# Southwire® Machine Flex® CU 600/1000V THHN Insulation Gray TPE Jacket. Silicone-Free

Type TC-ER Machine Tray Control Cable 600/1000 Volt Copper Conductors, Polyvinyl Chloride (PVC) with nylon layer Insulation Thermoplastic Elastomer Jacket, 90°C Dry 75°C Wet -40°C Cold Impact Identification Method 4. Silicone-Free


Image not to scale. See Table 1 for dimensions.

## CONSTRUCTION:

1. **Conductor:** Class K, Flexible stranded bare annealed copper per ASTM B3, B172, and B174
2. **Insulation:** Polyvinyl Chloride (PVC) with nylon layer THHN
3. **Ground:** One Green Ground with Yellow Stripe THHN
4. **Jacket:** Sunlight Resistant Gray Thermoplastic Elastomer TPE: Other jacket colors available upon request

## APPLICATIONS AND FEATURES:

Southwire's Machine Flex® control tray cables 600/1000 Volt conform to NFPA 79 and are suited for use in wet and dry areas, conduits, ducts, troughs, trays, direct burial and where superior electrical properties are desired. These cables are capable of operating continuously at the conductor temperature not in excess of 75°C in wet locations and 90°C in dry locations, 130°C for emergency overload, and 150°C for short circuit conditions. For uses in Class I, II, Division 2 hazardous locations per NEC® Article 501 and 502. Constructions with 3 or more conductors are listed for exposed runs (TC-ER) per NEC® 336.10. Southwire's machine tray cable is ideal for use in CNC machines, grinding, cutting, metal forming, buffing, bottling equipment, conveyors, processing & packaging equipment, assembly lines, control panels, food and beverage, oil sands, plant expansion, wind energy and data centers. Multiple approvals for multiple applications. Cable is rated for -40°C cold impact. Two conductor cables contain no green/yellow ground.

## SPECIFICATIONS:

- ASTM B172 Standard Specification for Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Copper Conductors
- ASTM B174 Standard Specification for Bunch-Stranded Copper
- UL 13 Power-Limited Circuit Cables
- UL 66 Fixture Wire Type TFFN (for sizes 18 and 16 AWG)
- UL 83 Thermoplastic Insulated Wire and Cables (sizes 14 AWG to 1000 kcmil)
- UL 758 AWM Style 2587
- UL 1063 Machine Tool Wiring (MTW)
- UL 1277 TC-ER
- UL 1690 Data Processing Cable (DP-1)
- UL 2250 Instrumentation Tray Cable
- UL 2277 Type WTTC
- CSA C22.2 No. 210 Appliance wiring material products I/II A/B (Sizes 16 - 8AWG)
- CSA C22.2 No.230 Tray Cables - Rated TC

- CSA C22.2 No. 239 Control and instrumentation cables
- ICEA S-95-658 (NEMA WC70) Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- IEEE 1202 FT4 Flame Test (70,000) BTU/hr Vertical Tray Test
- Exceeds Ecolab PM-40-1 Material Resistance Test With 30-day Exposure, UL Verified V747862
- **CE/RoHS-2 – The CE Marking has been applied solely to express the conformance to the material restrictions identified in the RoHS-2 (2011/65/EU) Directive**
- NFPA 79 Electrical Standard for Industrial Machinery
- Made in America: Compliant with both Buy American and Buy America Act (BAA) requirements per 49 U.S.C. § 5323(j) and the Federal Transit Administration Buy America requirements per 49 C.F.R. part 661

## SAMPLE PRINT LEGEND:

18 - 12 AWG:
SOUTHWIRE® XX AWG (X.XXmm2) X/C PVC/NYLON TYPE TC-ER E75755 (UL) 600V 90°C DRY 75°C WET SUN RES OIL RES I/II DIR BUR -40°C OR MTW FLEXING OR DP-1 OR WTTC 1000V OR PLTC OR ITC OR AWM 2587 -- LL90458 CSA CIC/TC FT4 OR AWM I/II A/B 105°C 1000V -40°C FT4 -- NOM-ANCE 90°C PVC/NYLON PVC-TPE THHN/THWN FT4 600V -- {CE} RoHS-2 MADE IN USA

10 AWG and Larger:
SOUTHWIRE® XX AWG (XX.X{MM2}) XX/C PVC/NYLON TYPE TC-ER E75755 {UL} 600V 90°C DRY 75°C WET SUN RES OIL RES I/II DIR BUR -40°C OR MTW FLEXING OR DP-1 OR WTTC 1000V OR AWM 2587 -- LL90458 {CSA} CIC/TC FT4 OR AWM I/II A/B 105°C 1000V -40°C FT4 -- {NOM}-ANCE 90°C PVC/NYLON PVC-TPE THHN/THWN FT4 600V -- {CE} RoHS-2 -- MADE IN USA

## Table 1 – Physical and Electrical Data

| Stock Number | Cond. Size | Cond. Number | Cond. Strands | Diameter Over Cond. | Insul. Thickness | Jacket Thickness | Approx. OD | Copper Weight | Approx. Weight | AC Resistance @ 75°C | Inductive Rectance | Min Bending Radius | Allowable Ampacity 75°C | Allowable Ampacity 90°C | Jacket Color |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AWG | No. | strands | inch | mil | mil | inch | lb / 1000ft | lb / 1000ft | Ω /1000ft | Ω/1000ft | inch | Amp | Amp | |
| 18 AWG | | | | | | | | | | | | | | | |
| 677071 | 18 | 2 | 16 | 0.044 | 20 | 45 | 0.266 | 10 | 35 | 8.613 | 0.036 | 1.0 | - | 14 | Gray |
| 581511◊ | 18 | 3 | 16 | 0.044 | 20 | 45 | 0.281 | 15 | 42 | 8.613 | 0.036 | 1.1 | - | 14 | Black |
| 582642◊ | 18 | 4 | 16 | 0.044 | 20 | 45 | 0.306 | 20 | 54 | 8.613 | 0.036 | 1.2 | - | 11 | Gray |
| 582644◊ | 18 | 5 | 16 | 0.044 | 20 | 45 | 0.332 | 25 | 63 | 8.613 | 0.036 | 1.3 | - | 11 | Gray |
| 139265 | 18 | 6 | 16 | 0.044 | 20 | 45 | 0.348 | 31 | 84 | 8.613 | 0.036 | 1.4 | - | 11 | Gray |
| 581513◊ | 18 | 7 | 16 | 0.044 | 20 | 45 | 0.358 | 35 | 79 | 8.613 | 0.036 | 1.4 | - | 9 | Gray |
| 582645◊ | 18 | 9 | 16 | 0.044 | 20 | 45 | 0.411 | 45 | 101 | 8.613 | 0.036 | 1.6 | - | 9 | Gray |
| 582646◊ | 18 | 12 | 16 | 0.044 | 20 | 45 | 0.456 | 60 | 128 | 8.613 | 0.036 | 1.8 | - | 7 | Gray |
| 582647◊ | 18 | 18 | 16 | 0.044 | 20 | 45 | 0.554 | 90 | 225 | 8.613 | 0.036 | 2.2 | - | 7 | Gray |
| 646262◊ | 18 | 19 | 16 | 0.044 | 20 | 45 | 0.560 | 95 | 200 | 8.613 | 0.036 | 2.2 | - | 7 | Gray |
| 581514◊ | 18 | 25 | 16 | 0.044 | 20 | 60 | 0.635 | 125 | 253 | 8.613 | 0.036 | 2.5 | - | 6 | Gray |
| 16 AWG | | | | | | | | | | | | | | | |
| 677072◊ | 16 | 2 | 26 | 0.059 | 20 | 50 | 0.294 | 16 | 45 | 5.406 | 0.033 | 1.1 | - | 18 | Gray |
| 581515◊ | 16 | 3 | 26 | 0.059 | 20 | 50 | 0.311 | 24 | 58 | 5.406 | 0.033 | 1.2 | - | 18 | Gray |
| 582648◊ | 16 | 4 | 26 | 0.059 | 20 | 50 | 0.339 | 32 | 71 | 5.406 | 0.033 | 1.3 | - | 14 | Gray |
| 582649◊ | 16 | 5 | 26 | 0.059 | 20 | 50 | 0.370 | 40 | 86 | 5.406 | 0.033 | 1.4 | - | 14 | Gray |
| 139203 | 16 | 6 | 26 | 0.059 | 20 | 50 | 0.400 | 47 | 116 | 5.406 | 0.033 | 1.6 | - | 14 | Gray |
| 581516◊ | 16 | 7 | 26 | 0.059 | 20 | 50 | 0.400 | 56 | 107 | 5.406 | 0.033 | 1.6 | - | 12 | Gray |
| 139204 | 16 | 8 | 26 | 0.059 | 20 | 50 | 0.431 | 72 | 142 | 5.406 | 0.033 | 1.7 | - | 12 | Gray |
| 582651◊ | 16 | 9 | 26 | 0.059 | 20 | 50 | 0.462 | 72 | 137 | 5.406 | 0.033 | 1.8 | - | 12 | Gray |
| 139205 | 16 | 10 | 26 | 0.059 | 20 | 50 | 0.500 | 81 | 186 | 5.406 | 0.033 | 2.0 | - | 9 | Gray |
| 582652◊ | 16 | 12 | 26 | 0.059 | 20 | 50 | 0.509 | 97 | 174 | 5.406 | 0.033 | 2.0 | - | 9 | Gray |
| 582653◊ | 16 | 18 | 26 | 0.059 | 20 | 65 | 0.623 | 145 | 262 | 5.406 | 0.033 | 2.4 | - | 9 | Gray |
| 646263◊ | 16 | 19 | 26 | 0.059 | 20 | 65 | 0.630 | 154 | 272 | 5.406 | 0.033 | 2.5 | - | 9 | Gray |
| 581517◊ | 16 | 25 | 26 | 0.059 | 20 | 65 | 0.717 | 202 | 345 | 5.406 | 0.033 | 2.8 | - | 8 | Gray |
| 581518◊ | 16 | 41 | 26 | 0.059 | 20 | 90 | 0.948 | 332 | 590 | 5.406 | 0.033 | 3.8 | - | 6 | Gray |
| 14 AWG | | | | | | | | | | | | | | | |
| 677073 | 14 | 2 | 41 | 0.073 | 20 | 50 | 0.324 | 25 | 58 | 3.391 | 0.058 | 1.2 | 20 | 25 | Gray |
| 581519◊ | 14 | 3 | 41 | 0.073 | 20 | 50 | 0.342 | 38 | 77 | 3.391 | 0.058 | 1.3 | 20 | 25 | Gray |
| 582654◊ | 14 | 4 | 41 | 0.073 | 20 | 50 | 0.375 | 51 | 96 | 3.391 | 0.058 | 1.5 | 16 | 20 | Gray |
| 582655◊ | 14 | 5 | 41 | 0.073 | 20 | 50 | 0.411 | 63 | 114 | 3.391 | 0.058 | 1.6 | 16 | 20 | Gray |
| 581521◊ | 14 | 7 | 41 | 0.073 | 20 | 50 | 0.445 | 89 | 149 | 3.391 | 0.058 | 1.7 | 14 | 17 | Gray |
| 673795◊ | 14 | 8 | 41 | 0.073 | 20 | 50 | 0.495 | 102 | 175 | 3.391 | 0.058 | 1.9 | 14 | 17 | Gray |
| 582656◊ | 14 | 9 | 41 | 0.073 | 20 | 50 | 0.516 | 115 | 188 | 3.391 | 0.058 | 2.0 | 14 | 17 | Gray |
| 582657◊ | 14 | 12 | 41 | 0.073 | 20 | 65 | 0.608 | 153 | 257 | 3.391 | 0.058 | 2.4 | 10 | 12 | Gray |
| 582658◊ | 14 | 18 | 41 | 0.073 | 20 | 65 | 0.697 | 230 | 363 | 3.391 | 0.058 | 2.7 | 10 | 12 | Gray |
| 581522◊ | 14 | 25 | 41 | 0.073 | 20 | 65 | 0.806 | 318 | 486 | 3.391 | 0.058 | 3.2 | 9 | 11 | Gray |
| 12 AWG | | | | | | | | | | | | | | | |
| 677074 | 12 | 2 | 65 | 0.094 | 20 | 50 | 0.362 | 40 | 80 | 2.137 | 0.054 | 1.4 | 25 | 30 | Gray |

| Stock Number | Cond. Size | Cond. Number | Cond. Strands | Diameter Over Cond. | Insul. Thickness | Jacket Thickness | Approx. OD | Copper Weight | Approx. Weight | AC Resistance @ 75°C | Inductive Rectance | Min Bending Radius | Allowable Ampacity 75°C | Allowable Ampacity 90°C | Jacket Color |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AWG | No. | strands | inch | mil | mil | inch | lb / 1000ft | lb / 1000ft | Ω /1000ft | Ω/1000ft | inch | Amp | Amp | |
| 677188◊ | 12 | 3 | 65 | 0.094 | 20 | 50 | 0.389 | 60 | 108 | 2.137 | 0.054 | 1.5 | 25 | 30 | Gray |
| 582659◊ | 12 | 4 | 65 | 0.094 | 20 | 50 | 0.420 | 81 | 136 | 2.137 | 0.054 | 1.6 | 20 | 24 | Gray |
| 582660◊ | 12 | 5 | 65 | 0.094 | 20 | 50 | 0.502 | 101 | 170 | 2.137 | 0.054 | 2.0 | 20 | 24 | Gray |
| 139262 | 12 | 6 | 65 | 0.094 | 20 | 50 | 0.502 | 122 | 194 | 2.137 | 0.054 | 2.0 | 20 | 24 | Gray |
| 582661 | 12 | 7 | 65 | 0.094 | 20 | 50 | 0.502 | 141 | 219 | 2.137 | 0.054 | 2.0 | 17 | 21 | Gray |
| 139263 | 12 | 8 | 65 | 0.094 | 20 | 65 | 0.574 | 162 | 260 | 2.137 | 0.054 | 2.3 | 17 | 21 | Gray |
| 139264 | 12 | 9 | 65 | 0.094 | 20 | 65 | 0.615 | 182 | 291 | 2.137 | 0.054 | 2.5 | 17 | 21 | Gray |
| 10 AWG | | | | | | | | | | | | | | | |
| 677075 | 10 | 2 | 105 | 0.117 | 25 | 50 | 0.430 | 64 | 119 | 1.339 | 0.050 | 1.7 | 35 | 40 | Gray |
| 677189◊ | 10 | 3 | 105 | 0.117 | 25 | 50 | 0.462 | 97 | 159 | 1.339 | 0.050 | 1.8 | 35 | 40 | Gray |
| 581523◊ | 10 | 4 | 105 | 0.117 | 25 | 50 | 0.502 | 129 | 201 | 1.339 | 0.050 | 2.0 | 28 | 32 | Gray |
| 582662 | 10 | 5 | 105 | 0.117 | 25 | 50 | 0.579 | 161 | 291 | 1.339 | 0.050 | 2.3 | 28 | 32 | Gray |
| 582663 | 10 | 7 | 105 | 0.117 | 25 | 65 | 0.628 | 226 | 336 | 1.339 | 0.050 | 2.5 | 24 | 28 | Gray |
| 8 AWG | | | | | | | | | | | | | | | |
| 677190◊ | 8 | 3 | 168 | 0.153 | 35 | 65 | 0.626 | 157 | 314 | 0.861 | 0.052 | 2.5 | 50 | 55 | Gray |
| 643367◊ | 8 | 4 | 168 | 0.153 | 35 | 65 | 0.680 | 210 | 361 | 0.861 | 0.052 | 2.7 | 40 | 44 | Gray |
| 673797 | 8 | 5 | 168 | 0.153 | 35 | 70 | 0.766 | 263 | 450 | 0.861 | 0.052 | 3.0 | 40 | 44 | Gray |
| 6 AWG | | | | | | | | | | | | | | | |
| 677191 | 6 | 3 | 259 | 0.198 | 35 | 70 | 0.725 | 268 | 440 | 0.541 | 0.051 | 2.9 | 65 | 75 | Gray |
| 643369◊ | 6 | 4 | 259 | 0.198 | 35 | 70 | 0.817 | 358 | 562 | 0.541 | 0.051 | 3.2 | 52 | 60 | Gray |
| 458641 | 6 | 5 | 259 | 0.198 | 35 | 80 | 0.902 | 448 | 671 | 0.541 | 0.051 | 3.6 | 52 | 60 | Gray |
| 4 AWG | | | | | | | | | | | | | | | |
| 677192 | 4 | 3 | 420 | 0.235 | 50 | 80 | 0.889 | 399 | 649 | 0.340 | 0.048 | 3.5 | 85 | 95 | Gray |
| 643371◊ | 4 | 4 | 420 | 0.235 | 50 | 80 | 0.969 | 532 | 829 | 0.340 | 0.048 | 3.8 | 68 | 76 | Gray |
| 458779 | 4 | 5 | 420 | 0.235 | 50 | 80 | 1.073 | 665 | 1048 | 0.340 | 0.048 | 5.4 | 68 | 76 | Gray |
| 2 AWG | | | | | | | | | | | | | | | |
| 677193 | 2 | 3 | 651 | 0.302 | 50 | 100 | 1.070 | 637 | 988 | 0.216 | 0.045 | 5.3 | 115 | 130 | Gray |
| 643373◊ | 2 | 4 | 651 | 0.302 | 50 | 100 | 1.196 | 849 | 1262 | 0.216 | 0.045 | 5.9 | 92 | 104 | Gray |
| 458778◊ | 2 | 5 | 651 | 0.302 | 50 | 100 | 1.286 | 1062 | 1564 | 0.216 | 0.045 | 6.4 | 92 | 104 | Gray |
| TBA | 1 | 5 | 836 | 0.347 | 60 | 80 | 1.426 | 1341 | 1752 | 0.167 | 0.046 | 7.1 | 104 | 116 | Gray |

All dimensions are nominal and subject to normal manufacturing tolerances

◊ Cable marked with this symbol is a standard stock item

***** Ampacities based upon 2023 NEC Table 310.16 and do not take into account the overcurrent protection limitations in NEC 240.4(D) of 15 Amps for 14 AWG CU, 20 Amps for 12 AWG CU, and 30 Amps for 10 AWG CU (independent of the conductor temperature rating and stranding if size is present in table). Also, see NEC sections 310.15 and 110.14(C) for additional requirements.

***** Ampacities have been adjusted for more than Three Current-Carrying Conductors.