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HARMONIZED SYSTEM COMMITTEE
-
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(+ Annexes I and II)

O. Fr.

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CLASSIFICATION OF GROUNDING RODS

(Item VIII.3 on Agenda)

I. BACKGROUND

1. On 7 February 2000, the Brazilian Administration requested the Secretariat's opinion on the classification of "Intel-Haste" grounding rods.

2. In its letter No. 00NL0195-Ca/Gon, the Secretariat informed the Brazilian Administration that, in its opinion, these articles were classifiable in subheading 7326.90 by application of GIRs 1 (Note 7 to Section XV) and 6.

3. On 21 March 2000, the Secretariat received a Note from the Argentine Administration requesting that the classification of grounding rods be submitted to the Harmonized System Committee, (HSC) as it did not agree with the Secretariat's opinion in response to the Brazilian Administration's request.

4. To enable it to prepare a document, the Secretariat requested and obtained (on 13 September 2000) documentation from the Argentine Administration containing technical information and various illustrations of products whose classification it wished to submit to the HSC.

II. NOTE FROM ARGENTINA

5. "The Directorate General of Customs of Argentina hereby contacts you in relation to the classification of grounding rods.

File No. 2813

6. The product at issue is normally fitted with connectors and the necessary elements to join two or more rods (according to the required electrical safety standards). Some products are fitted with a piece of conductor welded to the rod which is going to be grounded and which is to be the binding between the circuit and the ground to eliminate the contact resistance produced by connectors (little is known about the damage caused by this resistance on the plant where the grounding equipment is to be fitted).

7. It is important to point out that they are grounded to give a fault electrical junction to electrical installations. These circuits must have a low impedance, taking into account that their components, for a dwelling installation, are the grounding equipment and the electric conductor which goes through the whole installation and which is connected to each grounding connection of the sockets.

8. According to the technicians in the Argentine Administration, and subject to Note 1(f) to Section XV, these items as described above should fall in heading 85.36 since they bind circuits to the ground to make discharges of overcharged-current possible. However, if the voltage to be borne exceeds 1000 volts, the article should be classified in heading 85.35.

9. It is important to recall that lightning arresters are only mentioned as examples in the heading text of heading 85.35 as protecting electrical circuit apparatus, noting that some lightning arresters are similar to the grounding equipment, as seen in the appended brochure.

10. On the other hand, the Argentine Administration is aware of the request made by the Brazilian Administration regarding the products at issue and of the reply you sent on 28 February 2000 (Ref : 00NL195 – Ca/Gon) in which you state that the said item could not be considered apparatus for making connections to or in electrical circuits within the meaning of heading 85.35 or 85.36.

11. The Argentine Administration does not share this point of view and requests that this matter be submitted to the Harmonized System Committee. ”

III. SECRETARIAT COMMENTS

12. On the basis of paragraphs 5 to 11 above, the information sent by the two Administrations (see Annexes I and II) and subsequent research, the Secretariat feels that, in the light of the descriptions in the Annex, the two Administrations are apparently not seeking to classify the same articles.

13. Brazil requested the classification of metal rods designed to be used to discharge surplus electrical energy into the ground, whereas Argentina seems to be requesting the classification of any grounding device consisting of rods, wires, connection cables and their accessories.

14. Having made this point and in view of the differences between the articles at issue, the Secretariat proposes classifying them separately.

Grounding rods :

15. Such articles might be regarded as electrical apparatus for switching and, more specifically, as articles akin to lightning arresters. The description of the articles of heading 85.35 as set out in the corresponding Explanatory Note (page 1502, Part (C)) does not seem to match the grounding rods under examination. In fact, these rods imported

separately to be driven into the ground to facilitate the passage of current into the ground in the event of excess voltage could also have other uses, unlike lightning arresters which have a specific function. According to the McGraw-Hill Encyclopaedia of Science & Technology (Volume 10, 8th Edition), lightning arresters are specifically constructed devices and, in selecting an arrester to protect a transformer, "the voltage levels that can be maintained by the arrester both on lightning surges and surges resulting from system switching must be co-ordinated with the withstand strength of the transformers to these surges."

16. Nothing in the description of the article referred to in paragraph 1 seems to indicate that the rods have specific properties enabling them to perform switching functions for electrical energy, as they do not appear to include transformer systems. Hence the Secretariat feels that these articles fall in heading 73.26 which refers to articles of iron or steel. The Explanatory Note to that heading (page 1126, Item (1) refers to, inter alia, "...fencing posts, tent pegs, stakes for tethering livestock, etc.; hoops for garden borders ....". The particular characteristic of these products is that they are designed to be driven into the ground in order to accomplish a specific function. This seems to be the case with the articles under examination.

17. The grounding rods made of carbon steel with a copper jacket have to be driven into the ground to facilitate the discharge of electrical current in excess of actual needs. In the opinion of the Secretariat, as these grounding rods are not specifically provided for in any heading of the Nomenclature, they fall to be classified on the basis of their constituent material in heading 73.26, and more specifically, in subheading 7326.90, by application of GIRs 1 (Note 7 to Section XV) and 6.

Grounding device :

18. This set comprises grounding rods, cables and connection wires, together with their accessories. The main purpose of this assembly is to protect electrical installations against accidents or excessive voltage.

19. The Secretariat feels that, on the basis of its constitution and function, this assembly could fall in heading 85.35 or 85.36 as the case may be. Heading 85.35 covers “electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits (for example, switches, fuses, lightning arresters, voltage limiters, surge suppressors, plugs, junction boxes), for a voltage exceeding 1,000 volts".

20. Heading 85.36 covers “electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits (for example, switches, relays, fuses, surge suppressors, plugs, sockets, lamp-holders, junction boxes), for a voltage not exceeding 1,000 volts.”

21. The Secretariat also feels that the articles at issue are used for making connections to or in electrical circuits, within the meaning of heading 85.35 or 85.36. They are therefore "electrical" apparatus that operate in the way described in those headings.

22. In conclusion, the Secretariat feels that the “Intel-Haste” grounding rods made of carbon steel, with an electrolytic copper jacket, designed to be driven into the ground, presented alone, should be classified in heading 73.26, and more specifically, in subheading 7326.90, by application of GIRs 1 (Note 7 to Section XV) and 6.

23. The entire grounding assembly would be classifiable in heading 85.35 or 85.36, depending on the voltage for which it is intended, by application of GIRs 1 and 6.

IV. CONCLUSION

24. The Committee is invited to examine the classification of the two products described above, taking account of the Secretariat's comments based on the information submitted by the Argentine and Brazilian Administrations. It is also invited to indicate any action to be taken to reflect its decision.

* * *

Product submitted by the Brazilian Administration

Grounding rods in the form of solid-rod electrodes made of drawn carbon steel, with an electrolytically deposited copper jacket. The copper layer, with a maximum thickness of 254 microns (μ), ensures a perfect bond between the two metals. These rods are between 8 and 10 feet (2.5 and 3.1 meters) long, can weigh up to 5 kg and their lower ends, which can be connected together using threaded bronze couplings, are pointed.
These rods are used for high-tension lines, substations, communication lines, buildings, street lamps, lightning arresters, antennas, etc. and any installation requiring safe, effective and durable grounding.

Content of the brochure submitted by the Brazilian Administration

(1) GENERAL

INTEL-HASTE grounding rods, developed in our laboratory through rigorous testing, are in perfect accordance with all ABNT requirements (NB-82, MB-392, MB-226, NB-309, TB-19).

(2) MATERIALS

Solid-rod electrodes made of drawn carbon steel (AISI 1010 1020) with an electrolytic copper jacket with a minimum pureness of 95% and no traces of zinc.

(3) COPPER LAYER AND ADHERENCE

The copper layer is electrolytically deposited ensuring a perfect bond between the two materials. The thickness of the copper layer is controlled with electronic gauges and is normally 254 μ (10 mil), but it can also be furnished with a minimum thickness of 25.4 μ (1 mil). Since electrical resistance does not change too much according to rod diameter, the choice is mainly determined by the type of soil. Hence smaller diameters are suggested for softer soils and larger ones for harder soils.

(4) STANDARD AND SECTIONAL RODS

Standard rods with a length between 8 and 10 feet are most frequently used, chiefly when great depths are not essential to ensure low ground resistance. The sectional rods, which are between 8 and 10 (2.5 and 3.1 meters) feet long and which thread at both ends, can be connected with couplings and depths of 100 (30 meters) feet can be reached without damage to the threads and couplings. This makes it possible to achieve low ground resistance.

(5) USE

INTEL-HASTE grounding rods are intended to be used in grounding of electric energy plants, transmission and distribution lines, telephone or data processing installations whenever protection of equipment and human life against atmospheric or environmental hazards is required.

* * *

Product submitted by the Argentine Administration

Grounding assembly, consisting of copper-coated carbon steel grounding rods, terminals, bronze couplings and special uncovered copper or copper-coated-steel cables and wires. These installations may include inspection boxes to permit regular checks of the electrical resistance and to protect the rods from external shocks. These assemblies are used to protect high-tension lines, substations, communication lines, buildings, street lamps, lightning arresters, all kinds of antennas, etc., and any installation requiring safe, effective and durable grounding.

Content of the brochure submitted by the Argentine Administration

- ConduWeld grounding rods. Cylindrical, copper-steel, direct grounding rods. IRAM Standard 2309.

- Copper-steel arresters. Lightning arresters of the Franklin type, for protection according to IRAM Standard 21847/1 and IEC Standard 1024-1.

- ConduWeld conductors. Especially for grounding. Non-covered, copper-steel cables and wires. IRAM Standards 2466 and 2467.

GROUNDING RODS. IRAM STANDARD 2309

Copper-steel direct grounding rods are used to replace almost every method and material for grounding electrical systems.

The main reasons are that :
- They are economical to install.
- They are secure in electrical installations.
- They are easy to check.

They have an additional advantage : They make it easy to diminish the electrical resistance by adding parallel grounding rods, using sectional grounding rods or a ground chemical treatment. Grounding rods have a solid and inseparable external copper covering that protects them from corrosion and gives them electrical conductivity. This covering forms a unique structure with its high resistance steel core. It is important to point out that unlike galvanized steel, copper is the non-precious metal that best withstands corrosion under the ground.

Steel gives the necessary rigidity for the rods to be easily grounded with a light hammer, a manual, mechanical or pneumatic pile hammer or any other suitable method.

Grounding rods are used in high-tension lines, communication lines, high-tension stations, buildings, antennas, lightning arresters, etc. and wherever secure, effective, durable grounding rods are necessary.

Important

IRAM Standard 2309 for copper-steel grounding rods requires that the material state the name of the manufacturer or brand, the model and the corresponding Standard number. It is important to note ENRE (Argentine Energy Board) Resolution No. 207/95 that states that it is an obligation for the electrical installation to be made according to the "Regulations for Electrical Installation in Buildings", requiring the use of materials complying with IRAM or IEC Standards.

Smooth (common) grounding rods

Characteristics

* Copper to copper connection.
This connection eliminates contact between different metals, corrosion and unsecured electrical connections.

* High-resistance steel core.
All ConduWeld grounding rods are made of wire-drawn steel for resistance and rigidity. This makes it possible to ground the rods directly in the soil without any prior drilling.

* A perfect copper-steel union.
This external copper is perfectly linked to the steel core and behaves mechanically like a unique metal, making electromechanical corrosion impossible.

* Sharp end.
The lower end of the rod is sharp.
The end is obtained by a cold process, so as to preserve its strength and resistance.

Coupling grounding rods (in sections)

Coupling grounding rods are specially designed to be deep grounded. They have the same advantages as ConduWeld smooth grounding rods and have a rolling screw at each end for interlinking. This union is made with a connector. Thus, grounding may be made deeper by placing grounding rods on top of each other. Connectors are made of resistant threaded copper to be fitted in coupling grounding rods.

Smith's iron blocks are used to resist hammer hits when grounded, preventing deformation of the screw. To ground coupling grounding rods, the connector is tightly screwed on the blunt end of the first section, and the Smith's iron block is screwed onto the connector.

Once the first section is grounded, the Smith's iron block is withdrawn from the coupling and then as many sections as necessary can be added to obtain the necessary grounding electrical resistance.

"A"- type terminals.

The terminals together with grounding rods and copper or steel-copper cables provide an excellent low-resistance electrical connection without galvanic corrosion, since the contact is

copper to copper. The terminals are made of brass with copper threaded bolts, allowing high pressure between the grounding rod and the grounding cable.

They may be easily disconnected, allowing the grounding electrical resistance to be measured at any time.

"P" inspection boxes

These boxes prevent the grounding rods from being seen or hit, while enabling grounding electrical resistance to be checked periodically.

These inspection boxes are considered the best complement for a grounding rod installation.

Uncovered cables and wires especially for groundings

These are uncovered steel conductors coated with copper. They combine the mechanical resistance of steel with the conductivity and corrosion resistance of copper. As stated in IRAM Standard 2281 (Part I, Item 4.6.2) on “Proper materials for making terminals” , copper is the best material for the production of grounding rods because it is corrosion-resistant. Steel electrodes coated with copper fulfil the same function as pure copper electrodes.

Uses

These cables and wires have proven to be the best material for groundings, unions between grounding rods and structures, meshes, downward paths, substations, power installations and arresters. This is backed up by 60 years of experience.

Main properties

- Excellent corrosion resistance.
- High mechanical resistance
- High fatigue resistance.
- Lower impedance than copper at high frequencies.

Important advantages

It is important to point out that copper found in rods cannot be recovered, so these cables and wires have no resale value and do not encourage thieves, as may be the case with copper conductors. Steel-copper renders the installation secure and effective. These are two important conditions for groundings, and that is why there are so many facilities built with this type of conductor in Argentina.

Arresters and accessories

Details

Base of melted copper.
Interchangeable stainless steel end.

Copper-steel rods. These are the same materials as used for our grounding rods.

The copper base allows easy installation of arresters on flat or parabolic roofs, walls, antenna towers, etc.

This base is fitted with a terminal for wires or cables of copper-steel made according to IRAM Standards 2466 and 2467, or alternatively for copper cables. Clamps are added to fix the cable to the wall in an easy and clean manner.

COPPER COVERED STEEL GROUND RODS
(IRAM 2309 & UL467)

Copper-covered steel ground rods have practically replaced all other methods and materials for grounding. The main reasons are :

- **Reasonable installation costs**
- **Security of electrical circuits**
- **Ease of inspection and control.**

Additional advantages are the easy diminution of resistance values by adding several grounding rods in parallel, the possibility of using sectional ground rods for deeper grounding or, in extremely difficult installations, treating the soil with chemical substances. Our ground rods have an external, thick and inseparable copper covering that protects the ground rods from corrosion and adds the conductivity of copper to these rods. This copper covering forms a single body with the high-resistance steel core. It is well known that with the exception of precious metals, copper has the highest resistance against soil corrosion and outlasts by far galvanized steel products. The steel core gives sufficient rigidity allowing the rods to be driven in directly with a light hammer or with mechanical or pneumatic driving devices. The ground rods are used with high-tension lines, communication lines, substations, lightning arresters, antennas, street lamps etc. and wherever safe, durable and good grounding is necessary.

IMPORTANT

Argentine Standard IRAM 2309 regulating the manufacture of ground rods establishes that each ground rod must state the name of the manufacturer or his trademark and a code showing the size and diameter of the ground rod. The Argentine Energy Board (ENRE) as well as the AEA (Argentine Electrotechnic Association) clearly establishes in the code for electrical installations in buildings that the materials used for grounding must comply with the relevant IRAM Standards.

Standard ground rods

Characteristics

Copper-to-copper connection : This eliminates contact between different metals, corrosion and insecure electrical connections.

High-resistance steel core : All ConduWeld ground rods are made of cold-drawn steel in order to obtain higher strength and rigidity. This enables the user to bury these rods in the ground without prior drilling.

Perfect union of copper and steel. The external copper cladding is perfectly joined to the steel core. The metals behave like homogenous materials. This eliminates all problems of electromechanical corrosion.

Pointed lower end : The lower end of the ground rod is pointed. This is made without heating, thus preserving the hardness and strength of the rod

Sectional rods

Characteristics

The sectional ground rods are specially designed for deep earthing. They have the same advantages as the standard ConduWeld rods with the addition of a laminated threading at both ends allowing the joining of two or more rods. They are joined with threaded bronze couplings. This permits deeper groundings by joining one rod to another. The couplings are manufactured of strong bronze, fitted with the same thread as the ground rods. Removable steel bolts are used to drive the rods into the ground, to avoid deforming the threading. To drive in sectional ground rods, a coupling is screwed on to the blunt end of the rod, and a driving bolt is screwed in until it reaches almost ground level. The bolt is removed and substituted by a coupling and an additional ground rod is screwed into the coupling until the required depth or resistance has been reached.