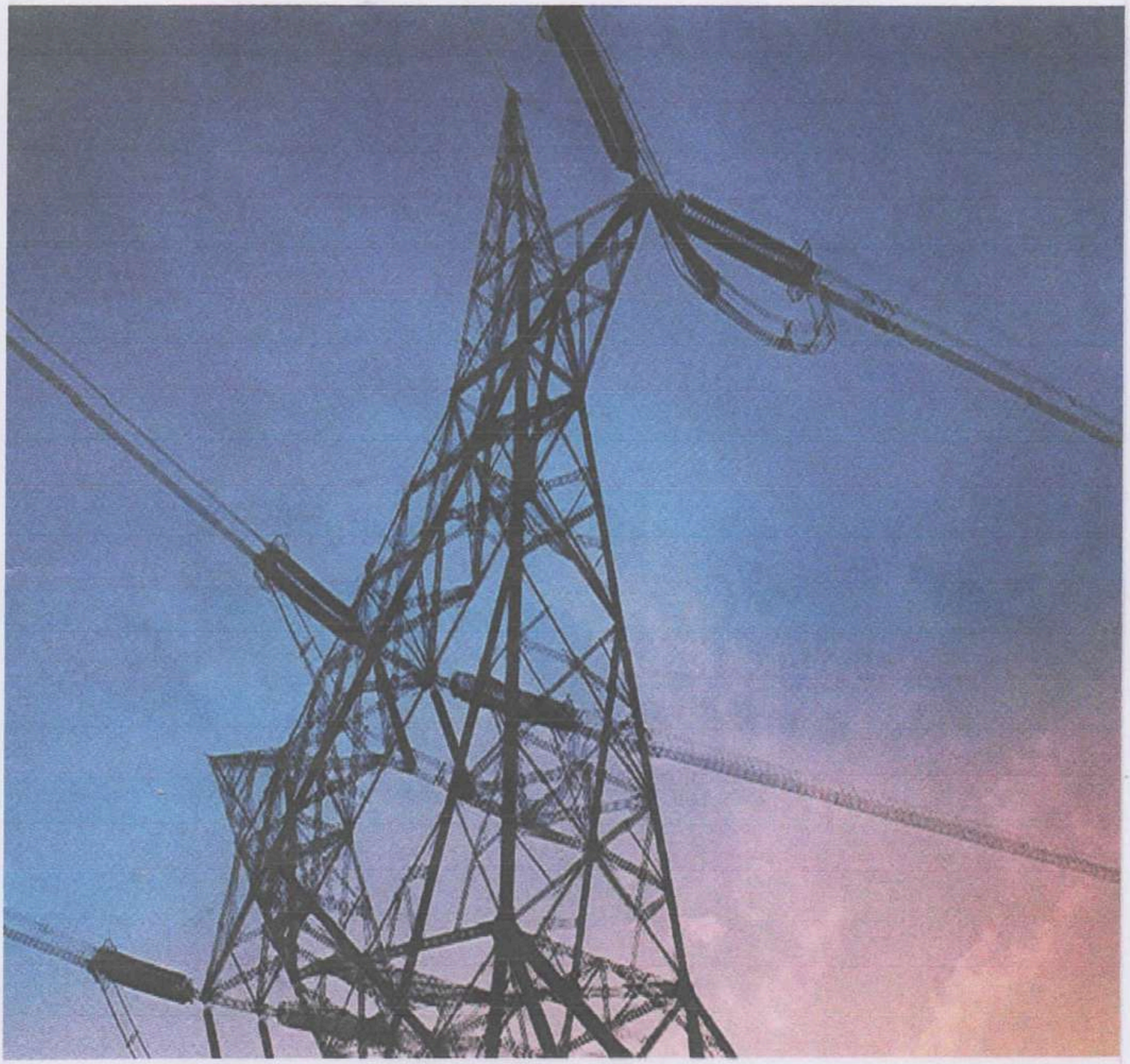
ALUMINIUM
OVERHEAD CONDUCTORS



RAMCO GROUP

SGS UKAS

ASL LIMITED
wire & cable division

FLAME RETARDANT
IEC 60332-01

www.ramco-group.com

Introduction

ASL wire & cable division manufactures overhead line conductors for all kinds of electrical transmission and distribution systems.

We supply all aluminium conductors and Aluminium Conductor Steel Reinforced to Kenyan, British or other standards. We also supply conductors with PVC insulation.

We manufacture these conductors in our aluminium factory where we closely co-ordinate wire drawing, stranding and corrosion prevention to ensure the highest product quality.

Manufacturing STANDARDS

ASL wire & cable division manufactures and supplies cable and allied products for the transmission and distribution of electrical energy and information primarily in East Africa. We manufacture over 200 cabling products including aluminium conductors, all to British and Kenya quality standards.

ASL wire & cable division offers a toll manufacturing option to all its customers who can access key raw materials such as copper and aluminium, which are converted at the cost of value addition.

STANDARDS KEBS

KEBS - KSO4-189, KSO4-190
British Standards (BS)
BS 215 Part 1:1970 -Specification for aluminium conductors

International Electro-technical Commission (IEC)
IEC 502-Extruded solid dielectric insulated power cables

MILESTONES

ASL wire & cable division became the first cable company to produce Flame retardant cables in East Africa.

ISO 9001:2015 CERTIFIED

Aluminium conductors- British sizes BS 215 Part 1:1970

Table 1

Code name	Nominal aluminium area	Stranding and wire diameter	Actual area	Overall diameter	Weight	Calculated dc breaking load		Calculated resistance at 20°C	Breaking length	Current rating tropical
	mm²	mm	mm²	mm	kg/km	kN	kgf	ohms/km	km	amp
Midge	22	7/2.06	23.33	6.18	64	3.99	407	1.227	6.36	147
Aphis	25	3.3.35	26.44	7.22	73	4.12	420	1.083	5.68	163
Gnat	25	7/2.21	26.85	6.63	74	4.59	468	1.066	6.32	161
Weevil	30	3/3.66	31.56	7.89	87	4.86	495	0.9070	5.63	181
Mosquito	35	7/2.59	36.88	7.77	101	6.03	614	0.7763	6.08	195
Ladybird	40	7/2.79	42.80	8.37	117	6.87	701	0.6689	5.99	214
Ant	50	7/3.10	52.83	9.30	145	8.28	844	0.5419	5.82	244
Fly	60	7.3.40	63.55	10.20	174	9.90	1010	0.4505	5.80	273
Bluebottle	70	7/3.66	73.65	10.98	202	11.33	1156	0.3887	5.72	299
Earwig	75	7/3.78	78.55	11.34	215	11.94	1217	0.3645	5.66	311
Grasshopper	80	7/3.91	84.05	11.73	230	12.78	1303	0.3406	5.67	325
Clegg	90	7/4.17	95.60	12.51	262	14.53	1482	0.2995	5.66	351
Wasp	100	7/4.39	106.0	13.17	290	16.01	1633	0.2702	5.63	375
Beetle	100	19/2.67	106.4	13.35	293	17.39	1773	0.2704	6.05	376
Bee	125	7/4.90	132.0	14.70	361	19.94	2033	0.2169	5.63	429
Cricket	150	7/5.36	157.9	16.08	432	23.85	2432	0.1813	5.63	479
Hornet	150	19/3.25	157.6	16.25	434	24.70	2519	0.1825	5.80	579
Caterpillar	175	19/3.53	185.9	17.65	511	28.61	2917	0.1547	5.71	530
Chafer	200	19/3.78	213.2	18.90	587	32.41	3305	0.1349	5.63	577
Spider	225	19/3.99	237.6	19.95	654	36.12	3683	0.1211	5.63	617
Cockroach	250	19/4.22	265.7	21.10	731	40.39	4118	0.1083	5.63	661
Butterfly	300	19/4.65	322.7	23.25	888	48.74	4970	0.08916	5.60	746
Moth	350	19/5.00	373.1	25.00	1027	56.36	5746	0.07711	5.59	816
Drone	350	37/3.58	372.4	25.06	1027	57.31	4844	0.07742	5.69	815
Locust	400	19/5.36	428.7	26.80	1180	64.76	6603	0.06711	5.60	890
Centipede	400	37/3.78	415.2	26.46	1145	63.11	6435	0.06944	5.62	972
Maybug	450	37.4.09	486.1	28.63	1340	73.89	7535	0.05931	5.62	961
Scorpion	500	37/4.27	529.8	29.89	1461	80.03	8160	0.05442	5.59	1014
Cicada	600	37/4.65	628.3	32.55	1732	94.90	9678	0.04589	5.59	1127
Tarantula	750	37/5.23	794.9	36.61	2192	120.07	12244	0.03627	5.59	1305

Aluminium conductors steel reinforced (ACSR)

This type of conductor possesses a higher strength-to-weight ratio than AAC and because of this it can be used on longer spans and in more severe weather conditions. It also possesses a higher modulus of elasticity and lower coefficient of thermal expansion both of which enhance its mechanical characteristics. These properties can be varied by altering the aluminium to steel ratio in the stranding geometry.

Higher strength steel can also be used which gives an improved strength-to-weight ratio without affecting any other property.

For a given current rating the cost of ACSR will be greater than AAC but the mechanical advantages it possesses mean it is superior economically when the total line is considered. It is this fact which makes it currently the most commonly used type of conductor.

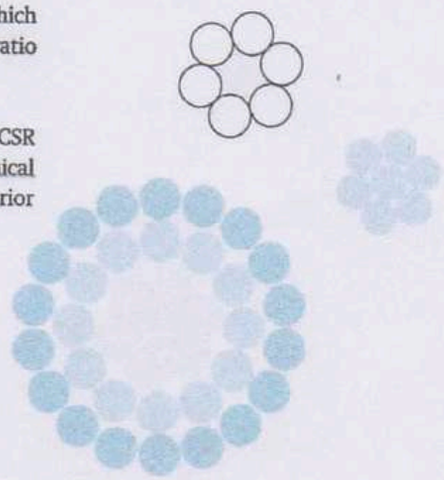


Table 2

Stranding	Practical or final modulus of elasticity		Coefficient of linear expansion at 20°C
	N/mm^2	kg/mm^2	x 10-6/°C
6/1	79400	8096	19.1
7/1	82870	8450	17.7
8/1	98000	9993	16.9
18/1	66000	6730	21.2
36/1	59820	6100	22.0
9/3	88300	9004	17.0
6/7	75500	7699	19.8
7/7	78460	8000	18.4
12/7	104950	10702	15.3
14/7	107900	11003	15.0
24/7	72570	7400	19.6
26/7	75510	7700	18.9
30/7	80240	8200	17.8
45/7	61000	6220	20.9
48/7	62000	6322	20.5
54/7	68650	7000	19.3
72/7	60000	6118	21.7
14/19	109840	11200	15.0
16/19	117700	12002	14.2
30/19	78460	8001	18.0
32/19	80420	8200	17.5
36/19	79040	8060	16.9
54/19	66690	6800	19.4
66/18	66500	6781	18.3
76/19	60800	6200	21.25
84/19	63750	6500	20.6
20+42/19	76500	7800	18.4
54+66/37	78460	8000	18.0

Table 3

Aluminium conductors steel reinforced - British sizes BS 215 Part 2:1970

Code name	Nominal aluminium area	Standing and wire diameter		Actual area			Overall diameter	Weight			Calculated breaking load		Calculated dc resistance at 20oC	Breaking length	Current rating *Tropical
		Aluminium	Steel	Aluminium	Steel	Total		Aluminium	Steel	Total					
	mm2	mm	mm	mm2	mm2	mm2	mm	kg/km	kg/km	kg/km	kgf	kN	ohms/km	km	amp
Mole	10	6/1.50	1/150	10.60	1.77	12.37	4.50	29	14	43	421	4.13	2.707	9.79	92
Squirrel	20	6/2.11	1/2.11	20.98	3.50	24.48	6.33	58	27	85	807	7.91	1.368	9.49	140
Gopher	25	6/2.36	1/2.36	26.25	4.37	30.62	7.08	72	34	106	979	9.60	1.093	9.24	161
Weasel	30	6/2.59	1/2.59	31.61	5.27	36.88	7.77	87	41	128	1167	11.44	0.9077	9.12	181
Fox	35	6/2.79	1/2.79	36.88	6.11	42.99	8.37	101	48	149	1342	13.16	0.7823	9.01	198
Ferret	40	6/3.00	1/3.00	42.41	7.07	49.48	9.00	116	55	171	1553	15.23	0.6766	9.08	217
Rabbit	50	6/3.35	1/3.35	52.88	8.81	61.69	10.05	145	69	214	1872	18.36	0.5426	8.75	248
Mink	50	6/3.66	1/3.66	63.13	10.52	73.65	10.98	173	82	255	2223	21.80	0.4545	8.72	277
Skunk	60	12/2.59	7/2.59	63.22	36.88	100.10	12.95	175	289	464	5396	52.92	0.4568	11.6	287
Beaver	70	6/3.99	1/3.99	75.02	12.50	87.52	11.97	205	98	303	2626	25.78	0.3825	8.67	308
Horse	70	12/2.79	7/2.79	73.36	42.80	116.16	13.95	203	335	538	6240	61.19	0.3936	11.6	315
Raccoon	75	6/4.10	1/4.10	79.22	13.20	92.42	12.30	217	103	320	2774	27.20	0.3622	8.67	318
Otter	80	6/4.22	1/4.22	83.92	13.99	97.91	12.66	230	109	339	2939	28.82	0.3419	8.67	330
Cat	90	6/4.50	1/4.50	95.43	15.90	111.33	13.50	262	124	386	3330	32.66	0.3007	8.63	357
Hare	100	6/4.72	1/4.72	105.00	17.50	122.50	14.16	288	137	425	3666	35.95	0.2733	8.63	379
Dog	100	6/4.72	7/1.57	105.00	13.55	118.55	14.15	288	106	394	3332	32.68	0.2733	8.46	375
Lynx	100	7/4.39	7/1.93	106.00	20.48	126.48	14.57	293	160	453	4183	41.02	0.2728	9.23	382
Cougar	125	18/3.05	1/3.05	131.50	7.31	138.81	15.25	362	57	419	3052	30.03	0.2190	7.31	431
Leopard	125	6/5.28	7/1.75	131.40	16.84	148.24	15.81	361	132	493	4156	40.76	0.2184	8.43	435
Tiger	125	30/2.36	7/2.36	131.20	30.62	161.82	16.52	363	240	603	5914	58.00	0.2203	9.81	438
Dingo	150	18/3.35	1/3.35	158.70	8.81	167.51	16.75	437	69	506	3642	35.72	0.1814	7.2	484
Wolf	150	30/2.59	7/2.59	158.10	36.88	194.98	18.13	437	389	726	7061	69.24	0.1828	9.73	444
Caracal	175	18/3.61	1/3.61	184.20	10.24	194.44	18.05	507	80	587	4191	41.10	0.1563	7.14	530
Lynx	175	30/2.79	7/2.79	183.40	42.80	226.20	10.53	507	335	842	8136	79.79	01576	9.66	538
Jaguar	200	18/3.86	1/3.86	210.60	11.70	222.30	19.30	580	91	671	4749	46.57	0.1367	7.08	576
Panther	200	30/3.00	7/3.00	212.10	49.48	261.58	21.00	586	388	974	9407	92.25	0.1362	9.66	589
Lion	225	20/3.18	7/3.18	238.30	55.60	293.90	22.26	659	436	1095	10248	100.50	0.1213	9.36	633
Bear	250	30/3.35	7/3.35	264.40	61.70	326.10	23.45	731	483	1214	11339	111.20	0.1093	9.34	675
Goat	300	30/3.71	7/3.71	324.30	75.67	399.97	25.97	896	593	1489	13848	135.80	0.08911	9.3	766
Sheep	350	30/3.99	7/3.99	375.10	87.53	462.63	27.93	1037	686	1723	15938	156.30	0.07704	9.25	838
Antelope	350	54/2.97	7/2.97	374.10	48.50	422.60	26.73	1034	380	1414	12084	118.50	0.07727	8.55	828
Bison	350	54/3.00	7/3.00	381.70	49.48	431.18	27.00	1055	388	1443	12328	120.90	0.07573	8.54	839
Deer	400	30/4.27	7/4.27	429.60	100.20	529.80	29.89	1187	785	1972	18202	178.50	0.06727	9.23	912
Zebra	400	54/3.18	7/3.18	428.90	55.60	484.50	28.62	1186	436	1622	13450	131.90	0.06740	8.29	902
Elk	450	30/4.50	7/4.50	477.10	111.30	588.40	31.50	1318	872	2190	20221	198.30	0.06057	9.23	973
Camel	450	54/3.35	7/3.35	476.00	61.70	537.70	30.15	1316	483	1799	14878	145.90	0.06073	8.27	962
Moose	500	54/3.35	7/3.53	528.50	68.51	597.01	31.77	1461	537	1998	16417	161.00	0.054470	8.22	1026

Aluminium alloy conductors - BS EN 50183:2000

Table 4

Code name	Nominal aluminium area	Equivalent copper area	Stranding and wire diameter	Actual area	Overall diameter	Weight	Calculated breaking load		Calculated dc resistance at 20°C	Curent Rating *Tropical
	mm²	mm²	mm	mm²	kg/km	kg/km	N	kgf	ohms/km	amp
-	-	6.45	7/1.47	11.7	4.41	32	3280	335	2.816	48
Box	-	9.68	7/1.85	18.8	5.55	51	5260	536	1.755	55
Acacia	-	12.9	7/2.08	23.9	6.24	66	6710	684	1.375	61
Almond	25	16.1	7/2.34	30.1	7.02	82	8450	862	1.094	85
Cedar	30	19.4	7/2.54	35.5	7.62	97	9950	1015	0.9281	85
-	-	22.6	7/2.77	42.2	8.31	115	11830	1206	0.7799	92
Fir	40	25.8	7/2.95	47.8	8.85	131	13400	1366	0.6880	99
Hazel	50	32.3	7/3.30	59.9	9.9	164	16800	1713	0.5498	113
Pine	-	38.7	7/3.61	71.7	10.83	196	20100	2050	0.4593	119
-	-	45.2	7/3.91	84.1	11.73	230	23570	2404	0.3916	126
Willow	-	48.4	7/4.04	89.8	12.12	246	25180	2568	0.3665	132
-	-	51.6	7/4.19	96.5	12.57	264	27060	2759	0.3410	138
-	-	58.1	7/4.45	108.8	13.35	298	30500	3110	0.3026	145
Oak	100	64.5	7/4.65	118.9	13.95	325	33300	3396	0.2769	150
-	-	64.5	19/2.82	118.8	14.1	326	33300	3396	0.2786	151
Mulberry	-	80.6	19/3.18	151.1	15.9	415	42360	4320	0.2190	166
Ash	150	96.8	19/3.48	180.7	17.4	497	50600	5160	0.1830	181
Elm	175	113	19/3.76	211	18.8	580	59100	6027	0.1568	188
Poplar	-	129	37/2.87	239	20.09	658	67000	6832	0.1387	196
-	-	145	37/3.05	270.8	21.35	746	75900	7740	0.1224	204
Sycamore	-	161	37/3.23	303	22.61	835	85000	8668	0.1094	205
Upas	300	194	37/3.53	362.1	24.71	997	101500	10350	0.09155	209
-	-	226	37/3.81	421.8	26.67	1162	118300	12063	0.0786	216
Yew	-	258	37/4.06	479.9	28.42	1322	134500	13715	0.06908	215

Aluminium-Alloy 6201 Conductors - ASTM B399

Table 5

Conductor size		Requires construction				Mass		Rated strength		Nominal dc resistance at 20°C	
			Dameter of wires								
AWG or MCM	mm²	Number of wires	inch	mm²	Class	lb/1000 ft	kg/km	kips	kN	ohm/1000 ft	ohm/km
-	886	61	0.1694	4.30	AA	1632	2431	56.9	251	0.01151	0.03781
-	759	61	0.1568	3.98	AA	1399	2082	48.8	215	0.01344	0.04414
-	631	61	0.1431	3.63	AA	1165	1732	40.6	179	0.01613	0.05306
-	508	37	0.1644	4.18	AA	932.5	1393	32.9	146	0.02015	0.06597
-	456	37	0.1560	3.96	AA	839.7	1250	29.6	131	0.02238	0.07351
-	404	37	0.1470	3.73	AA	745.6	1109	26.3	116	0.02520	0.08285
-	381	37	0.1424	3.62	AA	699.6	1045	24.7	109	0.02686	0.08796
-	354	37	0.1375	3.49	AA	652.3	971.2	23.0	101	0.02881	0.09464
-	330	37	0.1325	3.37	AA	605.7	905.5	21.4	94.9	0.03102	0.10150
-	303	37	0.1273	3.23	AA, A	559.1	831.9	20.6	91.0	0.03361	0.11049
-	279	37	0.1219	3.10	AA, A	512.7	766.2	18.9	83.9	0.03665	0.11995
-	253	19	0.1622	4.12	AA	466.1	695.0	16.8	74.2	0.04031	0.13224
-	228	19	0.1539	3.91	AA	419.6	626.0	15.1	66.8	0.04478	0.14683
-	203	19	0.1451	3.69	AA, A	373.0	557.5	13.4	59.5	0.05037	0.16486
-	178	19	0.1357	3.45	A	326.3	487.3	11.8	52.0	0.05759	0.18860
-	152	19	0.1257	3.19	A	280.0	416.7	10.5	46.6	0.06712	0.22059
-	126	19	0.1147	2.91	A	233.1	346.7	8.76	38.8	0.08061	0.26509
0000	107	7	0.1739	4.42	AA, A	197.4	294.7	7.34	32.5	0.09519	0.31188
000	84.9	7	0.1548	3.93	AA, A	156.4	233.0	5.82	25.7	0.12013	0.39450
00	67.3	7	0.1379	3.50	AA, A	124.1	184.8	4.62	20.4	0.15137	0.49738
0	53.5	7	0.1228	3.12	AA, A	98.43	146.8	3.82	17.0	0.19089	0.62592
2	33.5	7	0.0974	2.47	AA, A	61.92	92.00	2.40	10.6	0.30343	0.99870
4	21.1	7	0.0772	1.96	A	38.90	57.90	1.51	6.69	0.48300	1.5860
6	13.2	7	0.0612	1.55	A	24.49	36.20	0.949	4.18	0.76856	2.5361