



H - TYPE COMPRESSION TAP CONNECTORS

Specification No.: RCBL-026/2564

Approved date: 24 DEC 2021

Rev. No.: 2

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**Invitation to Bid No:** น.3 กบพ.(จร.)EBS8/2567

**C Material, equipment, and specification for H-TYPE COMPRESSION TAP CONNECTORS**

**C1 General material and packing instructions**

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

**1a Scope**

These specifications describe requirements for design, manufacture, tests and supply of H-type compression tap connectors used in low-voltage distribution system.

**1b Standards**

Except otherwise specified elsewhere in the specification, the connectors shall be manufactured and tested in accordance with the following standards

ANSI/NEMA CC1-2009 Electric power connection for substations

ANSI C119.4-2016 Connectors for use between aluminum-to-aluminum and aluminum-to-copper conductors designed for normal operation at or below 93°C and copper-to-copper conductors designed for normal operation at or below 100°C

PEA will also accept connector tested in accordance with the later edition of the above standards.

PEA will also accept the design test report in accordance with the previous edition of the above standards, if there is no significant change in any test items or no additional test item(s) compared with the above standards. On the other hand, if there is significant change in any test items or there are any additional test items, the previous edition design test report with the additional test report(s) of the significant change test item(s) and/or additional test item(s) will be also accepted.

**1c Principal requirement**

**1c.1 Service conditions and installation**

The H-type compression tap connector shall be designed and constructed for outdoor installation, and suitable for operation under the following conditions:

- Altitude : up to 1,000 m above sea level
- Ambient air temperature : up to 50°C
- Average relative humidity in any one year : up to 94%
- Climatic condition : tropical climate



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**1.c.2 General**

The H-type compression tap connectors shall be suitable for connection between LV main aluminium conductor and tap copper conductor which sizes as specified in "C3 Schedule of detailed requirement". The dimensions of the connectors shall be according to Drawing No.SA2-015/25001.

Entire contact surface of the connectors shall be thoroughly filled with oxide inhibiting contact grease, the minimum thickness of the grease shall be 0.5 mm.

Surface of the connectors shall be smooth, consistent, no dirt, no blemishes, no cracks and no rust.

**1.c.3 Construction and characteristics**

The finished product of the proposed H-type compression tap connector shall be of aluminum grade 1050, 1100 or 1350, which shall be standard grade or designation in accordance with international standards, i.e. SAE, AISI, JIS, ASTM, ANSI, UNS, ISO or BS. It shall be suitable for using with both aluminum to aluminum connection and aluminum to copper connection.

**1.c.4 Marking**

Each connector shall be marked by mean of engraving, knurling, hot stamping or laser marking on the body at least data listed below, which is clearly visible and durable foil-coated marking. i.e. printing with toner or laser toner with foil-coated. is not accepted.

- (1) Manufacturer's name or Trademark
- (2) Model or catalog/drawing number
- (3) Type and size of conductor to be used with
- (4) Purchase order number

**1.c.5 Samples**

The bidders shall submit at least one (1) sample for each proposal item within five (5) working days counted from bid closing date for consideration; otherwise, the proposal will be rejected.

PEA's bids committee will initially check the sample by comparing with the color photograph in the proposed type test report and PEA's specification. PEA's bid committee will reject a proposal if there are any parts of sample differing from the color photograph in the type test report and PEA's specification.

PEA reserves the right to test the sample in visual and dimension check and hardness test according to **1e.3 Acceptance tests**, in case of the failing test results. the proposal will be rejected.

The sample will not be returned after consideration, the sample of the successful bidder will be used as a reference sample in acceptance process. The supplied connectors with a different design compared with the reference sample shall be rejected.

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**1d Packing**

The supplied connectors shall be packed in a seal plastic envelope, by quantity of 1, 5, 10, 20, or appropriate per envelope, for protection the connectors and its compound from dust and moisture.

The envelopes shall be packed in paper box and each paper box shall be marked with purchase order number, contractor's name, manufacturer's name or trademark, model or catalog/drawing number type and size of conductor to be used with, number of connectors in the box and net weight. The box shall be wrapped and sealed with a moisture-proof material.

**1e Test and Test report**

**1e.1 Type tests**

The proposed H-type compression tap connector shall be passed all type test items with reference standards and test method as specified in **Table 1**.

**Table 1**  
**Type test items of H-type compression tap connector**

No.	Test items	Reference standard/Test method	Description
1	Visual and dimension check	PEA's specification	See (1)
2	Chemical composition test	Optical emission spectrometer	See (2)
3	Temperature rise test	ANSI/NEMA CC1	See (3)
4	Conductor damage test	ANSI C119.4	See (4)
5	Hardness test	Brinell hardness test	See (5)

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Before the type tests are proceeded, manufacturer shall submit following detail to PEA for approval:

- Ten (10) samples of H-type compression tap connector (All sample shall be signed by PEA's representative)
- Drawing showing specified dimensions and all information according to Drawing No.SA4-015/25001.
- Standard to be used as a reference of grade or designation of the H-type compression tap connector
- The details of tools and compression dies used for compressing the h-type-compression tap connector shall be submitted as following:
  - The catalogue of tools and compression die which specify the model and the name of manufacturer.
  - The dimensions of compression die are required in case of the manufacturer of h-type-compression tap connector uses his own compression die in the type test processes

One sample of H-type compression tap connector will be kept by PEA (by Electrical Equipment Standard and Quality Control Division) and will be used as a reference sample for bid consideration and acceptance processes.

The other samples will be sent to acknowledged independent testing laboratories/institutes, which have qualification mentioned below, for type tests in accordance with the test items specified in **Table 1**.

**(1) Visual and dimension check**

Four (4) samples are required for the test. Each sample shall have markings in accordance with clause **1c.4 Marking**, except purchase order number is not required. Dimensions of each sample shall be measured and recorded. The dimensions of all samples shall be according to Drawing No.SA2-015/25001 and according to manufacturer's drawing.

**(2) Chemical composition test**

One (1) sample is required for the test. The H-type compression tap connector shall be tested by means of optical emission spectrometer for verification grade or designation of aluminium alloy, which shall be aluminium grade or designation specified in accordance with **1.c.3 Construction and characteristics**.

**Note:** PEA will accept result of the chemical composition test with tolerance of -10% of minimum value of each substance specified in reference standard, except aluminium shall have a minimum value according to the reference standard.

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**(3) Temperature rise test**

Four (4) samples are required for the test. The temperature rise test shall be according to ANSI/NEMA CC1. Temperature rise of all connectors shall not exceed the temperature rise of tested conductor.

**(4) Conductor damage test**

Two (2) samples are required for the test. The conductor damage test shall be according to ANSI C119.4.

**(5) Hardness test**

Two (2) samples are required for the test.

The type tests of the H-type compression tap connectors shall be conducted or inspected by the acknowledged independent testing laboratories/institutes as follows:

(1) Independent at laboratories/institutes which are members of the Short-circuit Testing Liaison (STL) or independent laboratories/institutes which are accredited according to TIS 17025 or ISO/IEC 17025 with the scope of accreditation covered the relevant test items, standard and equipment. The certification and scope of accreditation of the independent laboratories/institutes shall be submitted with the bid for consideration.

(2) Laboratories, institutes, universities and electric utilities, as follows:

- NSTDA Characterization and testing service center (NCTC)
- Thailand Institute of Scientific and Technological Research (TISTR)
- National Metal and Materials Technology Center (MTEC)
- Electrical and Electronic Products Testing Center (PTEC)
- Thai Industrial Standards Institute (TISI)
- Electrical and Electronics Institute (EEI)
- Department of Science Service (DSS)
- Testing Laboratory, Electrical Engineering Department, Faculty of Engineering, Chulalongkorn University
- Electricity Generating Authority of Thailand (EGAT)
- Metropolitan Electricity Authority (MEA)
- Provincial Electricity Authority (PEA)
- Laboratory of manufacturers approved by PEA

(3) Other laboratories as follow:

- In case the foreign manufacturers have experience of more than twenty (20) years in design, manufactures and sell H-type compression tap connector, PEA will accept type test report(s) conducted by the manufacturer's laboratory or other independent laboratories without

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qualification mentioned in (1) or (2). Documents showing the manufacturer's experience such as reference list shall be submitted with the bid for consideration.

- The bidders or manufacturers who prefer to carry out the type tests of H-type compression tap connector with other laboratories without the qualification mentioned above, the detail of laboratory and the test facilities shall be submitted to PEA for approval before proceeding the tests and before the bid closing date. PEA reserves the right to send representatives to inspect or witness the tests.

The type test reports conducted by the laboratories/institutes in Thailand or local manufacturers shall be valid within five (5) years counted from the issued date in the test report to the bid closing date. The type test reports conducted by the laboratories/institutes in other countries shall be valid within ten (10) years counted from the issued date in the test report to the bid closing date.

**The cost of all tests and report shall be borne by the Bidders or manufacturers.**

**The type test reports shall be submitted with the bid.**

PEA will also accept other documents instead of the type test reports in the following cases:

- (1) In case the proposed connectors have been sold to PEA at PEA's Procurement Department (from PEA's head office). The bidder can submit the Purchase Order (PO) on the bid closing date, or
- (2) In case the proposed connectors have been registered for PEA Product Acceptance<sup>(1)</sup>, the Bidder can submit the valid registration certificate on the bid closing date, or
- (3) In case the proposed connectors have been registered for Product lists for transmission and substation turnkey project<sup>(2)</sup>, the Bidder can submit the valid registration certificate on the bid closing date.

However the document in case (1), (2) and (3) mentioned above shall be proved by the bidding committee that connectors specified in the PO or registration certificate is the same product, type model and all ratings as the proposed connectors for this bid.

**Note:** <sup>(1)</sup> PEA Product Acceptance (PPA) is the process for enhancing quality of electrical apparatus which PEA procure by making quality control system and certification of product's quality by reliable Certification Body (CB). PPA is taken responsibility by Electrical Equipment Standard and Quality Control Division.

<sup>(2)</sup> Product lists for transmission and substation turnkey project is the process of registration of electrical apparatus used in PEA's power system. Product lists is taken responsibility by Substation Project Management Division.

**The type test reports shall consist of the necessary as follow; otherwise, it is not accepted by PEA**

- (1) The test results of all test items as specified in **Table 1**.
- (2) The details of tools and compression dies used for compressing the H-type compression tap connector in the type test processes shall be declared as following:

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- Catalogue of tools and compression die which specify the model and the name of manufacturer, or
  - Dimensions of compression die are required in case of the manufacturer of the connectors uses his own compression die in the type test processes.
- (3) Outline drawing of the H-type compression tap connector, showing dimensions according to Drawing No.SA2-015/25001
- (4) The color photographs of H-type compression tap connector as following:
- Manufacturer's name or Trademark
  - Size of conductor to be used with
  - Model or catalog/drawing number H-type compression tap connector
  - Oxide inhibiting contact grease

**1.e.2 Routine tests**

Each H-type compression tap connector shall pass visual and dimension check and other tests according to manufacturer's standard.

**1.e.3 Acceptance tests**

PEA reserves the right to have acceptance tests, conducted by PEA's laboratory or acknowledge independent testing laboratories as mentioned in 1e.1 or by manufacturer's factory qualified by PEA.

**The cost of all tests shall be borne by the Contractor.**

PEA's acceptance committee will randomly select the samples of connector for each delivery lot with the number as specified in **Table 2**.

**Table 2**  
**Number of samples for acceptance tests**

Number of H-type compression tap connector for each delivery lot (sets)	Number of samples (sets)
Up to 100	2
101 – 500	3
501 – 1,000	4
More than 1,000	5

- Note:**
- The samples shall not be returned and shall not be used in the system.
  - After the tests, the additional H-type compression tap connectors, with the equal number of the samples specified in **Table 2**, shall be supplied by the contractor with free of charge to complete the number of connectors in the purchase contract.

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All sample(s) shall pass acceptance test items No. 1 – 5 sequentially, with reference standards and test method as specified in **Table 3**. PEA reserve the right not to continue the tests if the sample is failed the test in any test items.

**Table 3**

**Acceptance test items of H-Type compression tap connectors**

No	Test Items	Reference standard /Test method	Acceptance criteria
1	Visual check	PEA's specification	<ul style="list-style-type: none"> <li>- Surface of all samples shall be smooth, consistent, no dirt, no blemishes, no cracks and no rust</li> <li>- All sample shall have markings in accordance with clause 1c.4 <b>Marking</b></li> <li>- Entire contact surface of all samples shall be thoroughly filled with oxide inhibiting contact grease, the minimum thickness of the grease shall be 0.5 mm</li> </ul>
2	Dimension check	PEA's specification	Dimension of all sample shall be according to manufacturer's drawing and shall be according to Drawing No. SA2-015/25001
3	Chemical composition test	Optical emission spectrometer	According to Chemical composition test specified in <b>Table 1</b> . <b>Note:</b> Testing only one (1) sample per lot
4	Hardness test	Brinell hardness test	The test result shall be within 10% tolerance of the hardness test result in the type test report. <b>Note:</b> Testing only one (1) sample per lot
5	Assembly test	PEA's specification	The samples shall be suitable to assemble with the conductor to be used with.



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**C2 Material and packing data shall be submitted with the bid:**

The following critical documents and details shall be submitted with the bid:

**Critical documents of the proposed h-type compression tap connector shall be submitted with the bid for each item offered:**

(The bidders shall fill the table below; otherwise, the proposal shall be rejected)

No.	Required technical document	Proposed Technical document	Reference document (Page No.)
1	Type test report (see 1e.1) or	<input type="checkbox"/> YES <input type="checkbox"/> No	
	Purchase Order (PO) from PEA's Procurement Department (from PEA's head office) (see 1e.1) or	<input type="checkbox"/> YES <input type="checkbox"/> No	
	Product acceptance certificate (see 1e.1)	<input type="checkbox"/> YES <input type="checkbox"/> No	
	Product lists certificate (see 1e.1)	<input type="checkbox"/> YES <input type="checkbox"/> No	
2	Drawing(s) of the proposed H-type compression tap connectors, showing dimensions (see 1c.2) (Drawing(s) by using PEA's drawings shall not be accepted)	<input type="checkbox"/> YES <input type="checkbox"/> No	
3	Packing detail (see 1d)	<input type="checkbox"/> YES <input type="checkbox"/> No	



C3 Schedule of detailed requirement

Invitation to Bid No.: น.3 กบพ.(จร.)EBS8/2567

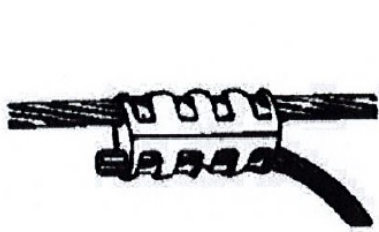
Item	PEA Material No.	Quantity	Description
1	1020320009	pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 3.57 mm to 4.50 mm (size 10 mm <sup>2</sup> to 16 mm <sup>2</sup> ) Tap : diameter range of 2.25 mm to 3.57 mm (size 4 mm <sup>2</sup> to 10 mm <sup>2</sup> ) Minimum Length : 25 mm
2	1020320010	pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 5.90 mm to 9.06 mm (size 25 mm <sup>2</sup> to 50 mm <sup>2</sup> ) Tap : diameter range of 1.78 mm to 2.76 mm (size 2.5 mm <sup>2</sup> to 6 mm <sup>2</sup> ) Minimum Length : 30 mm
3	1020320011	29,400 pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 5.90 mm to 9.06 mm (size 25 mm <sup>2</sup> to 50 mm <sup>2</sup> ) Tap : diameter range of 4.50 mm to 7.56 mm (size 16 mm <sup>2</sup> to 35 mm <sup>2</sup> ) Minimum Length : 40 mm
4	1020320012	11,900 pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 8.33 mm to 12.60 mm (size 50 mm <sup>2</sup> to 95 mm <sup>2</sup> ) Tap : diameter range of 8.33 mm to 12.60 mm (size 50 mm <sup>2</sup> to 95 mm <sup>2</sup> ) Minimum Length : 55 mm
III			



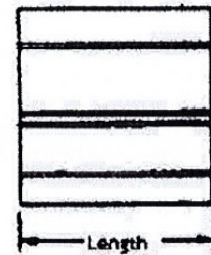
C3 Schedule of detailed requirement

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Item	PEA Material No.	Quantity	Description
5	1020320013	6,520 pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 9.73 mm to 11.45 mm (size 70 mm <sup>2</sup> to 95 mm <sup>2</sup> ) Tap : diameter range of 5.10 mm to 7.56 mm (size 16 mm <sup>2</sup> to 35 mm <sup>2</sup> ) Minimum Length : 40 mm
6	1020320014	149,000 pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 6.95 mm to 8.33 mm (size 35 mm <sup>2</sup> to 50 mm <sup>2</sup> ) Tap : diameter range of 3.12 mm to 4.05 mm (size 6 mm <sup>2</sup> to 10 mm <sup>2</sup> ) Minimum Length : 30 mm
7	1020320015	35,900 pc(s)	Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of 9.73 mm to 11.45 mm (size 70 mm <sup>2</sup> to 95 mm <sup>2</sup> ) Tap : diameter range of 3.12 mm to 4.05 mm (size 6 mm <sup>2</sup> to 10 mm <sup>2</sup> ) Minimum Length : 30 mm
			<p>Note :</p> <p>Enclosed Drawing No. SA2-015/25001.</p>
III			



Cross section



Side view

PEA MATERIAL No.	CONDUCTOR RANGE		MINIMUM LENGTH (mm)	SIMILAR TO							
	MAIN SIZES (mm <sup>2</sup> )	TAP SIZES (mm <sup>2</sup> )		BURNDY		KEARNEY		HOMAC		PENN-UNION	
				CATALOGUE NO.	DIE INDEX	CATALOGUE NO.	DIE INDEX	CATALOGUE NO.	DIE INDEX	CATALOGUE NO.	DIE INDEX
1020320009	10-16	4-10	25	YPC2A8U	BG	421-82	5/8"	UB 214	5/8"	-	-
1020320010	25-50	2.5-6	30	-	-	424-82	0	OB 2014	0	KO-R24	0
1020320011	25-50	16-35	40	YHO-150	0	508-82	0	OB 103	0	KO-R06	0
1020320012	50-95	50-95	55	YHD-300	D3	504-82	0	DB 2020	D	KD-R04	D
1020320013	70-95	16-35	40	YHD-200	D3	502-82	0	DB 202	0	KD-R02	D
1020320014	35-50	6-10	30	YPC26R 8U	0	428-82	0	-	-	KO-R24	0
1020320015	70-95	6-10	30	YPC26R 8U	0	-	-	-	-	-	-

กองวิศวกรรมไฟฟ้าและเครื่องกล      ฝ่ายวิศวกรรม      การไฟฟ้าส่วนภูมิภาค

มิติเป็น ..... วันที่ 13 ธ.ค. 2564 .....	<b>H-TYPE COMPRESSION TAP CONNECTORS</b>	แบบเลขที่ SA2-015/25001 ..... แผ่นที่ 1. ของจำนวน 1. แผ่น
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C4 Price schedule

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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
1	1020320009		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	pc(s)		
2	1020320010		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	pc(s)		
3	1020320011		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	29,400 pc(s)		
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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
4	1020320012		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	11,900 pc(s)		
5	1020320013		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	6,520 pc(s)		
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Manufacturer :

Country of origin :

Trade-mark :

Item	PEA Material No.	Catalogue No.	Description	Quantity	Unit Cost (See details & conditions attached)	Total Cost (See details & conditions attached)
6	1020320014		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	149,000 pc(s)		
7	1020320015		Connector, compression tap, H-type, connection of main aluminium conductor to tap copper conductor and main aluminium conductor to tap aluminium conductor, see Drawing No. SA2-015/25001, with : Main : diameter range of ..... mm to ..... mm. Tap : diameter range of ..... mm to ..... mm. Minimum length ..... mm.	35,900		
	III					