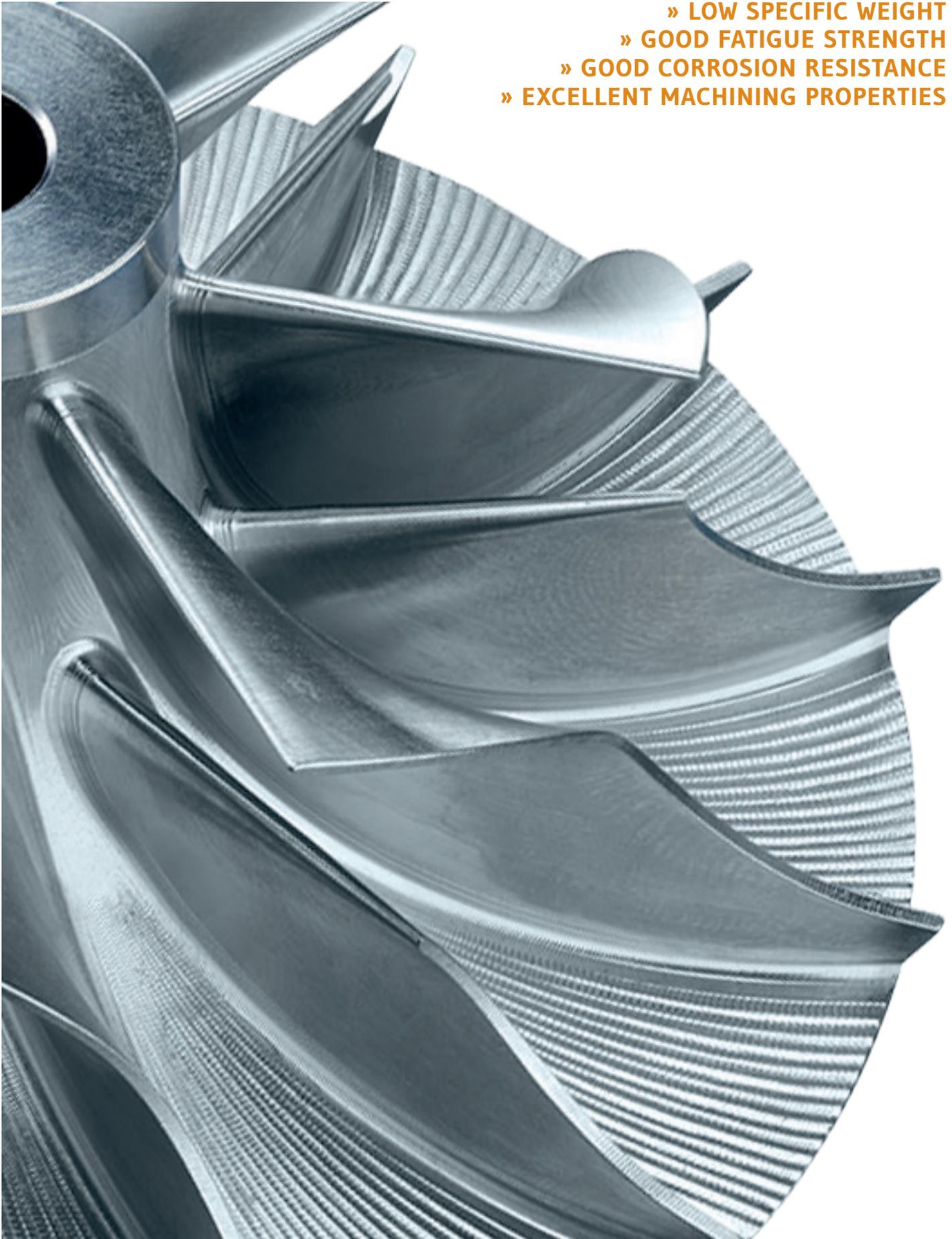


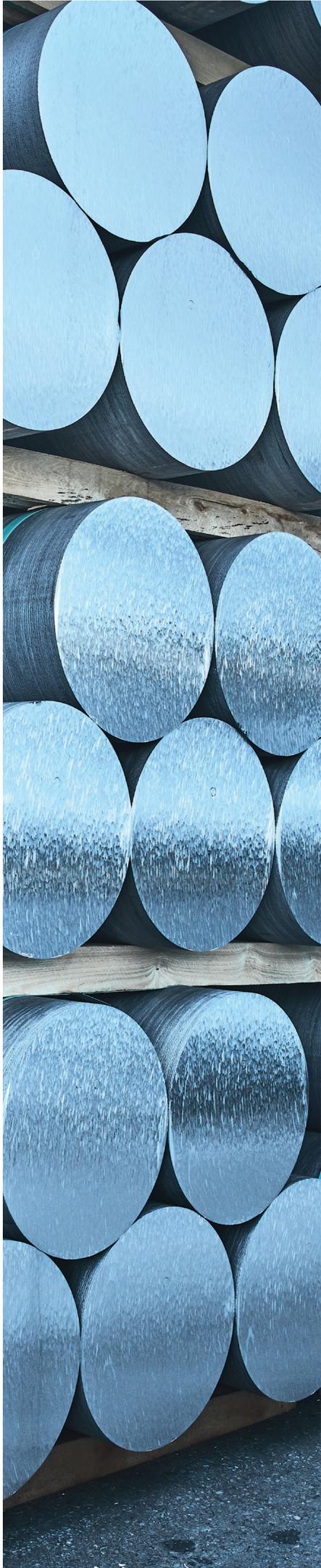


OTTO FUCHS

TECHNICAL INFORMATION
MATERIALS
ALUMINIUM

- » LOW SPECIFIC WEIGHT
- » GOOD FATIGUE STRENGTH
- » GOOD CORROSION RESISTANCE
- » EXCELLENT MACHINING PROPERTIES





ALUMINIUM COMPONENTS FROM OTTO FUCHS

Wrought aluminium alloys have the most balanced properties among the light alloy metals.

OTTO FUCHS uses these alloys to produce open-die forgings weighing up to 3,000 kg, with a maximum length of 6,000 mm and a maximum width of 3,000 mm.

Hydraulic presses with a maximum force of 54,000 tons produce closed-die forgings up to 1,000 kg and a projected area of 30,000 cm².

Extruded profiles, such as bars, tubes, solid and hollow profiles, with a maximum circumscribed diameter of \varnothing 420 mm, can reach weights per metre of up to 50 kg.

ADVANTAGES OF ALUMINIUM

- » low specific weight
- » good fatigue strength
- » good corrosion resistance
- » excellent machining properties
- » medium to high strength
- » good elongation at break/fracture toughness
- » attractive surfaces

OTTO FUCHS SOLUTIONS WITH ALUMINIUM WROUGHT ALLOYS

Aluminium wrought materials are used where strength and toughness are required combined with low weight or pressure tightness of the structure.

Our products are manufactured according to certified standards of our customers from the aerospace, automotive, transport, construction and industrial engineering industries. Our current approvals/certifications are available at OTTO-FUCHS.COM.

We develop all our products in close cooperation with the customer. From the initial cost calculations up to large series production - including final machining and assembly of components in the desired depth of added value.

Wrought aluminium alloys are melted, alloyed and cast in our own continuous casting plant. Each continuous cast billet is then subjected to an ultrasonic test, so that only perfectly tested material is passed on for further processing. The next steps are forming by extrusion and/or forging, heat treatment and acceptance. If required this is followed by a finishing treatment with painting and assembly.

Working with OTTO FUCHS means benefiting from more than 90 years of experience with aluminium wrought materials, which is incorporated into the development and manufacture of products by forging, extrusion, flow forming or ring rolling.

AREAS OF APPLICATION

» Aerospace industry

structural parts in fuselage and wings, undercarriage components, aircraft window frames, hydraulic housings and engine parts

» Railway engineering

couplings, disk wheel bodies, door sills and corner fittings

» Automotive and transport industry

forged passenger car wheels, components for chassis, steering, braking systems, drive train, bodywork, interior and battery housings, components for tail lifts, cargo floors and platforms of all kinds

» Construction industry

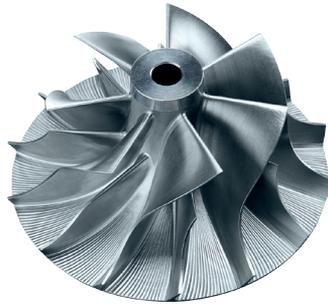
door and window profiles, insulating profiles, facade elements, bridge coverings, noise barriers, scaffolding planks and tapered pipes

» Industrial technology

impeller, large pistons, connecting rods, hydraulic components, centrifuge cups, electric motor housings and construction profiles



Passenger Window Frame
530 mm x 480 mm; 1,1 kg



Impeller
Ø 88 mm x 49 mm; 0,2 kg



Battery Housing
160 mm x 130 mm; 90,0 kg



Main Fitting
1,250 mm x 950 mm x 350 mm; 130,0 kg



Exclusive Forged Wheel (e-car)
5J x 19, ET 43; 8,2 kg



Side Skirt
140 mm - 160 mm; 10,0 kg/m



Swashplate
Ø 835 mm x 75 mm; 31,0 kg



Clamping Fork
340 mm x 188 mm; 3,2 kg



Tail Lift
800 mm x 2,000 mm; 20 kg/m²

COMPARISON OF STANDARDS

OTTO FUCHS Designation	Material Code EN AW	Material Number EN AW	Aerospace WLB	USA AA	France
A2	Al99,7	1070 A	-	1070 A	A 7
AM05	Al99,85Mg0,5	(5110)	-	5110	-
AM10	AlMg1	5005/5005 A	-	5005/5005 A	A-G 1,6
AM11	Al99,85Mg1	5305	-	5305	-
AM18	AlMg2	5051 A	-	5051 A	(A-G 2)
AM21	AlMg2Mn0,8	5049/5149	-	5049/5149	-
AM25	AlMg2,5	5052	-	5052	A-G 2,5 C
AM30	AlMg3Mn0,4	5018/5754	-	5018/5754	A-G 3
AM36	AlMg3Mn0,4	-	-	-	(A-G 3)
AM40	AlMg4,5Mn0,7	5083	-	5083	A-G 4,5 MC
AM54	AlMg4,5Mn0,4	5182	-	5182	(A-G 5)
AM58	AlMg5	5019/5119	-	5019/5119	A-G 5
AG15	AlMn1	3103	-	3103	-
AG18	AlMn1	3003	-	3003	-
AS03	AlSi0,5Mg	-	-	-	-
AS04	AlMgSi	6060/6063	-	6060/6063	-
AS05	AlMg0,7Si	6060/6063	-	6060/6063	(A-GS)
AS06	AlMg0,7Si	6060/6063	-	6060/6063	(A-GS)
AS07	AlSiMg	6005 A	3.3210	6005 A	A-SG 0,5
AS10	AlSi1MgMn	6082 A	-	6082 A	A-SG M 0,7
AS15	AlSi1MgMn	6082 A	-	6082 A	-
AS20	AlMg1SiCu	6061	3.3214	6061	A-GSUC
AS28	AlSi1MgMnCuCrZr	6110 A	-	6110 A	-
AS29	AlSi1MgMnCuCrZr	6110 A	-	6110 A	-
AS60	AlSi12,5MgCuNi	4032	-	4032	A-S 12 UGN
AS81	AlSiMg	-	-	-	-
AK13	AlCu4MgSi	2017	3.3124	2017	A-U 4 G
AK15	AlCu4MgSi	2017 A	-	2017 A	A-U 4 G
AK24	AlCu4Mg1	2024/2124	3.1354	2024/2124	A-U 4 G 1
AK25	AlCu4Mg1	2024/2124	3.1354	2024/2124	A-U 4 G 1
AK26	AlCu4Mg1	-	3.1254	-	-
AK34	AlCu4SiMg	2014/2214	-	2014/2214	A-U 4 SG/A7-U 4 SG
AK35	AlCu4SiMg	2014 A	3.1255	2014 A	A-U 4 SG
AK60	AlCu6Mn	2219	-	2219	A-U 6 M T
AK65	AlCu4SiMgAg	-	-	2016	-
AN40	AlCu2Mg1,5Ni	2618/2618 A	-	2618/2618 A	A-U 2 GN
AZ14	AlZn4,5Mg1	7020	-	7020	A-Z 5 G
AZ16	AlZn4,5Mg1	7108 A	-	7108 A	A-Z 5 G
AZ20	AlZn4,5Mg1	7108 A	-	7108 A	A-Z 56
AZ40	AlZn5Mg3Cu	7022	-	7022	-
AZ54	AlZn5Mg3Cu	7022	-	7022/7079	A-Z 5 GU
AZ62	AlZn5,5MgCu	7475	-	7475	-
AZ63	AlZn5,5MgCu	7075/7175	3.4364	7075	A-Z 5 GU
AZ64	AlZn5,5MgCu	7075	3.4364	7075	A-Z 5 GU
AZ69	AlZn5,5MgCu	7175	3.4334	7175	-
AZ83	AlZn6MgCu	7010	3.4394	7010	-
AZ84	AlZn6CuMgZr	7050/7150	3.4144	7050/7150	-
AZ86	AlZn8MgCu	7049 A	-	7049 A/7349	-
AL10	AlLi2,5Cu1,5Mg	8090	-	8090	-

CHEMICAL COMPOSITION

OTTO FUCHS Designation	Cu	Mg	Si	Mn	Zn	Other
A2	-	-	-	-	-	-
AM05	-	0,50	-	-	-	-
AM10	-	1,00	-	-	-	-
AM11	-	1,00	-	-	-	-
AM18	-	1,90	-	-	-	-
AM21	-	2,00	-	0,80	-	-
AM25	-	2,50	-	-	-	Cr
AM30	-	2,90	-	0,30	-	-
AM36	-	2,90	-	-	-	-
AM40	-	4,50	-	0,80	-	Cr
AM54	-	4,80	-	0,20	-	-
AM58	-	5,20	-	0,50	-	-
AG15	-	-	-	1,00	-	-
AG18	-	-	-	1,00	-	Fe
AS03	0,20	0,50	0,50	-	-	Zr
AS04	-	0,42	0,42	-	-	-
AS05	-	0,47	0,47	-	-	-
AS06	-	0,52	0,52	-	-	-
AS07	0,20	0,60	0,60	-	-	Cr
AS10	-	0,90	1,00	0,60	-	Cr
AS15	-	0,90	1,00	0,50	-	-
AS20	0,25	0,90	0,70	-	-	Cr
AS28	0,60	0,90	1,00	0,60	-	Cr, Zr
AS29	0,80	0,90	1,00	0,70	-	Cr, Zr
AS60	0,90	1,00	12,00	-	-	Ni
AS81	0,20	0,50	0,70	0,50	-	Cr
AK13	4,00	0,80	-	0,90	-	-
AK15	3,80	0,70	-	0,50	-	-
AK24	4,20	1,40	-	0,80	-	-
AK25	4,20	1,40	-	0,80	-	Zr
AK26	4,20	1,40	-	0,80	-	Zr
AK34	4,45	0,60	0,80	0,90	-	V
AK35	4,45	0,60	0,80	0,90	0,25	Zr
AK60	6,20	-	-	0,30	-	Zr
AK65	4,30	0,60	0,50	0,40	-	Ag, Ti, Zr
AN40	2,50	1,50	-	-	-	Fe, Ni
AZ14	-	1,20	-	0,10	4,70	Cr, Zr
AZ16	-	1,00	-	-	5,10	Zr
AZ20	-	0,90	-	-	5,40	Zr
AZ40	0,70	3,20	-	0,10	4,50	Cr
AZ54	0,70	3,40	-	0,10	4,60	Cr
AZ62	1,40	2,40	-	-	5,70	Cr
AZ63	1,40	2,30	-	-	5,70	Cr
AZ64	1,40	2,40	-	-	5,80	Cr
AZ69	1,40	2,30	-	-	5,80	Cr
AZ83	1,70	2,20	-	-	6,00	Zr
AZ84	2,50	2,10	-	-	6,20	Zr
AZ86	1,50	2,40	-	-	7,60	Cr, Zr
AL10	1,20	0,90	-	-	-	Li, Zr

MECHANICAL PROPERTIES (STANDARD VALUES)

OTTO FUCHS Designation	Tensile Strength R_m [MPa]	Yield Strength $R_{p0,2}$ [MPa]	Elongation at Break A_5 [%]	Density $[\text{g}/\text{cm}^3]$	Typical Material Properties
A2	60–130	20–40	25–30	2,70	
AM05	70–130	30–80	4–22	2,69	
AM10	100–155	40–135	4–22	2,69	good brightening, anodising and forming properties as well as corrosion resistance
AM11	100–155	40–135	4–22	2,69	
AM18	145–205	60–155	4–17	2,69	
AM21	175–255	80–175	4–17	2,69	good anodising and forming properties as well as corrosion resistance
AM25	160–235	70–165	4–17	2,68	
AM30	175–255	80–175	4–17	2,67	good corrosion resistance, including in seawater
AM36	175–255	80–175	4–17	2,67	special alloy within AlMg3 (AM30) for decorative purposes
AM40	255–275	110–155	4–17	2,66	excellent corrosion resistance with good weldability and formability
AM54	235–325	110–235	4–18	2,65	
AM58	235–325	110–235	4–18	2,75	excellent corrosion resistance with good weldability
AG15	95–160	40–130	4–17	2,73	
AG18	95–160	40–130	4–17	2,73	excellent corrosion resistance
AS03	220–280	200–240	10–15	2,70	energy absorbing alloy for automotive structural profiles
AS04	120–200	50–150	10–20	2,70	
AS05	120–215	60–160	10–15	2,70	excellent anodising and welding properties as well as corrosion resistance offer maximum geometric design freedom for extruded profiles
AS06	130–245	70–195	10–15	2,70	
AS07	195–270	100–200	8–15	2,70	medium strength, good extrudability
AS10	195–350	110–320	6–18	2,70	medium strength, corrosion resistance, weldability; standard forging alloy in automotive engineering
AS15	195–350	110–270	6–18	2,70	like AS10; standard extrusion alloy
AS20	195–315	100–255	6–18	2,70	good combination of strength and corrosion resistance
AS28	360–410	330–380	6–12	2,71	
AS29	360–430	330–400	6–12	2,71	higher strength than AS10; good corrosion resistance and weldability
AS60	280–380	240–350	3–5	2,68	good heat resistance and good wear resistance
AS81	260–310	240–280	10–15	2,70	energy absorbing for automotive structural profiles; higher strength than AS03
AK13	375–410	215–275	8–14	2,79	
AK15	375–410	215–275	8–14	2,79	special quality of AK13 for drawn tubes, rods and wires
AK24	410–470	245–355	6–12	2,78	
AK25	410–490	290–360	6–12	2,78	high toughness as well as high static and dynamic strength
AK26	460–520	340–400	10–15	2,78	like AK25; with special quality for stretch-bent parts and for increased strength
AK34	400–460	285–335	6–8	2,80	high static and dynamic strength for complex geometries
AK35	400–460	285–335	6–8	2,80	special quality for extruded products like AK34
AK60	400–425	270–345	5–8	2,84	excellent heat resistance and weldability
AK65	420–480	360–450	5–8	2,79	increased static and dynamic strength compared to AK34, high heat resistance
AN40	390–430	305–375	3–8	2,76	very good heat resistance
AZ14	315–390	275–295	6–10	2,78	good corrosion resistance with good weldability and formability
AZ16	350–385	290–330	3–8	2,78	like AZ14; with better extrudability
AZ20	340–350	270–290	10–14	2,78	like AZ16; with better extrudability
AZ40	460–500	385–430	5–8	2,77	special quality of AZ54 with better pressability for extruded products
AZ54	460–500	355–430	5–8	2,77	high strength properties
AZ62	420–540	355–470	5–8	2,81	high fatigue strength
AZ63	420–530	355–460	5–8	2,81	high strength properties for extruded products
AZ64	420–530	355–460	5–8	2,81	high strength properties for forged products
AZ69	420–540	355–470	5–8	2,81	like AZ64; with increased fatigue properties
AZ83	430–500	360–440	3–9	2,82	
AZ84	430–500	360–440	3–9	2,82	high strength properties and good hardenability
AZ86	480–620	410–570	3–9	2,85	ultra-high strength
AL10	400–470	300–400	2–6	2,54	increased modulus of elasticity and low density



OTTO FUCHS KG

Derschlager Straße 26
58540 Meinerzhagen
Germany
T. +49 2354 73-0
info@otto-fuchs.com
www.otto-fuchs.com



Perfect in any shape