

Armoured cable and flexible metal conduit fittings

Specifications – Armoured cable

Armoured cable (Type AC90) Ref. CEC Rule 12-600

The Canadian Electric Code 2012 Part I defines type AC armoured cable as, “A fabricated assembly of insulated conductors in a flexible metallic enclosure.”

All armoured cables may employ copper or aluminum or copperclad aluminum conductors with the following sizes and are rated for 600 volts or less:

- No. 14 AWG to no. 1 AWG copper
- No. 12 AWG to no. 1 AWG aluminum or copperclad aluminum

Armoured cable can be used for both exposed and concealed locations.

Armoured cable is not permitted in locations where it will be subjected to physical damage or corrosive fumes. Armoured cable cannot be used for direct burial in earth.

Codes require that cable shall be supported with straps or staples without damaging conductors. Certain precautions are prescribed in code where cable is installed through joist rafters or similar wood members.

According to CEC Rule 12-610

- (1) Where conductors issue from armour, they shall be protected from abrasion by bushings of insulating material or equivalent devices.
- (2) Where conductors are no. 8 AWG or larger, copper or aluminum, such protection shall consist of:
 - (a) Insulated type bushings, unless the equipment is equipped with a hub having a smoothly rounded throat; or
 - (b) Insulating material fastened securely in place which will separate the conductors from armoured cable fittings and afford adequate resistance to mechanical injury.

(3) Where armoured cable is fastened to equipment, the conductor or clamp shall be of such design as to leave the insulating bushing or its equivalent visible for inspection.

(4) Where conductors connected to open wiring issue from the ends of armouring, they shall be protected with boxes or with fittings having a separately bushed hole for each conductor.

Please refer to the following for further details and complete information:

1. UL 4, ANSI C33.9 – Safety standards for armoured cable
2. UL 514 A and 514B – Safety standards for outlet boxes and fittings
3. W-F-406 – Federal specification: Fittings for cable, power, electrical and conduit, metal, flexible
4. NEMA FB-1 – Standards publication: Fittings, cast metal boxes and conduit bodies for conduit, electrical metallic tubing and cable
5. CEC Section 12-600 – Wiring methods (armoured cable)
6. CSA C22.2 No. 51 – Safety standards for armoured cables
7. CSA C22.2 No. 18.1 and 18.3 – Safety standards for outlet boxes, conduit boxes and fittings

Please note

The excerpts and other material herein, whether relating to the Canadian Electrical Code 2012 Part I, the Underwriters Laboratories, Inc. listing, to industry practice or otherwise, is not intended to provide all relevant information required for use and installation. Reference to original or primary source material and data is mandatory before any application or use is made of the product.

Armoured cable and flexible metal conduit fittings

Specifications – Flexible metal conduit

Flexible metal conduit Ref. CEC Rule 12-1000

Flexible metal conduit can be used for exposed or concealed work in dry locations. It can be used for wet locations, provided conductors within are lead covered or other approved type.

Flexible metal conduit cannot be used underground or embedded in poured concrete or aggregate. With rubber covered conductors, the conduit cannot be exposed to oil, gasoline or other materials having a deteriorating effect on rubber.

With minor exceptions, use of flexible metal conduit is not permitted in hoists, in storage battery rooms or in any hazardous locations. Use of flexible metal conduit is restricted to systems under 600 volts.

Flexible metal conduit longer than six feet is permitted to be used as a grounding means provided the conduit and the fitting are approved for the purpose. To date there is no flexible metal conduit approved for the purpose by the Underwriters Laboratories or CSA.

In Class II Zone 2 and Division 2 hazardous areas, the conduit itself cannot be used as the grounding means. Class I Zone 2 flexible connections at motor terminals and similar places, ref.: CEC Rule 18-152 (6) and bonding CEC Rule 18-074 (1)(a). Class I Division 2, flexible connections at motor terminals and similar places, ref: CEC Rule J18-152 (3) and bonding CEC Rule J18-072 (1)(a). Flexible metal conduit is available with steel or aluminum armour in trade size $\frac{5}{16}$ in. to 4 in. With few exceptions where $\frac{5}{16}$ in. and $\frac{3}{8}$ in. trade sizes are used, code prohibits use of conduit less than $\frac{1}{2}$ in. trade size. Bends in concealed work are restricted to four 90° bends (CEC Rule 12-940). No angle fittings are permitted in concealed raceway installations.

Please refer to the following for further details and complete information:

1. UL 1, ANSI C33.92 – Safety standards for flexible metal conduit
2. UL 514 – Safety standards for outlet boxes and fittings
3. W-F-406 – Federal specification: Fittings for cable, power, electrical and conduit, metal flexible
4. WW-C-566 – Federal specification: Conduit, metal, flexible
5. NEMA FB1 – Standards publication: Fittings and supports for conduit and cable assemblies
6. CEC 12-1000 – Wiring method (rigid and flexible conduit)
7. CSA C22.2 No. 56 – Safety standards for flexible metallic conduit and liquidtight flexible metal conduit
8. CSA C22.2 No. 18 – Safety standards for outlet boxes, conduit boxes and fittings
9. CEC Rule 12-1000
Rule 18-152 (6) and bonding Rule 18-074 (1)(a) Class I, Zone 2 – Flexible connections at motor terminals and similar places.
Rule J18-152 (6) and bonding Rule J18-072 (1)(a) Class I, Division 2 flexible connections at motor terminals and similar places.
Rule 12-940 – Not more than the equivalent of four 90° bends

Armoured cable and flexible metal conduit fittings

Suggested specifications

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01 Series 3110
armoured cable fitting
and flexible metal conduit

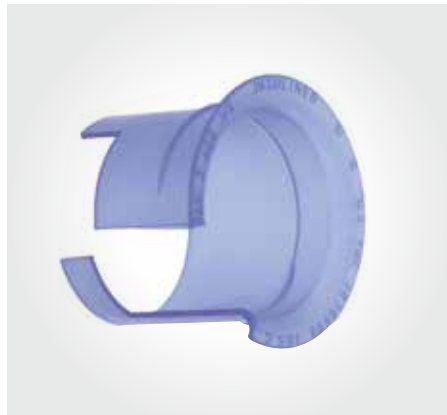
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02 Series 422
insuliner sleeve

—
03 Series 390
anti-short bushing

- Armoured cable and flexible metal conduit shall conform to provisions of following applicable standards:
Armoured Cable – UL 4/ANSI C33.9/CSA C22.2 No. 51; flexible metal conduit – UL 1/ANSI C33.92/WW-C-566/CSA C22.2 No.56
- Type of cable used and conductors within flexible metal conduit shall be suitable for conditions of use and location
- Where armoured cable or flexible metal conduit terminates into a threadless or threaded opening, it shall be assembled with approved fittings; fittings shall be of malleable iron/steel construction, electro-zinc plated inside and outside, equipped with nylon-insulated throat and shall be of angled saddle type as manufactured by ABB, series 3110; direct bearing screw type fittings shall not be used
- Suitable bushing as manufactured by ABB, series 422 or 390, shall be provided between the conductors and armour
- Where approved armoured cable or flexible metal conduit is used as an equipment grounding conductor, terminating fitting used shall be of the grounding type as manufactured by ABB, series 3110



01



02



03

Armoured cable and flexible metal conduit fittings

Specifications

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01 3110 Series
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02 Typical installation

Application

- To connect and effectively bond armoured cable or flexible metal conduit to a box or an enclosure

Features

- Provided with a saddle designed to:
 - (1) Firmly secure conduit in place without damaging cable armour (mechanical holding power of angled wedge assembly increases with increased strain)
 - (2) Provide high quality bond between conduit or cable and be unaffected by vibrations
 - (3) Centralize conduit or cable with respect to throat opening for conductors
- Insulated throat protects conductors during and after installation, reduces wire pull effort and prevents thread damage in handling
- Locknuts designed to provide effective bond between fitting and box or enclosure, will not vibrate loose
- Designed with fewer screws – reduces installation time and cost
- Rugged all steel or malleable iron construction.
- CEC Rule 18-152 (6) and bonding Rule 18-074 (1)(a) Class I, Zone 2 flexible connections at motor terminals and similar places CEC Rule J18-152 (6) and bonding Rule J18-072 (1)(a) Class I, Division 2 flexible connections at motor terminals and similar places

Standard material/finish

- Body: Steel or malleable iron/electro zinc plated and chromate coated
- Saddle: Steel/electro zinc plated and chromate coated
- Screws: Steel/electro zinc plated and chromate coated
- Insulator: Thermoplastic/as molded

Conformity

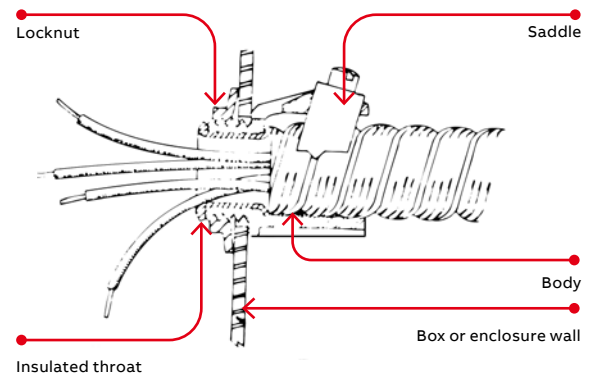
- UL 514B
- CSA C22.2 No. 18.3
- NEMA FB-1

Series	Hub size NPS (in.)	Conduit size (in.)	Cable opening (in.)
3110 Series straight fittings	½–5	¾–5	0.437–5.500
3130 Series 90° fittings	½–4	¾–4	0.437–4.560

(All hubs provided with straight pipe threads NPS)



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01



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02

Armoured cable and flexible metal conduit fittings

Tite-Bite® fittings

Steel or malleable iron

The tough lining of insulation and the Tite-Bite principles make these fittings a “must” when conductors are subject to conditions of vibration or strain

Tite-Bite fittings – Nylon insulated



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
3110-C*	0.656	0.437	3/8	1/2	1 7/16	1 5/16	7/16
3112	0.937	0.750	1/2	1/2	1 25/32	1 3/4	1 9/32
3115*	1.125	0.906	3/4	3/4	2	1 3/4	1 9/32
3117*	1.468	1.250	1	1	2 3/8	1 3/4	1 7/32
3118†	1.750	1.562	1 1/4	1 1/4	2 3/4	2	1 11/32
3119†	2.031	1.812	1 1/2	1 1/2	3 1/8	2 5/8	1 7/8
3120†	2.500	2.312	2	2	3 3/4	2 3/4	1 15/16
3121†	3.062	2.812	2 1/2	2 1/2	4 3/8	3 3/4	2 3/8
3122†	3.562	3.312	3	3	5	3 3/4	2 3/8
3123‡	4.060	3.620	3 1/2	3 1/2	5 1/4	3 11/16	2 15/32
3124**†	4.560	4.120	4	4	5 3/4	3 25/32	2 1/2
3125**	5.500	4.600	5	5	6 7/8	4 27/32	3

Material: Steel through 3/4 in. trade size

* UL Listed for armoured cable only

† UL Listed for flexible metal conduit only

‡ CSA not applicable

** Not UL Listed or CSA Certified

Steel or malleable iron

Easy to install with double-grip saddle. These fittings are completely salvageable. The 3/8 in. and 1/2 in. sizes are made of formed steel, which produces a uniform high quality and a smooth throat that protects conductor insulation. 3/4 in. and larger size are malleable iron.

Tite-Bite fittings



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
300-TBC*	0.656	0.437	3/8	1/2	7/16	1 5/16	7/16
302-C	0.937	0.750	1/2	1/2	1 7/64	1 11/16	3/4
304	1.093	0.906	3/4	3/4	1 7/32	1 11/16	29/32
306	1.468	1.250	1	1	1 1/8	1 3/4	1 1/4
308†	1.750	1.562	1 1/4	1 1/4	1 1/4	2 1/32	1 9/16
310†	2.031	1.812	1 1/2	1 1/2	1 3/4	2 9/16	1 13/16
312†	2.500	2.312	2	2	1 13/16	2 13/16	2 9/16
314†	3.062	2.812	2 1/2	2 1/2	2 1/4	3 1/8	2 13/16
316†	3.562	3.312	3	3	2 1/4	3 3/16	3 9/16

Material: Steel through 3/4 in. trade size

* UL Listed for armoured cable only

† UL Listed for flexible metal conduit only

Armoured cable and flexible metal conduit fittings

Tite-Bite fittings

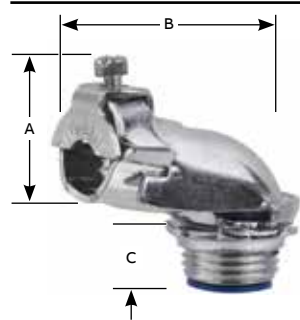
Steel or malleable iron.

Available with or without insulated throat, this Tite-Bite fitting line is by far the easiest and best to install when making sharp bends at the enclosure or equipment. It has all of the advantages of the straight fitting with only one screw to tighten, except in the larger sizes where there are two. A peep hole on top provides for easy inspection of the ABC bushing. Narrow design makes it easy to install fittings in adjacent knockouts.

Tite-Bite fittings – 90° angle nylon insulated



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
3130-C	0.563	0.437	3/8	1/2	1 ¹¹ / ₃₂	1 ¹⁹ / ₃₂	5/32
3132	0.937	0.750	1/2	1/2	1 ⁷ / ₈	2 ⁵ / ₁₆	1 ⁵ / ₃₂
3135	1.093	0.906	3/4	3/4	2	2 ¹ / ₈	1 ⁵ / ₃₂
3137	1.468	1.250	1	1	2 ²¹ / ₃₂	2 ¹ / ₈	1/2
3138†	1.750	1.562	1 ¹ / ₄	1 ¹ / ₄	3 ³ / ₈	2 ⁷ / ₈	3/4
3139†	2.031	1.812	1 ¹ / ₂	1 ¹ / ₂	4 ³ / ₈	4	1 ³ / ₁₆
3140†	2.500	2.312	2	2	5 ⁹ / ₁₆	4 ⁷ / ₈	1
3141†	3.062	2.812	2 ¹ / ₂	2 ¹ / ₂	5 ²⁵ / ₃₂	6	1
3142†	3.562	3.312	3	3	6	7	1
3143‡	4.060	3.620	3 ¹ / ₂	3 ¹ / ₂	6	6 ⁷ / ₈	1 ¹ / ₁₆
3144-TB‡	4.560	4.120	4	4	6 ²⁹ / ₃₂	7 ¹ / ₄	1 ¹ / ₈



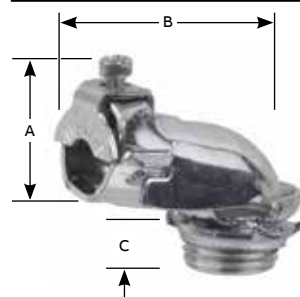
† UL Listed for flexible metal conduit only
‡ Not UL Listed or CSA Certified

The angle clip gives secure mechanical grip that tightens under tension or vibration. Throat is long enough to install in cast housing knockouts. The 3/8 in. and 1/2 in. sizes are of steel construction. The 3/4 in. and larger sizes are malleable iron.

Tite-Bite fittings – 90° angle



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
321-C	0.656	0.437	3/8	1/2	1 ¹¹ / ₃₂	1 ¹ / ₂	3/8
323	0.937	0.750	1/2	1/2	1 ⁷ / ₈	2 ³ / ₈	1 ⁷ / ₃₂
325	1.093	0.906	3/4	3/4	2 ¹ / ₈	2 ¹ / ₈	3/4
326-TB	1.468	1.250	1	1	2 ²¹ / ₃₂	2 ¹ / ₈	1
327-TB†	1.750	1.562	1 ¹ / ₄	1 ¹ / ₄	3 ³ / ₈	3 ³ / ₈	–
328†	2.031	1.812	1 ¹ / ₂	1 ¹ / ₂	4 ³ / ₈	4 ³ / ₈	–
329†	2.500	2.312	2	2	4 ³ / ₈	4 ³¹ / ₃₂	–
330-TB†	3.062	2.812	2 ¹ / ₂	2 ¹ / ₂	6 ¹ / ₂	6	–
331†	3.562	3.312	3	3	5 ²⁵ / ₃₂	7	–



† UL Listed for flexible metal conduit only

Armoured cable and flexible metal conduit fittings

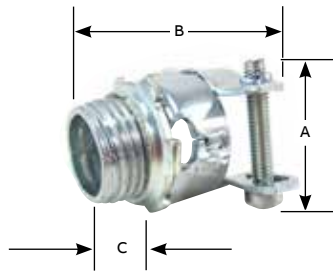
Squeeze fittings

Squeeze fittings will fit every size of armoured cable, leaded cable and flexible conduit. Malleable iron or steel construction. Part no. 253-TB is steel.

Squeeze fittings



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
252	0.531	0.437	5/16	3/8	13/16	25/32	11/32
253-TB†	0.585	0.455	3/8	1/2	31/32	113/64	5/8
254-C†	0.938	0.812	1/2	1/2	17/32	13/8	13/32
255	1.094	0.938	3/4	3/4	1 1/4	1 17/32	7/16
256	1.375	1.250	1	1	1 19/32	1 5/8	1/2
257	1.656	1.500	1 1/4	1 1/4	1 7/8	1 23/32	17/32
258	1.875	1.688	1 1/2	1 1/2	2 1/4	1 7/16	9/16
259	2.500	2.313	2	2	2 23/32	2 5/8	11/16
249	3.062	2.812	2 1/2	2 1/2	3 5/16	2 11/16	3/4
277	3.563	3.312	3	3	3 13/16	2 7/8	3/4



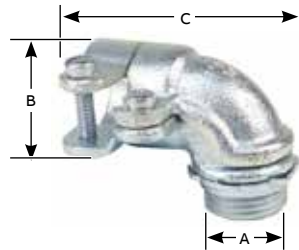
† UL Listed for armoured cable only. Fitting material steel

3/8 in. and 1/2 in. sizes made in steel. Cap lifts off by simply loosening screws part way. Only two screws to tighten. 3/4 in. size and larger made of malleable iron.

Squeeze fittings – 90° angle



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
266-C	0.656	0.406	3/8	1/2	1 1/2	1 13/32	1 7/16
272†	0.812	0.688	3/8	1/2	1 9/16	1 7/8	1 9/16
268-C	0.937	0.813	1/2	1/2	1 11/16	1 13/16	1 7/8
279	1.000	0.875	3/4	3/4	1 13/16	2 1/16	1 13/16
270	1.125	1.000	3/4	3/4	1 7/8	1 3/4	1 13/16
273-TB	1.406	1.187	1	1	2 3/8	2 7/32	2 7/16
274‡	1.656	1.375	1 1/4	1 1/4	3	2 9/16	2 7/8
275‡	1.875	1.625	1 1/2	1 1/2	3 7/32	3 1/16	4 1/8
276‡	2.500	2.125	2	2	4 5/8	3 5/8	4 7/8



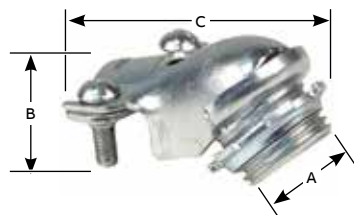
† UL Listed for armoured cable only
‡ UL Listed for flexible metal conduit only

3/8 in. and 1/2 in. sizes made in steel. Cap lifts off by simply loosening screws part way.

Squeeze fittings – 45° angle



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
265	0.656	0.406	3/8	1/2	1 7/16	1 3/32	1 3/8
267	0.937	0.813	1/2	1/2	1 3/16	1/2	1 1/4
269	1.125	1.000	3/4	3/4	1 7/8	1 7/32	1 9/16



Armoured cable and flexible metal conduit fittings

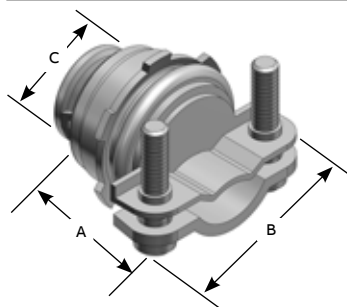
Two-screw and clamp fittings

Formed steel body with carefully round bushing.
The armour gripping saddle stays open by itself when cable is being inserted.

Two-screw fittings



Cat. no.	Cable opening (in.)		Trade size (in.)	KO size (in.)	Dimensions (in.)		
	max.	min.			A	B	C
3301-C*	0.656	0.250	3/8	1/2	5/8	1 1/16	1 3/16
3312-C	0.937	0.500	1/2	1/2	5/8	1 1/16	1 3/16



* UL Listed for armoured cable only.

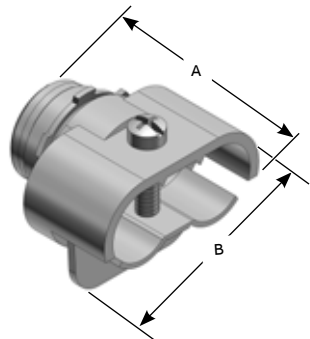
Malleable iron.

For nonmetallic and armoured cable.

Duplex clamp fitting



Cat. no.	KO size (in.)	Dimensions (in.)	
		A	B
291-C	1/2	1 13/32	1 11/16



UL Listed as grounding means under NEC 350-5.

Armoured cable and flexible metal conduit fittings

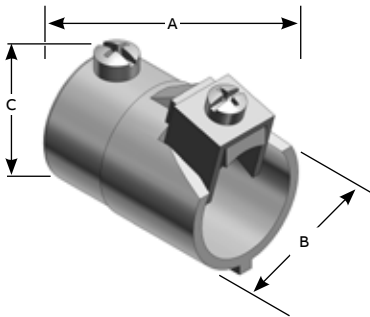
EMT to flex adaptors

Tite-Bite fitting design holds flexible metal cable firmly in place with a single screw rather than two screws.

Adaptor - EMT to flex



Cat. no.	KO size (in.)	Dimensions (in.)		
		A	B	C
503-TB	1/2 - 1/2	1 ²⁵ / ₃₂	1 ³ / ₁₆	1 ⁷ / ₈
504	3/4 - 3/4	1 ²⁵ / ₃₂	1 ⁷ / ₁₆	2 ¹ / ₈
505-TB	1 - 1	2 ¹ / ₃₂	2 ¹ / ₁₆	2 ⁵ / ₈



Armoured cable and flexible metal conduit fittings

Anti-short bushings and straps



Anti-short bushings are made of smooth plastic, and designed to protect conductor insulation from rough edges of armoured cable and flexible metal conduit.

Anti-short bushing

Cat. no.	Size
390	14-2, 14-3 and 12-2
391	14-4, 12-3, 6-1 and 4-1
392	12-4, 10-2, 10-3 and 2-1
393	10-4, 8-2, 8-3 and 1-1
394	8-4, 6-2, 6-3, 4-2, 4-3 and 6-4

Colourized
 Temperature rating: 240 °F
 UL not applicable



Strap



Cat. no.	Bolt hole dia. (in.)	Size (in.)
65C	0.265	3/8 Flex