

COPY

Invitation to Bid No. :

Specification No. : R-506/2546

C Material, equipment, and specifications for CONNECTORS AND ELECTRICAL CONTACT COMPOUND

C1 General material and packing instructions

Additional to the general instructions, the following shall be observed :

1a Scope

These specifications cover mechanical, compression and wedge type connectors to connect conductors, and electrical contact compound.

1b Standard

The connectors shall be manufactured and tested in accordance with the latest IEEE, ANSI, EEI-NEMA, ASTM, VDE Regulations and DIN, or equivalent; unless otherwise specified in these specifications.

The bodies of connectors shall be of aluminium-alloy according to manufacturer's standards, unless otherwise specified in these specifications.

1c Principal requirement

1c.1 General

The connectors shall be suitable for connecting stranded and/or solid conductors according to DIN, TIS, or equivalent; unless otherwise specified in these specifications.

1c.2 Bolted type connector

For the purpose of against self loosening, each bolt shall be furnished with at least of one (1) locknut. The bolts shall be designed for single-wrench installation. Each U-bolt is counted as two (2) bolts. The bolts shall be tightened to torque levels according to these shown in the table below or according to manufacturer's recommendation; the technical details of tightening torque levels shall be submitted on request.

All ferrous materials shall be hot-dip galvanized after manufacturing; except bolts, lockwashers, washers, and nuts up to M6 shall be electro galvanized; according to the relevant standards or having the thickness or zinc coating shown in the table below.

Sizes of Bolts, lockwashers, Washers, and Nuts	Tightening Torque Level of Galvanized Steel Bolts kgf-m	Minimum Thickness of Zinc Coating mm
M 6 (1/4")	-	0.010
M 8 (5/16")	2.0	0.040
M 10 (3/8")	2.7	0.040
M 12 (1/2")	5.5	0.040
M 14 (9/16")	6.5	0.040
M 16 (5/8")	7.5	0.040
M 20 (3/4")	11.0	0.045

1c.3 Compression type connector

Full tension sleeves and partial tension sleeves shall withstand at least 90% and 40%, respectively, of the minimum breaking strength of the conductors for which they are designed. Each sleeve shall be prefilled with electrical contact compound and closed both ends by plastic caps.

Conductor barrel of each terminal lug shall be prefilled with electrical contact compound and closed by a plastic cap.

Tap connectors shall be prefilled with electrical contact compound and packed in suitable packages, one (1) or two (2) pieces per package.

1c.4 Compression deadend assembly set

The aluminium body and aluminium jumper terminal shall accommodate aluminium conductor which is according to TIS; and the conductor barrel shall be prefilled with electrical contact compound and closed by a plastic cap.

1c.5 Wedge type connector

The wedge type connector shall consist of C-shaped member and wedge, and made of aluminium alloys which shall be described.

The wedge type connector shall pass the current cycle tests Class A (500 cycles) in accordance with the latest EEI-TDJ-162/NEMA C3, ANSI C 119.4 or equivalent.

Bidders who have never submitted the test reports of current cycle tests shall submit either prior to receipt of bids or within fifteen (15) days of the bid closing date, for saving bid consideration time, the item without submitting the report shall be rejected.

1c.6 Marking

Each connector shall be marked, on the body, at least as follows :

- (1) Applicable conductor type and size.
- (2) Manufacturer's symbol.
- (3) Marks to press, for compression type only.
- (4) Words "FULL TENSION" and "PARTIAL TENSION", on full tension sleeves and partial tension sleeves, respectively.

Except for compression type tap connectors for main line size less than 10 mm² (not including size 10 mm³), if the applicable conductor type and size can not be marked on the bodies, the marks shall be marked on individual packages.

1c.7 Sample

Free samples shall be supplied on request. The samples will not be returned.

1d Packing

Each item shall be packed separately in suitable packages in sets or pieces of 1, 2, 100, 200, 250, or 300.

Except :

PEA Material No.	Preformed fittings	sets or pieces per package
02300103	Connector, parallel groove	75
02310001	Connector, dead-end type	100

Packages of same item may be packed together in suitable cases.

C2 Material and packing data to be given by bidder

- 2a For each item offered, the following details shall be submitted with the bid :
- Catalogue number.
 - Specifications of materials used for the component parts (body, bolts, nuts, screws, lockwashers, washers, etc.) .
 - Surface finishing of the component parts.
 - Nominal cross-sectional area in mm^2 of conductor for which the connector is designed.
 - Diameter in mm of conductor for which the connector is designed.
 - Material of conductors for which the connector can be used (Al, ACSR, Cu, etc.) .
 - Recommended tightening torques for bolts in kgf-m .
 - Weight in $\text{kg}/100$ sets or pieces.
- 2b It shall be advised whether the connectors should be protected by armour tape or preformed line guards, etc.
- 2c For each item offered, a drawing with dimensions in mm and marking details shall be submitted with the bid. For compression type connector, a drawing with the dimensions including inside and outside diameters and marking details shall be submitted.
- 2d Number of aluminium-alloy copper-alloy, and/or the chemical compositions of the bodies of connectors.

2e Packing details

Packing method.

Number of sets or pieces in each package (maximum 300 sets or pieces in one package)

Principal dimensions of each package in cm .

Volume of each package in m^3 .

Gross weight of each package in kg .

Net weight of each package in kg .

Number of packages.

If several packages are contained in one big case, further details are required :

Number of packages in each case.

Principal dimensions of each case in cm .

Volume of each case in m^3 .

Gross weight of each case in kg .

Number of cases.



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Addendum

This addendum is made to be a part of specifications it's attached.

1. Replace the packing detail only for the specific items in the specifications by the packing detail specified in **Table A1** below:

Table A1: Packing Detail

Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
Connectors and cable accessories:					
1	Hot line bail clamp (hot line stirrup clamp), for main aluminium conductor size 25 mm ² to 50 mm ²	1-02-033-0000	Sealed package	40	49
2	Hot line protected thread clamp for main aluminium conductor size 25 mm ² to 50 mm ²	1-02-033-0100	Sealed package	50	100
3	Hot line protected thread clamp for main aluminium conductor size 50 mm ² to 120 mm ²	1-02-033-0101	Sealed package	50	50
4	Compression splicing sleeve, full tension, for aluminium conductor size 50 mm ²	1-02-040-0002	Suitable package	100	100
5	Compression splicing sleeve, full tension, for aluminium conductor size 95 mm ²	1-02-040-0004	Suitable package	50	100
6	Compression splicing sleeve, full tension, for aluminium conductor size 185 mm ²	1-02-040-0007	Suitable package	30	50
7	Compression splicing sleeve, full tension, for aluminium conductor size 400 mm ²	1-02-040-0009	Suitable package	30	50
8	Compression splicing sleeve, partial tension, for aluminium conductor size 50 mm ²	1-02-041-0002	Suitable package	100	100
9	Terminal connector (lug), compression type, for aluminium conductor size 185 mm ²	1-02-041-0106	Suitable package	50	50
10	Pin terminal, for aluminium conductor size 50 mm ²	1-02-042-0400	Suitable package	50	100
Overhead line hardware:					
11	Angle steel crossarm, size 150x100x12 mm, length 4,500 mm	1-00-012-0002	Bundle	10	-
12	Channel steel crossarm, size 100x50x5 mm, length 4,200 mm	1-01-000-0103	Bundle	20	-
13	Channel steel crossarm, size 100x50x5 mm, length 4,500 mm	1-01-000-0104	Bundle	20	-
14	Channel steel crossarm, size 150x75x6 mm, length 2,800 mm	1-01-000-0300	Bundle	20	-
15	Channel steel crossarm, size 150x75x6.5 mm, length 4,000 mm	1-01-000-0301	Bundle	20	-



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Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
16	Channel steel beam, size 150x75x6.5 mm, length 4,500 mm	1-01-000-0302	Bundle	20	-
17	Channel steel beam, size 150x75x6.5 mm, length 6,000 mm	1-01-000-0303	Bundle	20	-
18	Channel steel beam, size 150x75x6.5 mm, length 2,500 mm	1-01-000-0304	Bundle	20	-
19	Channel steel crossarm, size 150x75x9 mm, length 3,000 mm	1-00-012-0004	Bundle	20	-
20	Angle steel beam, size 65x65x6 mm, length 1,000 mm	1-01-001-0000	Bundle	100	-
21	Bolt, machine, M 16 x 170 mm	1-01-011-0201	Sack	100	56
22	Bolt, machine, M 16 x 300 mm	1-01-011-0204	Sack	80	56
23	Bolt, machine, M 16 x 350 mm	1-01-011-0205	Sack	80	56
24	Bolt, machine, M 16 x 450 mm	1-01-011-0207	Sack	40	56
25	Bolt, machine, M 16 x 500 mm	1-01-011-0208	Sack	40	50
26	Bolt, machine, M 16 x 600 mm	1-01-011-0209	Sack	40	50
27	Bolt, machine, hexagon head, M 16 x 75 mm	1-01-011-0400	Sack	200	56
28	Bolt, machine, hexagon head, M 16 x 550 mm	1-01-011-0401	Sack	40	50
29	Bolt, machine, hexagon head, M 16 x 600 mm	1-01-011-0402	Sack	40	50
30	Bolt, machine, hexagon head, M 16 x 650 mm	1-01-011-0403	Sack	30	50
31	Bolt, double arming, full thread, M 16 x 450 mm	1-01-012-0001	Sack	40	50
32	Bolt, double arming, full thread, M 16 x 500 mm	1-01-012-0002	Sack	40	50
33	Bolt, double arming, full thread, M 16 x 550 mm	1-01-012-0003	Sack	40	50
34	Bolt, double arming, full thread, M 16 x 600 mm	1-01-012-0004	Sack	40	50
35	Bolt, double arming, full thread, M 16 x 650 mm	1-01-012-0005	Sack	30	50
36	Bolt, double arming eye, M 16 x 450 mm	1-01-013-0001	Sack	40	56
37	Bolt, double arming eye, M 16 x 500 mm	1-01-013-0002	Sack	40	50
38	Bolt, double arming eye, M 16 x 650 mm	1-01-013-0005	Sack	30	50
39	Bolt, round eye, M 16 x 200 mm	1-01-014-0001	Sack	80	56
40	Bolt, round eye, M 16 x 250 mm	1-01-014-0002	Sack	80	56
41	Bolt, round eye, M 16 x 300 mm	1-01-014-0003	Sack	50	56
42	Bolt, oval eye, M 16 x 150 mm	1-01-015-0000	Sack	80	56
43	Bolt, oval eye, M 16 x 200 mm	1-01-015-0001	Sack	80	56
Insulators and accessories:					
44	Insulator, pin-post type, TIS 1251, Type 56/57-2	1-03-001-0101	Export package	2	30
45	Clevis-eye	1-03-014-0000	Suitable package	40	56
46	Ball-clevis, ANSI Type K	1-03-014-0001	Suitable package	30	56



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Item	Equipment	PEA's material No.	Packing method	Quantity per package/case	Number of packages/cases per pallet
47	Ball-hook, ANSI Type B	1-03-014-0002	Suitable package	40	56
48	Ball-clevis, ANSI Type B	1-03-014-0005	Suitable package	40	56
Surge arresters:					
49	LV surge arrester, 480 V, 5 kA	1-04-000-0300	Suitable package	100	5
Meters:					
50	Watt-hour meter, 15(45) A, 3-phase 4-wire	1-06-005-0107	Suitable corrugate-paper package	50	-
51	Watt-hour meter, 30(100) A, 3-phase 4-wire	1-06-005-0108	Suitable corrugate-paper package	50	-

2. Sacks used for packing equipment shall have enough durability and shall be made of hemp rope.
3. Bundle packing shall be using galvanized steel wires with diameter not less than 4 mm.
4. Pallets supplied to PEA shall have dimension not more than 1.1 m x 1.1 m (Width x Length) and the total height after containing the packages/cases shall be less than 1.5 m.

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C3 Schedule of detailed requirement

Item	PEA Material No.	Quantity	Description
16	02410102 (1020410102)	55,600 EA	Compression splicing sleeve, partial tension, for ACSR conductor according to TIS 86-2522 size 50/8 mm ² , length not less than 85 mm, see Drawing No. SA2-015/40002.
17	02410104 (1020410104)		Ditto as Item 16, but size 95/15 mm ² , length not less than 115 mm.
18	09080000 (1090080000)		Compound, electrical contact aid and anti-oxidation for use in bolted connections of aluminium-to-aluminium and aluminium-to-copper. The compound shall be contained in handy squeeze packages.
(9) 19	02300102 (1020300102)		Connector, parallel groove, 2-bolt type, length not less than 55 mm, for electrical tap off connection of aluminium, aluminium-alloy, and ACSR conductors to aluminium, aluminium-alloy, and ACSR conductors, with :
			Main : diameter range of 6.42 mm to 13.60 mm (size 25 mm ² to 95 mm ²). Tap : diameter range of 6.42 mm to 13.60 mm (size 25 mm ² to 95 mm ²).
20	02300103 (1020300103)		Ditto as Item 19, but 3-bolt type length, not less than 90 mm. with :
			Main : diameter range of 10.75 mm to 17.64 mm (size 70 mm ² to 185 mm ²). Tap : diameter range of 10.75 mm to 17.64 mm (size 70 mm ² to 185 mm ²).
21	02300104 (1020300104)		Ditto as Item 19, but 3-bolt type length, not less than 100 mm. with :
			Main : diameter range of 12.60 mm to 20.25 mm (size 95 mm ² to 240 mm ²). Tap : diameter range of 12.60 mm to 20.25 mm (size 95 mm ² to 240 mm ²).

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C3 Schedule of detailed requirement

Item	PEA Material No.	Quantity	Description
22	02310000 (1020310000)		Connector, dead-end type, for aluminium conductor diameter range of 6.42 mm to 7.56 mm (size 25 mm ² to 35 mm ²).
23	02310001 (1020310001)		Ditto as Item 22, but aluminium conductor diameter range of 9.06 mm to 10.75 mm (size 50 mm ² to 70 mm ²).
24	02310002 (1020310002)		Ditto as Item 22, but aluminium conductor diameter range of 12.60 mm to 14.25 mm (size 95 mm ² to 120 mm ²).
25	02420101 (1020420101)		Connector (or lug), terminal, compression type made of aluminium-alloy, for connecting aluminium cable according to TIS 293 size 35 mm ² to terminal pad, length not less than 125 mm, see Drawing No. SA2-015/24029.
(19) 26	02420102 (1020420102)	8,000 EA	Ditto as Item 25, but size 50 mm ² to terminal pad, length not less than 125 mm.
27	02420103 (1020420103)		Ditto as Item 25, but size 70 mm ² to terminal pad, length not less than 130 mm.
(20) 28	02420104 (1020420104)	23,370 EA	Ditto as Item 25, but size 95 mm ² to terminal pad, length not less than 140 mm.
29	02420106 (1020420106)		Connector (or lug), terminal, compression type made of aluminium-alloy, for connecting aluminium cable according to TIS 85 size 185 mm ² to terminal pad, length not less than 155 mm, see Drawing No. SA2-015/24029.

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 C4 Price schedule

Manufacturer:
 Trade-mark :
 Country of Origin:
 Bidder :
 Bid No. :
 Date :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
(9) 19	02300102 (1020300102)		Connector, parallel groove, 2-bolt type, length mm, for electrical tap off connection of aluminium, aluminium-alloy, and ACSR conductors to aluminium, aluminium-alloy, and ACSR conductors, with : Main : diameter range of mm to mm . Tap : diameter range of mm to mm .	55,600 EA	(เสนอราคาในระบบ e-GP เท่านั้น)	
20	02300103 (1020300103)		Ditto as Item 19, but 3-bolt type length, mm. with : Main : diameter range of mm to mm . Tap : diameter range of mm to mm .			
21	02300104 (1020300104)		Ditto as Item 19, but 3-bolt type length, mm. with : Main : diameter range of mm to mm . Tap : diameter range of mm to mm .			
22	02310000 (1020310000)		Connector, dead-end type, for aluminium conductor diameter range of mm to mm .			

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C4 Price schedule

Manufacturer:
Trade-mark :
Country of Origin:
Bidder :
Bid No. :
Date :

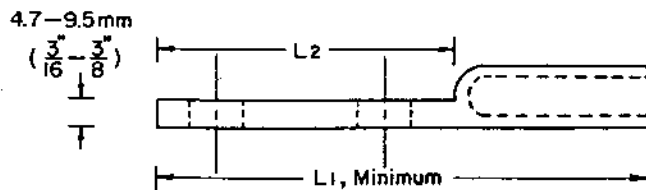
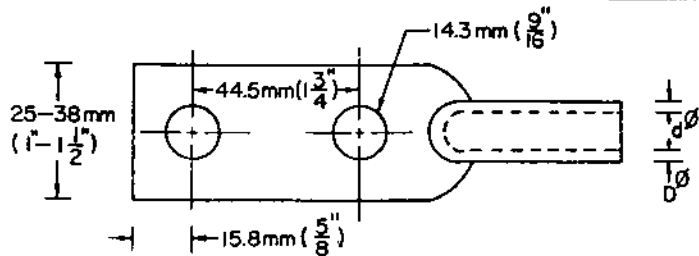
Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
23	02310001 (102031001)		Ditto as Item 22, but aluminium conductor diameter range of mm to mm .			
24	02310002 (102031002)		Ditto as Item 22, but aluminium conductor diameter range of mm to mm .			
25	02420101 (1020420101)		Connector (or lug), terminal, compression type, for connecting aluminium cable size 35 mm ² to terminal pad, length mm .			
(19) 26	02420102 (1020420102)		Ditto as Item 25, but size 50 mm ² to terminal pad, length mm .	8,000 EA	(เสนอราคาในระบบ e-GP เท่านั้น)	
27	02420103 (1020420103)		Ditto as Item 25, but size 70 mm ² to terminal pad, length mm .			

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 C4 Price schedule

Manufacturer :
 Trade-mark :
 Country of Origin:
 Bidder :
 Bid No. :
 Date :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
(20) 28	02420104 (1020420104)		Ditto as Item 25, but size 95 mm ² to terminal pad, length mm..'	23,370 EA	(เสนอราคาในระบบ e-GP เท่านั้น)	
29	02420106 (1020420106)		Connector (or lug), terminal, compression type, for connecting aluminium cable size 185 mm ² to terminal pad, length mm .			
30	02340001 (1020340001)		Connector, wedge type, for electrical tap off connection of aluminium conductor to aluminium conductor, with : Main : diameter of mm Tap : diameter of mm			
31	02340000 (1020340000)		Ditto as Item 30, but Main : diameter of mm Tap : diameter of mm			

การประกอบเลขที่
ASSEMBLY NO.



PRELIMINARY

COMPRESSION TYPE TERMINAL LUG, FOR ALUMINIUM CABLE

COMPRESSION TYPE, TERMINAL LUG	FOR ALUMINIUM CABLE		DIMENSIONS OF COMPRESSION TYPE TERMINAL LUG			
	SIZE mm ²	OVERALL DIAMETER OF CONDUCTOR mm	∅ D mm	∅ d mm	L1 mm, Min	L2 mm
02420101	35	6.95	14.0 (±0.4)	7.85 (±0.15)	125	75 (+5/0)
02420102	50	8.33	16.0 (±0.5)	9.75 (±0.25)	125	75 (+5/0)
02420103	70	9.73	18.5 (±0.5)	11.25 (±0.25)	130	75 (+5/0)
02420104	95	11.45	23.0 (±0.5)	13.25 (±0.25)	140	75 (+5/0)
02420105	120	12.95	23.0 (±0.5)	14.75 (±0.25)	145	75 (+5/0)
02420106	185	17.64	28.5 (±0.5)	18.3 (±0.5)	155	75 (+5/0)

- NOTES:
- FIGURES IN PARENTHESES IN THE TABLE, ARE TOLERANCE.
 - THE LUG SHALL BE PREFILLED WITH ELECTRICAL CONTACT COMPOUND AND CAPPED BY PLASTIC CAPS.
 - EACH LUG SHALL BE MARKED WITH APPLICABLE CONDUCTOR SIZE, MARKS TO PRESS, AND MANUFACTURER'S SYMBOL

กองวิศวกรรมไฟฟ้าและเทคนิค ฝ่ายวิศวกรรม	การไฟฟ้าส่วนภูมิภาค	วิงคนแบบ
ผู้รับ ผู้สำรวจ วิศวกร หัวหน้าแผนก หัวหน้ากอง ผู้อำนวยการฝ่าย	ผู้สำรวจ	ถูกทศโดยแบบ เขียนเสร็จวันที่ 20 ต.ค. 24 แก้แบบวันที่ 20 ก.ค. 2530 ผลิตเป็น มาตรฐาน
รองผู้อำนวยการฝ่ายเทคนิค	CONNECTOR (OR LUG), TERMINAL, COMPRESSION TYPE	แบบเลขที่ SA2-015/24029 แผ่นที่ 1 ของจำนวน 1 แผ่น