

(Reference translation)

6Z-25 TUBE-TYPE VINE GUARD (C RANK)



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Distribution Department
TEPCO Power Grid, Incorporated

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1. Scope

This specification shall apply to Tube-type vine guards for preventing grounding faults of distribution lines due to a vine trailing on a ground guy and reaching an overhead high- or low-voltage electric line.

2. Related standards

2.1 TEPCO standard specifications for electrical components and materials

- 6A-1 Galvanized steel stranded wire
- 6A-7 Vinyl binding wire
- 6C-14 Insulator for guy wire
- 6D-15 Plastic guy wire guard
- 6E-69 Guy grip

2.2 Japanese Industrial Standards

- JIS A 1415 (1999) Methods of exposure to laboratory light sources for polymeric material of buildings
- JIS C 3005 (2000) Test methods for rubber or plastic insulated wires and cables
- JIS K 6251 (2004) Rubber, vulcanized or thermoplastics-Determination of tensile stress-strain properties

3. Types

Shall be 2 types shown in Table 1.

Table 1

Type	Outer diameter	Length
Short type	φ190 mm or more	1,100 mm or more and below 1,500 mm
Long type	φ150 mm or more	1,500 mm or more

4. Use conditions

When TEPCO standard specification 6A-1 (Galvanized steel stranded wire) is used as a guy wire with the combination of 6E-69 (Guy grip), this product shall be used by being attached to 6E-69 (Guy grip) and 6A-1 (Galvanized steel stranded wire). The product shall be mounted on the guy foundation side according to 6C-14 (Insulator for guy wire).

5. Performance

When tests are performed according to 9.2 Test method, the test items shall be as described below. Regarding the performance of material alone, however, this shall not apply when a material having a performance equal to or higher than that shown in Table 3 is used.

5.1 Mounting stability performance

5.1.1 Horizontal stability performance

When tests are performed according to 9.2.4.1 Horizontal stability test, the product shall not slip off TEPCO standard specification 6A-1 (Galvanized steel stranded wire) or 6E-69 (Guy grip) in any case.

5.1.2 Rotational stability performance

When tests are performed according to 9.2.4.2 Rotational stability test, TEPCO standard specification 6E-69 (Guy grip) or 6A-1 (Galvanized steel stranded wire) shall not fall off the falling preventing device in any case.

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5.2 Impact performance

When tests are performed according to 9.2.5 Impact test, the falling prevention device of the product shall not come off TEPCO standard specification 6A-1 (Galvanized steel stranded wire).

5.3 Tensile performance

When tests are performed according to 9.2.6 Tensile test, the conditions specified in Table 2 shall be satisfied.

Table 2

Strength	9.8 N/mm ² or more
Elongation	200% or more

5.4 Cold resistance

When tests are performed according to 9.2.7 Cold resistance test, the product shall show no flaws, cracks, distortion or other abnormalities.

5.5 Heat resistance

When test are performed according to 9.2.8 Heat resistance test, the product shall show no distortion, deformation or other abnormalities.

5.6 Weather resistance

When tests are performed according to 9.2.9 Weather resistance test, the product shall show no flaws, scratches, cracks, or other abnormalities.

6. Structure

6.1 General matters

- (1) The product shall be designed so that the proper mounting condition can be reliably checked during mounting and that the position of the product can be easily changed to the pole side after it is mounted.
- (2) The surface shall be smooth and free from scratches, cracks, tear or other practical problems.
- (3) Required members shall be selected from Table 3 to constitute the product.
- (4) For materials, this shall not apply when a material having a performance equal to or higher than that shown below is used.

Table 3

Name	Material
Main body	Polyethylene
Falling prevention device	Stainless steel
Main body brace	PC alloy
Sealed holder	Chloroprene rubber
Magnet	Anisotropic ferrite
Main body clamping band	Stainless steel

6.2 Main body

Use a black material with a good weather resistance.

7. Shape

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

8. Indication

Indicate the following information clearly at an easily viewable place of the product in such a manner that the indication is not easily removable for a long time:

- (1) Product name : Tube-type vine guard
- (2) Type : (Example) Short type
- (3) Year and month of production : (Example) 2004.10
- (4) Name or abbreviation of manufacturer
- (5) Mounting direction : (Example) Pole side, guy foundation side, upper side, lower side (when the upper and lower sides are different)

9. Test and inspection

This product shall undergo 9.1.1 Type test, 9.1.2 Manufacturing process inspection, and 9.1.3 Acceptance inspection according to 9.2 Test method, and shall comply with all the provisions specified in Sections 5, 6, 7, and 8.

9.1 Types of test and inspection

9.1.1 Type test

Type test shall be conducted for products or test pieces created under the same conditions as the product, to examine the test items below. The test quantity shall be 3 pieces for each.

- (1) Appearance test
- (2) Structural test
- (3) Mounting stability test
- (4) Impact test
- (5) Tensile test
- (6) Cold resistance test
- (7) Heat resistance test
- (8) Weather resistance test

9.1.2 Manufacturing process inspection

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

9.1.3 Acceptance inspection

The acceptance inspection shall be conducted, when requested by TEPCO, according to the procedure specified in 9.1.1 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 perform in-house tests as determined by consultation with TEPCO in advance and submit a test result report to TEPCO.

9.2 Test method

9.2.1 General matters

In order to closely evaluate the quality of the products, this test shall be performed to examine the test items below, all of which must be satisfied.

9.2.2 Appearance inspection

Examine completed products by visual observation or touch to check that there is no flaw in the appearance.

9.2.3 Structural test

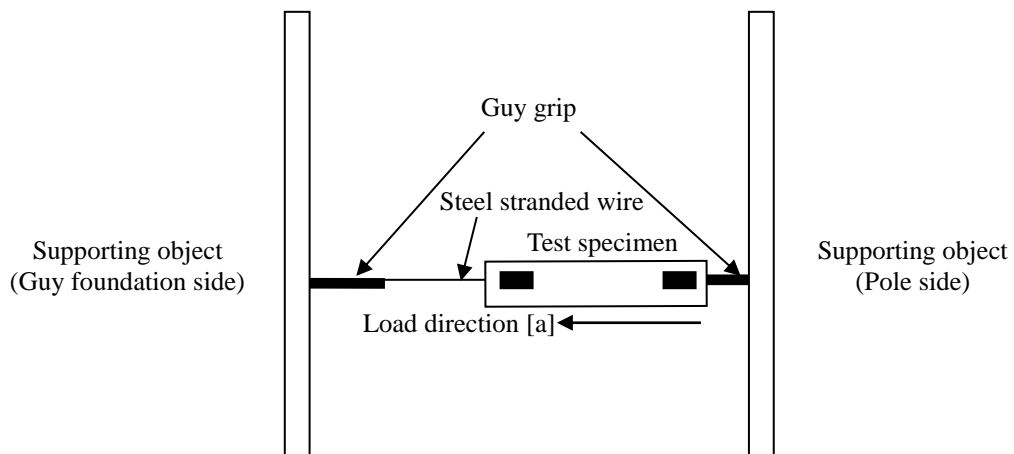
Measure the dimensions using a caliper or scale and check that the measured values are in accordance with this specification.

9.2.4 Mounting stability test

9.2.4.1 Horizontal stability test

Attach TEPCO standard specification 6A-1 (Galvanized steel stranded wire) between suitable supporting objects using 6E-69 (Guy grip). Next, attach a test specimen on 6A-1 (Galvanized steel stranded wire) and 6E-69 (Guy grip), without using any supplementary binding materials, such as 6A-7 (Vinyl binding wire). After that, apply a load of at least 245N in the direction indicated by “a” in Figure 1.

The test specimen shall be made by processing a completed product so that the mounting conditions of falling protection device and guy wire can be checked. The test shall be performed for each type of TEPCO standard specification 6A-1 (Galvanized steel stranded wire) (30 mm², 45 mm², 90 mm²), and for with and without 6E-69 (Guy grip).



* The test specimen shall be processed so that the mounting conditions of falling protection device and guy wire can be checked.

Figure 1

9.2.4.2 Rotational stability test

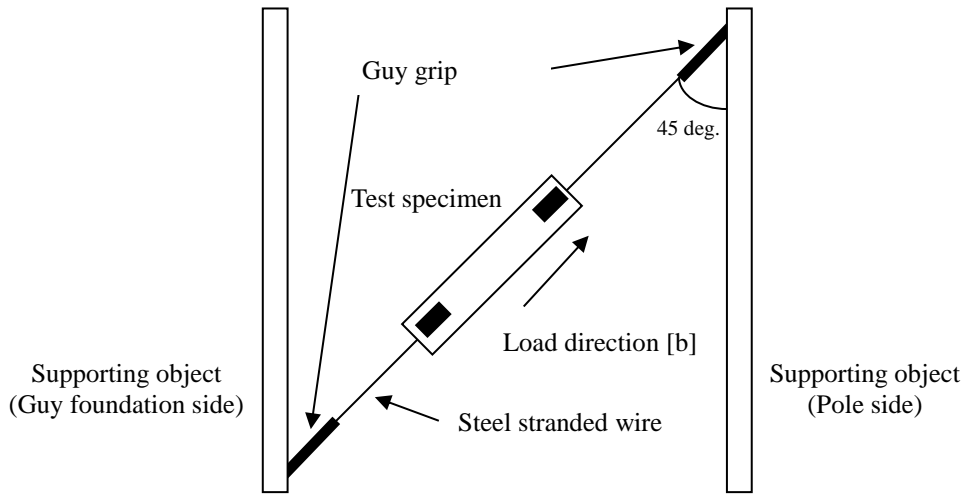
Attach TEPCO standard specification 6A-1 (Galvanized steel stranded wire) between suitable supporting objects using 6E-69 (Guy grip) so that the suitable supporting object and 6A-1 (Galvanized steel stranded wire) form an angle of 45 degrees, as shown in Figure 2. Next, attach a test specimen on 6A-1 (Galvanized steel stranded wire) and 6E-69 (Guy grip) without using any supplementary binding materials (such as 6A-7 (Vinyl bind)).

In this state, push up the test specimen in the direction indicated by “b” in Figure 2 while turning the specimen one round each for both clockwise and counter-clockwise around 6A-1 (Galvanized steel stranded wire). In addition, in this state, turn the specimen 3 turns each for clockwise and counter-clockwise around 6A-1 (Galvanized steel stranded wire).

The test specimen shall be made by processing a completed product so that the mounting conditions of falling protection device and guy wire can be checked. The test shall be performed for each type of TEPCO standard

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specification 6A-1 (Galvanized steel stranded wire) (30 mm², 45 mm², 90 mm²), and for with and without 6E-69 (Guy grip).



* The test specimen shall be processed so that the mounting conditions of falling protection device and guy wire can be checked.

Figure 2

9.2.5 Impact test

In the same manner as Section 9.2.4, attach TEPCO standard specification 6A-1 (Galvanized steel stranded wire) between suitable supporting objects using 6E-69 (Guy grip). Next, attach a test specimen on 6A-1 (Galvanized steel stranded wire). In this state, drop a weight of 10 kg from 1 m above to the center and each of both ends of the specimen. The type of TEPCO standard specification 6A-1 (Galvanized steel stranded wire) used in the test shall be 30 mm². The test specimen shall not be attached on 6E-69 (Guy grip).

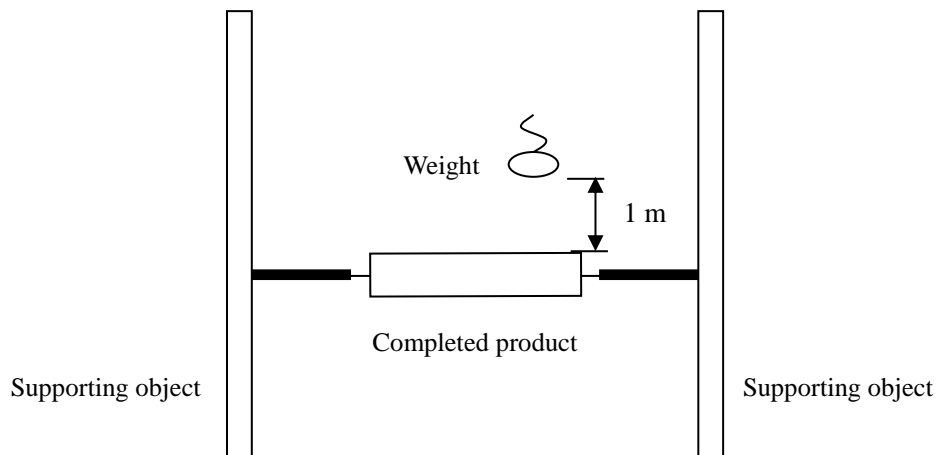


Figure 3

9.2.6 Tensile test

Using a test piece, make a measurement in the method specified in 4.16 of JIS C 3005 (Test methods for rubber or plastic insulated wires and cables) at an ambient temperature (24 +/-8°C).

The test piece shall be made from a completed main body or a flat plate of 2 to 3 mm in thickness formed from the same material and in the same conditions as the completed product, by punching with a dumbbell No.3 specified in JIS K 6251 (Rubber, vulcanized or thermoplastics-Determination of tensile stress-strain properties).

9.2.7 Cold resistance test

Keep a completed product in a low-temperature chamber of -10 +/-2°C for 1 hour. Then leave it at a room temperature for 30 minutes. After that, check for flaws, cracks, distortion or other abnormalities.

9.2.8 Heat resistance test

Keep a completed product in a thermostatic chamber of 70 +/-2°C for 2 hours. Then leave it at a room temperature for 30 minutes. After that, check for distortion, deformation or other abnormalities.

9.2.9 Weather resistance test

Perform accelerated exposure tests of main body and sealed holder according to JIS A 1415 (Methods of exposure to laboratory light sources for polymeric material of buildings). After that, perform tests described in Sections 9.2.2 and 9.2.6. The test conditions shall be shown in Table 4.

Table 4

Item	Condition
Type of test apparatus	WS-A type
Test period	1,000 hours
Cycle of water spray on test piece surface	After 48 min. of exposure to light, 12 min. of water spray

10. Packing

The product shall be packed in a cardboard box to facilitate transportation and prevent it from being disassembled or damaged. The information below shall be indicated at an easily viewable place in such a manner that the indication is not easily removable. Also, a manual describing the mounting method shall be supplied with the product.

- (1) Product name : Tube-type vine guard
- (2) Quantity : (Example) 10 pieces
- (3) Year and month of production : (Example) 2004.10
- (4) Name or abbreviation of manufacturer

11. Other

11.1 General matters

- (1) Issues that are necessary to satisfy the performance and functions of the product but not specified in this specification 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, it may be changed after approval by TEPCO.
- (3) TEPCO shall be entitled to conduct a witnessed process inspection, material inspection, etc. when TEPCO find it necessary.

11.2 Cost of test piece

The products and test pieces used for the tests as well as costs required for the tests shall be borne by the supplier or test applicant.

11.3 Documents to be submitted

11.3.1 Manufacturing specifications

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

11.3.2 Test result report

Perform the type test described in Section 9.1.1, and record the results and test conditions.

11.3.3 Quality control report

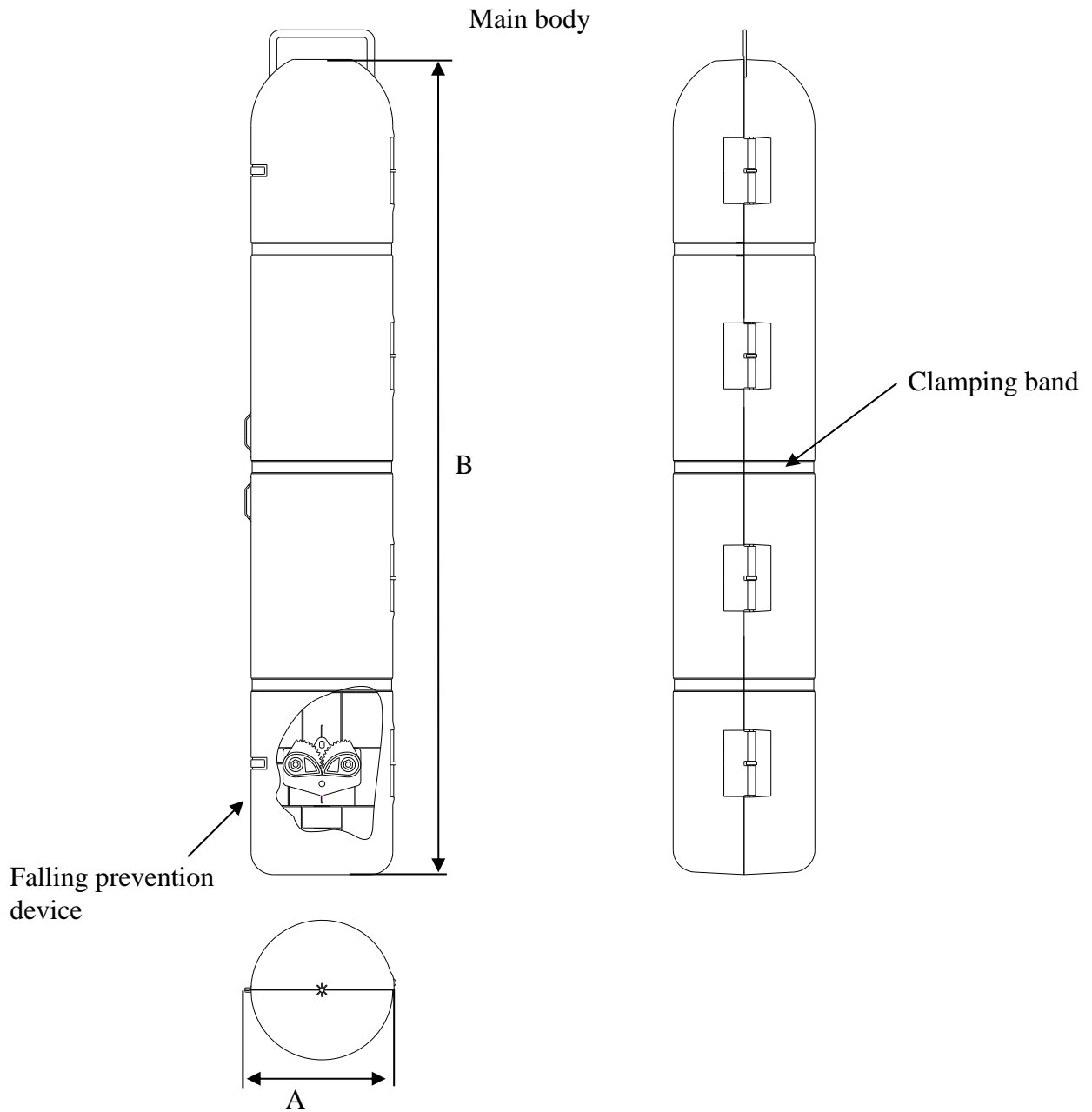
Specifically describe the materials used, quality control items at each manufacturing process, quality control method, non-conformance corrective actions, quality control system, etc. (including the QC process chart and management at subcontractors).

11.3.4 Technical documents

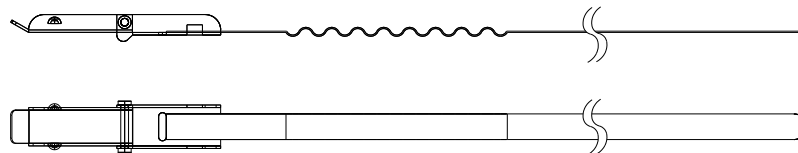
For type inspection, submit the technical documents listed below to fully and accurately evaluate the function and quality of the product. Submission of other technical documents may be requested if necessary.

- (1) Description on the prevention of trailing of vines, which is the primary aim of the product.
- (2) Tensile strength, elongation, and weather resistance of each member used.

Attached drawing



Clamping band



	A	B
Short type	190 mm or more	1,100 mm - 1,500 mm
Long type	150 mm or more	1,500 mm or more