



# Compact round aluminum stranded conductors (compact round ASE)



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# ***Revision History***

**CSA C49.5:10, Compact round aluminum stranded conductors (compact round ASC)**

<b>National Standard of Canada — October 2019</b>
Outside front cover, National Standard of Canada text, and title page.
This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

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# ***Update No. 2***

***C49.5-10***

***March 2014***

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**Title:** *Compact round aluminum stranded conductors (compact round ASC)* — originally published May 2010

**Revisions issued:** Update No. 1 — October 2012

The following revisions have been formally approved and are marked by the symbol delta ( $\Delta$ ) in the margin on the attached replacement pages:

<b>Revised</b>	Table 1
<b>New</b>	None
<b>Deleted</b>	None

- Update your copy by inserting these revised pages.
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## 7 Packaging

The protective covering on reels shall be a Level 2 Weather Protector in accordance with NEMA WC 26/EEMAC 201. The reel shall be the reusable wood type.

The following packaging information should be provided by the customer:

- (a) the reel type, if other than reusable wood;
- (b) the maximum flange diameter;
- (c) the minimum arbor hole diameter;
- (d) the maximum overall width (including bolts and cable ends);
- (e) the maximum gross weight;
- (f) the nominal cable length per reel and the appropriate tolerance; and
- (g) the protective covering, if other than a Level 2 Weather Protector.

**Note:** See also [Annex A](#).

**Table 1**  
**Construction requirements for compact round A1F\* conductors**  
 (See Clauses 4.1, 5.1.2, 5.2.1, and 6.2.2.)

Preferred designation	Aluminum area, mm <sup>2</sup>	Number of strands	Class	Nominal diameter, mm	Linear mass, kg/m	Linear weight, N/m	Rated tensile strength, kN	Nominal dc resistance at 20 °C, Ω/km	Reference	
									AWG or kcmil	Conductor name
8.4-A1F-7-3.4	8.37	7	A	3.4	0.0231	0.226	1.67	3.45	8	—
13-A1F-7-4.3	13.3	7	A	4.29	0.0367	0.360	2.59	2.17	6	Toad
21-A1F-7-5.4	21.2	7	A	5.41	0.0584	0.572	4.12	1.36	4	Dragon
27-A1F-7-6.0	26.7	7	A	6.05	0.0736	0.721	5.07	1.08	3	Lizard
34-A1F-7-6.8	33.6	7	A	6.81	0.0928	0.910	6.22	0.857	2	Moloch
42-A1F-7-7.6	42.4	7	AA	7.59	0.117	1.15	7.42	0.680	1	Monitor
54-A1F-7-8.5	53.5	7	AA, A	8.53	0.148	1.45	9.10	0.539	1/0	Tuatara
67-A1F-7-9.6	67.4	7	AA, A	9.60	0.186	1.83	11.5	0.427	2/0	Alligator
85-A1F-7-10.7	85.0	7	AA, A	10.74	0.235	2.30	14.0	0.339	3/0	Crocodile
107-A1F-7-12.1	107	7	AA, A	12.07	0.296	2.90	17.7	0.269	4/0	Salamander
127-A1F-7-13.2	127	7	AA	13.21	0.350	3.43	20.9	0.228	250	—
127-A1F-18-13.2	127	18 or 19	A	13.21	0.350	3.43	22.2	0.228	250	—
135-A1F-7-13.6	135	7	AA	13.64	0.373	3.56	22.3	0.213	266.8	—
135-A1F-18-13.6	135	18 or 19	A	13.64	0.373	3.56	23.0	0.213	266.8	Komodo
152-A1F-7-14.5	152	7	AA	14.48	0.419	4.11	24.3	0.190	300	—
152-A1F-18-14.5	152	18 or 19	A	14.48	0.419	4.11	25.8	0.190	300	Tadpole

(Continued)

# ***Update No. 1***

***C49.5-10***

***October 2012***

**Note:** For information about the **Standards Update Service**, go to **shop.csa.ca** or e-mail **techsupport@csagroup.org**.

**Title:** *Compact round aluminum stranded conductors (compact round ASC)* — originally published May 2010

The following revisions have been formally approved and are marked by the symbol delta ( $\Delta$ ) in the margin on the attached replacement pages:

<b>Revised</b>	Clause 4.3.2.1 and Tables 1 and 2
<b>New</b>	None
<b>Deleted</b>	None

- Update your copy by inserting these revised pages.
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### 4.3.2 Lay

#### Δ 4.3.2.1 Classes AA and A

The conductor lay length of Class AA conductors shall be in accordance with Clause 5.4 of CAN/CSA-C61089 and shall be not less than 10, nor more than 16, times the nominal outside diameter of that layer for Class A.

The direction of lay of the outer layer of Classes AA and A conductors shall be right-hand and it shall be reversed in successive layers.

#### 4.3.2.2 Class B

The direction of lay of the outer layer of Class B conductors shall be left-hand. Other layers may be reversed or unidirectional in successive layers.

The lay length of the outer layer shall be 8 to 16 times the outside diameter of the compacted conductor, except that for sizes No. 2 AWG and smaller, the maximum length of lay shall be 17.5 times the outside diameter of the completed conductor.

### 4.4 Joints

#### 4.4.1

Joints and splices shall not be made in completed compact round ASC.

#### 4.4.2

For Class AA or A conductors, joints in individual wires shall conform to Clause 5.5 of CAN/CSA-C61089.

#### 4.4.3

In order to insulate or cover conductors of all tempers,

- (a) joints may be made in any of the wires of any stranding by electric butt welding, cold pressure welding, or electric butt, cold upset welding; and
- (b) joints in individual wires in a finished conductor shall be spaced by at least 30 cm.

## 5 Aluminum cross-sectional area and tensile strength of completed conductors

### 5.1 Aluminum cross-sectional area

#### 5.1.1

The density of aluminum in completed compact round ASC shall be in accordance with the applicable CSA Standard listed in Clause 2.

#### 5.1.2

The aluminum cross-sectional area of the completed conductor shall be verified by determining the unit mass in accordance with Clause 6.6.3 of CAN/CSA-C61089 and shall not vary from the applicable nominal value specified in Table 1 by more than  $\pm 2\%$ . In case of non-compliance, the aluminum cross-sectional area shall be calculated based on the mass measurements and actual stranding increments of the conductor.

#### 5.1.3

For conductors to be used in covered or insulated wires or cables, dc resistance measurement may be used as an alternative to the method specified in Clause 5.1.2 to determine compliance with this Standard.

## 5.2 Tensile strength

### 5.2.1

The rated tensile strength of the completed conductor, as specified in Table 1, shall be calculated in accordance with Clause 5.7 of CAN/CSA-C61089.

### 5.2.2

For Classes AA and A conductors, the tensile strength of individual wires shall be calculated using the nominal area of the wire and the minimum tensile strength as specified in CAN/CSA-C60889 for the applicable equivalent diameter.

For Class B conductors, the tensile strength of individual wires shall be calculated using the nominal area of the wire and the minimum tensile strength as specified in CSA C49.3.

## 6 Test methods

### 6.1 General

#### 6.1.1

Before stranding and compacting, aluminum wires shall comply with CSA C49.3 or CAN/CSA-C60889.

#### 6.1.2

Tests shall be performed on samples taken from the outer ends of not less than 10% of reels or coils but from not fewer than five reels or coils (or the entire lot if the lot is smaller than five).

#### 6.1.3

Tests shall not be applicable to aluminum wires after compacting.

### 6.2 Conductor diameter

#### 6.2.1

The conductor diameter shall be measured in accordance with Clause 6.6.2 of CAN/CSA-C61089.

#### 6.2.2

When measured in accordance with Clause 6.2.1, the diameter shall not vary by more than  $\pm 1\%$  from the value specified in Tables 1 and 2, except that sizes No. 1/0 through 350 kcmil, in all tempers, composed of two or three aluminum layers and stranded with reverse lay shall not vary by more than  $\pm 1.5\%$  from the average diameter specified in Tables 1 and 2.

### 6.3 Tensile test of completed conductor (optional)

When tensile strength tests are performed on completed conductors, they shall be conducted in accordance with Clause 6.5.3 of CAN/CSA-C61089.

When tested, the tensile strength of the conductor shall be

- (a) not less than 90% of the rated tensile strength for Classes AA and A; and
- (b) not less than 90% of the minimum rated tensile strength and not more than the maximum rated tensile strength for conductors of intermediate temper.

### 6.4 Retests

If the results of testing a conductor sample from any reel or coil of conductor do not conform to the requirements of Clauses 5.1 and 5.2, the supplier may test all individual samples and submit for acceptance the samples that conform to the requirements of this Standard.

## 7 Packaging

The protective covering on reels shall be a Level 2 Weather Protector in accordance with NEMA WC 26/EEMAC 201. The reel shall be the reusable wood type.

The following packaging information should be provided by the customer:

- (a) the reel type, if other than reusable wood;
- (b) the maximum flange diameter;
- (c) the minimum arbor hole diameter;
- (d) the maximum overall width (including bolts and cable ends);
- (e) the maximum gross weight;
- (f) the nominal cable length per reel and the appropriate tolerance; and
- (g) the protective covering, if other than a Level 2 Weather Protector.

**Note:** See also Annex A.

**Table 1**  
**Construction requirements for compact round A1F\* conductors**  
 (See Clauses 4.1, 5.1.2, 5.2.1, and 6.2.2.)

Preferred designation	Aluminum area, mm <sup>2</sup>	Number of strands	Class	Nominal diameter, mm	Linear mass, kg/m	Linear weight, N/m	Rated tensile strength, kN	Nominal dc resistance at 20 °C, Ω/km	Reference	
									AWG or kcmil	Conductor name
8.4-A1F-7-3.4	8.37	7	A	3.4	0.0231	0.226	1.67	3.45	8	—
13-A1F-7-4.3	13.3	7	A	4.29	0.0367	0.360	2.59	2.17	6	Toad
21-A1F-7-5.4	21.2	7	A	5.41	0.0584	0.572	4.12	1.36	4	Dragon
27-A1F-7-6.0	26.7	7	A	6.05	0.0736	0.721	5.07	1.10	3	Lizard
34-A1F-7-5.4	21.2	7	A	6.81	0.0928	0.910	6.22	0.857	2	—
34-A1F-7-6.8	33.6	7	AA	6.81	0.0928	0.910	6.22	0.857	2	Moloch
42-A1F-7-7.6	42.4	7	AA	7.59	0.117	1.15	7.42	0.680	1	Monitor
42-A1F-18-7.6	42.4	7	A	7.59	0.117	1.15	8.27	0.680	1	—
54-A1F-7-8.5	53.5	7	AA	8.53	0.148	1.45	9.10	0.539	1/0	Tuatara
54-A1F-18-8.5	53.5	7	A	8.53	0.148	1.45	10.4	0.539	1/0	Skink
67-A1F-7-9.6	67.4	7	AA	9.55	0.186	1.83	11.5	0.427	2/0	Alligator
67-A1F-18-9.6	67.4	7	A	9.55	0.186	1.83	12.8	0.427	2/0	Gecko
85-A1F-7-10.7	85.0	7	AA	10.74	0.235	2.30	14.0	0.339	3/0	Crocodile
85-A1F-18-10.7	85.0	7	A	10.74	0.235	2.30	15.7	0.339	3/0	Anoli
107-A1F-7-12.1	107	7	AA	12.07	0.296	2.90	17.7	0.269	4/0	Salamander
107-A1F-18-12.1	107	7	A	12.07	0.296	2.90	18.8	0.269	4/0	Clayman
127-A1F-7-13.2	127	7	AA	13.21	0.350	3.43	20.9	0.228	250	—
127-A1F-18-13.2	127	18 or 19	A	13.21	0.350	3.43	22.2	0.228	250	—
135-A1F-7-13.6	135	7	AA	13.64	0.373	3.66	22.3	0.213	266.8	—
135-A1F-18-13.6	135	18 or 19	A	13.64	0.373	3.66	23.0	0.213	266.8	Komodo
152-A1F-7-14.5	152	7	AA	14.48	0.419	4.11	24.3	0.190	300	—
152-A1F-18-14.5	152	18 or 19	A	14.48	0.419	4.11	25.8	0.190	300	Tadpole

(Continued)

**Table 1 (Concluded)**

Preferred designation	Aluminum area, mm <sup>2</sup>	Number of strands	Class	Nominal diameter, mm	Linear mass, kg/m	Linear weight, N/m	Rated tensile strength, kN	Nominal dc resistance at 20 °C, Ω/km	Reference	
									AWG or kcmil	Conductor name
170-A1F-7-15.3	171	7	AA	15.32	0.470	4.61	27.3	0.169	336.4	—
170-A1F-18-15.3	171	18 or 19	A	15.32	0.470	4.61	29.0	0.169	336.4	Basilisk
177-A1F-18-15.7	177	18 or 19	A	15.65	0.489	4.80	30.1	0.163	350	—
201-A1F-18-16.7	201	18 or 19	AA	16.74	0.556	5.45	33.2	0.143	397.5	Hatteria
242-A1F-18-18.3	242	18 or 19	AA	18.34	0.667	6.54	39.9	0.119	477.0	Chuckwalla
253-A1F-18-18.7	253	18 or 19	AA	18.69	0.699	6.86	41.8	0.114	500	—
282-A1F-18-19.8	282	18 or 19	AA	19.81	0.778	7.63	46.5	0.102	556.5	—

\*A1F indicates 1350-H19 hard-drawn aluminum formed wire.

Δ

**Table 2**  
**Construction requirements for Class B compact**  
**round 1350 aluminum conductors**  
 (See Clauses 4.1 and 6.2.2.)

Aluminum area, mm <sup>2</sup>	Number of strands	Class	Nominal diameter, mm	Linear mass, kg/m	Maximum dc resistance at 20 °C, Ω/km	Reference
						AWG or kcmil
8.37	7	B	3.40	0.0231	3.52	8
13.3	7	B	4.29	0.0367	2.21	6
21.5	7	B	5.41	0.0584	1.39	4
26.7	7	B	6.05	0.0736	1.10	3
33.6	7	B	6.81	0.0928	0.874	2
42.4	18 or 19	B	7.59	0.117	0.694	1
53.5	18 or 19	B	8.53	0.148	0.550	1/0
67.4	18 or 19	B	9.55	0.186	0.436	2/0
85.0	18 or 19	B	10.7	0.235	0.346	3/0
107	18 or 19	B	12.1	0.296	0.274	4/0
127	35–37	B	13.2	0.350	0.233	250
152	35–37	B	14.5	0.419	0.194	300
177	35–37	B	15.6	0.489	0.166	350
203	35–37	B	16.7	0.559	0.145	400
228	35–37	B	17.8	0.629	0.129	450
253	35–37	B	18.7	0.699	0.116	500
279	58–61	B	19.7	0.769	0.105	550
304	58–61	B	20.7	0.839	0.0967	600
329	58–61	B	21.5	0.909	0.0893	650
355	58–61	B	22.3	0.979	0.0829	700
380	58–61	B	23.1	1.05	0.0774	750
405	58–61	B	23.8	1.12	0.0725	800
456	58–61	B	25.4	1.26	0.0645	900
507	58–61	B	26.9	1.40	0.0580	1000
557	58–61	B	28.2	1.54	0.0527	1100

# ***Standards Update Service***

***CSA C49.5:10***

***May 2010***

**Title:** *Compact round aluminum stranded conductors (compact round ASC)*

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*Published in May 2010 by CSA Group  
A not-for-profit private sector organization  
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*ICS 29.060.10  
ISBN 978-1-55491-405-0*

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