

Procedure:

**600V POWER AND CONTROL; MULTI-CONDUCTOR**

**JOYGLOBAL**

Document ID:

**P&H 5087**

Page:

**1**

Version:

**Ver. 1.0, 10-14**

Business:

**SURFACE**

Region:

**MILWAUKEE OPS**

Site:

**1A1**

**MATERIAL SPECIFICATION**

**1.0 SCOPE / PURPOSE**

This specification covers 600 volt, stranded, multi-conductor cable for surface mining application. The multi-conductor cable will consist of the specified number of cores, all black in color, and one green or green / yellow conductor for ground connection.

**NOTICE**

This material specification is applicable for model 4100XPC-AC machines and all new products, regardless of model; effective October 1, 2014.

**2.0 PROCEDURE**

**2.1 APPLICATION**

For use in power circuits up to 600V, phase to phase, for use in accordance with Article 336 and other applicable parts of the National Electrical Code (NEC), ANSI/NFPA 70 in cable trays, in raceways, and where supported in outdoor locations by a messenger wire (catenary).

**2.2 MATERIAL PROPERTIES**

**Table 1**

|                                   |   |   |
|-----------------------------------|---|---|
| Conductor Material                | Conductor material                                | Copper  |
|                                   | Conductor coating                                 | Bare  |
| Conductor stranding               | Size of stranding                                 | 30  |
|                                   | Exposed to vibration                              | Yes   |
|                                   | Stranding   | B8, C for 18AWG<br>B174, K for 16AWG and larger |
|                                   | Cable movement / flexing during operation         | No  |
| Insulation Material               | Minimum Voltage Rating                            | 600V  |
|                                   | Minimum ambient temperature storage (Deg. C)      | -20   |
|                                   | Minimum ambient temperature operation (Deg. C)    | -40   |
|                                   | Minimum ambient temperature installation (Deg. C) | -20   |
|                                   | Used in wet location                              | Exposed to condensation                         |
|                                   | Resistance to oil / gas                           | Yes   |
|                                   | Resistance to flame                               | Yes   |
|                                   | Resistance to chemicals                           | No  |
|                                   | Flame rating                                      | CSA FT-4 or UL 1685 or IEEE 1202                |
|                                   | Low smoke / zero halogen                          | No  |
|                                   | Color, power and signal cores                     | Black   |
|                                   | Color, ground                                     | Green or green with yellow trace                |
|                                   | Color, power / control                            | Black   |
| Material                          | Polyvinyl Chloride (PVC) / Nylon                  |   |
| Temperature rise minimum (Deg. C) | 90 dry / 60 wet                                   |   |

|                                     |                   |                                    |
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**Table 1 (Continued)**

|                      |  |  |
|----------------------|--|--|
| <b>Jacket</b>        | Minimum ambient temperature storage (Deg C)      | -20  |
|                      | Minimum ambient temperature operation (Deg C)    | -40  |
|                      | Minimum ambient temperature installation (Deg C) | -20  |
|                      | Used in wet location                             | Exposed to condensation  |
|                      | Resistance to oil / gas                          | Yes, UL 13, Section 36A  |
|                      | Resistance to flame                              | Yes  |
|                      | Resistance to chemicals                          | No   |
|                      | Flame rating                                     | CSA FT-4 or UL 1685 or IEEE 1202   |
|                      | Low smoke / zero halogen                         | No   |
|                      | Material   | Copolymer Alloy  |
|                      | Color  | Grey   |
| <b>Miscellaneous</b> | Cable configuration                              | Multi-core   |
|                      | Maximum Bend Radius                              | 8 x O.D.   |
|                      | Regions of use                                   | Global   |
|                      | Outer diameter                                   | See Table 2  |
|                      | Branding required                                | No   |
|                      | Weight / Unit of measure                         | See Table 2  |
|                      | Frequency  | 50/60Hz  |
|                      | Jacket identification Interval                   | Not to exceed NEC 310.11 requirement   |
|                      | Conductor core identification interval           | Less than 4"   |
|                      | Weight / Unit of measure                         | See Table 2  |
|                      | Jacket Marking                                   | c(UL) Type TC # C XX AWG, 600V, sun resistant, oil resistant II, 90C Dry, 60C Wet, FT4, -40C |

|                                     |                   |                             |
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## MATERIAL SPECIFICATION

**Table 2**

| AWG | Number of conductors (includes ground when greater than 2) | Overall Insulation Thickness (Mils) | Overall Jacket Thickness (Mils) | Nominal Outside Diameter (Mils) | Average Weight lbs / 1000ft | Stranding | Purchasing Number |
|-----|--|-------------------------------------|---------------------------------|---------------------------------|-----------------------------|-----------|-------------------|
| 18  | 6  | 20                                  | 45                              | 385                             | 77                          | 16/30     | 508780796         |
| 16  | 2  | 20                                  | 45                              | 290                             | 45                          | 26/30     | 508780150         |
| 16  | 3  | 20                                  | 45                              | 310                             | 62                          | 26/30     | 508780151         |
| 16  | 4  | 20                                  | 45                              | 340                             | 80                          | 26/30     | 508780152         |
| 16  | 6  | 20                                  | 45                              | 383                             | 105                         | 26/30     | 508780154         |
| 16  | 8  | 20                                  | 45                              | 394                             | 118                         | 26/30     | 508780156         |
| 16  | 10   | 20                                  | 45                              | 476                             | 163                         | 26/30     | 508780158         |
| 16  | 12   | 20                                  | 45                              | 505                             | 215                         | 26/30     | 508780159         |
| 16  | 14   | 20                                  | 45                              | 561                             | 236                         | 26/30     | 508780161         |
| 16  | 20   | 20                                  | 60                              | 645                             | 290                         | 26/30     | 508780167         |
| 16  | 25   | 20                                  | 60                              | 700                             | 400                         | 26/30     | 508780171         |
| 16  | 26   | 20                                  | 60                              | 710                             | 418                         | 26/30     | 508780173         |
| 16  | 30   | 20                                  | 60                              | 754                             | 441                         | 26/30     | 508780177         |
| 16  | 37   | 20                                  | 60                              | 812                             | 493                         | 26/30     | 508780184         |
| 14  | 2  | 20                                  | 45                              | 324                             | 58                          | 41/30     | 508780250         |
| 14  | 3  | 20                                  | 45                              | 345                             | 88                          | 41/30     | 508780251         |
| 14  | 4  | 20                                  | 45                              | 370                             | 110                         | 41/30     | 508780252         |
| 14  | 5  | 20                                  | 45                              | 405                             | 122                         | 41/30     | 508780253         |
| 14  | 6  | 20                                  | 45                              | 420                             | 148                         | 41/30     | 508780254         |
| 14  | 7  | 20                                  | 45                              | 435                             | 170                         | 41/30     | 508780255         |
| 14  | 8  | 20                                  | 45                              | 474                             | 193                         | 41/30     | 508780257         |
| 14  | 9  | 20                                  | 45                              | 530                             | 242                         | 41/30     | 508780256         |
| 14  | 12   | 20                                  | 60                              | 590                             | 308                         | 41/30     | 508780260         |
| 14  | 16   | 20                                  | 60                              | 659                             | 330                         | 41/30     | 508780262         |
| 14  | 24   | 20                                  | 60                              | 793                             | 473                         | 41/30     | 508780272         |
| 14  | 30   | 20                                  | 60                              | 890                             | 605                         | 41/30     | 508780265         |
| 14  | 37   | 20                                  | 60                              | 955                             | 726                         | 41/30     | 508780270         |
| 12  | 2  | 20                                  | 45                              | 334                             | 74                          | 65/30     | 508780312         |
| 12  | 3  | 25                                  | 45                              | 376                             | 103                         | 65/30     | 508780313         |
| 12  | 4  | 25                                  | 45                              | 435                             | 150                         | 65/30     | 508780314         |
| 12  | 5  | 25                                  | 45                              | 480                             | 174                         | 65/30     | 508780315         |
| 12  | 6  | 25                                  | 45                              | 496                             | 195                         | 65/30     | 508780316         |
| 12  | 8  | 25                                  | 60                              | 567                             | 260                         | 65/30     | 508780318         |
| 12  | 9  | 20                                  | 60                              | 620                             | 282                         | 65/30     | 508780795         |
| 12  | 12   | 20                                  | 60                              | 672                             | 367                         | 65/30     | 508780322         |
| 12  | 15   | 20                                  | 60                              | 750                             | 445                         | 65/30     | 508780325         |
| 12  | 16   | 20                                  | 60                              | 765                             | 522                         | 65/30     | 508780326         |
| 12  | 24   | 25                                  | 60                              | 904                             | 673                         | 65/30     | 508780334         |
| 12  | 25   | 25                                  | 60                              | 911                             | 708                         | 65/30     | 508780327         |
| 10  | 3  | 25                                  | 45                              | 428                             | 142                         | 105/30    | 508780383         |

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|----|---|----|----|-----|-----|--------|-----------|
| 10 | 4 | 25 | 45 | 540 | 255 | 105/30 | 508780384 |
| 8  | 2 | 35 | 63 | 562 | 267 | 168/30 | 508780462 |
| 8  | 3 | 35 | 63 | 645 | 316 | 168/30 | 508780463 |
| 8  | 4 | 35 | 83 | 694 | 366 | 168/30 | 508780464 |
| 6  | 4 | 35 | 83 | 726 | 526 | 266/30 | 508780524 |

**2.3 INSTALLATION**

Installation of Power and Control Tray Cable (TC) shall be in accordance with NEC article 336 and Joy Global MPS 378 – Electrical Wiring Practices for Mining Equipment.

**2.4 "Y" NUMBER DESCRIPTION ON DRAWING**

Example: CABLE, 16AWG, 5 COND, 600V X 180FT  
CABLE, 10AWG, 4 COND, 600V X 20FT

**2.5 PACKAGING AND LOADING**

Material furnished under this specification shall be packaged as agreed upon between supplier and purchaser.

In the absence of such an agreement or specific instructions, the material shall be packaged in accordance with good commercially acceptable practices to prevent loss or damage in handling or transportation.

All shipping notices shall include the Customer's Purchase Order Number.

**2.6 IDENTIFICATION**

Material shall be tagged or identified as per standard practice. All means of identification must show the following information:

- Manufacturer Name
- Type of Cable - P&H No. 5087
- Gage (AWG Conductor Size)
- Number of conductors
- Length where specified
- Cable part number

**2.7 INSPECTION AT PURCHASER'S WORKS**

Acceptance of material furnished under this specification may be subject to confirmation by the Customer's Manufacturing Supervision/Quality Control and Electrical Engineering Departments.

The purchaser shall have the option of accepting or rejecting material that fails to meet any of the requirements of this specification.

In the event of rejection, the producer or supplier shall be notified and granted a hearing at his request.

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**2.8 APPROVED SUPPLIERS**

Southwire – 1000V Wind Turbine Tray Cable UL Type WTTC

**3.0 REFERENCES**

- UL 1277
- UL 13
- NEC Type TFN Conductors (16 & 18 AWG)
- NEC Type THHN/THWN Conductors (14-6 AWG)
- ASTM B-3 and B-172/174
- ANSI/NEMA WC-70; ICEA S-95-658