## TS Williamson M3 10 (1.545) 2093



Governing Units: Metric

Mechanical Specifications	Governing Units: Metric					
Encapsulated Aluminum Cross-Sectional Area   122.52   mm²   0.18991   in²   in²   0.18991   in²   in²   0.18991   in²   in²   0.18991   in²   in²	Mechanical Specifications	Metric		Imperial		
Diameter of Composite Core (Exclude Encapsulation)   10.0 mm   0.39400 in	Fully Annealed Al Cross-sectional Area*	1060.39		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)*         3068.18         kg/km         290.08         lb/kft           Fully Annealed AllMass 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°/F           Final Modulus of Elasticity Above Thermal Kneepoint (based on core area)         150.0         GPa         21.8         Msi           Final Modulus of Elasticity Below Thermal Kneepo	Encapsulated Aluminum Cross-Sectional Area	122.52	mm <sup>2</sup>	0.18991	in <sup>2</sup>	
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 Corductor 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         206.08         lb/kft           Conductor Temperature at Surface 3)         200         °C         392         °F           Coefficient of Linear Expansion Above Thermal Kneepoint (core)         0.500         x10°PC         0.278         x10°PF           Coefficient of Linear Expansion Below Thermal Kneepoint (conductor)         19.257         x10°PC         10.699         x10°PF           Final Modulus of Elasticity Above Thermal Kneepoint (based on core area)         150.0         GPa         8.9         Msi           Final Modulus of Elasticity Below Thermal Kneepoint (based on conductor area)         61.6         GPa         8.9         Msi           Aluminum Heat Capacity	Diameter of Composite Core (Exclude Encapsulation)	10.0	mm	0.39400		
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 Corde - 399 ksi (2750 MPa)         216.01         kN         48.56         kip           Core Mass per unit length (Exclude Encapsulation)         137.00         kg/km         2062.08         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)         150.0         GPa         21.8         Msi           Aluminum Heat Capacity         2718.2         Watt-s/m~C         19.7         Watt-s/m~C           Core Heat Capacity <td< td=""><td>Cross-sectional Area of Core (Exclude Encapsulation)</td><td>78.50</td><td>mm<sup>2</sup></td><td>0.12174</td><td>in<sup>2</sup></td></td<>	Cross-sectional Area of Core (Exclude Encapsulation)	78.50	mm <sup>2</sup>	0.12174	in <sup>2</sup>	
Ultimate Tensile Strength of Conductor 1),2  277.97 kN 62.49 kip	Overall Diameter of Conductor	39.243		1.545	I	
Rated Strength of Core - 399 ksi (2750 MPa)	Cross-sectional Area of the Conductor (Exclude Covering)	1138.90	mm <sup>2</sup>	1.76535	in <sup>2</sup>	
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           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°/c           Coefficient of Linear Expansion Below Thermal Kneepoint (conductor)         19.257         x10°/c         10.699         x10°/c           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         Imperial         Imperial           DC Resistance at 20°C (Fully Annealed Al 63% IACS)         0.0264         ohm/km         0.0425         ohm/mile           DC Resistance at 25°C         0.0324         ohm/km	Rated Strength of Core - 399 ksi (2750 MPa)	216.01	kN	48.56	kip	
Fully Annealed AlMass per unit length (Include Encapsulation)**   2931.18 kg/km   1970.00 lb/kft	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           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         10.699         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         21.8         Msi           Aluminum Heat Capacity         2718.2         Watt-s/m-°C         460.3         Watt-s/m-°C         19.7         Watt-s/m-°C	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/PC         0.278         x10 6/P           Coefficient of Linear Expansion Below Thermal Kneepoint (conductor)         19.257         x10 6/PC         10.699         x10 6/P           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           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         1.02	Fully Annealed AlMass per unit length (Include Encapsulation)**	2931.18	kg/km	1970.00	lb/kft	
Coefficient of Linear Expansion Below Thermal Kneepoint (conductor)         19.257         x10°6°C         10.699         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           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	Maximum Emergency Temperature at Surface 3)	200	°C	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 <sup>-6</sup> /°C	0.278	x10 <sup>-6</sup> /°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 <sup>-6</sup> /°C	10.699	x10 <sup>-6</sup> /°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/m²C         19.7         Watt-s/ft-²F           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 20°C (Fully Annealed Al 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,	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         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 </td <td>Core Heat Capacity</td> <td>116.2</td> <td>Watt-s/m-°C</td> <td>19.7</td> <td>Watt-s/ft-°F</td>	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	
Electrical Specifications         Metric         Imperial           DC Resistance at 20°C (Fully Annealed Al 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	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           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	Covered Thickness	0.000	mm	0.000	in	
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	Electrical Specifications	Metric		lmp		
DC Resistance at 75°C   0.0324   0hm/km   0.0521   0hm/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           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	
Ampacity 4)         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 180°C	0.0453	ohm/km			
2945 @200°C, & A	Ampacity 4)		2780	@180°C, & A		
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	

<sup>\*</sup>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: 12/4/2023

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

<sup>1)</sup> Fully Annealed Al rated tensile strength based on applicable standard. Core tensile strength based on 100% of its strength.

<sup>2)</sup> Strength at ambient temperature, Strength may be reduced to Rated Core Strength when temperature is above knee point

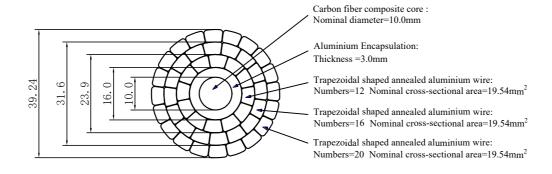
<sup>3)</sup> Maximum continuous operating temperature of TS Williamson M3 10 (1.545) 2093 is 180°C and a maximum emergency temperature of 200°C

<sup>4).</sup> 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

Unit is mm

## TS® Conductor Cross sectional drawing

## Expected value at production time



## TS Conductor Corp.

TS Williamson M3 10 (1.545) ID:26016

Design	
Check	
Ratify	