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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods

Twenty-eighth session, 28 November-7 December 2005
Item 5 of the provisional agenda

LISTING, CLASSIFICATION AND PACKING

Testing of maneb and maneb preparations stabilized against self-heating (UN 2968) with reference to Special Provision 273

Transmitted by the expert from South Africa

Discussion

Special Provision 273 in the UN Model Regulations reads as follows:

> "Maneb and maneb preparations stabilized against self-heating need not be classified in Division 4.2 when it can be demonstrated by testing that a cubic volume of 1 m^3 of substance does not self-ignite and that the temperature at the centre of the sample does not exceed 200 °C, when the sample is maintained at a temperature of not less than 75 °C ± 2 °C for a period of 24 hours."

The testing of such a large volume of a potentially self-heating substance requires that special precautionary measures be put in place, for example:

(a) an environmental impact study carried out to ensure that the test apparatus is set up in an area where gases emitted in the event of a fire will not pollute populated areas;

(b) fire fighting equipment installed and the Fire Brigade notified;

(c) a control room should be available on the test site to provide protection against the elements to operators and the temperature control and recording instrumentation;

(d) all safety operating points clearly marked so as to be visible in the dark by torchlight; and

(e) vehicles parked ready for escape if necessary.

Special equipment is also needed to maintain the test conditions stated in Special Provision 273. This is not conveyed in the Model Regulations.

The test method developed and used in South Africa is attached hereto as annex.

Request

The Sub-Committee is requested to consider the inclusion of a test method for a cubic volume of 1 m^3 of maneb and maneb preparations stabilized against self-heating in Part III, section 33.3.1 of the UN *Manual of tests and criteria*, based on the test method given in annex.

Annex

Test method for a cubic volume of 1m^3 of maneb and maneb preparations stabilized against self-heating

1. Introduction

The ability of 1 m^3 of maneb and maneb preparations stabilized against self-heating to undergo oxidative self-heating when exposed to air at a temperature of 75 ºC ± 2 ºC for a period of 24 h.

2. Equipment

2.1 A metal shipping container of nominal dimensions 2,4 m x 2,6 m x 6,5 m divided into two chambers by a double brick wall as follows:

a) a chamber of nominal dimensions 2,3 m x 2,3 m x 2,4 m (12,7m^3) to serve as a forced draft oven by thermally insulating the inside and outside surfaces with a 25 mm thick layer of polyurethane foam covered with aluminium foil. A double-hinged door that closes tightly on the oven frame and fitted with a device to enable opening of the doors from a distance of at least 25 m. An opening in the floor fitted with an adjustable butterfly valve to regulate the temperature distribution in the oven.

The hot air from the heating plant (see (b) below) shall enter the oven vertically and centrally through the roof with the orifice parallel to the floor. The hot air is exhausted onto a flat cone of steel sheeting (Chinese hat) with the circumference angled upward to ensure turbulent airflow around the test specimen.

Install a water pipe, fitted with a sprinkler head, and capable of providing a pressure of at least 500 kPa and that opens centrally in roof of the oven under the cone distributor. Provide the pipe with two water stops in order to prevent accidental operation of the fire fighting system. The opening device for the fire fighting water shall be installed in the vicinity of the control room (see 2.2).

b) The other part of the container to serve as the heating plant for the oven by fitting it with heating elements, a blower of sufficient capacity to facilitate even distribution of hot air and an air duct of suitable dimensions to guide the hot air into the oven.

2.2 A control room situated at least 25 m from the metal container providing rest and ablution facilities.

2.3 Wooden pallet

2.4 Fifteen thermometer assemblies (e.g. PT 100 thermo resistance sensor, cable and recorder)

2.5 Temperature and recording instrumentation able to record both the time and the temperature of each thermometer assembly every 1 min.

2.6 Manual and automatic temperature control devices.

2.7 Specimen container, woven plastics FIBC, coated and with inner lining (13H4), equipped with handling devices and that is able to contain $1m^3$ of test material.

3. Test specimen

Before testing, place the test specimen on a wooden pallet and store in an enclosed area that protects it from moisture and temperatures above 40 °C

4. Procedure

4.1 The test site shall be in an area where the gases emitted in the event of a fire will not pollute populated areas. A professional environmental impact study shall be done and the site declared safe before any testing commences.

4.2 Mark the test site with a "No Entrance" sign as well as a sign that indicates toxicity dangers. Mark all operating points clearly so as to be visible in the dark by torchlight. The passage to these points shall always be free from any obstacles. All operators shall be trained to ensure that the safety rules are understood and adhered to at all times.

4.3 Dig a ditch around the test container that is capable of retaining more than 25 m^3 of effluent fire fighting water. Line the ditch with a suitable material to render it impervious.

4.4 Place a wooden pallet in the centre of the oven floor for the test specimen to be located on during the test.

4.5 Provide each operator with personal protective clothing as per the manufacturer's Safety Data Sheet and provide each person handling the test material with a respirator with two chemical filters for the filling operation of the specimen container and self-contained breathing apparatus in case a fire occurs and the wind blows towards the control room. Install a windsock at the test site to indicate the wind direction.

4.6 Directly after filling, close the specimen container securely and place it on the pallet in the oven.

4.7 Ensure even heat distribution in the oven within the temperature range of 75ºC ± 2 ºC by installing 8 thermometer assemblies as follows: in two horizontal planes; one plane 80 mm ± 20 mm below the base of the specimen and one plane 80 mm ± 20 mm above the top of the test specimen centrally at the four quarters of these planes and in vertical planes 80 mm ± 20 mm outside the vertical sides of the specimen.

4.8 Place another thermometer assembly close to the deflector sheet to serve as the control thermometer to regulate the temperature in the oven. Connect the control thermometer assembly to an alarm system to warn operators against temperature readings outside the temperature range of 75 ºC ± 2 ºC.

4.9 Insert five thermometer assemblies in the test specimen as follows: one in the centre of the sample and the other four nominally 50 mm, 150 mm, 250 mm and 450 mm respectively from the centre of the sample.

4.10 Close the doors of the oven tightly and start the heating plant and recorders. Observe and control the oven temperature within the specified limits. Record the time when all the oven thermometers reach a temperature of 75 ºC ± 2 ºC. Keep the specimen for another 24 h at this temperature and observe whether or not the centre of the specimen reach a temperature higher than 200ºC.

4.11 One operator shall always be in control of the test. The operator shall observe the control panel continuously for temperature fluctuations and warn the project leader immediately by cell phone if anything appears not to be within control. The cell phone shall be programmed with the Fire Brigade's telephone number and the project leader's number

4.12 Conditions that need the attention of the project leader are oven temperatures below 73,5 ºC and above 76,5 ºC, and a specimen temperature above 80 ºC.

4.13 The safety measures specified by the environmental impact study shall be adhered to at all times.

4.14 If at any stage, the sample reaches a temperature of 203 ºC in any location, record the time, switch off the heat and open the water spray. Keep the water flowing until all temperature indications are normal, observe whether or not a temperature rise re-occur and dose with water if necessary.

4.15 On completion of the test, arrange with a waste management company for the collection and disposal of the test specimen.

5. Test criteria

The test specimen should not be classified in Division 4.2 if the substance does not self-ignite and the temperature at the centre of the specimen does not exceed 200 °C**.**