ 0.25% is recommended.)[6] Not contained in the EN-ISO draft 18273.)[7] Typical values

Permits

Symbol of source of issue	Permits	Usable welding fillers	numerical designation
	Germanischer Lloyd Schipbuilding	DE 56 DE 58 DE 63 DE 64	R 5754 R 5356 R 5183 R 5087
	Lloyd's Register of Shipping Schipbuilding	DE 63 DE 56 DE 58 DE 63	R 5183 R 5754 R 5356 R 5183
DNV	Det Norske Veritas Schipbuilding	DE 58 DE 63	R 5356 R 5183
ABS	American Bureau of Shipping Schipbuilding	DE 58 DE 63	R 5356 R 5183
BV	Bureau Veritas Schipbuilding	DE 63 DE 64	R 5183 R 5087
	Deutsche Bahn AG (German Rail) Rail vehicle construction	DE 51 DE 53 DE 56 DE 57 DE 58 DE 59 DE 60 DE 63 DE 64	R 1080 A R 1450 R 5754 R 5249 R 5356 R 4043 A R 4047 A R 5183 R 5087
TÜV	Technical Inspection Association Pressure vessel construction	DE 50 DE 51 DE 53 DE 56 DE 57 DE 58 DE 63 DE 64 DE 65	R 1098 A R 1080 A R 1450 R 5754 R 5249 R 5356 R 5183 R 5087 not standardised
BWB	Federal Agency for military defence technology and procurement of high-stressed components for military defence material	DE 63 DE 64	R 5183 R 5087

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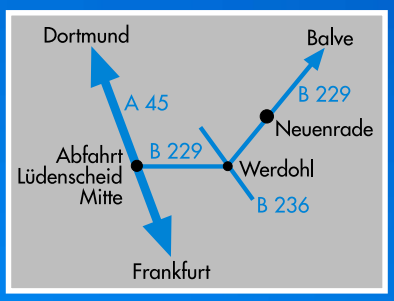

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Aluminium wire
Magnesium wire

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