International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

L.24

(11/2009)

SERIES L: CONSTRUCTION, INSTALLATION AND PROTECTION OF CABLES AND OTHER ELEMENTS OF OUTSIDE PLANT

Classification of outside plant waste

Recommendation ITU-T L.24

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Summary

Recommendation ITU-T L.24 specifies a classification for products as toxic and dangerous waste (TDW) and methods to carry out a screening of the characterization of the different residues emanating from the outside plant.

Appendix I presents materials and products considered by Recommendation ITU-T L.24, and Appendices II and III provide information on legislations applied to waste and chemical substances.

Source

Recommendation ITU-T L.24 was approved on 29 November 2009 by ITU-T Study Group 5 (2009-2012) under Recommendation ITU-T A.8 procedures.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications, information and communication technologies (ICTs). The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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1 Scope

After ISO 14000 (Environmental management), the environmental activities in the operators' companies, manufacturers and contractors had to adapt their procedures of classification of outside plant waste in the infrastructure of telecommunication networks.

There is a very considerable amount of outside plant waste, some of which includes products that may be considered to be dangerous, toxic or ecotoxic.

A waste product may be classified as toxic and dangerous waste (TDW) if, and only if, it contains any of the constituents listed in Table 1, and if these, in turn, present any of the characteristics shown in Table 2, in the proportions and limits considered in the current international regulations (Restriction of Hazardous Substances Directive or RoHS).

Table 1 – Constituents which, depending on the amount, concentration and form of presentation of the waste, may make the latter toxic and dangerous

Code No.	Waste with the following constituents
C1	Beryllium, beryllium compounds
C3	Hexavalent chromium compounds
C6	Soluble copper compounds
C8	Arsenic, arsenic compounds
C9	Selenium, selenium compounds
C11	Cadmium, cadmium compounds
C13	Antimony, antimony compounds
C14	Tellurium, tellurium compounds
C16	Mercury, mercury compounds
C17	Thallium, thallium compounds
C18	Lead, lead compounds
C21	Inorganic cyanides
C23	Acidic solutions and acids in solid form
C24	Basic solutions and bases in solid form
C25	Asbestos (powder and fibres)
C26	Metallic carbonyls
C28	Peroxides
C29	Chlorates
C30	Per chlorates
C31	Nitrides
C32	PCBs and/or PCTs
C33	Pharmaceutical or veterinary compounds
C34	Pesticides and other biocides

Table 1 – Constituents which, depending on the amount, concentration and form of presentation of the waste, may make the latter toxic and dangerous

Code No.	Waste with the following constituents
C37	Isocyanates
C38	Organic cyanides
C39	Phenols, phenolic compounds
C40	Halogenate solvents
C41	Organic, non-halogenate solvents
C42	Organo-halogenate compounds, excluding inert polymerized matter and other substances which appear in this table
C43	Aromatic compounds, polycyclic and heterocyclic organic compounds
C44	Ethers
C49	Any product from the polychlorate dibenzosulphide family
C50	Any product from the polychlorate dibenzoparadioxin family
C52	Tar-based products from refining operations and tarry waste from distillation operations
C53	Used mineral or synthetic oils, including water-oil mixtures and emulsions
C54	Unidentifiable and/or new chemical laboratory substances whose effects on the environment are not known

Table 2 – Characteristics of the waste which may make it toxic and dangerous

Code No.	Characteristics
H1	Explosive. Substances and preparations which could explode under the effect of a flame or which are more sensitive to shocks or friction than benzene dinitrate.
H2	Comburent. Substances and preparations which, in contact with others, particularly flammable ones, give rise to highly exothermic reactions.
H2A	Easily flammable substances. The following are defined as such: Substances and preparations which, at ambient temperature, in the air and without input, can heat up and even ignite. Substances and preparations in a liquid state which at ambient temperature have a flash point lower than 21°C. Substances and preparations which could easily ignite under the brief action of a strong ignition source and which continue burning or being consumed after the source is removed. Gaseous substances and preparations which are flammable in the air at normal pressure. Substances and preparations which, in contact with water or damp air, give off easily flammable gases in dangerous amounts.
H2B	Flammable. Substances or preparations whose flash point is greater than or equal to 21°C and lower than or equal to 55°C.
H2C	Highly flammable. Liquid substances and preparations whose flash point is lower than 0°C and whose boiling point is lower than or equal to 35°C.

Table 2 – Characteristics of the waste which may make it toxic and dangerous

Code No.	Characteristics
H4	Irritants. Non-corrosive substances and preparations which, on immediate, prolonged or repeated contact with the skin or mucous membranes, could provoke an inflammatory reaction.
H5	Noxious products. Substances and preparations which, on inhalation, ingestion or cutaneous penetration, could entail risks of limited gravity.
H6	Toxic. Substances or preparations which, due to inhalation, ingestion or cutaneous penetration, could produce serious acute or chronic risks, or even death (including very toxic substances and preparations).
H7	Carcinogenic. Substances or preparations which, due to inhalation, ingestion or cutaneous penetration, could produce cancer or increase its frequency.
H8	Corrosive. Substances or preparations which, in contact with living tissue, could exercise a destructive action thereon.
H9	Infectious. Matter containing viable micro-organisms or their toxins which are known to cause disease in animals and man or are strongly suspected of doing so.
H10	Teratogenic. Substances and preparations which, due to inhalation, ingestion or cutaneous penetration, could cause damage to the foetus during its intrauterine development.
H11	Mutagenic. Substances and preparations which, due to inhalation, ingestion or cutaneous penetration, could produce alterations in the cells' genetic material.
H12	Substances or preparations which, in contact with water, air or acid, release a toxic or a very toxic gas.
H13	Materials which may, after disposal, produce another substance by whatever means, for instance, a lixiviation product possessing any of the characteristics listed above.
H14	Ecotoxic. Substances or preparations which are dangerous for the environment. Waste which entails immediate or deferred risks for the environment.

2 References

This clause has been intentionally left blank.

3 Definitions

None.

4 Abbreviations and acronyms

None.

5 Conventions

None.

6 Waste product characterization tests

It is recommended that a screening of the characterization of the different residues emanating from the outside plant be carried out in accordance with the following waste product characterization tests.

6.1 Content declared to be carcinogenic

The constituents of the waste are compared with the list of agents which may be considered as carcinogenic for man, in accordance with the IARC (International Agency for Research on Cancer).

Waste products which contain any agent included in the aforementioned list in a concentration of ≥ 0.01% are assigned the code H7.

6.2 Flammability screening

This method allows the flammability potential of the residue to be characterized, whether it is liquid, solid or semi-solid.

According to law, a residue is to be identified by an H code if its burning point is less than or equal to 55°C, the burning point being defined as the temperature, adjusted for an atmospheric pressure of 101.325 kPa, at which the test liquid gives off vapours in a sealed container under the conditions defined in the test method and in amounts which produce a flammable vapour/air mixture in the aforementioned container.

Two tests are performed:

– *Test A*

  Five grammes of the finely crushed sample are placed in an aluminium crucible and a reducing flame is applied for 2 or 3 s, without touching it. If the sample ignites, the burning point should be ascertained. Otherwise, the flame should be applied directly to the sample for at least 15 s. If the sample ignites, it is to be considered as having a positive flammability.

  If the sample melts, boils or decomposes, the flammability test is to be considered as negative.

– *Test B*

  For liquid waste, 100 ml of the sample is used for carrying out the test. In the case of solids, 2 g should be dissolved in 100 ml of water and the test performed on the resulting solution. The solution containing the residue is placed in a beaker which is then covered with a watch-glass and left to sit at an ambient temperature for five minutes, after which sparks are applied to the vapour area located immediately above the sample. The sample is considered to present a positive flammability potential if a flash appears in the vapour or the sample ignites.

The methods described are based on 67/548/EEC and on ASTM Standard D4982-89, Standard Test Methods for Flammability Potential Screening Analysis of Waste.

The positive or negative results of both tests are to be noted on the waste product characterization screening sheet, together with the ambient temperature at the time the test was performed.

In the event of a clearly negative result, full flammability screening will not be necessary since, if the sample withstands the temperature of a Bunsen burner without igniting, its burning point is very much higher than that established by law. In the event of a positive result in Test A, a more detailed analysis of the waste's behaviour may be necessary in order to ascertain its burning point according to the methods described in clause 6.3. Once the burning point has been determined, the waste may be classified as easily flammable (H2A), flammable (H2B) or highly flammable (H2C). In the event of a positive result in Test B, the waste product shall be designated by the code H2A.

6.3 Burning point

As indicated above, a waste product shall be considered dangerous and toxic if its burning point is less than or equal to 55°C, as defined in clause 6.2.

The methods to be followed for determining the burning point of liquid substances whose vapours may be kindled by ignition sources are described here, since the law does not describe any method for determining the burning point of solid samples. Solid specimens should be dissolved in a sufficient amount of water and the test performed on the resulting liquid.

There are two acceptable methods for determining the burning point of waste, according to 67/548/EEC and standards ISO 1516, ISO 3680, ISO 1523, ISO 3679, ISO 2719 and ASTM D-56.

1) *Balanced method*

   i) *Balanced method in a closed beaker*

      The sample is placed in a closed beaker, submerged in a bath and heated by slowly raising the temperature of the bath so that the temperature difference between the bath and the sample does not exceed 2°C. Moreover, it should be ensured that the temperature of the sample increases at a rate which does not exceed 0.5°C in 1.5 min.

      At intervals of at least 1.5 min, ignition tests should be carried out through the application of a spherical flame with a diameter of 3.5 ± 0.5 mm to the vapour released by the sample. The lowest temperature at which ignition occurs should be noted and adjusted for an atmospheric pressure of 101.3 kPa.

      The ignition point is defined as the minimum temperature to which the product has to be heated for the vapours given off to ignite in the presence of a flame.

   ii) *Rapid balanced method*

      For liquids whose burning point is suspected to be lower than 110°C, a faster procedure than the one described above may be used, with a small sample:

      a) For liquids whose burning point is expected to be between the ambient temperature and 110°C, the sample is heated and the ignition test performed under balanced conditions at a temperature 3°C lower than the expected burning point. The test is repeated until ignition is observed at a temperature more than 1°C above the temperature at which ignition was not observed. The temperature is then adjusted for an atmospheric pressure of 101.3 kPa.

      b) For liquids whose burning point is suspected to be lower than the ambient temperature, the sample is cooled to a temperature 3°C lower than the expected flammability point, and the ignition tests are carried out.

2) *Non-balanced method*

   The sample is placed in a beaker with a sealed cover and heated slowly at a constant rate. A flame is brought close at regular intervals until it ignites the vapour above the sample. The lowest temperature at which ignition occurs is the sample's burning point.

6.4 Determination of pH

According to law, any aqueous liquid waste with a pH less than or equal to 2 or greater than or equal to 12.5 shall be considered to be TDW.

For aqueous liquid waste, the waste product itself is used for the test. For solid waste, sludge and non-aqueous liquids, the residue is mixed with water in a concentration of 1 g/ml, shaken and left to settle. The pH is measured once the suspension has precipitated.

The pH is ascertained by two methods:

– *Test A*: With a pH paper. A small amount of the sample is placed on a pH strip. The result is obtained by visual comparison of the strip with the standard colour scale, and the pH is recorded to the nearest unit.

– *Test B*: With a pH meter, calibrated with at least two buffer solutions. The results are recorded to the nearest 0.1 pH unit.

The first method allows the pH to be determined rapidly although the value obtained is less accurate than with the pH meter. Moreover, it enables the calibration range of the pH meter to be established.

These methods are based on 67/548/EEC and on ASTM Standard D4980-89.

This test makes it possible to determine whether the waste should or should not be designated by codes C23 or C24 (C23: acid solutions and acids in solid form; C24: basic solutions (or bases in solid form)).

6.5 Cyanides

6.5.1 Detection of the presence of cyanides

This test may be used to detect the presence of potentially hazardous cyanides in the waste, without determining their concentration and type.

In EEC Directive 67/548, it is specified that one of the reactivity characteristics giving a waste product's toxic and dangerous character is the presence of substances such as cyanides or sulphides, which may generate toxic gases in pH media between 2 and 12.5.

By measuring the pH as described in clause 6.4 and detecting the presence of cyanides and sulphides as described in clause 6.8, it can be established whether or not the waste belongs to this group of substances.

Two tests, based on ASTM Standard D5049-90, are used in order to determine the presence of cyanides.

In some cases, if the result of the test is not clear, it is supplemented by a quantitative analysis with the aid of a CN-sensitive reversible electrode.

The waste product should be assigned code C38 H6 if the result of Test A is positive and code C21 H6 if the result of Test B is positive.

1) *Test A: Chloramine-T method*

The tests are performed on the sample itself when this is a liquid; solids should be dissolved in a proportion of 1:10 with water.

The presence of cyanides in the sample is observed through the formation of cyanogen chloride, when the liquid waste is made to react with Chloramine-T at pH 8. The pH 8 is obtained by adding a phosphate buffer solution to the sample.

The presence of cyanogen chloride is detected by the intense red colour which appears when barbituric acid is added to the substance formed by the reaction of the waste solution with Chloramine-T.

This method is used to detect the presence of cyanides which are sensitive to chlorination.

2) *Test B: Prussian blue method*

A sample of between 1 and 5 g of the waste product is taken. In the case of solid samples, a paste is made with the waste by mixing it in a proportion of 1:10 with water, and its pH is adjusted to 12 through the addition of sodium hydroxide (NaOH). Solutions of ferrous sulphate and ferric chloride are then added, and concentrated sulphuric acid is added slowly until the pH falls below 1. The presence of cyanides is revealed by the greenish-blue colour which appears on addition of the sulphuric acid.

This method indicates the presence of free cyanides and many of the cyanide compounds.

6.5.2 Quantitative determination of cyanides

If the presence of cyanides was detected in the two previous tests, they should be subject to quantitative determination. In liquid samples, the test is carried out directly on the sample following elimination of interferences. In the case of solid samples, 2 ml of cuprous chloride acid is added to the sample placed in the distillation apparatus shown in Figure 1 and diluted with water up to 80 ml. The solution is heated and distilled in 5 ml of 1 N sodium hydroxide to a final volume of 10 ml.

Taking either 100 ml of the liquid sample from which the interferences have been eliminated or the distillate of the solid diluted down to 100 ml, the cyanide content is determined potentiometrically, using a cyanide-sensitive reversible electrode.

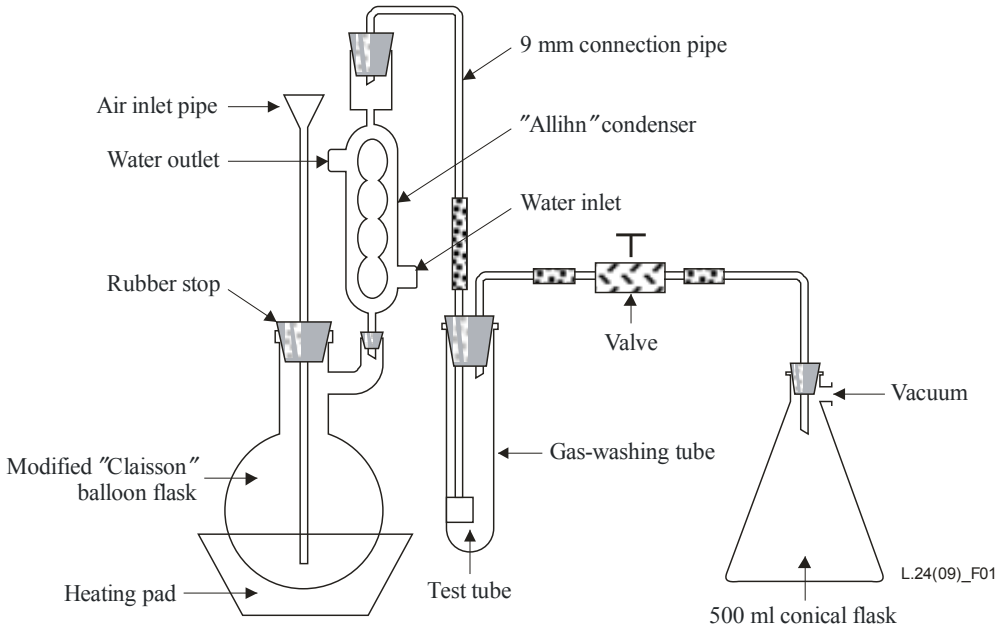

Figure 1 – Assembly for cyanide distillation in solid samples

6.6 Corrosion

A liquid waste product shall be considered to be corrosive when it corrodes a thickness of more than 6.35 mm of steel in one year at a test temperature of 55°C. These values are extrapolated in such a way that the test time is reduced to 10 days, as this is representative of the waste's corrosiveness. The test may be extended in time if the result is not sufficiently clear after 10 days.

Steel nails with their upper part protected by a rust-proof coating are used in the test. They are submerged in a test tube containing the sample.

Measurements are taken of the difference in diameter between the protected and unprotected part of each steel nail. In order to measure the diameter of the protected part of the nail, the rust-proof coating is dissolved using acetone, and the nail is then rinsed with water. A precision gauge is used for making the measurement and at least three measurements are taken in each area.

If a positive result is obtained in this test, the waste is to be considered toxic and dangerous and assigned code H8.

6.7 Oxidants

This test method, based on ASTM Standard 4981-89, allows the presence of oxidants in the waste to be detected, although it does not enable them to be identified or their concentration to be measured.

The presence of oxidants in the waste may cause dangerous reactions.

For aqueous solutions, the sample itself is used for the test. For solids, semi-solids and sludge, a mixture of 1 to 5 g of the waste product in the same amount of reactive water is used.

A drop of the sample or the prepared mixture is placed on a potassium iodide paper; if the paper turns a dark blue colour, the presence of oxidants is revealed.

A positive result of the test will entail carrying out tests on flammability, explosiveness and reactivity with water, as described in the corresponding clauses.

6.7.1 Screening for explosive properties

The need for this test depends on the results of the previous one.

The test, which is based on EEC Directive 84/449, determines whether the waste product presents a risk of exploding, in which case it would be designated an H1 code. Very small dry samples of about 10 mg are subjected to common stimuli (heating with a Bunsen burner, impact with a hammer, and any friction mechanism); it is observed whether there is any ignition, spark or explosion, and if not, whether there is any perceptible change in the substance.

1) *Heat sensitivity test*

   This consists of heating the waste product in a steel tube in order to ascertain whether it might explode due to thermal pressure.

2) *Mechanical sensitivity test*

   a) *Shock*: This consists of subjecting the sample to an impact by hitting it with a hammer on a steel anvil.

   b) *Friction*: This consists of subjecting the substance to friction between two surfaces.

6.7.2 Flammability with water

The aim of this test is to analyse whether the sample shows any reaction to water and whether it gives off any flammable gas in dangerous amounts in the reaction. Whether the test is performed or not performed, depends on the results of the oxidants test described in clause 6.7. The test method is based on 67/548/EEC.

6.7.3 Gas flammability test

This test is based on 67/548/EEC.

It enables one to determine whether gases mixed with air at an ambient temperature and pressure present a flammability period.

It consists of exposing mixtures with increasingly higher concentrations of the test gas to an electric spark and observing whether ignition occurs.

A glass tube 5 cm in diameter and 35 cm long, placed vertically, is used as a recipient. The ignition electrodes are placed 6 cm away from the bottom of the tube, and 3 to 5 mm away from each other.

With the aid of a chemical pump, the cylinder is filled with a mixture of known proportions of air and the gas obtained in the flammability with water test described in clause 6.7.2. A spark is set off in this mixture and it is observed whether a flame is produced in the vicinity of the electrodes and whether it spreads along the tube. If this does not happen, the concentration of the gas is increased by steps of 1% volume until ignition occurs or until all the gas has been used in the mixture.

If a positive result is obtained in this test, the waste is to be considered toxic and dangerous and assigned code H2A.

6.8 Sulphides

As mentioned earlier, it is specified in EEC Directive 67/548 that one of the reactivity characteristics giving a waste product its toxic and dangerous character is the presence of substances such as cyanides or sulphides, which may generate toxic gases in pH media between 2 and 12.5.

The pH measurement test described in clause 6.4, and the test for detecting sulphides allow one to establish whether the waste belongs to this group of substances or not.

The test technique, based on ASTM Standard 4978-89, allows the presence of sulphides to be detected in residual liquids, sludge, semi-solids and solids, although it does not enable their concentration or type to be determined. The lead acetate paper test described below is used.

6.8.1 Lead acetate paper test

This test is based on the formation of hydrogen sulphide in the samples containing sulphides when they are acidified.

To perform it, 5 to 10 g of the sample are placed in a beaker. Solid samples should be mixed with 15 ml of water. Hydrochloric acid is added until a pH value lower than 2 is reached. The presence of hydrogen sulphide is detected by the silvery brown or black colour which the lead acetate paper turns on contact with the sample.

If the presence of sulphides is detected, a quantitative analysis should be performed.

6.8.2 Quantitative sulphide analysis

For liquid waste, a sample of the waste product itself is used for the test. In the case of solid waste, a distillate must be made by following the procedure described below. The distillation apparatus shown in Figure 2 is used. 25 ml of cadmium and zinc acetate solution is placed in each of the bubbling jars. The gas inlet is connected to an oxygen-free nitrogen source and 2 to 10 g of the sample with about 10 ml of water are added to the reaction flask. The apparatus is then connected up and 25 ml of hydrochloric acid added slowly. After one hour of distillation, the sulphide content of the bubbling jars is assessed.

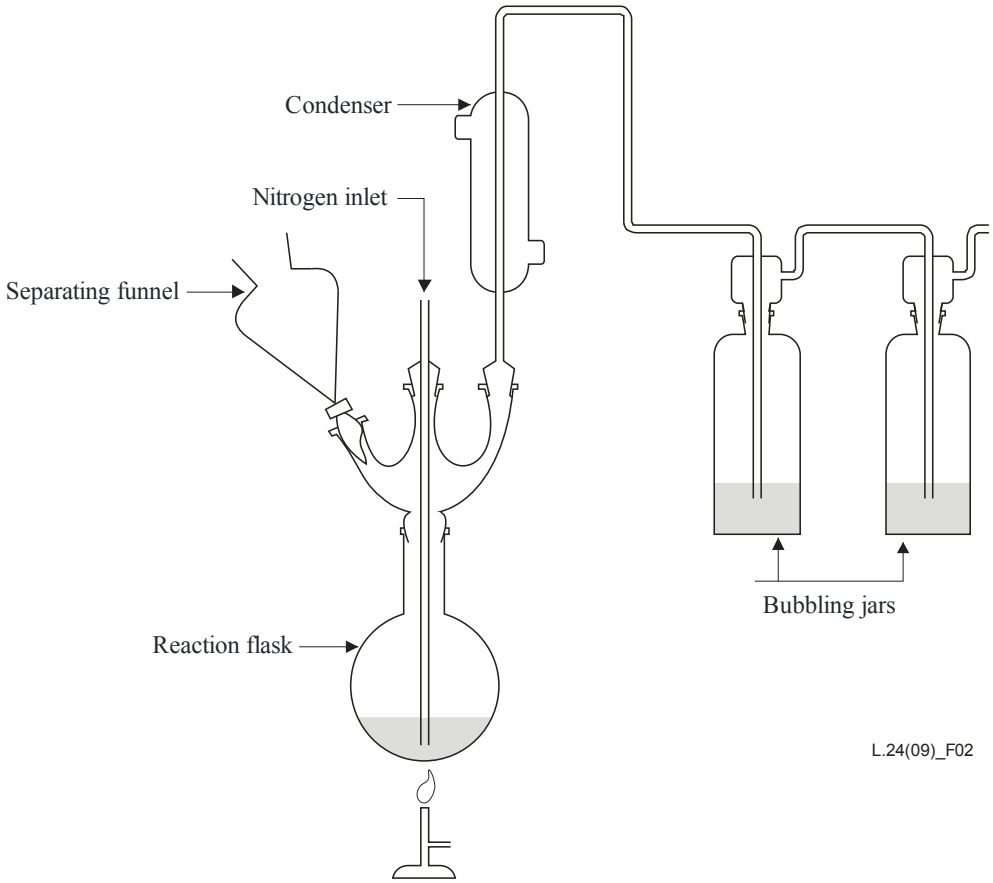

Figure 2 – Assembly for sulphur distillation in solid samples

6.9 Humidity and hygroscopic capacity test

The aim of this test is to determine the humidity percentage of the solid or semi-solid waste products and their resistance to drying. To this end, they are subjected to a hydrating and drying process.

The test is based on ASTM Standards D4843-88, C305, D2216.

A representative fraction of the waste is selected and weighed. In order to obtain the humidity content, the sample is dried at 60°C for 24 hours, after which it is weighed, heated to 60°C once more for 6 hours and then weighed again in order to check whether it has reached a constant weight. If not, the process is repeated until this happens. Subsequently, the sample is dehydrated and dried at least twice more, enabling the dry weight, the evaporable material and the percentage of recoverable humidity to be determined.

This test is included in the characterization screening, since the percentage of humidity is a parameter to bear in mind if one wishes to dispose of a waste product in a dump. A higher humidity percentage usually means a higher cost.

6.10 Lixiviation

The lixiviation method, based on 67/548/EEC and ASTM Standards D 4874-89, D 4793-88 and D 3987-85, is the process used for extracting soluble substances contained in solid or pasty waste.

The lixiviate provides analytical information about the concentration of toxic substances in the waste product, due mainly to the presence of metal ions. It is used as a sample in determining toxicity by means of the biotests described in clause 6.11. In both analyses the pH of the lixiviate is important, as it will determine the solubility of the different ions.

Of the two methods described in Spanish legislation, method 1 or "EP" is used to obtain the lixiviate.

Method 1 or "EP"

A sample of 100 g of waste product is taken and the solid phase separated from the liquid one. The solid matter is weighed, and 16 times its weight in double-distilled water added. It is then placed in a shaker to prevent sedimentation and ensure constant contact between the fluid and the sample.

The shaking process is started, and the pH of the solution is checked periodically and adjusted to 5 ± 0.2 through the addition of 0.5 N acetic acid, without ever adding more than 4 ml of acid per gramme of solid.

The pH is adjusted every 15, 30 and 60 minutes and continually for at least six hours. Extraction continues until 24 hours have elapsed, at the end of which the pH is adjusted once again. If after 24 hours the pH is greater than 5.2, extraction should be continued for four more hours. Once extraction has been completed, an amount of double-distilled water is added in accordance with the following equation:

$$V = 20W - 16W - A$$

where:

V = ml of double-distilled water to be added

W = weight in grammes of solid

A = ml of 0.5 N acetic acid added

The matter taken from the extractor is separated into its solid and liquid phases in the same way as before beginning the process, and the two liquids obtained from the filtering process are mixed, the mixture being used in the toxicity biotests and in determining the concentrations of toxic substances through inductive plasma coupling (IPC) emission spectrometry.

6.11 Ecotoxicity

In order to establish the ecotoxicity of the waste, its lixiviate is analysed by means of the luminescence biotest, which is one of the tests stipulated in 67/548/EEC.

Luminescence biotest

This test is based on the decrease in bioluminescence of the bacterium *Photobacterium Phosphoreum* when exposed to toxic substances. This response can be considered to be linear within a range of concentrations of the substance.

The toxicity of the waste is measured by means of the EC_{L50} parameter, representing the concentration of the sample which causes a 50% reduction in the intensity of the light emitted at 15°C and with an incubation time of 15 min.

In order to determine the luminescence, an apparatus is used to measure the difference between the bacteria in a blank sample without waste and in various samples with different concentrations of the waste product, in given temperatures and salinity conditions. The EC_{L50} value for the waste is obtained from these values, using a simple mathematical formula.

If the lixiviate has an EC_{L50} value (t = 15 min 15°C) lower than or equal to 3000 mg/l, the waste product is to be considered toxic and assigned the ecotoxic waste code H14.

6.12 Pathogenicity

Testing for the presence of pathogenic organisms

The aim of this test is to determine the presence in the sample of viable organisms, which are known to cause, or which may cause, disease in animals or man.

The test is performed on 1 ml of liquid waste or 5 ml of recovering solution + Twen 80 in which 1 g of solid, atomized sample has been incubated. The sample is added to a nutritive medium with sterile yeast extract.

The presence of micro-organisms is detected by the appearance of cloudiness in the sample after it has been left to incubate for one day at 35°C.

An API 20 or similar type of biochemical identification system is used to identify the micro-organisms.

The sample is to be considered infectious, and assigned code H9, if the micro-organism most present in it belongs to a pathogenic species, for animals or man, or if the total number of micro-organisms detected exceeds 100 000 per gramme in the plate count.

6.13 Bacterial mutagenesis

The purpose of this test is to determine whether the waste product can produce alterations in the genetic material of cells. A positive result will indicate that the residue should be considered to be mutagenic and therefore designated by code H11 according to TDW legislation.

The test is based on the methods described in Community Directive 84/449/EEC.

Extrapolating the results obtained in animal or "in vitro" experiments, the possible effects on man can be determined.

The test consists of exposing the bacteria to the test substances – with or without metabolic activation – and then counting the reverted colonies after an incubation period. The number obtained is compared with that of the spontaneously reverted colonies, observed in a control culture which is not treated and/or in the presence of a solvent.

The mutagenesis characteristic is revealed by the increase in the frequency of spontaneous reverted mutations. In the mutagenicity report, the bacteria, the strain used in the test and the resulting mutation frequency should be noted.

6.14 Toxicity and irritability screening

This test is designed to determine the toxicity and irritability of the waste, while keeping the number of animals used to the strict minimum necessary for the toxicological tests.

The tests are based on Community Directive 84/449/EEC and on ASTM Standard E 1163-90.

1) *Toxicity*

   One female rat is given an oral dose of the waste corresponding to 600 mg/kg of its weight, and another is given 1200 mg/kg of its weight through the cutis.

   If both animals survive, no further toxicity tests need to be carried out. If one of them dies, the complete test is performed: oral or cutaneous administration, or both, as the case may be.

2) *Irritability*

A dose of the waste is applied to the skin and eyes of an adult albino rabbit, i.e., 0.1 ml of liquid or 0.1 g of solid waste on the eyes and 0.5 ml of liquid or 0.5 g of solid waste on 6 cm of clean skin. After 15 min, the appearance of erythema on the animal's skin is observed and, using appraisal tables, assigned a number from 0 to 4 depending on the cutaneous reaction observed. The appearance of ocular damage is assessed in the same way.

If the result of the assessment is greater than 1, the irritability test does not need to be confirmed; if the result is less than 1, it needs to be confirmed in some cases by carrying out the complete test described in Directive 84/449/EEC.

The waste is assigned code H6 if the acute toxicity screening is positive, and code H4 if the irritability test is positive.

Complete irritability test

This is only performed in the case of death of the animal used for the toxicity and irritability test described in clause 6.14.

1) *Skin irritation test*

A dose of the waste is applied to the shaven skin of several animals; the reaction is observed over a period of time long enough to allow the reversible nature of the effects produced to be assessed.

2) *Eye irritation test*

A dose of the waste is applied to one eye of several animals and the degree of irritation assessed at regular intervals.

Acute oral toxicity test

This test is based on ASTM Standard E 1163-90.

It is only carried out if the animal used for the toxicity and irritability test dies. It constitutes a method for determining the LD_{50} (mean lethal dose) of a material in rats.

Initially, a female rat is given an estimated LD_{50} dose. If it survives, the next rat is given a higher dose, but if it dies, the second rat is given a lower dose. The LD_{50} is calculated using the most probable maximum method.

Acute toxicity test by cutaneous application

This test is only carried out if the animal used for the toxicity and irritability test dies.

It is based on Directive 84/449/EEC.

If the waste product is solid, it is atomized and dampened with water; if it is liquid, it is normally used without being diluted.

Increasingly larger doses of the waste are administered through the cutis, on the shaven skin of several batches of laboratory animals. The effects produced are observed and an autopsy is carried out on all the animals.

6.15 Final action

Once all the waste products have been classified according to the above tests, a table is prepared grading them by groups in accordance with their subsequent management and handling. For instance, waste to be dumped, incinerated, buried, packed and sent to particular places, etc.

The approach to be followed should be that set out in the current national regulations. Each of the characterization tests to be carried out is described and following the screening order shown in the flow chart in Annex A.

Annex A

Exclusion list products

(This annex forms an integral part of this Recommendation)

Content declared to be carcinogenic

\+ characterized H7
– continue

Flammability

Test A
- \+
  - burning point
    - H2A easily flammable
    - H2B flammable
    - H2C highly flammable
  - Test B
- – Test B

Test B
- \+ characterized H2
- – continue

pH

Test A
- \+ characterized H6 C23 – C24
- – test B

Test B
- \+ characterized H6 C23 – C24
- – continue

Cyanides

Test A
- \+ characterized C38 H6
- – test B

Test B
- \+ characterized C21 H6
- – continue
- suspect quantitative analyses

Corrosion

liquid	10-day test
solid	continue

Oxidants

\+ explosiveness, flammability, reactivity with water*
– continue
suspect quantitative analysis
explosiveness screening test

***Drying/humidity**

water — calculation of % and dry residue
negative flammability — determination of dry weight

reactivity with water { + characterized H12 / – continue

Sulphides

+ characterized H6
– continue
suspect quantitative analysis

Lixiviates

– presence of any substance which has been declared to be carcinogenic or a toxic metal in a proportion of > 0.01%
+ characterized H13
– continue

Ecotoxicity

+ characterized H14
– continue

Testing for presence of pathogenic micro-organisms

+ characterized H9
– continue

Bacterial mutagenesis

+ characterized H11
– acute toxicity screening

suspect cytotoxic { acute toxicity screening / cell cultures / acute toxicity screening

Acute toxicity screening

+ characterized H6 { + H6 / – continue

– continue
continue — sub-chronic toxicity

Irritability screening

+ characterized H4
– characterized as neither toxic nor dangerous

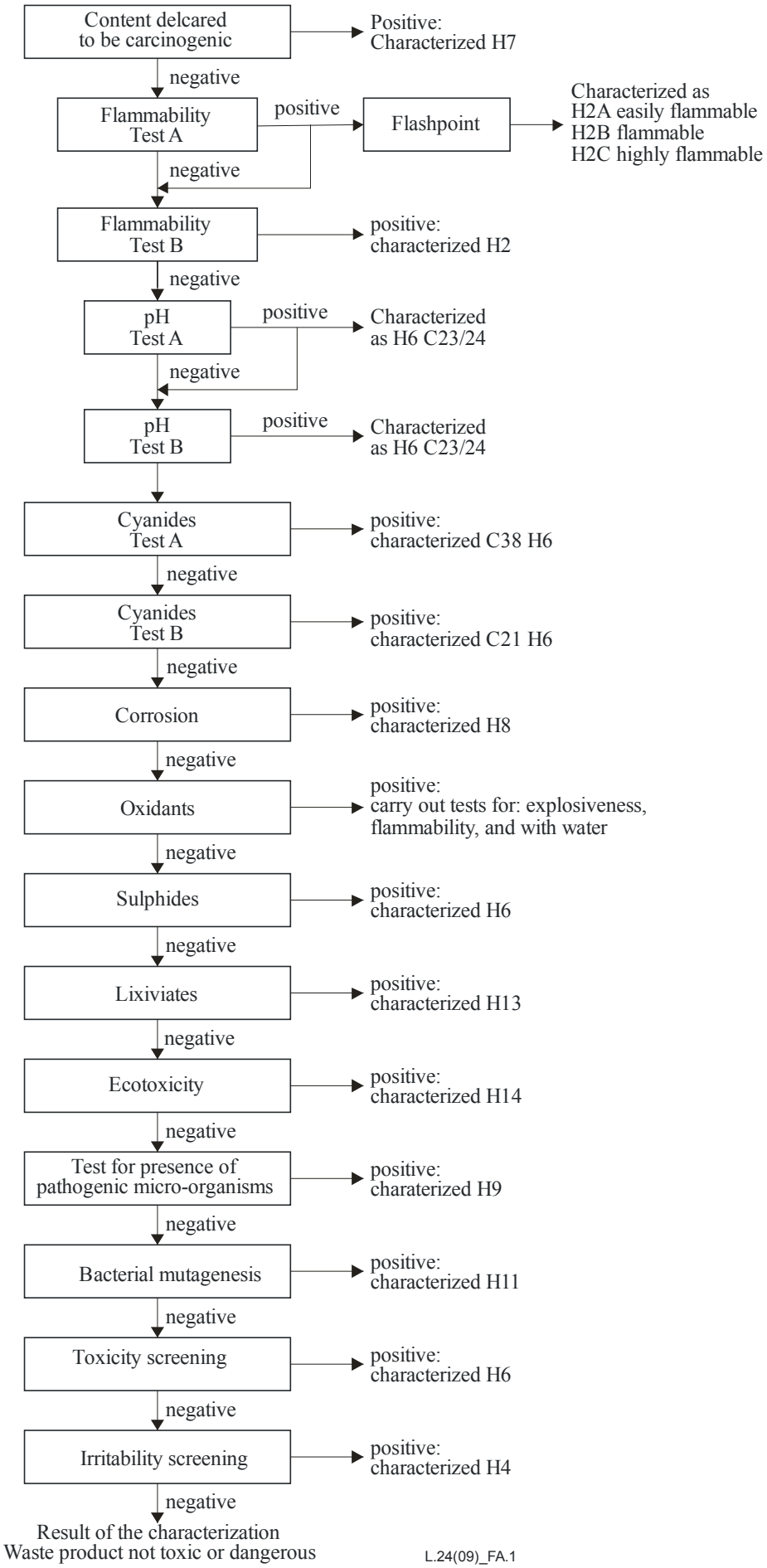

Figure A.1 – Characterization flow chart

Appendix I

Information from Telefonica of Spain

(This appendix does not form an integral part of this Recommendation)

Table I.1 – Materials graded according to components

Product	Grade	Type/ hazardousness	Recommended treatment	Composition	Comments
"Solvex Tar" aromatic oil impregnation of wooden posts	E-15-L	C-43		Product of oil-based origin. Components: naphthalene, paraffins, etc.	
PVC joint adhesive	G-90-L	C41/ /H4/2A (/14) RTP	Incineration	PVC resin solution in organic solvent (tetrahydrofuran, cyclohexanone and butanone)	The characterization was carried out on the liquid and solid (dry) adhesive, both of which were found to be TDW.
Alkaline nickel-cadmium station batteries	A-80-S B-100-L	C11/24	Safety Dep. Physical-Chemical P.	Miscellaneous: Ni(OH)3, Cd, KOH	
Lead-acid batteries	A-60-S B-20-L	C18/23	Safety Dep. Physical-Chemical P.	Miscellaneous: lead sulphuric acid	
Cartridge mixture of aluminium ether-mica ZINC electrode	A-100-S	/ /H2B	Neutralization in Physical-Chemical P.	Aluminium powder, copper oxide and activator powder	
Cartridge mixture of aluminium ether-mica rod electrode	A-100-S	/ /H2B	Neutralization in Physical-Chemical P.	Aluminium powder, copper oxide and activator powder	
Bostik N.820 liquid cement	G-100-L	C41/ /H5/H2A RTP		Elastomer solution in ketone solvent, e.g., methyl ethyl ketone	Limited life. Consult specifications. The characterization was carried out on aged liquid cement.
Floor wax	E-30-S	C53	Incineration	Miscellaneous: beeswax, solid paraffin	
Cable-sealing compound (PREN)	G-40-S	C41/ /H5 RTP	Inventory control. Inerting	Epoxy resin-polyamine or polyamide hardener, e.g., triethylene-tetramine	Limited life. Consult specifications. The characterization screening was carried out on the aged compound.
"Flex-Gel" filling compound for paired cables	E-30-S	C53		Mineral oil with synthetic rubber thickener and polyethylene waxes	

Table I.1 – Materials graded according to components

Product	Grade	Type/ hazardousness	Recommended treatment	Composition	Comments
Sealant for occupied ducts	G-100-S	C37, (C43)/ /H4 RTP INH.ING. CON.	Inventory control. Inerting	Two separate components: methyl-diphenyl-isocyante (MDI), N-methyl-dicyclohexylamine (foaming agent)	Limited life. The characterization was carried out on the aged compound.
150 BB splicing set	A-80-S G-100-S		Separation of components for possible sale	Miscellaneous: thermorect.sheath (polyolefin) metallic core (aluminium alloy), encapsulant, etc.	Advisable to code and treat the components separately. Limited life. Consult specifications.
ER splicing set	A-80-S G-100-S	C37/ /H5 (Encapsulant) TDW	Incineration of encapsulant	Inert and encapsulating components based on disocyante of diphenyl-methylene and polyol	The characterization screening was carried out as a waste product of the set when formed.
Armorcast splicing set	A-80-S G-100-S	C37/ /H5 (Armorcast bandage) TDW		Miscellaneous: metallic components, putty and armorcast bandage (contains isocyanates)	The characterization screening was carried out as a waste product of the set when formed.
Creosote for wood preservation	F-10-L	(C36 European Leg.) C43/ /H7/ H14 RTP		Distillation of the secondary coal tar	It could produce dangerous substances or incineration; study required.
Scrap lead-sheathed cable	A-80-S	C18/ /H5 RTP INH. ING.CON.	Separation of components for possible sale	Miscellaneous: lead, etc.	Lead exposure limit: 0.05 mg/m^3.
Lead scrap	A-60-S	C18/ /H5 RTP INH. ING.CON.	Could be sold, waste bags	Lead	Exposure limit: 0.05 mg/m^3.
Wood scrap	K-40	If it contains creosote it may be H7		Wood. If the wood is creosoted, the waste should be analysed separately	More thorough analysis required.
Wood scrap with metal	J-100	If it contains creosote it may be H7		Wood, metal. If the wood is creosoted, the waste should be analysed separately	More thorough analysis required.
Radioactive detectors and lightning conductors		Radioactive waste	Special dumping ground. Radioactive waste	Miscellaneous	
Gella for slicing	C-10-L	C37/ /H5 RTP INH. CON.		Isocyanate and polybutadiene resin	Limited life. Consult specifications.

Table I.1 – Materials graded according to components

Product	Grade	Type/ hazardousness	Recommended treatment	Composition	Comments
Supergras grease	E-30-S	C53	Incineration		
Aguila 75 grease	E-30-S	C53			
Methyl-ethyl ketone cleaner	G-60-L	C41/ /H2A/ H4 RTP	Recovery, incineration	Methyl-ethyl ketone	Analysed in the waste characterization screening. Exposure limit 200 ppm (590 mg/m^3).
PVC joint cleaner	H-10-L	C40/ /H5/H2B/(H7) RTP INH.ING	Recycling	Methylene chloride	Characterization was carried out on the product as waste. Exposure limit: 500 ppm.
Petroleum jelly cleaner	G-70-L	C41/ /H2B/ 4 (/14) RTP	Recovery, incineration	Mixture of D-limonene with 5% of liquid vaseline	Analysed in the waste characterization screening.
Contact-cleaning liquid	E-20-L	C53		Solution of 20% white vaseline oil in refined heavy solvent	
Trichloro-trifluorethane liquid	H-10-L	C40/ /H14 RTP	Recycling	Freon 113 (TTE)	Among the substances that destroy the ozone layer. Characterization carried out as a waste product.
Perchloroethylene liquid for pin cleaning	H-10-L	C30/ /H5 RTP		Perchloroethylene	
Lead sheaths	A-60-S	C18/ /H5 RTP INH.ING.CON	Could be sold, waste bags	Lead	Exposure limit: 0.05 mg/m^3.
Epoxy putty	G-40-S G-20-S	C39/ /H5 RTP	Inventory control. Inerting	Two separate packed products: epoxy based on bisphenol A; triethyltetramine hardener	The unmixed component wastes are harmful. Characterization carried out on aged putty.
Meig mortar for cable-sealing	G-20-S	/ /H4/8		Epoxy with inert loads. Polyamine hardener. Example: triethyl-tetramine	
Dry batteries	A-20-S		Recycling, controlled collection	Miscellaneous: zinc-carbon ammonium chloride. There are mercury batteries (C16)	

Table I.1 – Materials graded according to components

Product	Grade	Type/ hazardousness	Recommended treatment	Composition	Comments
50 lead expansion block	A-60-S	C18/ /H5 RTP INH. ING.CON.	Could be sold, waste bags	Lead	Exposure limit: 0.05 mg/m^3.
Gas detector tubes	B-50-L	C23/ /H8 RTP		Iodine pentoxide and fuming sulphuric acid	
Lead pipes	A-60-S	C18/ /H5 RTP INH. ING.CON.	Could be sold, waste bags	Lead	Exposure limit: 0.05 mg/m^3.

Table I.2 – Materials characterized in Telefonica of Spain

Product	Type/ hazardousness	Recommended treatment	Composition	Comments
PVC joint adhesive	C41/ /H4/ 2A(/14) RTP	Incineration	PVC resin solution in organic solvent (tetrahydofuran, cyclohexanone and butanone)	The characterization was carried out on the liquid and solid (dry) adhesive, both of which were found to be TDW.
Fibre-optic cables	Inert	Controlled dumping ground	Miscellaneous	
Bostik N.820 liquid cement	C41/ /H4 RTP	Safety incinerating tank	Nitrylic rubber or other synthetic elastomer solution	Results refer to aged liquid cement (in addition, liquid should be classified H2A).
Sealant for occupied ducts	Inert	Incinerating or dumping ground	Methyl-diphenyl-isocyanate (MDI). (N-methyl-dicyclohexylamine)	Results refer to the aged hazardousness of the aged product.
Cable-sealing compound (PREN)	Inert	Incinerating or dumping ground	Compound formed by two components: epoxy resin and polyamine-based hardening agent	Results refer to the sealing compound, mixed and aged.
Armorcast wire splicing set	Inert	Dumping ground	Miscellaneous: metallic compounds, putties and armorcast bandage (contains isocyanates)	Results refer to the splicing set comprising all its elements.
ER splicing set	C37/ /H11 RTP	Incineration of encapsulant	Inert and encapsulating components based on disocyanate of diphenyl methylene and polyol	Results refer to the characterization of the splice when formed.
PVC joint cleaner	C40/ /H5/ H2B/ (/7) RTP	Recycling	Methylene chloride	Exposure limit: 500 ppm.
Petroleum jelly cleaner	C41/ /H4/2B RTP	Recovery, incineration	Mixture of D-limonene with 5% of liquid vaseline	
Methyl ethyl ketone cleaner	C41/ /H4/H2A RTP	Recycling	Methyl ethyl ketone	Exposure limit: 200 ppm (590 mg/m^3).

Table I.2 – Materials characterized in Telefonica of Spain

Product	Type/ hazardousness	Recommended treatment	Composition	Comments
Trichloro-trifluorethane liquid	C40/ /H14 RTP	Recycling	Freon 113 (TTE)	Exposure limit: 1000 ppm (7600 mg/m^3). Among the substances that destroy the ozone layer.
Lubricant for fibre-optic cable	Inert	Biological purifier	Aqueous solution of a synthetic polymer, e.g., polypropylene glycol	
Epoxy putty	Inert	Dumping ground	Bisphenol A-based epoxy; polyamine or polyamide hardener; triethyl-tetramine	Results refer to the hazardousness of the aged product's residues.
TA 100 to TC 1600 concrete posts	Inert	Controlled dumping ground	Reinforced concrete	
Polyethylene pipes	Inert	Mechanical recycling	Low-density polyethylene	A cytotoxic effect was observed, probably due to external contaminants.
PVC pipes	Inert	Mechanical recycling	Polyvinyl chloride	A cytotoxic effect was observed, probably due to external contaminants.

Appendix II

Information from CPqD of Brazil

(This appendix does not form an integral part of this Recommendation)

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials		Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Metallic Cables	Copper – Conductor		Copper – Conductor	C6	Consider that the degradation of copper cable may generate compounds of copper and the dissolution of copper salts.
	Conductors isolate – PEBD		Conductors isolate – PEBD	C41	
	PAL-sheath	PAL-sheath	Inert	Inert	
			C41	C41	
	Wire cord		Wire cord	Inert	
	Wire cord – PEBD		Wire cord – PEBD	Inert	
Optical fibre cables-dry aerial and dry core	Optical Fibre – Glass		Class III – Inert	Inert	The glass fibre is usually covered by a polyurethane-acrylate layer and other protections that avoid direct contact with humidity, it also avoids dispersal of silica dust when ground with cables.
	Central Member – FRP		Class I – Hazards	H7	The process of grinding glass fibre can generate silica dust, which is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group I.
	Tubettes – PBT		Class II – Not inert	C41	
	Sheath- PEAD/PEBD		Class II – Not inert	C41	
	Strength member – Aramid or glass fibre		Class II – Not inert	C43/H7	The particles resulting from the processes of grinding and/or shear are considered toxic according to NIOSH, describing toxicity of PAH type (aromatic hydrocarbons) in the range of sensory irritation to carcinogenicity. When using glass fibre as a support element, consider the comment at item FRP.
	Compound – Silicon or Olefinic		Class II – Not inert	C53	

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials	Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Optical Fibre Cables Jelly core	Jelly filed compound – Silicon or Olefinic	Class II – Not inert	C53	
FE Wire	Conductor – Copper	Class I – Hazardous	C6	Consider that the degradation of copper cable may generate compounds of copper and the dissolution of copper salts.
	Conductors isolation – PEBD/PEAD	Class II – Not Inert	C41	
	Central element – Steel	Class I – Hazardous	H13	This classification considers the release of elements such as chromium and lead. Chromium and lead put in risk residues where they are present, according to ABNT 10004.
	Central element – FRP	Class I – Hazardous	H7	The process of grinding glass fibre can generate silica dust, which is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group I.
	Cover – PEAD	Class II – Not Inert	C41	

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials		Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Battery	Boxes	ABS	Class II – Not Inert	C43/H7	Residues of degradation of acrylonitrile-butadiene-styrene (styrene) is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group 2B. Also, the acrylonitrile put in risk the residues.
		PP	Class II – Not Inert	C41	
		PS	Class II – Not Inert	C43/H7	Residue of degradation of polystyrene by division (styrene) is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group 2B.
	Board – Lead		Class I – Hazardous	C18/H5	Lead and its components offer risk to the residues where they are present, according to ABNT 14001.
	Active pasta				
	Electrolyte (for lead – acid)		Class I – Hazardous	C23/H8	Lead and its components offer risk to the residues where they are present, according to ABNT 10004.
	Electrolyte Gel (for Stationary alkaline)		Class I – Hazardous	C24	
	Cathode – Cadmium		Class I – Hazardous	C11/C24/H5	Cadmium and its components offer risk to the residues where they are present, according to ABNT 10004.
	Anode – Nickel oxide		Class I – Hazardous	C24	Nickel and its components offer risk to the residues where they are present, according to ABNT 10004.
Telephone booth	Glass fibre		Class I – Hazardous	H7	The process of grinding glass fibre can generate silica dust, which is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group I.
	Polyester		Class II – Not Inert	C41/C43/H7	This classification considers some additives in the formulation.

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials			Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Mend Collection	Box	CEV and CEA	PP	Class II – Not Inert	C41	
			Reinfor-cement – Talc or FV	Class I – Hazardous	H7	The process of grinding glass fibre can generate silica dust, which is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group I.
		Metal – lead		Class I – Hazardous	C18/H5	Lead and its components offer risk to the residues where they are present, according to ABNT 10004.
	Connectors and Blocks of engineering plastic			Class II – Not Inert	C41/ C43	Considered degradation products of basic polymers (polycarbonate/ABS/ polioxide of phenylene/ polystyrene and PBT).
	Resin	Jelly Polymer		Class I – Hazardous	C37/H4	The products of degradation (e.g., polyol, MDI (methylene di-isocyanate) and TDI (toluene di-isocyanate)) – are considered irritant by the safety rules of CPqD.
		Jelly Olefinic		Class II – Not Inert	C53/H4	
	Rubber seal			Class II – Not Inert	C41/H4	If the gaskets are made from Nitrile they will release HCN, and if they are chlorinated, they will release HCl while degrading.
Ducts	PVC			Class II – Not Inert	C42/H5	Consider burning this material if disposing in landfills or in unsuitable areas (generation of hydrochloric acid, chlorine gas and methylene chloride).
	PEAD			Class II – Not Inert	C41	
Cable coils	Wood			Class II – Not Inert	Inert	
	Wood with Creosote			Class I – Hazardous	C43/H7/H14	Consider the release of creosote in the decomposition of wood treated with this product. The creosote is toxic and offer risk to the residues where they are present, according to ABNT 10004.

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials	Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Other metals		Class I – Hazardous	C11/C18	Consider seperating metals like lead, copper and cadmium that may be present.
Packages	Plastic	Class II – Not Inert	C42	
	Wood	Class II – Not Inert	Inert	
	Paper	Class II – Not Inert	Inert	
Pole	Wood with Creosote	Class I – Hazardous	C43/H7/H14	Consider the release of creosote in the decomposition of wood treated with this product. The creosote is toxic and offer risk to the residues where they are present, according to ABNT 10004.
	Wood	Class II – Not Inert	Inert	
	Concrete	Class II – Not Inert	H13	When addressing the release of dust in milling or grinding processes to reuse or discard the product, pay attention to civil waste construction requirements, according to Fundacentro – Programa Nacional de Eliminação de Silicose.

Table II.1 – Classification on environmental hazards outside plant typical products

Product	Materials	Classification Standards (NBR ABNT 10004)	Classification on ITU-T L.24	Comments
Central board – CI	Polyester	Class II – Not Inert	C41/C43/H7	The residue of degradation of polyester (styrene) is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group 2B.
	Glass Fibre	Class I – Hazardous	H7	The process of grinding glass fibre can generate silica dust, which is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group I.
	Tin			
	Lead	Class I – Hazardous	C18/H5	Lead and its components offer risk to the residues where they are present, according to ABNT 10004.
	Epoxy Resin	Class I – Hazardous	C39	The Phenol released by the degradation of epoxy resin put in risk residues where they are present, according to ABNT 10004.
	Bakelite – Formaldehyde phenol	Class I – Hazardous	C43	The aromatic compound put in risk residues where they are present, according to ABNT 10004.
Cabinets		Class II – Not Inert	C39/H7	The residue of degradation of polyester (styrene) is considered by the International Agency for Research on Cancer (part of the World Health Organization) carcinogenic from Group 2B.

Appendix III

EEC legislation

(This appendix does not form an integral part of this Recommendation)

European Community legislation on waste and chemical substances is dealt with in clauses III.1, III.2 and III.3:

– Solid urban waste.

– Toxic and dangerous waste.

– Chemical substances.

The Directives and Decrees issued in each subclause are as follows:

III.1 Solid urban waste

75/442/EEC Waste:

- COM (88) 391 FINAL – SYN 145
- 91/156/EEC

76/431/EEC Waste management.

81/972/EEC Recycling of used paper.

90/C 122/EEC Policy on the matter of waste.

COM (91) 102 FINAL – SYN 335 Dumping waste.

COM (91) 219 FINAL – SYN 217 Civil liability for damages caused by waste.

91/692/EEC Standardization of reports.

III.2 Toxic and dangerous waste

75/439/EEC Used oils:

- 87/101/EEC.

76/403/EEC PCB and PCT management:

- COM (91) 373 FINAL – SYN 161.

78/319/EEC Toxic and dangerous waste:

- 91/689/EEC Dangerous waste.

84/631/EEC Cross-border transfers:

- 85/469/EEC
- 86/279/EE
- COM (88) 391 FINAL – SYN 145

91/157/EEC Batteries and storage batteries.

III.3 Chemical substances

67/548/EEC Classification and labelling of dangerous substances:

- 69/91/EEC
- 73/146/EEC
- 75/409/EEC
- 79/831/EEC
- 83/467/EEC

- 84/449/EEC
- 87/302/EEC
- 91/325/EEC
- 91/326/EEC
- 91/632/EEC
- COM (91) 469 – SYN 276
- COM (8) FINAL – SYN 227
- 92/33/EEC
- 92/37/EEC

76/769/EEC Marketing of dangerous preparations:

- 82/828/EEC
- 83/478/EEC
- 85/467/EEC
- 85/610/EEC
- 89/677/EEC
- 89/678/EEC
- 91/173/EEC
- 91/338/EEC
- 91/339/EEC
- COM (91) 7 FINAL – SYN 325
- 91/659/EEC
- COM (92) 195 FINAL – SYN 414

80/1107/EEC Protection of workers against the risks related to exposure to chemical, physical and biological agents:

- 83/477/EEC Protection of workers against the risks related to exposure to asbestos.
- 88/642/EEC
- 91/322/EEC
- 91/382/EEC Risks related to exposure to asbestos during work.

Council Decision of 27 February 1984.

Health and safety at work.

88/378/EEC Classification, packing and labelling of dangerous preparations:

- 90/492/EEC
- 91/155/EEC

Regulation No. 1734/88 Export and import of dangerous chemical products.

Regulation No. 428/89 Exportation of particular chemical products.

91/C339/09 Ecological label.

Appendix IV

Questionnaire on "Classification of outside plant waste"

(This appendix does not form an integral part of this Recommendation)

Questions

1. Company or organization name:

2. Country:

For the following questions, please select the answer that best describes your opinion.
If you select 'other', please add a corresponding description.

3. Is there any interest involving the knowledge of the environmental impact caused by the company's activities?

   ☐ No
   ☐ Yes

4. Is there any corporate concern about the deployment of ISO 14000 certification (Environmental Management System)??

   ☐ Yes
   ☐ No, owing to not knowing the processes involved
   ☐ No, due to other reasons (please describe):

5. Is there any history of health problems involving the company's employees – either direct or indirect ones – due to the manipulation of products used in their occupations?

   ☐ No
   ☐ Yes (please detail):

6. Is there any information available related to research/studies on the subject matters mentioned above?

   ☐ No
   ☐ Yes (In this case, the Rapporteur would greatly appreciate a copy of the text of such a standard.)

7. Is there any history of environmental accidents generated by the company?

   ☐ I don't know
   ☐ No
   ☐ Yes

8. In general terms, is the discard of utilized products a controlled process?

   ☐ No
   ☐ Yes

9. Is there a general discard procedure of products which are drawn back from use?

   ☐ No
   ☐ Yes. How is the discard process accomplished?

10. Does the discard of products involve outsourcing?

- ☐ No
- ☐ Yes. Which criteria involve the hiring of outsourced personnel?

11. Is there a special warehouse for discarded products?

- ☐ No
- ☐ Yes. How is storage accomplished? Are there any standards to avoid environment contamination?

12. Is the procedure of discarding products controlled (either internally or outsourced)?

- ☐ No
- ☐ Yes

13. Are sanitary landfills, garbage dumps (for ordinary debris or industrial refuse) or dumpsters used??

- ☐ I don't know
- ☐ No
- ☐ Yes. Where? Is this dumpsite presently controlled?

14. Does the company interact with third sector-related entities?

- ☐ I don't know
- ☐ No
- ☐ Yes. Which? In which situation is it applicable?

15. Is there any estimate concerned with the volume of discarded residues?

- ☐ No
- ☐ Yes. Which residues relate to the largest discarded volume?

16. How is the transport of discarded-to-be residues made?

17. Is there a selection process of the site to be used for discard?

- ☐ No
- ☐ Yes. How is it selected?

18. Does the company interact with companies that are specialized in recycling processes?

- ☐ No
- ☐ Yes. Which?

19. Is there any resale of discarded products?

- ☐ No
- ☐ Yes. Which product?

20. Among the products listed below, list the corresponding quantity and periodicity of discard, the specific discard procedures and recycling procedures:

Product	***Which is the estimate of discard in terms of quantity and periodicity?***	***Is there any specific discarding procedure?*** ***How is it accomplished?***	***Is there any specific recycling procedure?*** ***How is it accomplished?***
Self-supporting aerial copper cables		☐ No ☐ Yes	
Cables for data transmission (e.g., Cat 7, 6)		☐ No ☐ Yes	
Copper Cables (dry or jelly filled core)		☐ No ☐ Yes	
Optical fibre cables		☐ No ☐ Yes	
OPGW cables		☐ No ☐ Yes	
Drop Wires		☐ No ☐ Yes	
Indoor Wires		☐ No ☐ Yes	
Fibre optics		☐ No ☐ Yes	
Optical Connectors		☐ No ☐ Yes	
Coaxial cables		☐ No ☐ Yes	
Wooden poles		☐ No ☐ Yes	
Concrete poles		☐ No ☐ Yes	
Copper closures		☐ No ☐ Yes	
Optical closures		☐ No ☐ Yes	
Blocking resins (copper splices)		☐ No ☐ Yes	
Reentrant resin (copper splices)		☐ No ☐ Yes	
Pay Phones		☐ No ☐ Yes	
Wire Strands		☐ No ☐ Yes	
Access Terminals		☐ No ☐ Yes	
Terminals blocks		☐ No ☐ Yes	
Connectors		☐ No ☐ Yes	
Earth Grounding Systems		☐ No ☐ Yes	
Distribution Cabinet		☐ No ☐ Yes	
PVC Ducts		☐ No ☐ Yes	
PEAD ducts		☐ No ☐ Yes	
Manhole Covers		☐ No ☐ Yes	
Plastic stretcher		☐ No ☐ Yes	
Load coils		☐ No ☐ Yes	
Subscriber Mux.		☐ No ☐ Yes	
Optical amplifiers		☐ No ☐ Yes	
DSLAN		☐ No ☐ Yes	

Summary of replies to the questionnaire on classification of outside plant waste

		Question No.																
#	Source	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	Lithuania/TEO LT,AB	Yes	No	No	No	No	Yes	Yes	Yes	No	Yes	No	No	Yes	-	Yes	Yes	No
2	Moldova/JSC Moldetelecom	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	-	No	Yes	Yes
3	Turkey/Turk Telecom	No	No	No	No	No	Yes	No	No	No	No	No	No	No	Yes	No	No	Yes
4	Suriname/Telesur	Yes	No	No	No	Don't know	Yes	Yes	No	No	No	No	No	No	Yes	No	No	Yes
5	Yemen/Yemen Telecom	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	Afghanistan/Telecom	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	Italy/Sielte	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No
8	Fiji/Fiji Telecom	Yes	No	No	No	Don't know	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
9	Korea/KT	Yes	Yes	Yes	No	Don't know	Yes	–	Yes	Yes	Yes	Don't know	Don't know	No	Yes	No	Yes	Yes
10	Hungary/Magyar Telecom	Yes	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes
11	Japan/NTT	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Don't know	Yes	Yes	Yes	Yes	Yes
12	Azerbaijan/Baku Telecom	–	–	–	–	–	–	–	–	–	–	–	–	–	–	Yes	No	No
13	Malta	Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	No
14	Ukraine	Yes	Yes	No	No	Don't know	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No
15	Peru/Nextel, Americatel, Telmex	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	–
16	Portugal/PT Comunicaçoes SA	No	Yes	–	–	No	Yes	Yes	Yes	Yes	Yes	Yes	–	Yes	–	Yes	Yes	Yes
17	Senegal/SONATEL	No	No	No	No	–	No	No	No	No	No	No	No	No	by road	No	No	Yes

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Printed in Switzerland
Geneva, 2010