

STANDARD INFORMATION

Standard: CSA C22.2 No. 239

Standard ID: Control And Instrumentation Cables [CSA C22.2#239:2021 Ed.5]

Previous Standard ID: Control And Instrumentation Cables [CSA C22.2#239:2017 Ed.4]

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **January 1, 2023**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: Per our accreditation, Intertek is required to review reports against the standard revisions to confirm compliance. Once compliance is confirmed, the standard reference in the report is updated to show continued compliance to the technical requirements of the standard.

Overview of Changes:

- Addition of PCS cable construction and corresponding markings
- Addition of the acid gas emission test and corresponding marking
- Removal of option to perform smoothing and die cutting after accelerated aging for physical properties testing
- Revision of criteria for retention of tensile strength and elongation after accelerated aging
- Addition of Table 33 for colour coding of insulated PCS power conductors

Specific details of new/ revised requirements are found in table below.

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown lined out below.</i>
5	Info	Construction
5.1	Info	Conductors
5.1.2	Info	Sizes
		<i>New clause added;</i>
5.1.2.3		The PCS construction may be used for Type ACIC cable with limitations that the control and signal jacketed subassembly shall be 18 AWG – 16 AWG and the power conductors shall be 14 AWG – 6 AWG inclusive.
5.5	Info	Assembly and identification
5.5.1	Info	Assembly
		<u>jacket shall be as specified in Clause 5.6.3.1. Protective tapes may be used in lieu of the jacket over cable cores consisting of only individually jacketed control/signal subassemblies in accordance with Clause 5.6.2.</u>
5.5.1.4		<u>For cables marked with the suffix “-PCS”, a protective tape may be used in lieu of the jacket if the control/signal subassembly is jacketed in accordance with Clause 5.6.5. The power conductor subassembly for PCS constructions need not be jacketed. PCS cables shall meet the requirements in Clauses 6.5 and 6.6.</u>
		The thickness of protective tapes shall be sufficient to prevent damage to the cable core from the armour.
		Identification of conductors
5.5.2		The identification of individual conductors, groups of conductors, or inner jackets shall be by any suitable method compatible with the intended applications. <u>Where a PCS construction is used, the control/signal subassembly conductor insulations shall be coded any colour except green, black, white, red, and blue (solid or striped). The identification of the power conductors in a PCS construction shall be as shown in Table 33.</u>
5.6	Info	Non-metallic jackets
5.6.4	Info	Non-metallic jacket materials
5.6.4.2		Thermoplastic jackets other than polyethylene shall meet the requirements of the tests specified in Table 8. Compliance shall be determined using the corresponding test method and procedure specified in CSA C22.2 No. 2556, except that smoothing and die-cutting, where required, may be performed after exposure to accelerated aging.



CLAUSE	VERDICT	COMMENT
		<i>New clause added;</i>
5.6.5		<p>Jacket for PCS sub-assembly</p> <p>For cables employing both power and control or signal cables the group of signal or control conductors shall be enclosed in a 90 °C jacket. The minimum average thickness of the jacket shall be 0.76 mm and the minimum point shall be 0.61 mm.</p>
5.9	Info	Optional components
5.9.1		<p>One or more insulated or uninsulated bonding conductors may be included in the cable construction, but the size shall be not less than that given in Table 32, where applicable, except that it need not be larger than the largest ungrounded conductor. <u>For a circuit conductor 26 – 16 AWG, the bonding conductor shall be at least the same size as the largest circuit conductor.</u> Insulated bonding conductors shall be either green or green with yellow stripes.</p>
6	Info	Tests
6.2	Info	Physical and flammability tests on complete cable
6.2.5		<p><i>New section added;</i></p> <p>Acid gas emission (optional)</p>
6.2.5.1		Any non-metallic cable component shall not exceed an acid gas level of 14% by weight when calculated as HCl.
6.2.5.2		Compliance with Clause 6.2.5.1 shall be determined using the apparatus and method specified in the acid gas emission test in CSA C22.2 No. 2556.
7	Info	Marking
		Marking on product
7.1	Info	<p>The marking shall be durably and legibly surface ink-printed, embossed, or embedded on the outer jacket or covering at intervals of not more than 1 m. When the outer jacket is not present, the marking shall be printed, embossed, or embedded on the inner jacket of an armoured cable at intervals of not more than 1 m or on a marker tape under the outer covering. The marking shall include the following:</p> <p>p) <u>“AG14” for cables meeting the requirements of Clause 6.2.5;</u> q) <u>the “-PCS” suffix shall be added after “ACIC” for cables complying with all the requirements of Clauses 5.1.2.3, 5.5.1.4, 5.5.2, and 5.6.5; and</u> r) <u>for PCS cables, the jacket over the PCS subassembly marked “FOR CONTROL AND/OR SIGNAL USE ONLY”.</u></p>
		Marking on packages
7.2		<p>Each coil or reel of cable shall be clearly tagged or marked to show the following:</p> <p>p) <u>“AG14” for cables meeting the requirements of Clause 6.2.5.</u></p>



CLAUSE	VERDICT	COMMENT
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Properties of thermoplastic jackets other than polyethylene

Table 8

		Jacket Temperature					
		75°C					
After aging	Air oven test		60°C	Other than CPE	CPE	90°C	105°C
		Elongation — minimum % of original	65 <u>45</u>	65 <u>45</u>	50	65 <u>45</u>	65 <u>45</u>
		Tensile strength — minimum % of original	75 <u>70</u>	75 <u>70</u>	85	75 <u>70</u>	75 <u>70</u>

Properties of halogen-free thermoplastic jacket

Table 30

Property	Unit	Requirement	Reference test
Oil immersion, 4 h at 70 °C in IRM 902 oil			
Retention of unaged tensile strength, minimum	%	75 <u>60</u>	Physical properties test in CSA C22.2 No. 2556
Retention of unaged elongation, minimum	%	75 <u>60</u>	Physical properties test in CSA C22.2 No. 2556

Properties of halogen-free thermoset jacket

Table 31

Property	Unit	Requirement	Reference test
Oil immersion, 18 h at 121 °C in IRM 902 oil			
Retention of unaged tensile strength, minimum	%	60 <u>50</u>	Physical properties test in CSA C22.2 No. 2556
Retention of unaged elongation, minimum	%	60 <u>50</u>	Physical properties test in CSA C22.2 No. 2556

New table added;

Colour coding of insulated PCS power conductors

Table 33

Cable	Colour of individual conductors
Two-conductor*	One black and one white
Three-conductor †	One black, one red, and one blue
Four-conductor	One black, one red, one blue, and one white

* When specified by the purchaser (e.g., for 2-wire 208 or 240 V circuits), the white conductor shall be replaced by a red conductor.

† When specified by the purchaser (e.g., for single-phase, 3-wire installations), the blue conductor shall be replaced by a white conductor.

Note: When an insulated bonding conductor is provided, it shall be coloured green, or green with one or more yellow stripes.