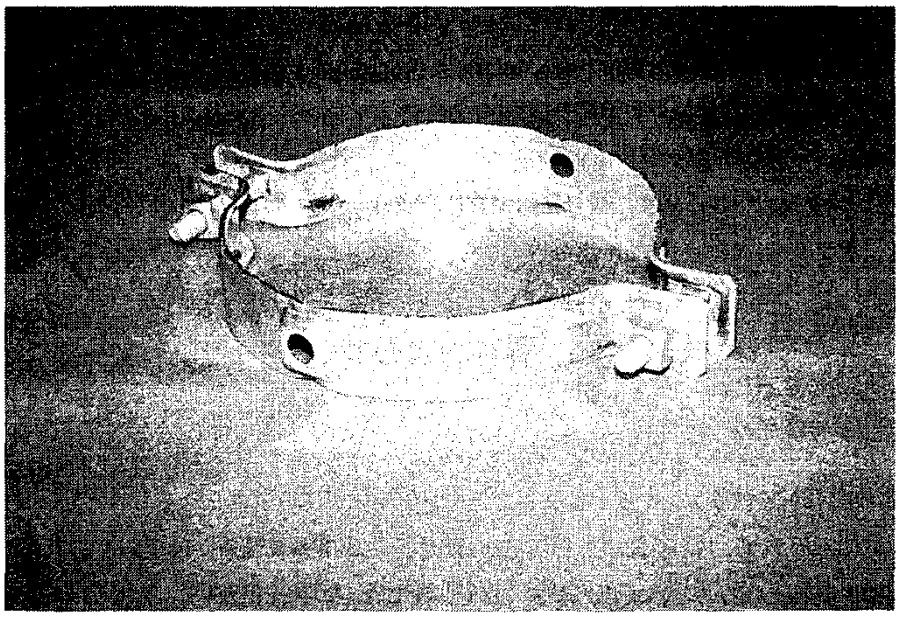
(Reference translation)



# 6E-37 BANDS

# (C RANK)



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(Functional standardization)

Distribution Department

Tepco Power Grid, Incorporated

1. Scope

This product is used for attaching round arm ties, low-voltage racks, scaffolding hardware, etc. to reinforced concrete poles and steel-pipe columns for coupled poles.

1.1 Category (type)

The products are categorized into 9 types based on the applicable diameter, as shown in Table 1.

Table 1

| Designation | Band diameter | Designation | Band diameter |
|---|---|---|---|
| 8 | 8 cm | 21 | 21 cm |
| 10 | 10 cm | 24 | 24 cm |
| 13 | 13 cm | 27 | 27 cm |
| 16 | 16 cm | 30 | 30 cm |
| 18 | 18 cm | | |

2. Structure and materials

2.1 General matters

The product shall be securely and reliably attachable to "6D-8 Reinforced concrete poles" in TEPCO specifications, be designed so that "6E-33 Round arm ties," "6E-26 Low-voltage racks" and "6E-47 Scaffolding hardware" can be easily mounted, and have excellent tightening workability without the bolt turning. There shall be no scratch, crack, rust, or any other flaw.

2.2 Shape and dimensions

The shape and dimensions of the product shall be in accordance with the attached figure as a standard. The allowable tolerance other than specified in the attached figure shall be within the range causing no practical harm.

2.3 Provisions on principal structural part

(1) Materiasl

(a) Main body

For the material, use steel materials that satisfy the functional characteristics of the product.

[Note]

The "steel materials that satisfy the functional characteristics of the product" include, based on the conventional knowledge, SS400 specified in JIS G 3101 (Rolled steels for general structure).

(b) Bolt and nut

For the material, use steel materials that satisfy the functional characteristics of the product.

[Note]

The "steel materials that satisfy the functional characteristics of the product" include, based on the conventional knowledge, SWCH12R specified in JIS G 3539 (Carbon steel wires for cold heading and cold forging).

(2) Surface treatment

Apply hot dip galvanized coating specified in JIS H 8641 over the entire surface.

2.4 Indication

Before coating the product, make a punch mark clearly to indicate the information below, at an easily viewable place of the product.

(1) Type Example: 21

(2) Name or abbreviation of manufacturer

3. Performance

3.1 Fitting test

When conducting a fitting test in Section 4.3 below, the band shall be attached without any problem. Also, M12 (3 cm and 6 cm) of 6E-1 bolts and nuts in TEPCO specifications are mountable and the bolt shall not turn.

3.2 Material strength

(1) Main body

When the tensile test and bend test are conducted, performance specified in Table 2 shall be satisfied.

Table 2

| Tensile strength | Yield point | Elongation | Bend test |
|---|---|---|---|
| 401 - 509 ($N/mm^2$) | 245 ($N/mm^2$) | 17 (%) or more | No scratch or any other flaw on the outer side of bent part |

(2) Bolt

When the bolt tensile test is conducted, the breaking load shall be 29400 N or more (strength category 3.6 in Table 6 of JIS B 1051).

3.3 Load bearing performance

(1) Vertical load bearing performance

When the vertical load bearing test is conducted in accordance with Section 4.5 (1), there shall be no split, crack, or extreme deformation at any part of the band.

(2) Horizontal load bearing performance

When the horizontal load bearing test is conducted in accordance with Section 4.5 (2), there shall be no split, crack, or fracture at any part of the band.

3.4 Hot dip galvanized coating performance

When the hot dip galvanized coating mass test is conducted, the mass shall be 350 $g/m^2$ or more, except for the thread part of bolts and nuts.

4. Test method

4.1 Appearance inspection

Conduct inspection on appearance-related matters by visual examination or touch.

4.2 Structural/dimensional inspection

Conduct inspection on structure-related matters by visual examination or using appropriate measuring apparatuses.

4.3 Fitting test

Attach 3 pairs of bands specified by TEPCO at the reference position of a concrete pole to check fitting-related matters. Also, mount M12 (6E-1 bolt and nut) in TEPCO specification at the middle of the band to check fitting-related matters.

4.4 Material test

(1) Main body

Conduct the test in accordance with JIS Z 2241 (Metallic materials-Tensile testing-Method of test at room temperature) and JIS Z 2248 (Metallic materials-Bend test).

(2) Bolt

Using the product, apply an axial directional load between the bolt head and the nut to measure the breaking load.

4.5 Load bearing test

(1) Vertical load bearing test

Attach the product with the specified method as shown in Figure 1 and apply a load of 9810N.After a lapse of 3 minutes, check the condition in each part of the band. After checking, increase the load to measure the maximum load when the band breaks.

The pole or jig used for the test may be a concrete pipe or steel pipe having the diameter close to the reference value.

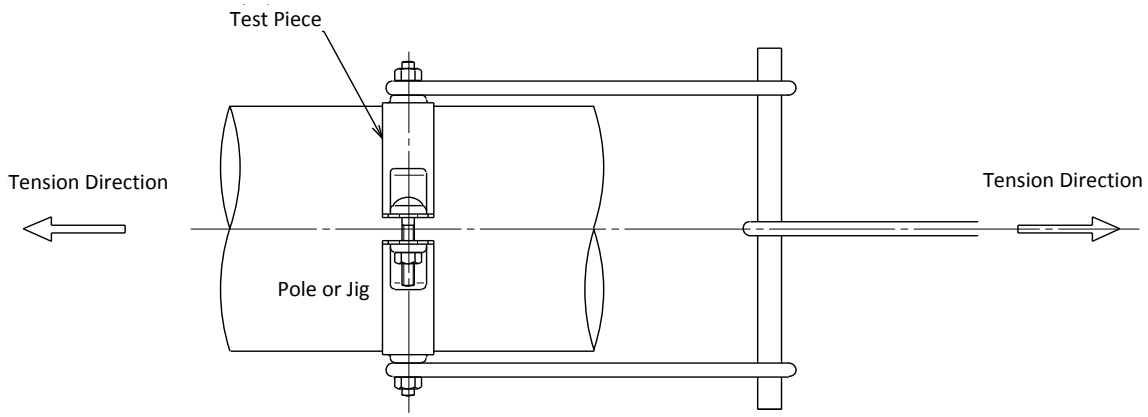



Figure 1: Vertical load bearing test

(2) Horizontal load bearing test

(a) Thimble attachment condition test

Attach the product with the specified method as shown in Figure 2 and mount the thimble (6E-78) in TEPCO specifications at the ear part of the band. Then apply a load of 25000N to check the condition in each part of the band.

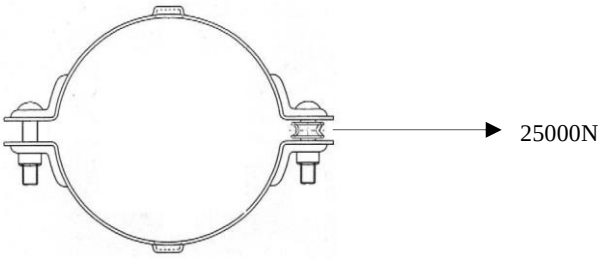



Figure 2: Thimble attachment condition test

(b) Rack attachment condition test

Attach the product with the specified method as shown in Figure 3 and mount the low-voltage rack (6E-26) in TEPCO specifications at the middle part of the band. Then apply a load of 9800N to check the condition in each part of the band.

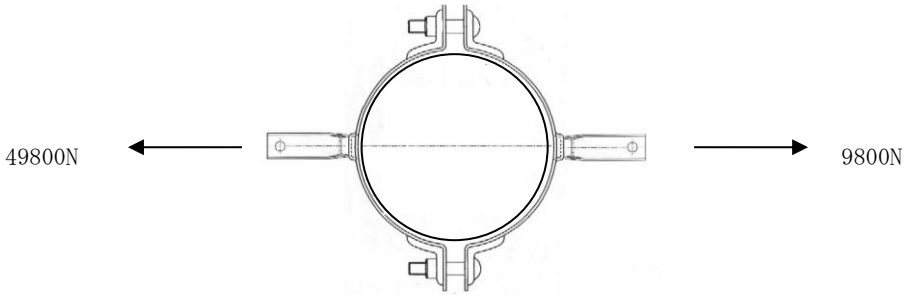



Figure 3: Rack attachment condition test

4.6 Hot dip galvanized coating mass test

In the hot dip galvanized coating mass test, the mass shall be measured in accordance with 4. "Methods of coating mass test" in JIS H 0401 (Test methods for hot dip galvanized coatings) or by the coating thickness test method (average of values at any given 5 places) specified in the reference material of the same JIS. Note, however, that the thread part of bolts and nuts shall be excluded.

For the test specimen, test pieces of an appropriate size may be created in advance. The test pieces shall be coated in the same procedure of the same manufacturing process as the product.

5. Test

5.1 General matters

The product shall undergo the type test and acceptance inspection in accordance with 4. "Test method" and satisfy the requirements specified in 2. "Structure and materials" and 3. "Performance."

5.2 Type test

The type test shall be conducted for products or test pieces created under the same conditions as the product, to measure the test items below.

The type test shall be conducted for 3 specimens of the same type.

(1) Appearance inspection

(2) Structural/dimensional inspection

(3) Fitting test

(4) Material test

(5) Load bearing test

(6) Hot dip galvanized coating mass test

5.3 Manufacturing process inspection

For the type test, to check that the production process produces completely the same items as the type test specimens, conduct a series of inspections on the materials used, quality control items of each manufacturing process, quality control method, non-conformance corrective actions, and quality management system.

5.4 Acceptance inspection

The acceptance inspection shall be conducted, when requested by TEPCO, according to the procedure specified in 5.2 "Type test" in the presence of TEPCO. Specific test items and the sampling rate shall be determined by consultation with TEPCO.

When the witnessed acceptance inspection is not conducted, the manufacturer shall conduct an in-house test determined by consultation with TEPCO in advance and submit the test result report to TEPCO.

6. Related standards

6.1 Japanese Industrial Standards

(1) JIS B 0205 (2001) ISO general purpose metric screw threads

(2) JIS B 1051 (2000) Mechanical properties of fasteners made of carbon steel and alloy steel－Part 1 : Bolts, screws and studs

(3) JIS B 1181 (1993) Hexagon nuts and hexagon thin nuts

(4) JIS H 0401 (1999) Test methods for hot dip galvanized coatings

(5) JIS H 8641 (1999) Hot dip galvanized coatings

(6) JIS Z 2241 (1998) Metallic materials-Tensile testing-Method of test at room temperature

(7) JIS Z 2248 (1996) Metallic materials-Bend test

6.2 TEPCO electric equipment material standard specifications

6D-8 Reinforced concrete poles

6D-21 Steel-pipe columns for coupled poles

6E-1 Bolt and nuts

6E-33 Round arm ties

6E-26 Low-voltage racks

6E-47 Auxiliary scaffolding hardware

7. Other

(1) Issues required to satisfy the performance and functions of the product, other than those specified in this specification document, shall be determined by consultation with TEPCO.

(2) When a substantial advantage for use or manufacturing is available by changing a part of this specification document, it may be changed after approval by TEPCO.

(3) Packing

The products shall be packed as a set of 5, with one half of each product stacked on top of the other, facing the same direction, and with bolts and nuts assembled in pairs.

(4) TEPCO shall be entitled to conduct a witnessed process inspection and material inspection when TEPCO find it necessary.

7.1 Cost of test piece

The test pieces shall be borne by the supplier.

7.2 Documents to be submitted

7.2.1 Manufacturing specification document

Specifically list in the manufacturing specification document the information required for TEPCO to check the compliance with this specification document and attach the drawings with details of dimensional tolerances, materials, etc. Also attach technical documents related to the manufacturing specification document as necessary.

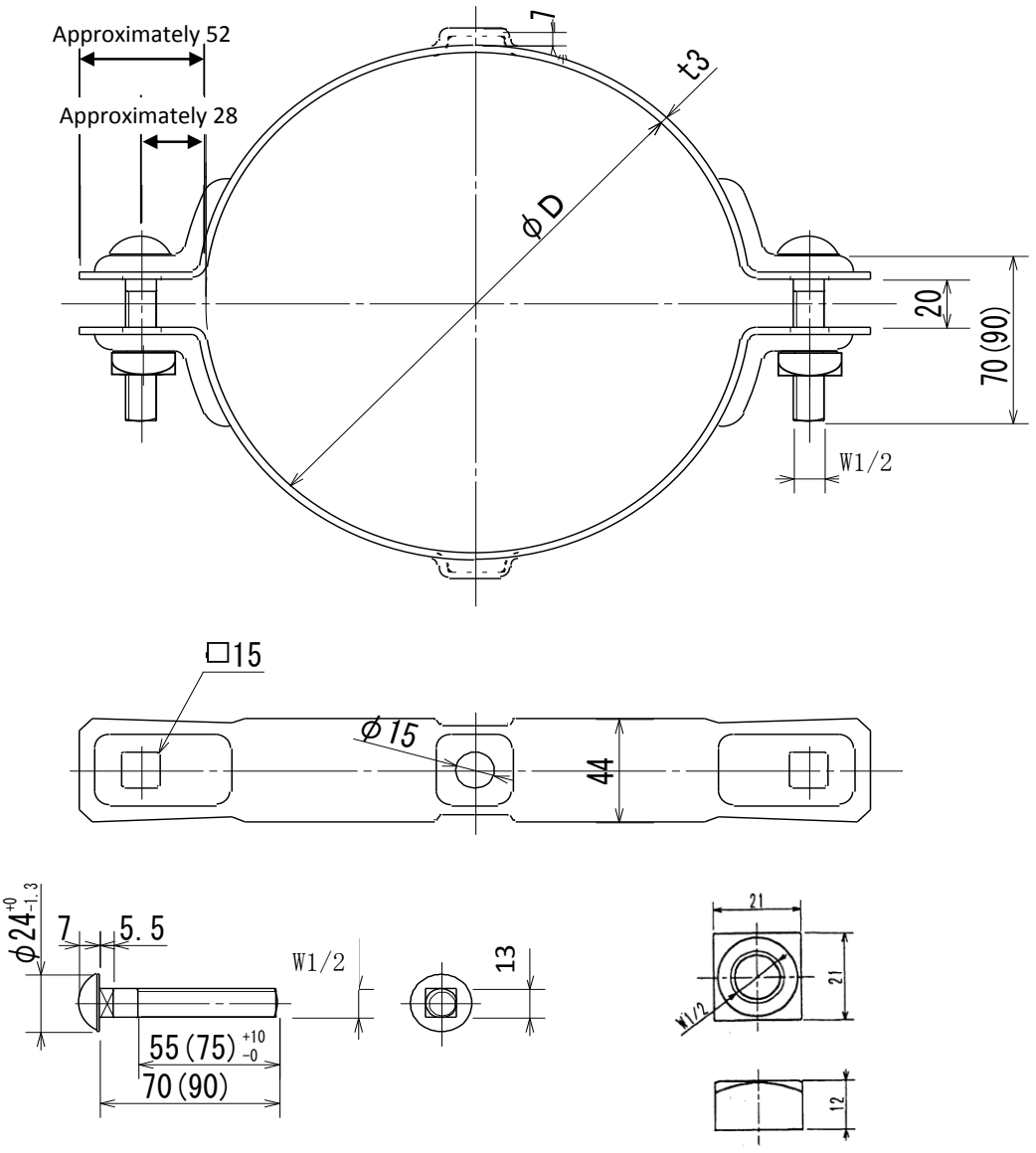
7.2.2 Test result report

Conduct the type test described in Section 5.2, and record the results and test conditions.

7.2.3 Quality management report

Specifically describe the materials used, quality management items at each manufacturing process, quality management method, non-conformance corrective actions and quality management system (including the QC process chart, management at the subcontractor). (Unit: mm)

(Unit: mm)




*Dimensions in parentheses are applied for 10cm and 13cm bands.

Type

| Design ation | D | Applicable diameter (reference) mm |
|---|---|---|
| 8 | 8 cm | ——— |
| 10 | 10 cm | φ85 - 118 |
| 13 | 13 cm | φ122 - 136 |

Dimensional tolerance

| Type | Tolerance |
|---|---|
| Band width | +1, -1 mm |
| Band plate thickness | +0.5, -0.2 mm |
| Band square hole | +1, -0 mm |

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| | | |
|---|---|---|
| 16 | 16 cm | φ157 - 169 |
| 18 | 18 cm | φ173 - 191 |
| 21 | 21 cm | φ204 - 216 |
| 24 | 24 cm | φ234 - 250 |
| 27 | 27 cm | φ261 - 281 |
| 30 | 30 cm | φ292 - 310 |

| | |
|---|---|
| Bolt length | +5, -0 mm |
| Bolt neck | +1, -0 mm |

Attached figure