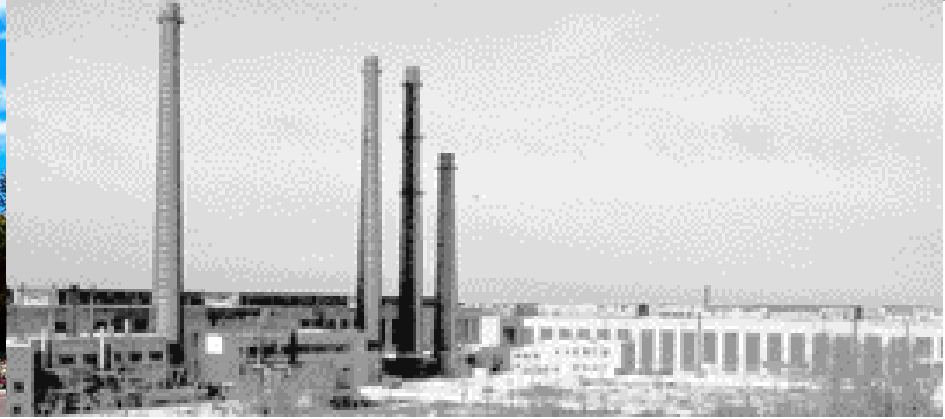




Kamensk Uralsky Metallurgical Works (KUMZ)
Joint Stock Company

KAMENSK URALSKY METALLURGICAL WORKS

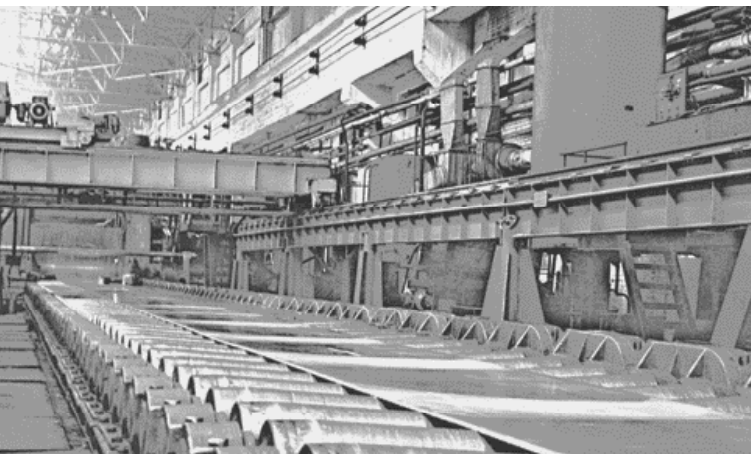


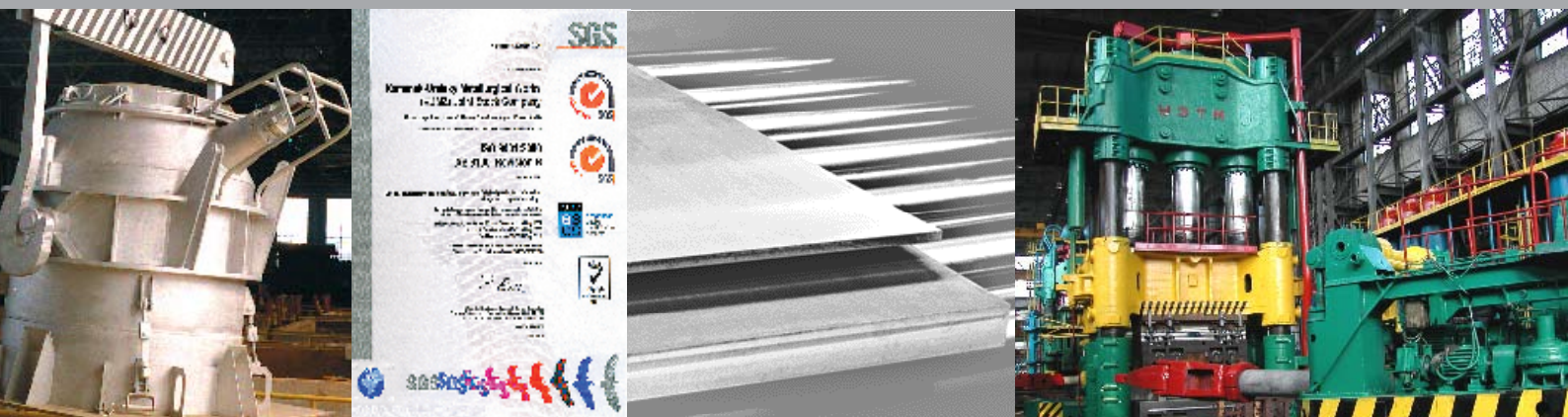
Kamensk Uralsky Metallurgical Works (KUMZ in Russian abbreviation) is one of the largest downstream companies in Russia. KUMZ has a rich history as it was founded in 1944 as a manufacturer of semi-finished products in aluminium-, magnesium-based and aluminium-lithium alloys. Today we supply high quality aluminium plates, wide variety of extruded products (rods & bars, profiles of different shapes & wide railway extruded panels as well as aluminium tubes & drill pipes). KUMZ is also specialized in forged materials supplying die-forgings, hand-forgings, rolled rings, forged plates and bars to aerospace, military and automotive industries. KUMZ three productions are situated in one place.

KUMZ serves Russian and CIS markets as well as exports worldwide. Export sales cover North American market (USA and Canada), European market (Germany, France, Italy, Spain, the Netherlands, Austria etc.) and Asian market (China, Singapore, Taiwan, South Korea etc.).

KUMZ has a number of advantages:

- On-site casting providing high quality ingots for further manufacturing of semi-finished products;
- In-house tooling production allowing to make and maintain dies for extrusions and forgings;
- On-site R&D Centre.





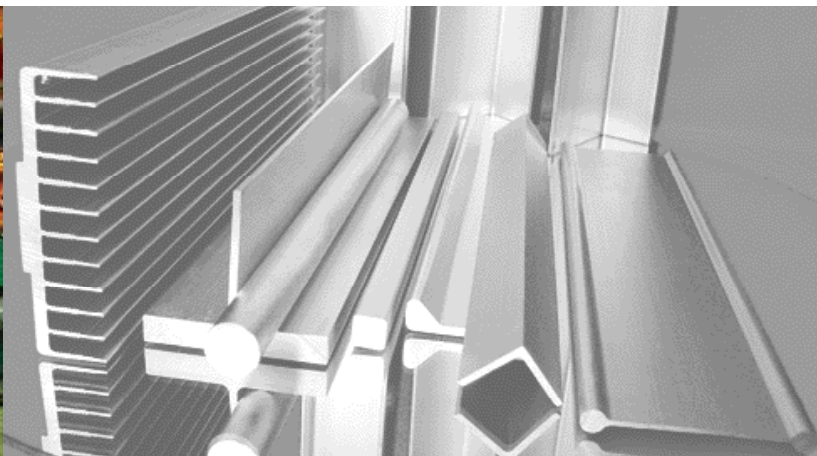
**Product quality is KUMZ utmost priority.
The quality was approved by the following certificates:**

- AS 9100 & ISO 9001:2000 for quality assurance;
- ISO 14001:1996 for ecological management;
- OHSAS 18001:1999 for labour safety;
- Lloyd's Register for production of aluminium alloy semi-finished products;
- International Aircraft Committee certificate (Moscow, Russia);
- KUMZ is now preparing for Nadcap accreditation of special processes.

All these allow KUMZ to be a reliable supplier for its customers and better fulfill high requirements of the market.

Major historical steps:

- 1944 – Start-up of KUMZ in Kamensk Uralsky, Russia as a manufacturer of high strength semi-finished products in Al-based alloys for defense metallurgy;
- 1958 – First production of semi-finished products in Mg alloys at KUMZ;
- 1964 – Production of first Al-Li 1420 alloy at KUMZ;
- 2000 – KUMZ privatization and integration in SUAL;
- 2004 – Modernization of the hot rolling mill main drive;
- 2005 – Start-up of two new casting units 30,000 mt capacity each;
- 2005 – Start-up of wide extruded panels production;
- 2005 – A new «Plate Project» start at KUMZ;
- 2006 – Certification of KUMZ Quality System for conformance to the requirements of AS 9100;
- Next step: Nadcap accreditation.



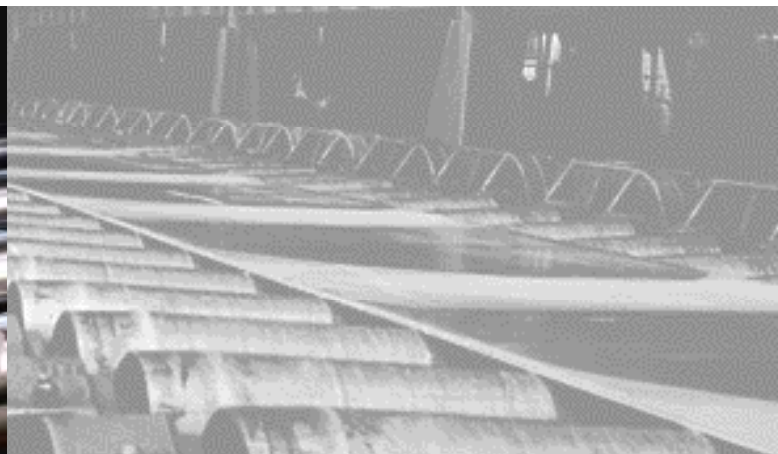
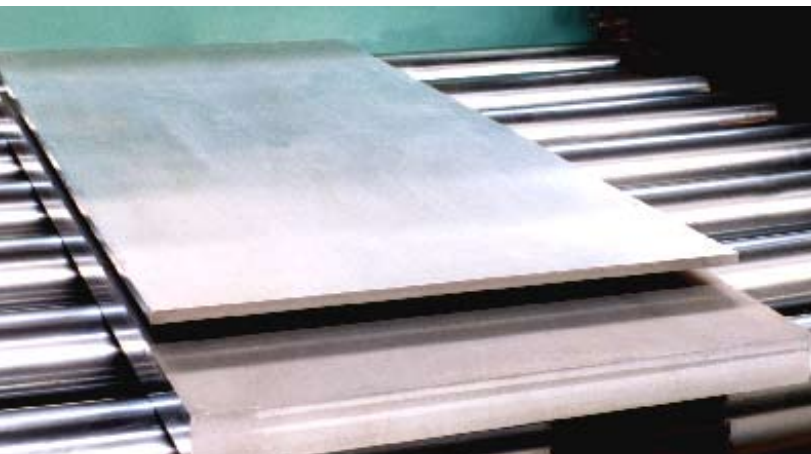
ROLLED PRODUCTS



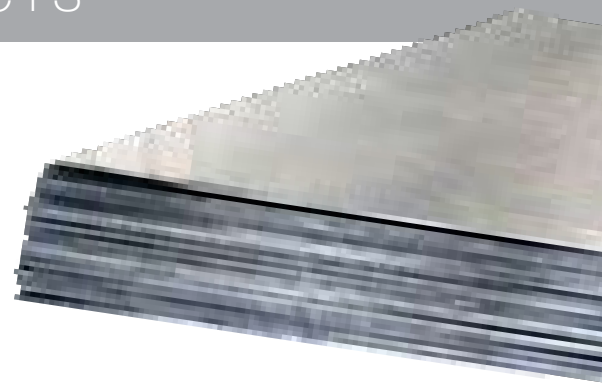
Major equipment for rolling production:

- milling machines for treatment of ingot surface before rolling;
- heat-treatment furnaces (ingot heating before hot rolling, annealing or aging of rolled semi-finished products as well as saltpeter baths for heating before quenching);
- one hot-rolling mill «Quarto»;
- two cold-rolling mills «Quarto»;
- two lines for cutting rolls to sheets;
- two lines for heat-treated sheet & plate finishing.

KUMZ rolled products quality corresponds to a number of national and international standards such as EN485, ASTM B209, ASTM B928, a number of AMS, DIN and QQ-A standards.



ROLLED PRODUCTS



PLATE

Manufacturing is according to EN485, ASTM B209, ASTM B928 and a number of AMS, DIN and AA standards.
Chemical composition is according to EN573, ASTM B209, ASTM B928 and AMS 4050.

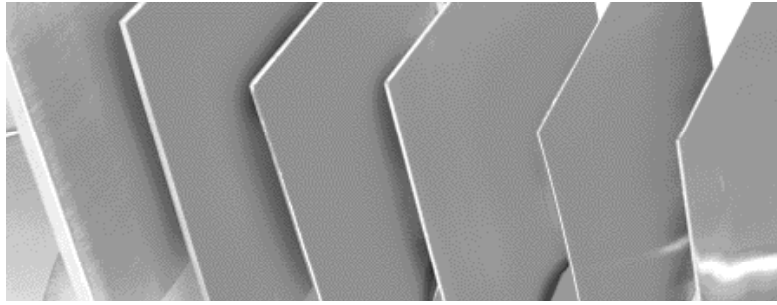
METRIC

2XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, mm		Width, mm	Length, mm	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min
		Above	Up to incl.			min	max	min	max	A 50 mm	A	
2014	T4, T451	6.0	12.5	1,000 – 1,540	2,500 – 4,000	400	-	250	-	14	-	112
		12.5	40.0	1,000 – 1,540	2,000 – 6,000	400	-	250	-	-	10	112
		40.0	100.0	1,000 – 1,540	2,000 – 8,000	395	-	250	-	-	7	111
	T651	6.0	12.5	1,000 – 1,540	2,500 – 4,000	450	-	395	-	7	-	135
		12.5	40.0	1,000 – 1,540	2,000 – 6,000	460	-	400	-	-	6	138
		40.0	60.0	1,000 – 1,540	2,000 – 8,000	450	-	390	-	-	5	135
		60.0	80.0	1,000 – 1,540	2,000 – 8,000	435	-	380	-	-	4	131
		80.0	100.0	1,000 – 1,540	2,000 – 8,000	420	-	360	-	-	4	126
100.0	120.0	1,000 – 1,540	2,000 – 7,000	410	-	350	-	-	4	123		
2017A	T4, T451	6.0	12.5	1,000 – 1,540	2,000 – 4,000	390	-	260	-	13	-	111
		12.5	40.0	1,000 – 1,540	2,000 – 6,000	390	-	250	-	-	12	110
		40.0	60.0	1,000 – 1,540	2,000 – 7,500	385	-	245	-	-	12	108
		60.0	80.0	1,000 – 1,540	2,000 – 7,500	370	-	240	-	-	7	105
		80.0	120.0	1,000 – 1,540	2,000 – 5,000	360	-	240	-	-	6	105
		120.0	130.0	1,000 – 1,540	2,000 – 5,000	350	-	240	-	-	4	101
2024	T3, T351	6.0	12.5	1,000 – 1,540	2,000 – 4,000	440	-	290	-	13	-	124
		12.5	40.0	1,000 – 1,540	2,000 – 6,000	430	-	290	-	-	11	122
		40.0	80.0	1,000 – 1,540	2,000 – 8,000	420	-	290	-	-	8	120
		80.0	100.0	1,000 – 1,540	2,000 – 7,500	400	-	285	-	-	7	115
		100.0	120.0	1,000 – 1,540	2,000 – 6,000	380	-	270	-	-	5	110
		120.0	130.0	1,000 – 1,540	2,000 – 5,000	360	-	250	-	-	5	104
2124	T851	25.4	50.8	1000 – 1300	2,000 – 4,000	450	-	390	-	-	5	-
		50.8	76.2	1000 – 1300	2,000 – 4,000	445	-	390	-	-	4	-
		76.2	101.6	1000 – 1300	2,000 – 4,000	445	-	385	-	-	4	-

ROLLED PRODUCTS



PLATE

5XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, mm		Width, mm	Length, mm	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min	
		Above	Up to incl.			min	max	min	max	A 50 mm	A		
5052	O, H111	10.0	12.5	1,000 – 1,540	2,000 – 4,000	165	215	65	-	19	-	46	
		12.5	80.0	1,000 – 1,540	2,000 – 6,000	165	215	65	-	-	18	46	
	H32	6.35	25.4	1,000 – 1,540	2,500 – 6,000	215	260	160	-	-	11	-	
	F	12.0	80.0	1,000 – 1,540	2,000 – 6,000	165	-	-	-	-	-	-	
5083	O, H111, H112	6.0	12.5	1,000 – 1,540	2,000 – 4,000	275	350	125	-	12	-	75	
		12.5	50.0	1,000 – 1,540	2,000 – 6,000	275	350	125	-	-	10	75	
	O, H111	50.0	80.0	1,000 – 1,540	2,000 – 8,000	270	345	115	-	-	14	73	
		80.0	120.0	1,000 – 1,540	2,000 – 7,000	260	-	110	-	-	12	70	
		120.0	152.0	1,000 – 1,540	2,000 – 4,000	255	-	105	-	-	12	69	
	H116, H321, H32	6.35	19.05	1,000 – 1,540	2,500 – 6,000	305	385	215	295	-	12	-	
		F	12.0	50.0	1,000 – 1,540	2,000 – 6,000	250	-	-	-	-	-	-
			50.0	152.0	1,000 – 1,540	2,000 – 4,000	250	-	-	-	-	-	-
5086	O, H111	6.0	12.5	1,000 – 1,540	2,000 – 4,000	240	310	100	-	17	-	65	
		12.5	50.0	1,000 – 1,540	2,000 – 6,000	240	310	100	-	-	16	65	
		50.0	152.0	1,000 – 1,540	2,000 – 4,000	240	310	100	-	-	16	65	
	H116	6.35	19.05	1,000 – 1,540	2,500 – 6,000	275	-	195	-	-	8	-	
	F	12.0	50.0	1,000 – 1,540	2,000 – 6,000	240	-	-	-	-	-	-	
		50.0	150.0	1,000 – 1,540	2,000 – 4,000	240	-	-	-	-	-	-	
5754	O, H111	6.0	10.0	1,000 – 1,540	2,000 – 4,000	190	240	80	-	18	-	52	
		10.0	12.5	1,000 – 1,540	2,000 – 6,000	190	240	80	-	18	-	52	
		12.5	50.0	1,000 – 1,540	2,000 – 6,000	190	240	80	-	-	17	52	
		50.0	80.0	1,000 – 1,540	2,000 – 10,000	190	240	80	-	-	17	52	
		80.0	152.0	1,000 – 1,540	2,000 – 10,000	190	240	80	-	-	17	52	

ROLLED PRODUCTS

PLATE

6XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, mm		Width, mm	Length, mm	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min
		Above	Up to incl.			min	max	min	max	A 50 mm	A	
6061	T6, T651	6.0	10.0	1,000 – 1,540	2,000 – 4,000	290	-	240	-	9	-	88
		10.0	12.5	1,000 – 1,540	2,000 – 6,000	290	-	240	-	9	-	88
		12.5	40.0	1,000 – 1,540	2,000 – 6,000	290	-	240	-	-	8	88
		40.0	80.0	1,000 – 1,540	2,000 – 8,000	290	-	240	-	-	6	88
	T6, T651	80.0	100.0	1,000 – 1,540	2,000 – 7,500	290	-	240	-	-	5	88
		100.0	150.0	1,000 – 1,540	2,000 – 5,000	275	-	240	-	-	5	84
6082	T6, T651	6.0	10.0	1,000 – 1,540	2,500 – 4,000	300	-	255	-	9	-	91
		10.0	12.5	1,000 – 1,540	2,000 – 6,000	300	-	255	-	9	-	91
		12.5	60.0	1,000 – 1,540	2,000 – 6,000	295	-	240	-	-	8	89
	T6, T651	60.0	100.0	1,000 – 1,540	2,000 – 7,500	295	-	240	-	-	7	89
		100.0	150.0	1,000 – 1,540	2,000 – 5,000	275	-	240	-	-	6	84
		150.0	175.0	1,000 – 1,540	2,000 – 5,000	275	-	230	-	-	4	83

PLATE

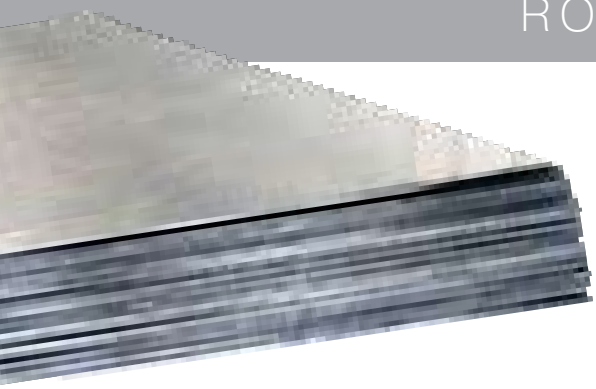
7XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, mm		Width, mm	Length, mm	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min
		Above	Up to incl.			min	max	min	max	A 50 mm	A	
7050	T7451	20.0	100.0	1,000 – 1,300	2,000 – 4,000	496	-	400	-	-	3	-
7075	T6, T651	6.0	12.5	1,000 – 1,540	2,000 – 4,000	540	-	460	-	8	-	160
		12.5	25.0	1,000 – 1,540	2,000 – 8,000	540	-	470	-	-	6	161
		25.0	50.0	1,000 – 1,540	2,000 – 8,000	530	-	460	-	-	5	158
		50.0	60.0	1,000 – 1,540	2,000 – 8,000	525	-	440	-	-	4	155
		60.0	80.0	1,000 – 1,540	2,000 – 7,000	495	-	420	-	-	4	147
		80.0	90.0	1,000 – 1,540	2,000 – 6,000	490	-	390	-	-	4	144
		90.0	100.0	1,000 – 1,540	2,000 – 5,000	460	-	360	-	-	3	135
		T7351	6.0	12.5	1,000 – 1,540	2,000 – 4,000	475	-	390	-	7	-
	12.5		25.0	1,000 – 1,540	2,000 – 8,000	475	-	390	-	-	6	140
	25.0		50.0	1,000 – 1,540	2,000 – 8,000	475	-	390	-	-	5	140
	50.0		60.0	1,000 – 1,540	2,000 – 8,000	455	-	360	-	-	5	133
	60.0		80.0	1,000 – 1,540	2,000 – 7,000	440	-	340	-	-	5	129
	80.0		100.0	1,000 – 1,540	2,000 – 5,000	430	-	340	-	-	5	126
	T7651	6.0	12.5	1,000 – 1,540	2,000 – 4,000	490	-	415	-	7	-	146

Other alloys are possible by request.

ROLLED PRODUCTS



PLATE

Manufacturing according to EN485, ASTM B209, ASTM B928 and a number of AMS, DIN and AA standards.
Chemical composition is according to EN573, ASTM B209, ASTM B928 and AMS 4050.

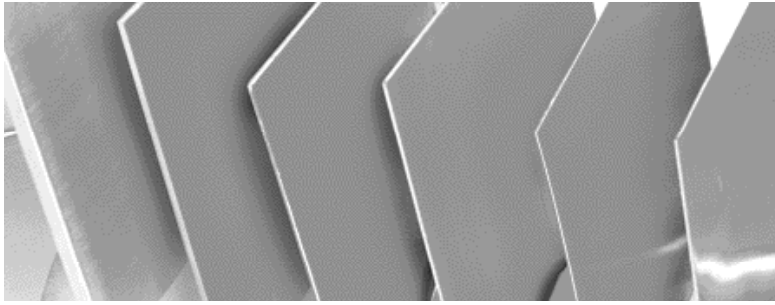
INCHES

2XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, inches		Width, inches	Length, inches	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min
		Above	Up to incl.			min	max	min	max	A 2 inches	A	
										-	-	
2014	T4, T451	0.240	0.495	39.40 – 60.65	98.45 – 157.50	400	-	250	-	14	-	112
		0.495	1.575	39.40 – 60.65	78.75 – 236.25	400	-	250	-	-	10	112
		1.575	3.940	39.40 – 60.65	78.75 – 315.00	395	-	250	-	-	7	111
	T651	0.240	0.495	39.40 – 60.65	98.45 – 157.50	450	-	395	-	7	-	135
		0.495	1.575	39.40 – 60.65	78.75 – 236.25	460	-	400	-	-	6	138
		1.575	2.365	39.40 – 60.65	78.75 – 315.00	450	-	390	-	-	5	135
		2.365	3.150	39.40 – 60.65	78.75 – 315.00	435	-	380	-	-	4	131
		3.150	3.940	39.40 – 60.65	78.75 – 315.00	420	-	360	-	-	4	126
3.940	4.725	39.40 – 60.65	78.75 – 275.60	410	-	350	-	-	4	123		
2017A	T4, T451	0.240	0.495	39.40 – 60.65	78.75 – 157.50	390	-	260	-	13	-	111
		0.495	1.575	39.40 – 60.65	78.75 – 236.25	390	-	250	-	-	12	110
		1.575	2.365	39.40 – 60.65	78.75 – 295.30	385	-	245	-	-	12	108
		2.365	3.150	39.40 – 60.65	78.75 – 295.30	370	-	240	-	-	7	105
		3.150	4.725	39.40 – 60.65	78.75 – 196.85	360	-	240	-	-	6	105
		4.725	5.120	39.40 – 60.65	78.75 – 196.85	350	-	240	-	-	4	101
2024	T3, T351	0.240	0.475	39.40 – 60.65	78.75 – 157.50	440	-	290	-	13	-	124
		0.495	1.575	39.40 – 60.65	78.75 – 236.25	430	-	290	-	-	11	122
		1.575	3.150	39.40 – 60.65	78.75 – 315.00	420	-	290	-	-	8	120
		3.150	3.940	39.40 – 60.65	78.75 – 295.30	400	-	285	-	-	7	115
		3.940	4.725	39.40 – 60.65	78.75 – 236.25	380	-	270	-	-	5	110
		4.725	5.120	39.40 – 60.65	78.75 – 196.85	360	-	250	-	-	5	104
2124	T851	1.000	2.000	39.40 - 51.20	78.75 – 157.50	450	-	390	-	-	5	-
		2.000	3.000	39.40 - 51.20	78.75 – 157.50	445	-	390	-	-	4	-
		3.000	4.000	39.40 - 51.20	78.75 – 157.50	445	-	385	-	-	4	-

ROLLED PRODUCTS



PLATE

5XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, inches		Width, inches	Length, inches	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness, min
		Above	Up to incl.			min	max	min	max	A 2 inches	A	
5052	O, H111	0.395	0.495	39.40 – 60.65	78.75 – 157.50	165	215	65	-	19	-	46
		0.495	3.150	39.40 – 60.65	78.75 – 236.25	165	215	65	-	-	18	46
	H32	0.250	1.000	39.40 – 60.65	98.45 – 236.25	215	260	160	-	-	11	-
	F	0.475	3.150	39.40 – 60.65	78.75 – 236.25	165	-	-	-	-	-	-
5083	O, H111, H112	0.240	0.495	39.40 – 60.65	78.75 – 157.50	275	350	125	-	12	-	75
		0.495	1.970	39.40 – 60.65	78.75 – 236.25	275	350	125	-	-	10	75
	O, H111	1.970	3.150	39.40 – 60.65	78.75 – 315.00	270	345	115	-	-	14	73
		3.150	4.725	39.40 – 59.05	78.75 – 275.60	260	-	110	-	-	12	70
		4.725	6.000	39.40 – 59.05	78.75 – 157.50	255	-	105	-	-	12	69
	H116, H321, H32	0.250	0.750	39.40 – 60.65	98.45 – 236.25	305	385	215	295	-	12	-
		F	0.475	1.970	39.40 – 60.65	78.75 – 236.25	250	-	-	-	-	-
			1.970	6.000	39.40 – 60.65	78.75 – 157.50	250	-	-	-	-	-
5086	O, H111	0.240	0.495	39.40 – 60.65	78.75 – 157.50	240	310	100	-	17	-	65
		0.495	1.970	39.40 – 60.65	78.75 – 236.25	240	310	100	-	-	16	65
		1.970	6.000	39.40 – 60.65	78.75 – 157.50	240	310	100	-	-	16	65
	H116	0.250	0.750	39.40 – 60.65	98.45 – 236.25	275	-	195	-	-	8	-
	F	0.475	1.970	39.40 – 60.65	78.75 – 236.25	240	-	-	-	-	-	-
		1.970	5.905	39.40 – 60.65	78.75 – 157.50	240	-	-	-	-	-	-
5754	O, H111	0.240	0.395	39.40 – 60.65	78.75 – 157.50	190	240	80	-	18	-	52
		0.395	0.495	39.40 – 60.65	78.75 – 236.25	190	240	80	-	18	-	52
		0.495	1.970	39.40 – 60.65	78.75 – 236.25	190	240	80	-	-	17	52
		1.970	3.150	39.40 – 60.65	78.75 – 393.75	190	240	80	-	-	17	52
		3.150	6.000	39.40 – 60.65	78.75 – 393.75	190	240	80	-	-	17	52

ROLLED PRODUCTS

PLATE

6XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, inches		Width, inches	Length, inches	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness,	
		Above	Up to incl.			min	max	min	max	A 2 inches	A	min	
6061	T6, T651	0.240	0.395	39.40 – 60.65	78.75 – 157.50	290	-	240	-	9	-	88	
		0.395	0.495	39.40 – 60.65	78.75 – 236.25	290	-	240	-	9	-	88	
	T651	0.495	1.575	39.40 – 60.65	78.75 – 236.25	290	-	240	-	-	8	88	
		1.575	3.150	39.40 – 60.65	78.75 – 315.00	290	-	240	-	-	6	88	
		T6, T651	3.150	3.940	39.40 – 60.65	78.75 – 295.50	290	-	240	-	-	5	88
			3.940	5.905	39.40 – 60.65	78.75 – 196.85	275	-	240	-	-	5	84
6082	T6, T651	0.240	0.395	39.40 – 60.65	98.50 – 157.50	300	-	255	-	9	-	91	
		0.395	0.495	39.40 – 60.65	78.75 – 236.25	300	-	255	-	9	-	91	
	T651	0.495	2.365	39.40 – 60.65	78.75 – 236.25	295	-	240	-	-	8	89	
		T6, T651	2.365	3.940	39.40 – 60.65	78.75 – 295.50	295	-	240	-	-	7	89
			3.940	5.905	39.40 – 60.65	78.75 – 196.85	275	-	240	-	-	6	84
		5.905	6.890	39.40 – 60.65	78.75 – 196.85	275	-	230	-	-	4	83	

PLATE

7XXX SERIES ALLOYS

TECHNICAL CHARACTERISTICS

Alloy	Temper	Nominal, thickness, inches		Width, inches	Length, inches	Rm, MPa		Rp0.2, MPa		Elongation, %		HB hardness,	
		Above	Up to incl.			min	max	min	max	A 2 inches	A	min	
7050	T7451	0.790	3.940	39.40 – 51.20	78.75 – 157.50	496	-	400	-	-	3	-	
7075	T6, T651	0.240	0.495	39.40 – 60.65	78.75 – 157.50	540	-	460	-	8	-	160	
		0.495	0.985	39.40 – 60.65	78.75 – 315.00	540	-	470	-	-	6	161	
		0.985	1.970	39.40 – 60.65	78.75 – 315.00	530	-	460	-	-	5	158	
		1.970	2.365	39.40 – 60.65	78.75 – 315.00	525	-	440	-	-	4	155	
		2.365	3.150	39.40 – 60.65	78.75 – 275.60	495	-	420	-	-	4	147	
		3.150	3.545	39.40 – 60.65	78.75 – 236.25	490	-	390	-	-	4	144	
		3.545	3.940	39.40 – 60.65	78.75 – 196.85	460	-	360	-	-	3	135	
		T7351	0.240	0.495	39.40 – 60.65	78.75 – 157.50	475	-	390	-	7	-	140
			0.495	0.985	39.40 – 60.65	78.75 – 315.00	475	-	390	-	-	6	140
	0.985		1.970	39.40 – 60.65	78.75 – 315.00	475	-	390	-	-	5	140	
	1.970		2.365	39.40 – 60.65	78.75 – 315.00	455	-	360	-	-	5	133	
	2.365		3.150	39.40 – 60.65	78.75 – 275.60	440	-	340	-	-	5	129	
	3.150		3.940	39.40 – 60.65	78.75 – 196.85	430	-	340	-	-	5	126	
	T7651	0.240	0.495	39.40 – 60.65	78.75 – 157.50	490	-	415	-	7	-	146	

Other alloys are possible by request.

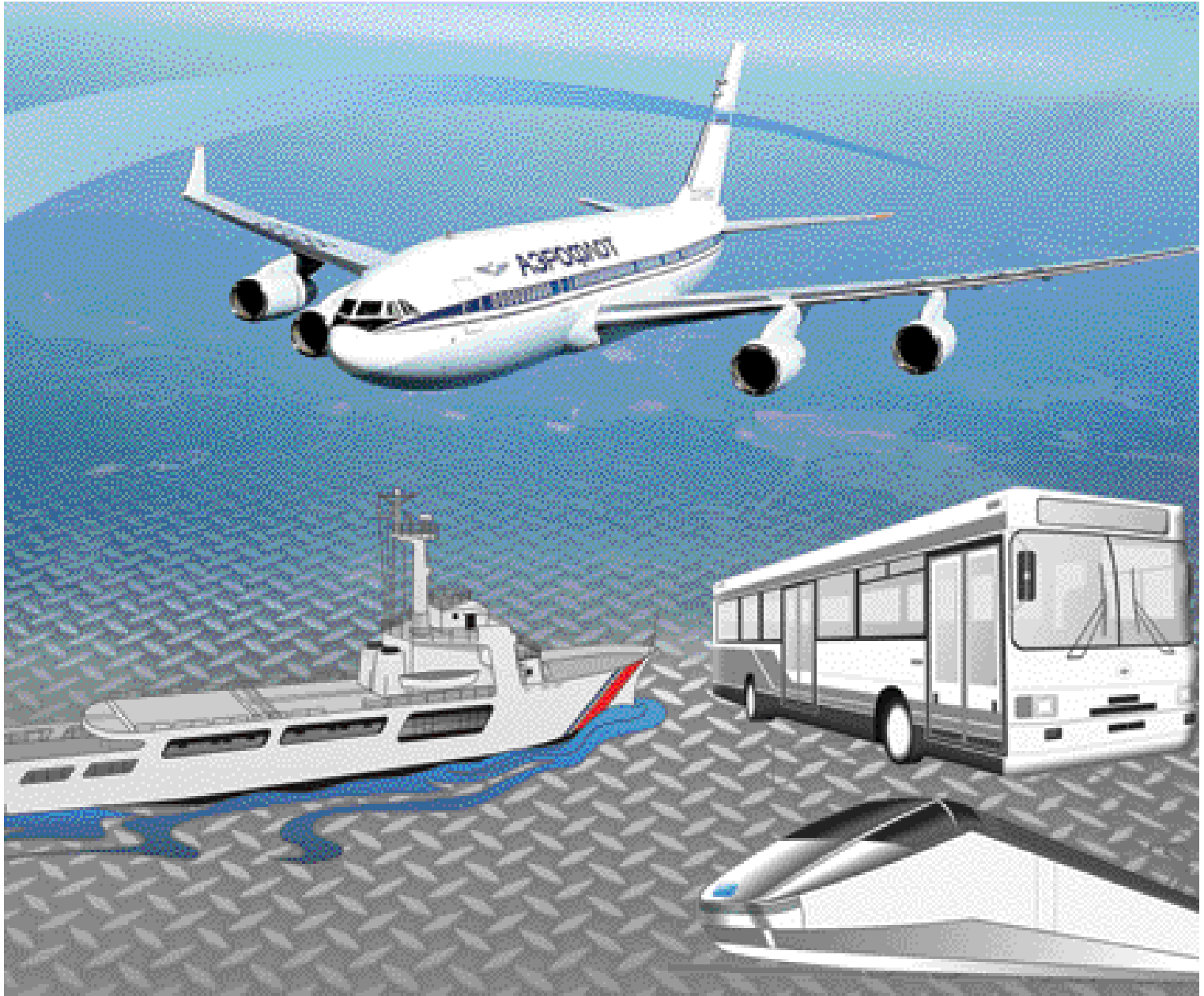
TREAD SHEET & PLATE

According to ASTM B632

Dimensions and characteristics:

- thickness 3.0 – 9.5 mm
- width 1,200 – 1,540 mm
- length 2,000 – 5,000 mm
- alloy 6061 T6

- thickness 0.125 – 0.375 inches
- width 47.25 – 60.65 inches
- length 78.75 – 196.85 inches
- alloy 6061 T6



Applications:

- Sliding resistance (for ship-building)
- Industrial refrigerators and freezers
- Transportation



PLATE PROJECT «CHKALOVSKY»

KUMZ continuously implements new methods and techniques, installs state-of-the-art equipment, develops new products and expands its presence in the world. One of the latest projects at KUMZ is «Plate project» called «Chkalovsky».

New facilities represented by new annealing and aging furnaces, horizontal quenching furnace, stretcher will allow us to manufacture aerospace and commercial plates in 2XXX, 5XXX, 6XXX and 7XXX alloy series.

The Project is scheduled for start-up in December 2007.

Projected annual output is 23,200MT

Dimensions:

- width from 1,000 up to 2,500 mm
- length from 2,000 up to 16,000 mm (with possible extension to 30,000 mm)
- thickness from 6,3 up to 152.4 mm

- width from 39.40 up to 98.45 inches
- length from 78.75 up to 630.00 inches (with possible extension to 1181.10 inches)
- thickness from 0.40 up to 6.00 inches

ALUMINIUM ROLL-BOND® HEAT EXCHANGER PANEL

One of KUMZ businesses is Roll-Bond heat exchanger panels production. (KUMZ produces Roll-Bond heat exchanger panels with one-side and double-side channels.) Roll-Bond panels are used for manufacturing heat exchangers for home household refrigerators and are applied in other spheres where high efficiency of heat-exchanging is needed, for instance, heat receiving panels of solar collectors. There is a complete technological cycle of heat exchangers production at KUMZ which consists of billet casting, strip rolling and production of heat exchangers.

Aluminium Roll-Bond heat exchanger panels production is fully automated. Production is based on Roll-Bond technology. Modern technological line for heat exchanger panels production as well as big experience and potential of KUMZ specialists guarantee product output in conformance with international standards.



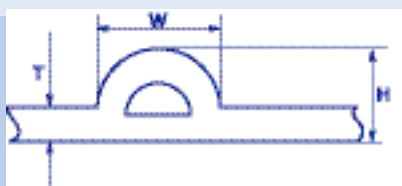
KUMZ PRODUCES ONE-SIDE-FLAT AND DOUBLE-SIDE-INFLATED PANELS



Dimensions and characteristics:

- Material:** ■ Aluminium 1100, 1200, 1050, 1080 according to EN 573-3
- Panel length:** ■ 800 – 4,000 mm ■ 31.5-157.50 inches
- Panel width:** ■ 250 – 1,100 mm ■ 9.84 – 43.31 inches

**Channel section
(flat side)**



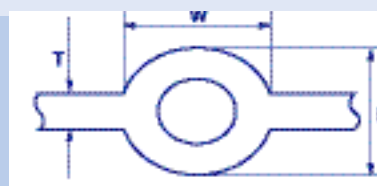
T

W

H

1.3-1.5 mm (0.05-0.06")	7 mm (0.28")	2.2 mm (0.09")
1.3-1.5 mm (0.05-0.06")	9-13 mm (0.35-0.5")	3.0 mm (0.12")
1.3-1.5 mm (0.05-0.06")	14 mm (0.55")	3.0 mm (0.12")

**Channel section
(double side)**



T

W

H

1.1-1.5 mm (0.04-0.06")	5.5 mm (0.22")	3.0 mm (0.12")
1.1-1.5 mm (0.04-0.06")	8-10 mm (0.3-0.4")	4.5 mm (0.2")
1.1-1.5 mm (0.04-0.06")	14 mm (0.55")	4.5 mm (0.2")

Other dimensions are possible by request.

Channel volume tolerance	±5%
Pattern length tolerance	±2%
Pattern shift tolerance	±3%
Pattern tolerance = pattern length tolerance + pattern shift tolerance	

Channel width tolerance:

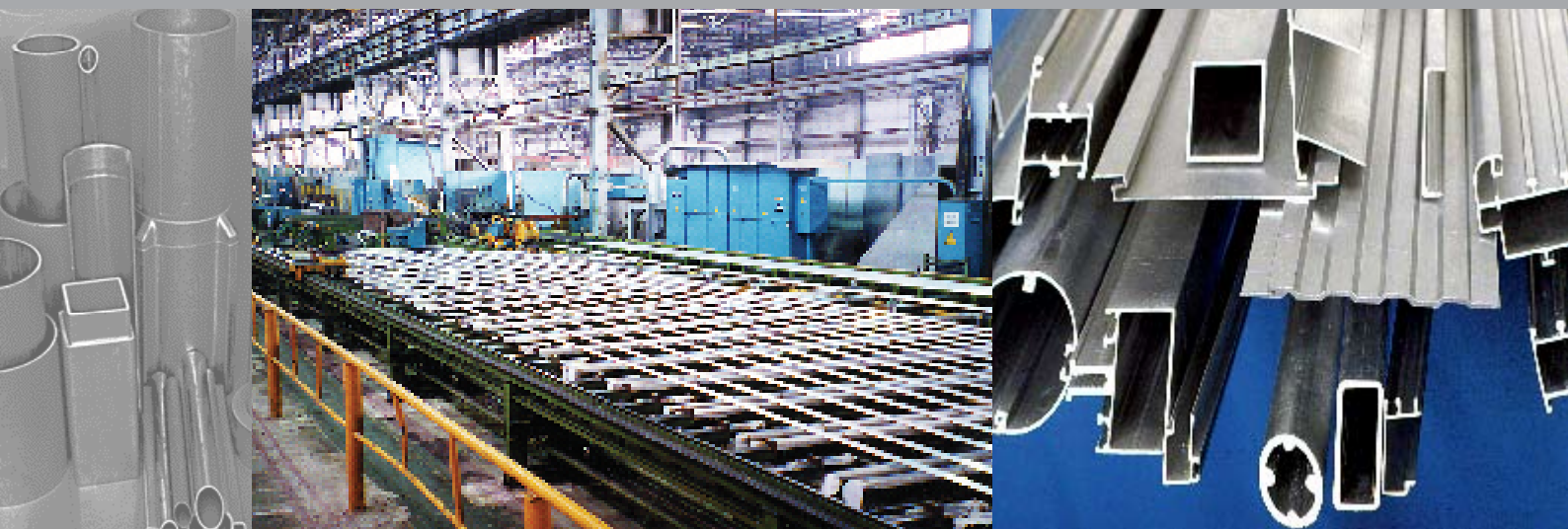
longitudinal direction	±0.5 mm (0.02")
transversal direction	±1.0 mm (0.04")

Minimal internal pressure of panel deformation is 1.6 MPa.

Specific humidity is up to 5 mg per 100 cm³ of internal volume.

Internal surface quality of channels conforms to the requirements of DIN 8964. This allows to use ozone friendly Freon R 134a and R 600 as a coolant.

EXTRUDED PRODUCTS



Production according to EN754, EN755, DIN1746, DIN1747, DIN1748, ASTM B221, ASTM B241, ASTM B211 and BS1474.

Major equipment for extruded products manufacturing:

- horizontal hydraulic extrusion presses with capacity from 500 up to 12,000 tons;
- containers with a diameter of 75 up to 800 mm (2.92" up to 31.50");
- electrical furnaces (induction furnaces for ingot heating, vertical quenching aggregates, pit-type aging furnaces);
- stretchers with capacity from 25 up to 500 tons.

KUMZ manufactures extruded products in 2xxx, 3xxx, 5xxx, 6xxx and 7xxx Al-based alloys.

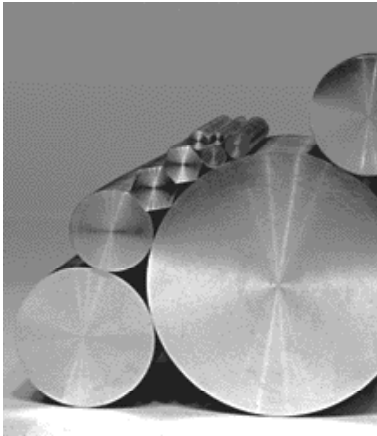
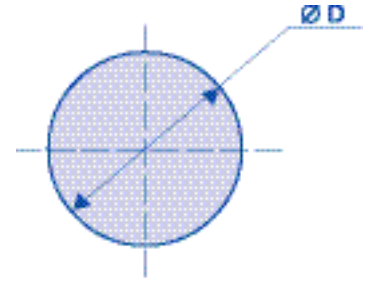
KUMZ supplies:

- extruded rods, square & flat bars;
- tubes and drill pipes;
- solid and hollow profiles (equal and unequal angles, L-bar, T-bar, H-bar, Z-channel etc);
- cold-drawn rods.

State-of-the-art on-site tooling production facilities allow KUMZ to manufacture semi-finished products in new shapes and sizes.

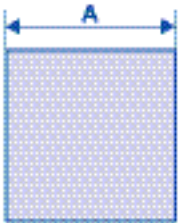
Standard sizes and lengths are shown in the tables below.

EXTRUDED ROD

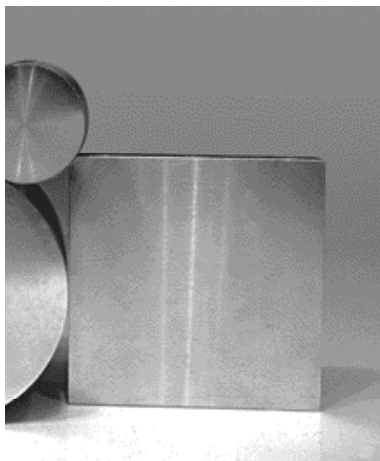


Alloy series	Size				Length			
	Metric/mm		Inches		Metric/mm		Inches	
	min. diameter (D)	max. diameter (D)	min. diameter (D)	max. diameter (D)	min.	max.	min.	max.
2XXX	8	450 incl.	0.375	17.75	2,000	6,000	78.75	236.25
6XXX	8	533.4 incl.	0.375	21.00	2,000	6,000	78.75	236.25
7XXX	8	431.8 incl.	0.375	17.00	2,000	6,000	78.75	236.25

Other sizes are possible by request.



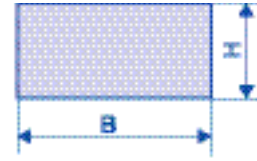
EXTRUDED SQUARE BAR



Alloy series	Size				Length			
	Metric/mm		Inches		Metric/mm		Inches	
	min. (A)	max. (A)	min. (A)	max. (A)	min.	max.	min.	max.
2XXX	12	304.8 incl.	0.50	12.00	2,000	3,800	78.75	149.61
6XXX	12	406.4 incl.	0.50	16.00	2,000	3,800	78.75	149.61
7XXX	12	304.8 incl.	0.50	12.00	2,000	3,800	78.75	149.61

Other sizes are possible by request.

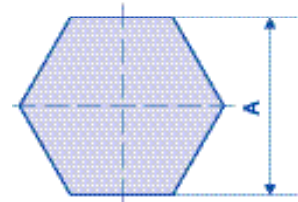
EXTRUDED FLAT BAR



Size								Length			
Metric/mm				Inches				Metric/mm		Inches	
min. thickness (H)	min. width (B)	max. thickness (H)	max. width (B)	min. thickness (H)	min. width (B)	min. thickness (H)	min. width (B)	min.	max.	min.	max.
5	20	400.0	480.0	0.25	0.75	15.75	18.90	2,000	6,000	78.75	236.25

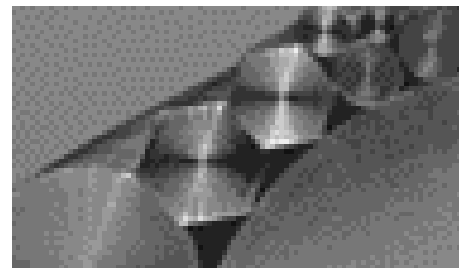
Other sizes are possible by request.

EXTRUDED HEXAGONAL BAR



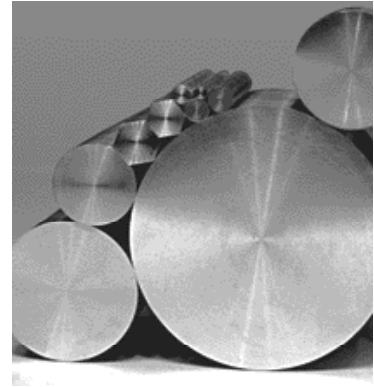
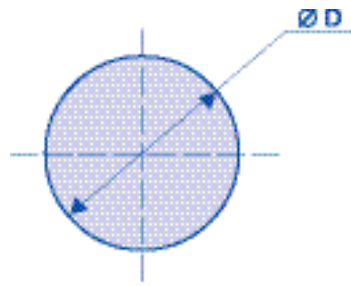
Size					Length			
Alloy series	Metric/mm		Inches		Metric/mm		Inches	
	min. (A)	max. (A)	min. (A)	max. (A)	min.	max.	min.	max.
2007, 2011	24	76.2 incl.	1.00	3.00	2,000	3,800	78.75	149.61
other alloys	12.7	76.2 incl.	0.50	3.00	2,000	3,800	78.75	149.61

Other sizes are possible by request.



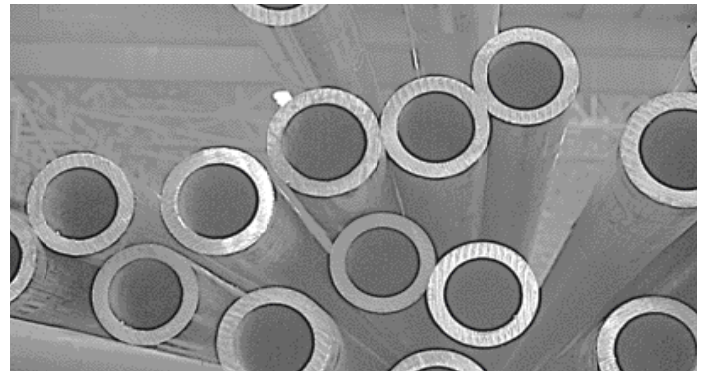
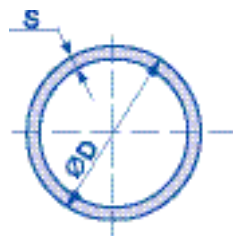
EXTRUDED PRODUCTS

COLD-DRAWN ROD



Alloy series	Size				Length			
	Metric/mm		Inches		Metric/mm		Inches	
	min. diameter (D)	max. diameter (D)	min. diameter (D)	max. diameter (D)	min.	max.	min.	max.
2XXX	19.05	60.00 incl	0.75	2.36	3,000	3,658	118.11	144.02
6XXX	19.05	60.00 incl.	0.75	2.36	3,000	3,658	118.11	144.02
7XXX	19.05	55.00 incl.	0.75	2.17	3,000	3,658	118.11	144.02

EXTRUDED ROUND TUBE



Size								Length			
Metric/mm				Inches				Metric/mm		Inches	
min. diameter (D)	min.wall thickness (S)	max. diameter (D)	max.wall thickness (S)	min. diameter (D)	min.wall thickness (S)	max. diameter (D)	max.wall thickness (S)	min.	max.	min.	max.
25.0	5.00	550.0	80.0	1.00	0.20	21.65	3.15	2,000	6,000	78.75	236.25



ALUMINIUM DRILL PIPE

KUMZ produces aluminium light alloy drill pipes (LDP) according to GOST 23786-79 (ISO 5226-85), ISO 15546-2002 and oil pipelines as well. Pipes are produced in D16T, 1953T1, 2024T3 alloys and with Sc (501, 502 alloys). Drill pipe production operation procedure which has been implemented at KUMZ is considered to be state-of-the-art in this production field. KUMZ produces drill pipes featuring external and internal upsets, protective thickening, heavy-weight and integral-joint pipe. Unique drill pipes design is possible by customer's request.

The application of LDP in oil & gas industry, in difficult land surface areas access and shelf zone has required performance characteristics improvement. Utilization of LDP provides a significant technical-and-economic effect. This allows to refuse expensive and heavy-weight drilling rigs utilization when using LDP. It has become possible to carry out drilling at the same depth using light alloy drilling rigs. Moreover, utilization of LDP for ultradeep drilling allows to improve a technology, for example, using LDP instead of steel pipes for well drilling with drilling mud allows to reduce drill string weight by 4-8 times. Unit weight reduction helps to prevent drilling equipment wearing during tripping.



LDP MECHANICAL PROPERTIES:

DRILL PIPE WITH EXTERNAL UPSET

OD, mm	131	164	168
Length, mm	8,400 – 13,800		

OD, inch	5.157	6.456	6.614
Length, ft	27.558 – 45.275		

DRILL PIPE WITH INTERNAL UPSET

OD, mm	76	90	103	129	147	168
Length, mm	8,400 – 13,800					

OD, inch	2.992	3.543	4.055	5.078	5.787	6.614
Length, ft	27.558 – 45.275					

DRILL PIPE WITH PROTECTOR

Base OD, mm	Protector OD, mm	Wall thickness, mm		
		end	base	protector
129	150	17	11	21.5
147	172	17	11	23.5
168	185	20	11	25.5

Base OD, inch	Protector OD, inch	Wall thickness, inch		
		end	base	protector
5.078	5.905	0.669	0.433	0.846
5.787	6.771	0.669	0.433	0.925
6.614	7.283	0.787	0.433	1.003

LDP MECHANICAL PROPERTIES:

LIGHT ALLOY INTEGRAL JOINT PIPE – HEAVY WEIGHT

Parameters	Type of HW ADP		
	HW ADP 146x36	HW ADP 172x35	HW ADP 150x25
Length, mm	8,000	6,000	8,000
Wall thickness, mm	36	35	25
OD, mm	146	172	150
ID, mm	74	102	100

Parameters	Type of HW ADP		
	HW ADP 146x36	HW ADP 172x35	HW ADP 150x25
Length, ft	26.246	19.684	26.246
Wall thickness, inch	1.417	1.377	0.984
OD, inch	5.748	6.771	5.905
ID, inch	2.913	4.015	3.937

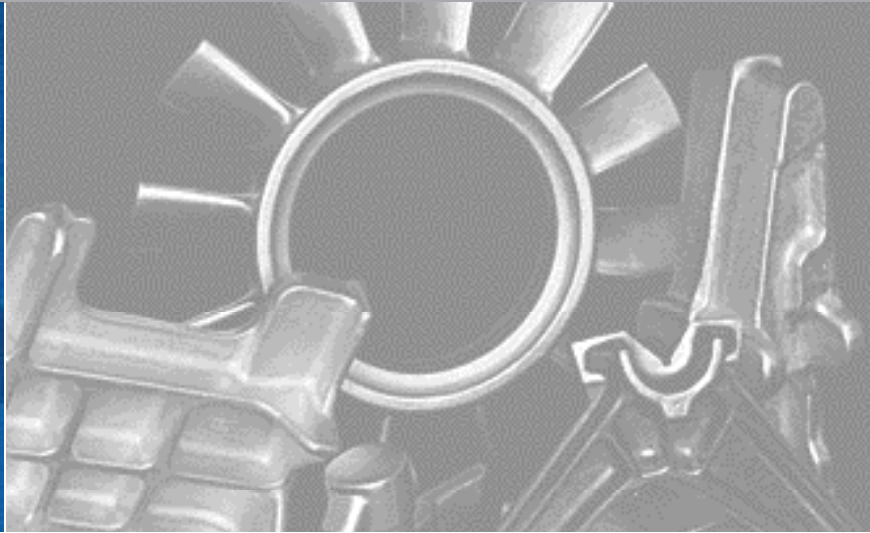
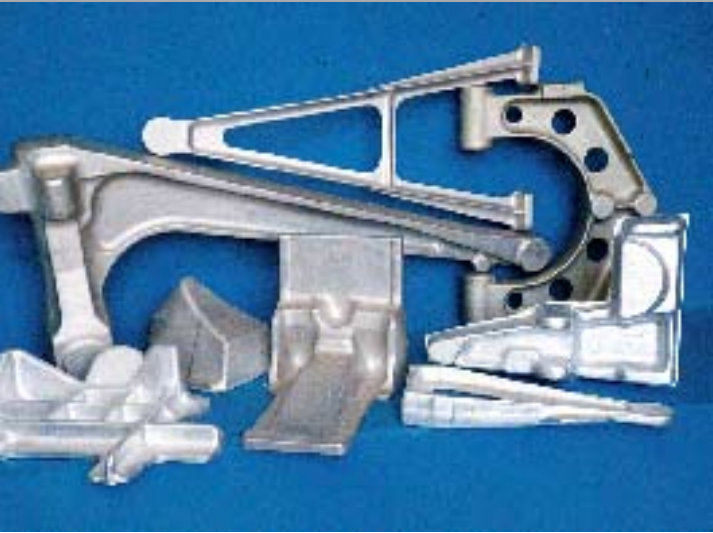
LIGHT-ALLOY FLUSH-JOINT TUBING PERFORMANCE PARAMETERS

Parameters	Type		
	LNKT 74x8	LNKT103x9	LNKT 114x10
Length, mm	9,000	9,000	9,000
Wall thickness, mm			
Tube body	8.0	9.0	10.0
External upset ends	16.0	18.0	20.0
Length of upset ends, mm	250	250	250
Outside diameter, mm			
Tube body	74.0	103.0	114.0
Upset end	90.0	122.0	134.0

Parameters	Type		
	LNKT 74x8	LNKT103x9	LNKT 114x10
Length, ft	29.527	29.527	29.527
Wall thickness, inch			
Tube body	8.0	0.314	0.393
External upset ends	16.0	0.629	0.787
Length of upset ends, mm	250	0.820	0.820
Outside diameter, inch			
Tube body	74.0	2.913	4.488
Upset end	90.0	3.543	5.275



FORGED PRODUCTS



KUMZ forging production is represented by two forging workshops which are equipped with the following forging and die-forging facilities:

- hydraulic vertical die-forging presses ranging from 1,250 up to 30,000 tons;
- 1 hydraulic forging press with capacity of 6,000 tons;
- 1 radial ring rolling mill;
- horizontal hydraulic presses for preparatory operations (3,500 tons; 5,000 tons; 12,000 tons).

Original ingots are heated in inductive electrical furnaces before extruding and in electrical furnaces with induced air circulation before forging and die-forging operations.

KUMZ manufactures the following forged products:

- die-forgings with projection area ranged from 100 up to 12,500 square cm (39.40 – 4921.25 square inches), weight from 0.1 kg up to 1,500 kg;
- rolled rings with diameter up to 4,500 mm (177.17"), height up to 600 mm (23.62"), weight up to 3,000 kg.

Some applications of KUMZ forged products are as follows:

- aircraft fuselage and wing parts;
- aircraft bulkheads;
- aircraft wheel hubs and flanges;
- aircraft propeller blades;
- die-forged shells;
- combustion engine pistons;
- automobile suspension arms;
- axle bearing for railway wheel pairs;
- car & truck wheel-forgings.

FORGED PRODUCTS



KUMZ manufactures forged products according to a number of national and international standards such as BS 1472, DIN 1749, AMS 412G, ASTM B 247-02a, ASTM B 91-97.

DIE-FORGINGS IN AL-BASED ALLOYS.

Chemical composition and mechanical properties according to ASTM B247-02a.

Alloy grade Temper	Thickness, mm	Thickness, inches	Mechanical properties		
			Rm, ksi, min	Rp0.2, ksi, min	Elongation,%
2014 T6	Up to 25.40 incl.	Up to 1.000 incl.	65.0	56.0	6
	25.43 – 50.80	1.001 – 2.000	65.0	56.0	6
	50.83 – 76.20	2.001 – 3.000	65.0	55.0	6
	76.23 – 101.60	3.001 – 4.000	55.0	40.0	7
2618 T6	Up to 101.60 incl.	Up to 4.000 incl.	58.0	45.0	4
5083 O	Up to 101.60 incl.	Up to 4.000 incl.	42.0	22.0	14
6061 T6	Up to 101.60 incl.	Up to 4.000 incl.	38.0	35.0	7
7050 T74	Up to 50.80 incl.	Up to 2.000	72.0	62.0	7
	50.83 – 101.60	2.001 – 4.000	71.0	61.0	7
	101.63 – 127.00	4.001 – 5.000	70.0	60.0	7
	127.03 – 152.40	5.001 – 6.000	70	59.0	7
7075 T6	Up to 25.40 incl.	Up to 1.000 incl.	75.0	64.0	7
	25.43 – 50.80 incl.	1.001 – 2.000 incl.	74.0	63.0	7
	50.83 – 76.20 incl.	2.001 – 3.000 incl.	74.0	63.0	7
	76.20 – 101.60 incl.	3.001 – 4.000 incl.	73.0	62.0	7

FORGED PRODUCTS



KUMZ LATEST DEVELOPMENTS:

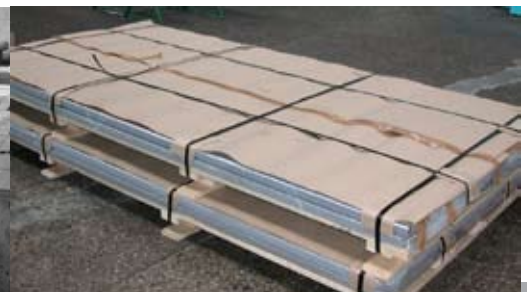
FORGED PLATE & BAR

Forged bar in 2014 T652, 5083 O, 5083 H111, 6061 T652, 7075 T652 and 7075 T7352;
 Forged rod in 2014 T6, 5083 O, 5083 H111, 6061 T6, 7075 T6 and 7075 T73.

Diameter/Side, mm	Maximum length, mm	Diameter/Side, inches	Maximum length, inches
300 – 500	3,000	11.81 – 19.67	118.11
501 – 700	2,500	19.72 – 27.56	98.43

Forged plate/block in 2014 T652, 5083 O, 5083 H111, 6061 T652, 7075 T652 and 7075 T7352.

Thickness, mm	Maximum format, mm	Thickness, inches	Maximum format, inches
150 – 250	1,400 x 3,600	5.91 – 9.84	55.12 – 141.73
251 – 300	1,200 x 3,500	9.88 – 11.81	47.24 – 137.80
301 – 350	1,300 x 3,000	11.85 – 13.78	51.18 – 118.11
351 – 400	1,300 x 2,800	13.82 – 15.74	51.18 – 110.24
401 – 450	1,300 x 2,500	15.79 – 17.71	51.18 – 98.43
451 – 500	1,500 x 2,000	17.76 – 19.69	59.06 – 78.75
501 - 700	1,400 x 1,600	19.72 – 27.56	55.12 – 63.00





ROLLED RINGS

KUMZ manufactures rolled rings in the following alloys: 2014, 2017, 2219, 2618, 5083, 6061, 6082 and 7075. Other alloys are also possible by request.

KUMZ manufactures rolled rings in accordance with international standards: ASTM-B247-02a, AMS-QQ-A 367, AMS4127, AMS4133, AMS4310, AMS4312, AMS4314, AMS4132 and customers' specifications.

RANGE OF SUPPLY:

OD, metric/mm	Height, mm	OD, inches	Height, inches
550 – 1,500 +/- 1	100 – 380 +/- 1	21.6 – 59 +/- 0.04	6 – 15 +/- 0.04
1,501 – 2,500 +/- 2	300 – 600 +/- 1.5	59.1 – 98 +/- 0.08	11.8 – 23.6 +/- 0.06
Wall thickness:	50 – 250	Wall thickness:	2 - 10

Height must be larger than wall thickness.



RESEARCH AND DEVELOPMENT CENTRE

One of the most important advantages of KUMZ is its on-site Research and Development Centre (R&D Centre). R&D Centre provides the opportunity to control the entire production cycle of semi-finished products from preparing an alloy in the casting furnace to carrying out a variety of tests and analyses, and further research works with new applications and materials.

R&D Centre specialists in casting, rolling, extrusion and forging productions continuously develop new products and alloys, control preproduction of new products, take part in development of new and modernization of present technological processes, design 3D models, work out computer simulations of technological processes.

R&D Centre utilizes the following CAD-CAM-CAE systems for computer simulation, forging processes simulation, making drawings and creation of software applications for CNC machines: «POWER SHAPE», «POWER MILL», «SOLID WORKS», «CIMATRON-IT», «DEFORM-3D».

Being a part of R&D Centre, Central Laboratory at KUMZ performs a number of tests and analyses:

Analytical Control

- spectrographic analysis
- chemical analysis
- gas detection analysis

Metal physics testing

- microstructure testing (grain size, plate thickness), corrosion testing (exfoliation corrosion, stress corrosion etc.), X-ray diffraction analysis
- semi-fabricated products in Al-based and Mg-based alloys testing (tensile test, yield point, elongation and compression; Brinell, Rockwell hardness test, creep-rupture test, bending test, fracture toughness test, impact toughness test)
- macrostructure testing.

NDT is performed to control material homogeneity.

Combination of all these allows KUMZ to guarantee product and production processes quality.

For aerospace and defence industries and applications, R&D Center continuously develops new and special products such as rolled and extruded products in Al-Li alloys, Mg alloys etc.



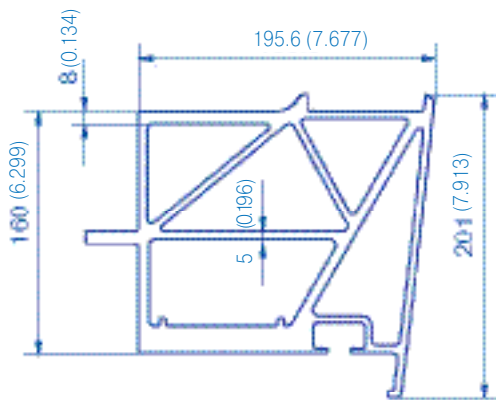
WIDE EXTRUDED SECTION

Production according to EN755.

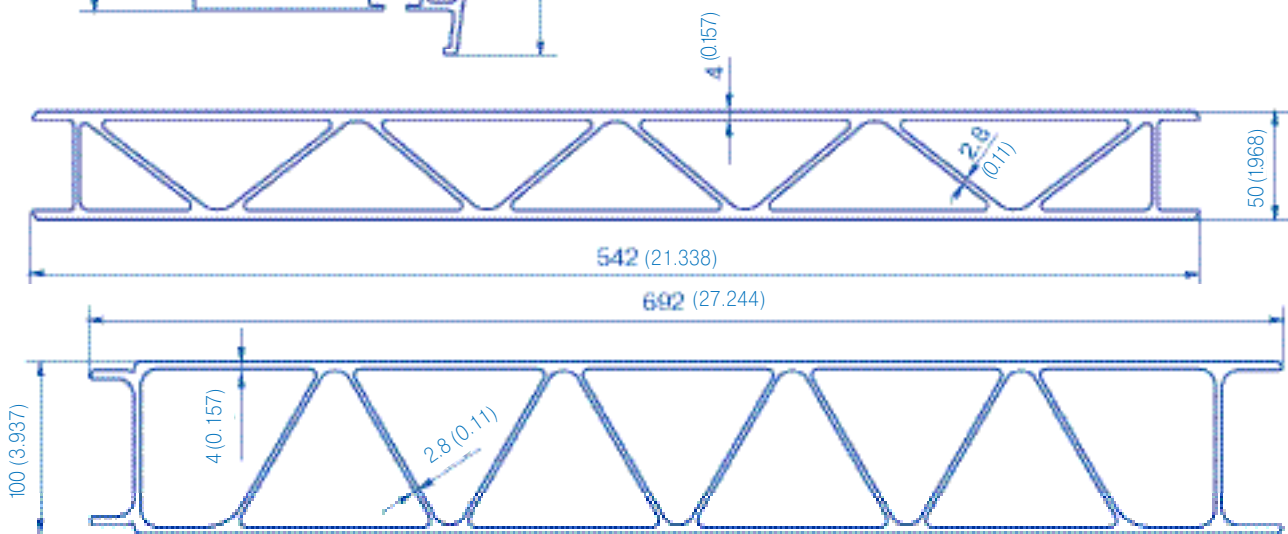
Production of wide extruded sections started at KUMZ in 2005. Production line includes large extrusion press, flat-oval press container, stretcher, cutter, handling racks and storage shelves. Initially designed for structures of passenger trains, sections also found usage for car and truck decks in ferries and multi-chamber panels for refrigerators.

Supplied in traditional commercial alloys, sections have max width 750 mm, more than most producers can offer.

* Max. size depends on the extrusion shape.



Alloys	6005A, 6082	6005A, 6082
Width	Up to 750 mm*	Up to 29.53 inches*
Height	Up to 150 mm*	Up to 5.91 inches*
Wall thickness	Min. 2.5 mm	Min. 0.1 inches



EXTRUDED PRODUCTS IN MG ALLOYS

KUMZ produces extruded products in Mg alloys AZ31B, ZK60A, Z80A in accordance with GOST 18351-73 and ASTM B107:

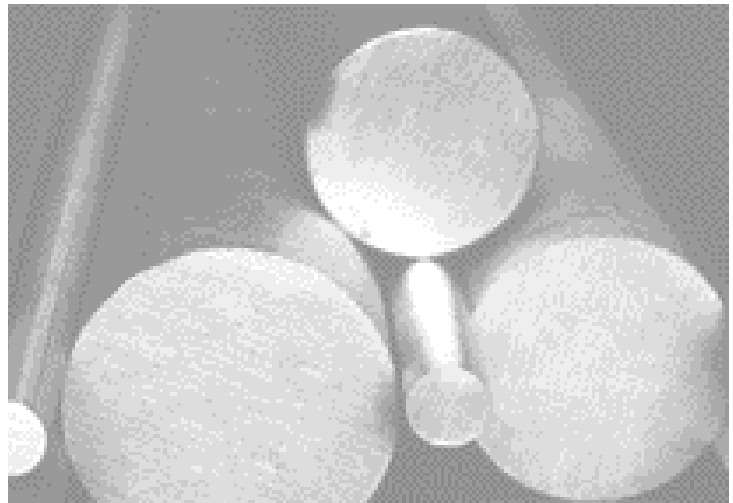
EXTRUDED FLAT BAR

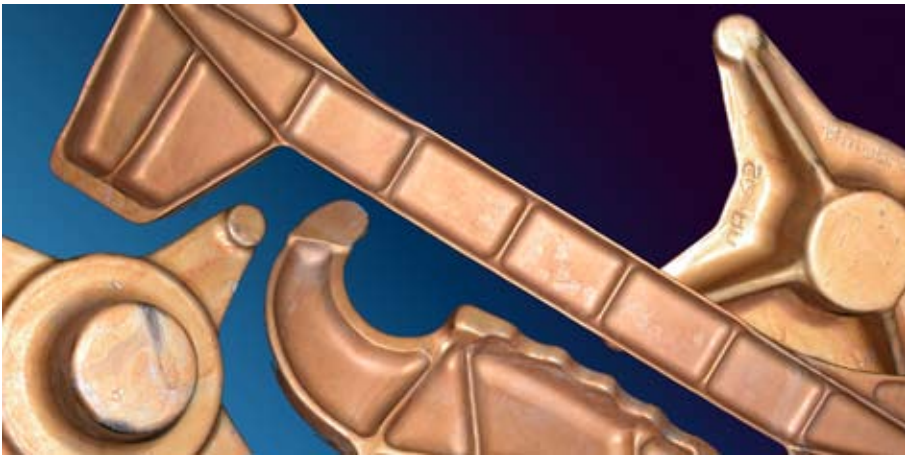
Alloy series	Width		Max. ratio of thickness/width
	Metric, mm	Inches, mm	
6xxx 2xxx, 7xxx	From 100 up to 220 incl.	From 3.95 up to 8.66 incl.	20/1 13/1
6xxx 2xxx, 7xxx	From 220 up to 360 incl.	From 8.66 up to 14.17 incl.	18/1 13/1

EXTRUDED ROD

Diameter of rod varies from 50 mm up to 370 mm (1.97 up to 14.57 inches, incl.).

Diameter, metric/mm	Diameter, inches
152.4	6.00
160	6.30
177.8	7.00
190	7.50
200	7.90
210	8.30
220	8.70
240	9.45
250	9.84
260	10.25
300	11.81
370	14.57





DIE-FORGINGS IN MG ALLOYS

- production of die-forgings in Mg alloys for aircraft and sports car wheels;
- production of large conic shells with diameter up to 2,500 mm (98.43")

TECHNICAL CHARACTERISTICS

Alloy grade/Temper		Weight, kg	Mechanical properties		HB Brinell hardness, min
ASTM B91-97	GOST 14957-76		Ultimate strength, MPa	Elongation, %	
AZ61A	MA2-1	Up to 30	245	7	490
		30...100	245	7	490
ZK60A T5	MA 14 T1	Up to 30	295	7	635
		30...100	275	7	590
		Over 100	265	6	590
	MA 15	Up to 30	275	5	590
		30...100	255	4	540



AL-LI ALLOYS

Al-Li alloys at KUMZ: 1420, 1421, 1424, 1430, 1441, 1450, 1451, 1460, 1461, 1464.

SHEET & PLATE

Metric

Alloy grade/Temper	Thickness, mm	Width, mm	Length, mm
Sheet			
1420 T	1.2 – 10.0	1,000 – 1,200	2,000 – 4,000
1421* T1	2.5 – 6.0	1,000 – 1,200	2,000 – 4,000
1424* T	1.2 – 6.0	1,000 – 1,200	2,000 – 4,000
1430* T	1.2 – 6.0	1,000 – 1,200	2,000 – 4,000
1441 T, 1441 T1	0.5 – 10.0	1,000 – 1,400	2,000 – 6,000
1441K T, 1441K T1	0.3 – 0.4	1,000 – 1,400	2,000 – 4,000
1451 T	2.0 – 6.0	1,000 – 1,200	2,000 – 4,000
1460* T	1.2 – 6.0	1,000 – 1,200	2,000 – 4,000
1461* T	1.2 – 6.0	1,000 – 1,200	2,000 – 4,000
1464* T1	1.2 – 6.0	1,000 – 1,200	2,000 – 4,000
Plate			
1420 T	12.0 – 40.0	1,200 – 1,600	2,000 – 7,000
1421* T	12.0 – 25.0	1,200 – 1,600	2,000 – 7,000
1440 T	20.0 – 55.0	1,200 – 2,100	6,000 – 8,000
1450 T	20.0 – 55.0	1,200 – 2,100	6,000 – 8,000
1460* T	20.0 – 55.0	1,200 – 2,100	6,000 – 8,000

*Al-Li alloys with Sc and Zr

K — for composite materials manufacturing

T — quenched, flattened, naturally aged

T1 — quenched, flattened, artificially aged



SHEET & PLATE

Inches

Alloy grade/Temper	Thickness, inches	Width, inches	Length, inches
Sheet			
1420 T	0.05-0.40	39.40-47.24	78.75-157.48
1421* T1	0.1-0.24	39.40-47.24	78.75-157.48
1424* T	0.05-0.24	39.40-47.24	78.75-157.48
1430* T	0.05-0.24	39.40-47.24	78.75-157.48
1441 T, 1441 T1	0.02-0.40	39.40-55.12	78.75-236.22
1441K T, 1441K T1	0.01-0.02	39.40-55.12	78.75-157.48
1451 T	0.08-0.24	39.40-47.24	78.75-157.48
1460* T	0.05-0.24	39.40-47.24	78.75-157.48
1461* T	0.05-0.24	39.40-47.24	78.75-157.48
1464* T1	0.05-0.24	39.40-47.24	78.75-157.48
Plate			
1420 T	0.48-1.57	47.24-63.00	78.75-275.60
1421* T	0.48-1.00	47.24-63.00	78.75-275.60
1440 T	0.79-2.17	47.24-82.68	236.22-315.00
1450 T	0.79-2.17	47.24-82.68	236.22-315.00
1460* T	0.79-2.17	47.24-82.68	236.22-315.00

*Al-Li alloys with Sc and Zr

K — for composite materials manufacturing

T — quenched, flattened, naturally aged

T1 — quenched, flattened, artificially aged

EXTRUSION

KUMZ produces rods and bars, tubes and solid profiles with wall thickness of 1.5 mm (0.06 inch) and more in Al-Li alloys 1420, 1424, 1440, 1441, 1450, 1460, 1460.

Standard length is 3,000 mm, however other lengths are possible by request.



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