

## DATA SHEET:

## 509 KCMIL\_Flat\_top\_AECC\_TW\_M3\_TS



Governing Units: Metric

Mechanical Specifications	Metric		Imperial	
Fully Annealed Al Cross-sectional Area*	258.08	mm <sup>2</sup>	509.32	kcmil
Encapsulated Aluminum Cross-Sectional Area	70.87	mm <sup>2</sup>	0.10986	in <sup>2</sup>
Diameter of Composite Core (Exclude Encapsulation)	7.0	mm	0.27600	in
Cross-sectional Area of Core (Exclude Encapsulation)	38.50	mm <sup>2</sup>	0.05965	in <sup>2</sup>
Overall Diameter of Conductor	19.888	mm	0.783	in
Cross-sectional Area of the Conductor (Exclude Covering)	296.60	mm <sup>2</sup>	0.45968	in <sup>2</sup>
Ultimate Tensile Strength of Conductor 1) ,2)	121.61	kN	27.34	kip
Rated Strength of Core - 399 ksi (2750 MPa)	105.78	kN	23.78	kip
Core Mass per unit length (Exclude Encapsulation)	67.00	kg/km	45.03	lb/kft
Conductor Mass per unit length	773.76	kg/km	520.03	lb/kft
Fully Annealed Al Mass per unit length (Include Encapsulation)**	706.76	kg/km	475.00	lb/kft
Maximum Emergency Temperature at Surface 3)	200	°C	392	°F
Coefficient of Linear Expansion Above Thermal Kneepoint (core)	0.500	x10 <sup>-6</sup> /°C	0.278	x10 <sup>-6</sup> /°F
Coefficient of Linear Expansion Below Thermal Kneepoint (conductor)	16.630	x10 <sup>-6</sup> /°C	9.239	x10 <sup>-6</sup> /°F
Final Modulus of Elasticity Above Thermal Kneepoint (based on core area)	150.0	GPa	21.8	Msi
Final Modulus of Elasticity Below Thermal Kneepoint (based on conductor area)	68.4	GPa	9.9	Msi
Aluminum Heat Capacity	661.6	Watt-s/m-°C	112.0	Watt-s/ft-°F
Core Heat Capacity	56.9	Watt-s/m-°C	9.6	Watt-s/ft-°F
Encapsulation Thickness	2.40	mm	0.09449	in
Stranding Ratio	1.0200			
Covered Thickness	0.000	mm	0.000	in
Electrical Specifications	Metric		Imperial	
DC Resistance at 20°C (Fully Annealed Al 63% IACS)	0.1076	ohm/km	0.1731	ohm/mile
DC Resistance at 25°C	0.1098	ohm/km	0.1766	ohm/mile
DC Resistance at 75°C	0.1317	ohm/km	0.2120	ohm/mile
Temperature Coefficient of Resistance at 20°C	0.00408	1/°C	0.00227	1/°F
Frequency	60	Hz	60	Hz
AC Resistance at 25°C	0.1104	ohm/km	0.1777	ohm/mile
AC Resistance at 75°C	0.1322	ohm/km	0.2128	ohm/mile
AC Resistance at 180°C	0.1781	ohm/km	0.2866	ohm/mile
Ampacity 4)		1131	@180°C, & A	
		1191	@200°C, & A	
GMR (estimated)	8.13	mm	0.0267	ft
Inductive Reactance (Xa: internal flux+external flux radius 1 ft)	0.2733	ohm/km	0.440	ohm/mile
Capacitive Reactance	0.1634	Mohm-km	0.102	Mohm-mile

\*509 KCMIL\_Flat\_top\_AECC\_TW\_M3\_TS conductor is produced with Fully Annealed Al aluminum. The nominal Aluminum equivalent area is 258.1 sq. mm (509.3 kcmil)

\*\*TS® Conductors are required to exhibit lay lengths (ratios) that conform to established ACSR and ACSS standards.

- 1) Fully Annealed Al rated tensile strength based on applicable standard. Core tensile strength based on 100% of its strength.
- 2) Strength at ambient temperature, Strength may be reduced to Rated Core Strength when temperature is above knee point
- 3) Maximum continuous operating temperature of 509 KCMIL\_Flat\_top\_AECC\_TW\_M3\_TS is 180°C and a maximum emergency temperature of 200°C
- 4). Ampacity based on: 25°C ambient temperature, 2ft/s (0.6 m/s) perpendicular wind, 0.5 Emis 0.5 Absorb. 60 Hz, sea level (0) elevation, 30°N line Azimuth, noon on June 10th (96W/sq.ft, 1033W/sq.m), clear atmosphere

The information contained herein is offered in good faith. All values are nominal unless specifically indicated as maximum or minimum. The actual configuration of a given size may vary between conductor manufacturers and may result in slight variations in some of the indicated values. Data herein is to be considered confidential and proprietary to TS Conductor

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Date Produced:

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