

ALL ALUMINUM CONDUCTOR FOR OVERHEAD POWER TRANSMISSION

Code Name	Nominal Aluminum Area	Equivalent Copper Area	Conductor Construction	Approx. Overall Diameter	Calculated Area	Approx. Weight	Nominal Breaking Load	Max. DC Resistance at 20°C	Current Rating
	mm ²	mm ²	No./mm	mm	mm ²	kg/km	N	Ω/km	Amp
MIDGE	22	14.2	7/2.06	6.2	23.3	64	4000	1.227	72
ANT	50	32.3	7/3.10	9.3	52.8	145	8300	0.5419	112
FLY	60	38.7	7/3.40	10.2	63.6	174	9900	0.4505	124
WASP	100	64.5	7/4.39	13.2	106.0	290	16000	0.2702	158
HORNET	150	96.8	19/3.25	16.3	157.6	434	24700	0.1825	190
CHAFER	200	129	19/3.78	18.9	213.2	587	32400	0.1349	215
COCKROACH	250	161	19/4.22	21.1	265.7	731	40400	0.10830	232
BUTTERFLY	300	194	19/4.65	23.3	322.7	888	48700	0.08916	247
CENTIPEDE	400	258	37/3.78	26.5	415.2	1145	63100	0.06944	262

BS 3242

REFERENCE CODE AAAC

ALL ALUMINUM ALLOY CONDUCTOR FOR OVERHEAD POWER TRANSMISSION

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	mm ²	mm ²	No./mm	mm	mm ²	kg/km	N	Ω/km	Amp
ALMOND	25	16.1	7/2.34	7.02	30.1	82	8450	1.094	85
CEDAR	30	19.4	7/2.54	7.62	35.5	97	9950	0.9281	85
FIR	40	25.8	7/2.95	8.85	47.8	131	13400	0.6880	99
HAZEL	50	32.3	7/3.30	9.90	59.90	164	16800	0.5498	113
OAK	100	64.5	7/4.65	13.95	118.9	325	33300	0.2769	150
ASH	150	96.8	19/3.48	17.40	180.7	497	50600	0.1830	181
ELM	175	113	19/3.76	18.80	211.0	580	59100	0.1568	188
UPAS	300	194	37/3.53	24.71	362.1	997	101500	0.09155	209

TNB SPECIFICATION

REFERENCE CODE ACSR

ALUMINUM CONDUCTOR STEEL REINFORCED FOR OVERHEAD POWER TRANSMISSION

Code Name	Nominal Aluminum Area	Equivalent Copper Area	Conductor Construction		Approx. Overall Diameter	Calculated Area	Approx. Weight	Nominal Breaking Load	Max. DC Resistance at 20°C	Current Rating*
			Aluminum	Steel						
	mm ²	mm ²	No./mm	No./mm	mm	mm ²	kg/km	N	Ω/km	Amp
BATANG	300	197	18/4.78	7/1.68	24.16	323.0	1010	69670	0.08914	178

NOTES:

*THE RATINGS ARE BASED ON THE FOLLOWING CONDITIONS:

1. Wind speed 0.447 m/s
2. Ambient Temperature 35 °C
3. Intensity of solar radiation 1200 W/m²
4. Temperature rise 20 °C

ALUMINUM CONDUCTOR STEEL REINFORCED FOR OVERHEAD POWER TRANSMISSION

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			Aluminum	Steel						
	mm ²	mm ²	No./mm	No./mm	mm	mm ²	kg/km	N	Ω/km	Amp
GOPHER	25	16.1	6/2.36	1/2.36	7.08	30.62	106	9600	1.093	77
WEASEL	30	19.4	6/2.59	1/2.59	7.77	36.88	128	11400	0.9077	84
FERRET	40	25.8	6/3.00	1/3.00	9.00	49.48	172	15200	0.6766	98
RABBIT	50	32.3	6/3.35	1/3.35	10.05	61.70	214	18400	0.5426	112
SKUNK	-	38.7	12/2.59	7/2.59	12.95	63.48	465	53100	0.4565	139
HORSE	70	45.2	12/2.79	7/2.79	13.95	116.2	538	61200	0.3936	148
DOG	100	64.5	6/4.72	7/1.57	14.15	118.5	394	32700	0.2733	153
WOLF	150	96.8	30/2.59	7/2.59	18.13	194.9	726	69200	0.1828	162
DINGO	150	97.9	18/3.35	1/3.35	16.75	167.5	506	35700	0.1815	179
LYNX	175	113.0	30/2.79	7/2.79	19.53	226.2	842	79800	0.1576	178
CARACAL	175	113.7	18/3.61	1/3.61	18.05	194.5	587	41000	0.1563	205
PANTHER	200	129	30/3.00	7/3.00	21.00	261.5	974	92200	0.1363	191
BISON	-	226	54/3.00	7/3.00	27.00	431.3	1444	120900	0.07571	208
JAGUAR	200	130	18/3.86	1/3.86	19.30	222.3	671	46600	0.13670	197
ZEBRA	400	258	54/3.18	7/3.18	28.62	484.5	1621	131900	0.06740	202

ASTM B232

REFERENCE CODE : ACSR

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			Aluminum	Steel						
	mm ²	mm ²	No./mm	No./mm	mm	mm ²	kg/km	N	Ω/km	Amp
CURLEW	525	330	54/3.52	7/3.52	31.68	591.6	1981	162790	0.05531	177

CURRENT RATING CALCULATION FOR ALUMINUM CONDUCTOR STEEL REINFORCED

The following equations can be used to calculate the current rating for ACSR.

$$\text{Current rating } I = \sqrt{\frac{W_s}{(h_w + (h_r - \pi\theta)\eta)\pi D\theta}} \quad \text{Amp-eqn.(1)}$$

Where

1. heat dissipated due to wind velocity,

$$h_w = \frac{0.00572}{(273 + T + \theta/2)^{0.123}} \sqrt{\frac{v}{D}} \quad \text{W/°C cm}^2$$

- v = wind velocity m/s
- D = Conductor diameter cm
- T = Ambient Temperature °C
- θ = Temperature rise °C

2. heat dissipated due to radiation,

$$h_r = 0.000567 \frac{(273 + T + \theta)^4 - (273 + T)^4}{\theta} \quad \text{W/°C cm}^2$$

- W_s = solar radiation = 0.1 W/cm²
- η = black body radiation coefficient = 0.9
- R_a = ac resistance of conductor, Ω/cm
- R_a = K₁K₂R_d

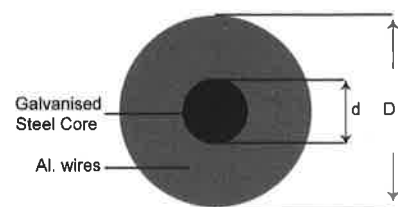
Where

- R_d = dc resistance converted to R at (T+θ)
- R_d = R_t {1 + α (t-t₀)};
- t = T + θ
- α = temp. coeff. at 20°C = 0.004
- t₀ = 20°C
- R_t = dc resistance at 20°C

Continuous Current Rating (Calculation)

ALUMINUM CONDUCTOR STEEL REINFORCED FOR OVERHEAD POWER TRANSMISSION

Cross-Sectional View



Skin effect constant:-

$$K_1 = 0.99609 + 0.018578x - 0.030263x^2 + 0.020735x^3$$

$$x = \left(\frac{D + 2d}{D + d}\right) \times 0.01 \times \sqrt{\frac{8\pi f (D - d)}{(D + d) R_d}}$$

f = frequency in Hz

Iron loss constant:-

$$K_2 = 0.99947 + 0.028895\delta - 0.0059348\delta^2 + 0.00042259\delta^3$$

for ACSR with 3 layers of AL

$$R_a = K_1 K_2 R_d$$

$$\delta = \frac{I}{S} \quad \text{Where } I = \text{current from eqn.(1)}$$

$$S = \frac{\pi}{4} (D^2 - d^2) \text{mm}^2$$