TS Williamson M3 10 (1.545) 2093



Governing Units: Metric

| Fully Annealed Al Cross-sectional Area* 1060.39 mm² 2092.64 kcmil | Governing Units: Metric | | | | |
|--|---|---------|-----------------------|----------|-----------------------|
| Encapsulated Aluminum Cross-Sectional Area 122.52 mm² 0.18991 in² in² cross-sectional Area of Core (Exclude Encapsulation) 10.0 mm 0.39400 in 0.7850 mm² 0.12174 in² in² 0.12174 in² 0.1 | Mechanical Specifications | | | <u> </u> | |
| Diameter of Composite Core (Exclude Encapsulation) 10.0 mm 0.39400 in | Fully Annealed Al Cross-sectional Area* | 1060.39 | mm ² | 2092.64 | |
| Cross-sectional Area of Core (Exclude Encapsulation) 78.50 mm² 0.12174 in² Overall Diameter of Conductor 39.243 mm 1.545 in Cross-sectional Area of the Conductor (Exclude Covering) 1138.90 mm² 1.76535 in² Ultimate Tensile Strength of Conductor 1).2) 277.97 kN 62.49 kip Rated Strength of Core - 399 ksi (2750 MPa) 216.01 kN 48.56 kip Core Mass per unit length (Exclude Encapsulation) 137.00 kg/km 92.08 lb/kft Conductor Mass per unit length (Include Encapsulation)** 2931.18 kg/km 2902.08 lb/kft Fully Annealed AlMass per unit length (Include Encapsulation)** 2931.18 kg/km 1970.00 lb/kft Maximum Emergency Temperature at Surface 3) 200 °C 392 °F Coefficient of Linear Expansion Above Thermal Kneepoint (core) 0.500 x10.6°/C 0.278 x10.6°/C Coefficient of Linear Expansion Below Thermal Kneepoint (based on core area) 150.0 GPa 21.8 Msi Final Mo | Encapsulated Aluminum Cross-Sectional Area | 122.52 | mm ² | 0.18991 | in ² |
| Description | Diameter of Composite Core (Exclude Encapsulation) | 10.0 | mm | 0.39400 | 1 |
| Cross-sectional Area of the Conductor (Exclude Covering) 1138.90 mm² 1.76535 in² Ultimate Tensile Strength of Conductor 1 (.2) 277.97 kN 62.49 kip Rated Strength of Core - 399 ksi (2750 MPa) 216.01 kN 48.56 kip Core Mass per unit length (Exclude Encapsulation) 137.00 kg/km 92.08 lb/kft Conductor Mass per unit length 3068.18 kg/km 2062.08 lb/kft Fully Annealed AlMass per unit length (Include Encapsulation)** 2931.18 kg/km 1970.00 lb/kft Maximum Emergency Temperature at Surface 3) 200 °C 392 °F Coefficient of Linear Expansion Above Thermal Kneepoint (core) 0.500 x10°°/C 0.278 x10°°/F Coefficient of Linear Expansion Below Thermal Kneepoint (based on core area) 150.0 GPa 21.8 Msi Final Modulus of Elasticity Above Thermal Kneepoint (based on conductor area) 61.6 GPa 21.8 Msi Final Modulus of Elasticity Below Thermal Kneepoint (based on conductor area) 150.0 GPa 21.8 Msi | Cross-sectional Area of Core (Exclude Encapsulation) | 78.50 | mm ² | 0.12174 | in ² |
| Ultimate Tensile Strength of Conductor 1),2) | Overall Diameter of Conductor | 39.243 | mm | 1.545 | |
| Rated Strength of Core - 399 ksi (2750 MPa) 216.01 kN 48.56 kip | Cross-sectional Area of the Conductor (Exclude Covering) | 1138.90 | mm ² | 1.76535 | in ² |
| Core Mass per unit length (Exclude Encapsulation) | Ultimate Tensile Strength of Conductor 1) ,2) | 277.97 | kN | 62.49 | kip |
| Conductor Mass per unit length 3068.18 kg/km 2062.08 lb/kft | Rated Strength of Core - 399 ksi (2750 MPa) | 216.01 | kN | 48.56 | kip |
| Fully Annealed AlMass per unit length (Include Encapsulation)** Maximum Emergency Temperature at Surface 3) 200 °C 392 °F Coefficient of Linear Expansion Above Thermal Kneepoint (core) 0.500 x10°6°C 0.278 x10°6°F Coefficient of Linear Expansion Below Thermal Kneepoint (conductor) 19.257 x10°6°C 0.278 x10°6°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) 61.6 GPa 8.9 Msi Aluminum Heat Capacity 2718.2 Watt-s/m-*C 460.3 Watt-s/ft-*F Encapsulation Thickness 3.00 mm 0.11811 in Stranding Ratio 1.0275 Covered Thickness 0.000 mm 0.000 in Electrical Specifications Metric Imperial DC Resistance at 25°C 0.0270 ohm/km 0.0425 ohm/mile DC Resistance at 25°C 0.0324 ohm/km 0.0521 ohm/mile DC Resistance at 25°C 0.00299 ohm/km 0.0482 ohm/mile AC Resistance at 25°C 0.0299 ohm/km 0.0482 ohm/mile AC Resistance at 25°C 0.0349 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0468 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0515 ohm/mile AC Resistance at 180°C 0.0468 ohm/mile | Core Mass per unit length (Exclude Encapsulation) | 137.00 | kg/km | 92.08 | lb/kft |
| Maximum Emergency Temperature at Surface 3 200 °C 392 °F | Conductor Mass per unit length | 3068.18 | kg/km | 2062.08 | lb/kft |
| Coefficient of Linear Expansion Above Thermal Kneepoint (core) 0.500 x10-6/°C 0.278 x10-6/°F | Fully Annealed AlMass per unit length (Include Encapsulation)** | 2931.18 | kg/km | 1970.00 | lb/kft |
| Description Coefficient of Linear Expansion Below Thermal Kneepoint (conductor) 19.257 x10^6/°C 10.699 x10^6/°F | Maximum Emergency Temperature at Surface 3) | 200 | | 392 | °F |
| Final Modulus of Elasticity Above Thermal Kneepoint (based on core area) 150.0 GPa 21.8 Msi | Coefficient of Linear Expansion Above Thermal Kneepoint (core) | 0.500 | x10 ⁻⁶ /°C | 0.278 | x10 ⁻⁶ /°F |
| Final Modulus of Elasticity Below Thermal Kneepoint (based on conductor area) 61.6 GPa 8.9 Msi | Coefficient of Linear Expansion Below Thermal Kneepoint (conductor) | 19.257 | x10 ⁻⁶ /°C | 10.699 | x10 ⁻⁶ /°F |
| Aluminum Heat Capacity 2718.2 Watt-s/m-°C 460.3 Watt-s/ft-°F | Final Modulus of Elasticity Above Thermal Kneepoint (based on core area) | 150.0 | GPa | 21.8 | Msi |
| Core Heat Capacity 116.2 Watt-s/m-°C 19.7 Watt-s/ft-°F Encapsulation Thickness 3.00 mm 0.11811 in Stranding Ratio 1.0275 . | Final Modulus of Elasticity Below Thermal Kneepoint (based on conductor area) | 61.6 | GPa | 8.9 | Msi |
| Stranding Ratio 1.0275 | Aluminum Heat Capacity | 2718.2 | Watt-s/m-°C | 460.3 | Watt-s/ft-°F |
| Stranding Ratio 1.0275 | Core Heat Capacity | 116.2 | Watt-s/m-°C | 19.7 | Watt-s/ft-°F |
| Covered Thickness 0.000 mm 0.000 in Electrical Specifications Metric Imperial DC Resistance at 20°C (Fully Annealed AI 63% IACS) 0.0264 ohm/km 0.0425 ohm/mile DC Resistance at 25°C 0.0270 ohm/km 0.0434 ohm/mile DC Resistance at 75°C 0.0324 ohm/km 0.0521 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 0.0299 ohm/km 0.0482 ohm/mile AC Resistance at 75°C 0.0349 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile Ampacity 4) 2780 @180°C, & A 2945 @200°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | Encapsulation Thickness | 3.00 | mm | 0.11811 | in |
| DC Resistance at 20°C (Fully Annealed AI 63% IACS) 0.0264 ohm/km 0.0425 ohm/mile DC Resistance at 25°C 0.0270 ohm/km 0.0434 ohm/mile DC Resistance at 25°C 0.0324 ohm/km 0.0521 ohm/mile DC Resistance at 75°C 0.0324 ohm/km 0.0521 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 0.0299 ohm/km 0.0482 ohm/mile AC Resistance at 75°C 0.0349 ohm/km 0.0562 ohm/mile AC Resistance at 75°C 0.0453 ohm/km 0.0730 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile Ampacity 4 2780 @180°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile Comparison 0.0453 ohm/km 0.360 ohm/mile Comparison 0.0515 ohm/m | Stranding Ratio | 1.0275 | | | |
| DC Resistance at 20°C (Fully Annealed AI 63% IACS) 0.0264 ohm/km 0.0425 ohm/mile DC Resistance at 25°C 0.0270 ohm/km 0.0434 ohm/mile DC Resistance at 75°C 0.0324 ohm/km 0.0521 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 0.0299 ohm/km 0.0482 ohm/mile AC Resistance at 75°C 0.0349 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile Ampacity 4) 2780 @180°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | Covered Thickness | 0.000 | mm | 0.000 | in |
| DC Resistance at 25°C 0.0270 ohm/km 0.0434 ohm/mile | Electrical Specifications | Metric | | Imperial | |
| DC Resistance at 75°C 0.0324 ohm/km 0.0521 ohm/mile | DC Resistance at 20°C (Fully Annealed Al 63% IACS) | 0.0264 | ohm/km | 0.0425 | ohm/mile |
| Temperature Coefficient of Resistance at 20°C 0.00408 1/°C 0.00227 1/°F | DC Resistance at 25°C | 0.0270 | ohm/km | 0.0434 | ohm/mile |
| Frequency 60 | DC Resistance at 75°C | 0.0324 | ohm/km | 0.0521 | ohm/mile |
| AC Resistance at 25°C | Temperature Coefficient of Resistance at 20°C | 0.00408 | 1/°C | 0.00227 | 1/°F |
| AC Resistance at 75°C 0.0349 ohm/km 0.0562 ohm/mile AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile Ampacity 4) 2780 @180°C, & A 2945 @200°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | Frequency | 60 | Hz | 60 | Hz |
| AC Resistance at 180°C 0.0453 ohm/km 0.0730 ohm/mile Ampacity 4) 2780 @180°C, & A 2780 @200°C, & A 2945 @200°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | AC Resistance at 25°C | 0.0299 | ohm/km | 0.0482 | ohm/mile |
| Ampacity 4) 2780 @180°C, & A 2945 @200°C, & A GMR (estimated) 15.68 mm 0.0515 ft Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | AC Resistance at 75°C | 0.0349 | ohm/km | 0.0562 | ohm/mile |
| 2945 @200°C, & A | AC Resistance at 180°C | 0.0453 | ohm/km | | |
| 2945 @200°C, & A | Ampacity 4) | | 2780 | | |
| Inductive Reactance (Xa: internal flux+external flux radius 1 ft) 0.2237 ohm/km 0.360 ohm/mile | | | 2945 | @200 | °C, & A |
| · · · · · · · · · · · · · · · · · · · | GMR (estimated) | 15.68 | mm | 0.0515 | ft |
| Capacitive Reactance 0.1309 Mohm-km 0.081 Mohm-mile | Inductive Reactance (Xa: internal flux+external flux radius 1 ft) | 0.2237 | ohm/km | 0.360 | ohm/mile |
| | Capacitive Reactance | 0.1309 | Mohm-km | 0.081 | Mohm-mile |

^{*}TS Williamson M3 10 (1.545) 2093 conductor is produced with Fully Annealed Al aluminum. The nominal Aluminum equivaelnt area is 1060.4 sq. mm (2092.6 kcmil)

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

contact: info@tsconductor.com ID:26016 Date Produced: 12/21/2023

^{**}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 TS Williamson M3 10 (1.545) 2093 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