

DISCLAIMER: This translation may be used for reference purpose only. This English version is not an official translation of the original Japanese document. In cases where any differences occur between the English version and the original Japanese version, the Japanese version shall prevail. This translation is subject to change without notice. Tokyo Electric Power Company, Incorporated shall accept no responsibility or liability for damage or loss caused by any error, inaccuracy, misunderstanding or changes with regard to this translation.

6E-141 Upper T-Shaped Arm Auxiliary Bracket (Rank C)



Established on September 3, 2007

Enforced on October 3, 2007

Distribution Department

Tokyo Electric Power Company, Incorporated

1. Scope of Application

This product is used when an upper T-shaped arm is attached by using the indirect hot-line construction method in assembly of a transformer platform or a cradle to a power pole, and is also used at points where it is necessary to secure the separation of a T-shaped arm and a high-voltage pin-type insulator from a high-voltage main line and a high-voltage strain insulator.

2. Related Standards

2.1 Japanese Industrial Standards

- (1) JIS G 3101 (2004) Rolled steels for general structure
- (2) JIS H 8641 (2007) Hot dip galvanized coatings
- (3) JIS H 0401 (2007) Test methods for hot dip galvanized coatings
- (4) JIS G 3317 (2005) Hot-dip zinc - 5% aluminium alloy-coated steel sheet and strip
- (5) JIS Z 2201 (1998) Test pieces for tensile test for metallic materials
- (6) JIS Z 2241 (1998) Metallic materials-Tensile testing - Method of test at room temperature
- (7) JIS Z 2248 (2006) Metallic materials - Bend test
- (8) JIS Z 2371 (2000) Methods of salt spray testing

2.2 TEPCO Standards

- (1) 6C-1 High-Voltage Pin-Type Insulators
- (2) 6D-33 Light Cross Arms
- (3) 6E-1 Bolts and Nuts

3. Types and Applications

This product has two types, which are shown in the Table 1. The reinforced salt-resistant type products are coated with highly anti-corrosive plating for use in areas suffering severe salt damage.

Table 1

Type	Application
Normal type	Points equipped with an upper T-shaped arm
Reinforced salt-resistant type (S)	Points equipped with an upper T-shaped arm

4. Structure and Material

4.1 General Matters

- (1) The product must not have any scratches, cracks, rust, and other flaws inappropriate for practical use.
- (2) The surface of the product must be smooth and free from protrusions, burrs, and peelings of the surface treatment.

4.2 Shape and Dimensions

The standard shape and dimensions are shown in Attached Figure. Note that the tolerances not described in the Attached Figure must be in a range where the product can be used without a hitch.

4.3 Requirements for the Primary Structure

- (1) Structure

This product must be so structured as to be attachable with an M12×45 cm bolt and nut stipulated in 6E-1 without

backlashes and hard to come off, when a Type-1.8MARUHI, 1.8KAKUTE, 1.5MARUHI, 1.5KAKUTE light cross arm stipulated in 6D-33 and a Type-1.2TO light cross arm are held in the upper ditch and the lower ditch, respectively. In addition, the structure must be able to secure at least a 200-mm separation of a T-shaped arm and a high-voltage pin-type insulator from a high-voltage main line and an anchor fitting for a high-voltage strain insulator.

(2) Materials

The material used must be steel stipulated in JIS and satisfying the functional characteristics of the product.

[Explanation]

The "materials satisfying the requirements in this specifications" include SS400 stipulated in JIS G 3101 (Rolled steels for general structure).

(3) Surface Treatment

With normal-type products, apply a hot dip galvanized coating stipulated in JIS H 8641 uniformly over the entire surface including the welded portions.

With reinforced salt-resistant type products, apply a surface treatment having an anti-corrosion performance equivalent to or higher than hot-dip zinc aluminium alloy plating uniformly over the entire surface including the welded portions.

5. Performance

Table 2 shows the performance of this product for the tests in Section 7.

Table 2

Item			Performance	Test method Applicable item
Appearance			There must be no points inappropriate for practical use.	7.1
Structure and dimensions			Major dimensions (tolerances) shown in Attached Figure must be satisfied.	7.2
Combination			There must be no backlashes in a combined state.	7.3
Material test	Tensile test	Yield point	245 N/mm ² or greater	7.4
		Tensile strength	400 N/mm ² or greater	
		Elongation	21% or greater	
	Bending test		There must be neither cracks nor fissures.	
Hot dip galvanizing test	Normal type	Mass of deposit	350 g/m ² or greater	7.5
	Reinforced salt-resistant type	Mass of deposit	250 g/m ² or greater	
		Bending test	The hot dip galvanizing on the outer surface of the test specimen (the part 7 mm or more inside from the both ends of the test specimen) must not peel off.	
		Salt spray test	No red rust occurs after the lapse of 1,500 hours.	

6. Display Method

The following items must be engraved clearly on the point as shown in Attached Figure before plating.

- (1) Name of manufacturer or its abbreviation
- (2) Year of manufacture (the last two digits of the Christian Era): e.g., 07
- (3) Reinforced salt-resistant type display (only for reinforced salt-resistant type products): S

7. Test Methods

7.1 Appearance Inspection

Inspect the product visually or by touching with the hands for the conformance with Section 4.

7.2 Structure and Dimensions Inspection

Inspect structure-related matters of the product visually or with an appropriate graduated ruler for the conformance with Section 4.

7.3 Combination Test

Inspect the product that is attached with an M12×45 cm bolt and nut stipulated in 6E-1 for the conformance with Section 4, when a Type-1.8MARUHI, 1.8KAKUTE, 1.5MARUHI, 1.5KAKUTE light cross arm stipulated in 6D-33 and a Type-1.2TO light cross arm are held in the upper ditch and the lower ditch, respectively.

7.4 Material Test

7.4.1 Tensile Test

Tensile test must be conducted in accordance with JIS Z 2241 (Metallic materials-Tensile testing - Method of test at room temperature). Note that the test specimen must be cut out according to the requirements in JIS Z 2201 (Test pieces for tensile test for metallic materials).

7.4.2 Bending Test

Bending test must be conducted in accordance with the squeezing method of JIS Z 2248 (Metallic materials - Bend test). Note that the test specimen must be cut out according to the requirements in JIS Z 2248 (Metallic materials - Bend test).

7.5 Hot Dip Galvanizing Test

7.5.1 Normal Type

- (1) Deposit mass test

Measure the mass of deposit by using either of the methods stipulated in Section 5.2 "Indirect method" and Section 5.3 "Magnetic thickness test" of JIS H 0401 (Test methods for hot dip galvanized coatings).

Note that a test specimen used for deposit mass test can be an appropriately pre-manufactured test piece to which plating is applied with the same work method in the same manufacturing process as the product.

7.5.2 Reinforced Salt-resistant Type

- (1) Deposit mass test

Measure the mass of deposit by using either of the methods stipulated in Section 5.2 "Indirect method" and Section 5.3 "Magnetic thickness test" of JIS H 0401 (Test methods for hot dip galvanized coatings).

Note that a test specimen used for deposit mass test can be an appropriately pre-manufactured test piece to

which plating is applied with the same work method in the same manufacturing process as the product.

(2) Bending test

The bending test stipulated in JIS G 3317 (Hot-dip zinc - 5% aluminium alloy-coated steel sheet and strip) must be conducted. The angle and the internal interval of the bending must be 180 degrees and three times the thickness of the test specimen, respectively.

(3) Salt spray test

Salt spray test must be conducted in accordance with JIS Z 2371 (Methods of salt spray testing).

8. Test

8.1 General Matter

This product must go through the type approval test in Section 8.2, the acceptance test in Section 8.3, and the manufacturing process inspection in Section 8.4 based on the test method stipulated in Section 7 and comply with the entire provisions from Section 4 to Section 6.

8.2 Type Approval Test

Type approval test must be conducted on a product or a test specimen manufactured under the same conditions with products for the following test items.

Note that the test must be conducted on three pieces of the same type.

(1) Appearance inspection

(2) Structure and dimensions inspection

(3) Combination test

(4) Material test

(5) Hot dip galvanizing test

8.3 Acceptance Test

The acceptance test must be conducted in the presence of the supplier when designated by the buyer based on a method stipulated in the type approval test in Section 8.2. Its concrete test items and sampling rate must be defined in consultation with the buyer. When no acceptance test will be conducted in the presence of the supplier, the manufacturer must conduct internal tests predefined in consultation with TEPCO and submit the results as a test report to the buyer.

8.4 Manufacturing Process Inspection

A series of inspections including the materials used, the quality control items in the manufacturing processes, and the quality control method must be conducted to confirm that the manufacturer has a system in which the exactly same products as the one used for the type approval test can be produced in the mass production process.

9. Miscellaneous

9.1 General Matters

(1) Items necessary for satisfying the performance and functions of the product other than those stipulated in this specification document should be determined in consultation with TEPCO.

(2) When modifications to part of this specification document will yield a substantial benefit to the use or manufacturing, the manufacturer can change this specification document after having obtained approval from TEPCO.

- (3) On-the-spot process inspection and material inspection can be conducted when TEPCO recognizes the necessity to do so.

9.2 Cost for Test Items

The supplier or the applicant of inspection will bear the product and test specimens used for tests as well as the costs involved in conducting them.

9.3 Documents to be submitted

The following documents must be submitted for type approval evaluation.

- (1) Manufacturing specifications

Specify necessary items in a manufacturing specifications and attach a drawing on which the tolerances of the dimensions and the materials are described in detail in order that TEPCO can assess the conformance to this specification document. Technical documents modeled after the manufacturing specifications must be also attached when necessary.

- (2) Test report

Conduct the type approval test in Section 8.2 and describe the results and test conditions in a test report.

- (3) Quality control report

Specify the information about the materials used, the quality control items in the manufacturing processes, the quality control method, fault-prevention measures, and the quality control system in a "quality control flowchart" and "management of subcontract suppliers," and the like. Note that an outsourced process control document (a document described according to the format of a quality control flowchart, showing the process control status of the subcontractors) must be submitted when major manufacturing processes are outsourced.

The concrete scope of description will be determined in consultation with TEPCO.

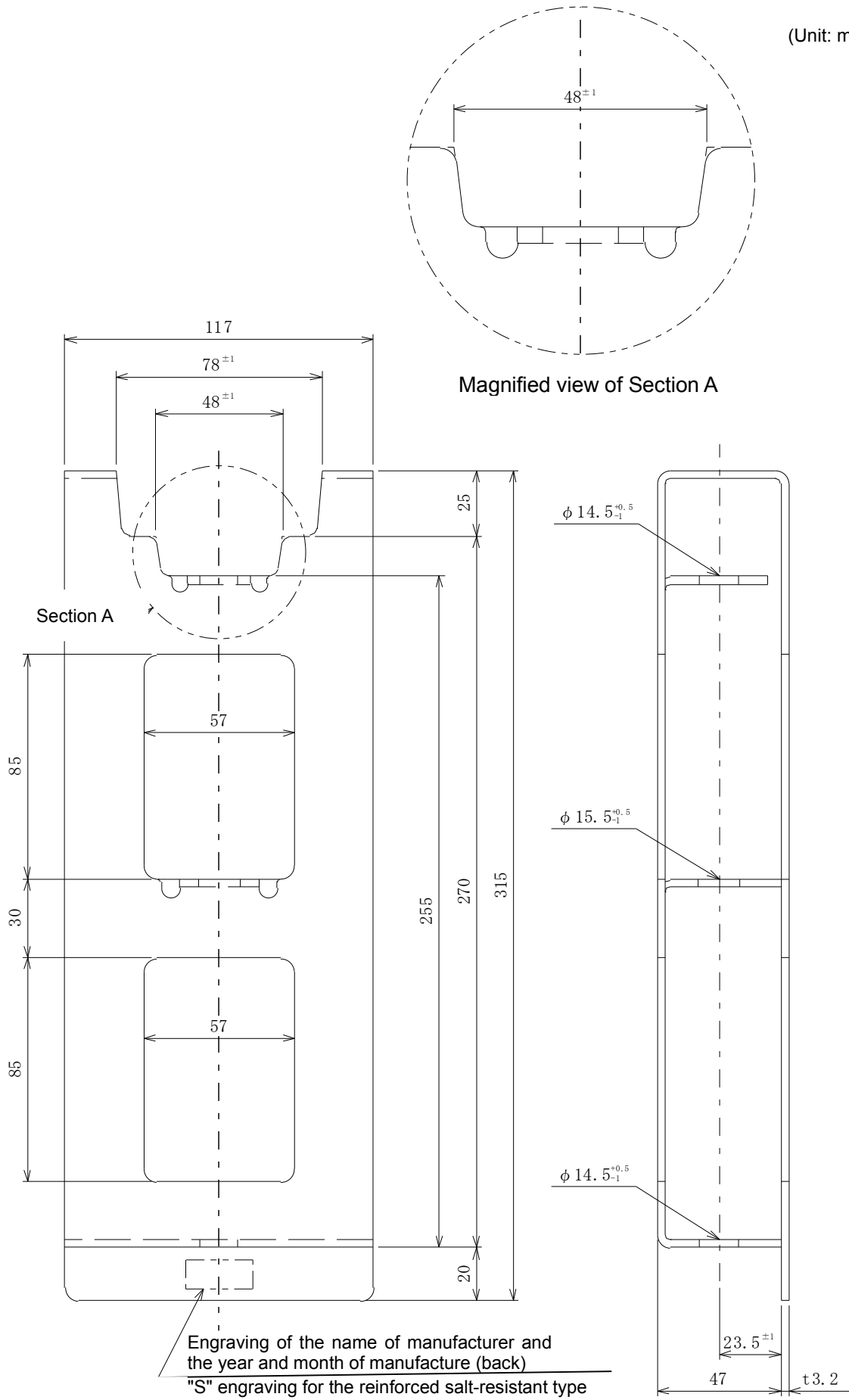
- (4) Technical documents

9.4 Package and Packing

Use an appropriate method suitable for transportation and carrying, which can ensure that the products will not spread out or be easily broken, with the following items displayed on the package. The concrete packing method must be described in the packing specifications after consultation with TEPCO.

- (1) Specifications No.
- (2) Item name
- (3) Quantity
- (4) Year and month of manufacture
- (5) Name of manufacturer or its abbreviation

From here down blank.



Attached Figure: Upper T-Shaped Arm Auxiliary Bracket