Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Perishable Foodstuffs   **20 October 2011**

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Item 11 of the provisional agenda
Other business

Certification and calibration of instruments used by testing stations

Transmitted by an Italian equipment manufacturer

> *Note*: The secretariat has received the following communication from an Italian manufacturer of thermal measuring equipment which is presented in this Informal document and made available for information and possible discussion by WP.11.
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> This document, dated 20 October, replaces a previous document on the same subject.

Introduction

I am the legal representative of a small company which, among other activities, builds and sells measuring equipment specifically designed for the thermal tests carried out by experts on means of transport subject to the ATP and I have been involved in these issues since 1992.

I am writing to point out what seems to me to be a lacuna in the ATP text. The only point in the entire text in which reference is made to regulations concerning the performance, reliability and periodic testing of the measuring instruments utilized is to be found in Annex 2, Appendix 1 and regards the temperature recorders mounted on means of transport destined for the transportation of frozen foodstuffs for human consumption.

Nothing is specified instead with regard to the instruments utilized by the testing stations and experts. In chapter 6 VERIFYING THE EFFECTIVENESS OF THERMAL APPLIANCES OF EQUIPMENT IN SERVICE the experimental tests which have to be carried out by the experts are specified. There is, however, no specification as to the characteristics that the instruments utilized should possess. That is to say, neither the precision nor the resolution of the temperature measuring instruments is specified, and there is no norm of reference which prescribes the periodic technical tests which the instruments have to undergo.

In our opinion, it is necessary that WP.11 indicate clearly the characteristics of the measuring instruments to be utilized and the tests to which they have to be subjected.

In the hope that it may prove useful, we attach a draft of what, in our opinion, should be specified by WP.11. This document is based both on the indications present within the ATP and on our own lengthy experience in the design, manufacture and maintenance of these instruments. It should be stressed that the performance levels indicated the minimum levels required for the instrument to be considered reliable in its real conditions of use.

On the basis of these data, it is possible to think of giving rise to a norm which specifies on the one hand the technical characteristics and on the other the standard procedure for the functional testing of the technical characteristics and on the other the standard procedure for the functional testing of the instruments and which would thus guarantee their suitability for the use for which they are intended.

Description of instrument for trial on cold-store means of transport

The instrument has to allow for the registration of at least ? (12) external environment temperatures and ? (12) internal temperatures of the means of transport being tested.

The instrument has to be able, autonomously or with the aid of an external data processor, to produce a graph with time on the x-axis and temperature on the y-axis. This graph has to represent the performance of the average internal and external temperatures for the entire duration of the trial (autonomous). In order to compose the graph, the temperatures have to be recorded at least once (1) a minute.

The instrument has to record the temperature values measured by all the probes at intervals of 10 minutes, annotating the recording with the date and time at which the reading was taken (interval programmable by the operator).

The maximum uncertainty tolerated on the measurement of time is of +/- 1/1800 seconds (+/- 1/3600).

The temperatures have to be measured with a maximum uncertainty of 0,5°C (0, 1°C) in the interval between -20 and +30°C.

The instrument has to allow for the continuous recording of the temperatures for at least 4 hours (unlimited autonomy).

Functional test of instrument for trial on cold-store means of transport

Note: If the instrument is intended also for trials on refrigerated means of transport, only the testing procedure relative to these means will be carried out.

Necessary equipment:

- climate chamber with integral internal metallic casing, large enough to contain the entire instrument, excluding the parts which interface with the operator,

- calibrated thermometer [standard] with margin of measurement less than 0,1°C and remote reading of the temperature,

- calibrated chronometer [standard] with margin of measurement less than 1/3600 seconds.

Testing procedure to be repeated at most every 12 months:

- Place the sensitive part of the sample thermometer and the entire instrument, excluding its interface towards the operator, inside the climate chamber.

- Start up the calibrated chronometer and the system of measurement.

- Bring the temperature of the climate chamber to +30 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to +15 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels do not exceed the prescribed uncertainty.

- Extract the part of the system intended for the measurement of the external environment from the climate chamber.

- Bring the temperature of the climate chamber to 0 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to -10 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to -20 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Check that the time measured by the instrument does not exceed the prescribed margin.

Description of instrument for trial on refrigerated means of transport

The instrument has to allow for the reading of at least ? (12) external environmental temperatures, ? (12) internal temperatures of the van being tested (and 2 more temperatures in contact with the eutectic elements).

The instrument has to be able, autonomously or with the aid of an external data processor, to produce a graph with time on the x-axis and temperature on the y-axis. This graph has to represent the performance of the average internal and external temperatures for the entire duration of the trial (autonomous). In order to compose the graph, the temperatures have to be recorded at least every 5 (1) minutes.

The instrument has to record the temperature values measured by all the probes at intervals of 30 minutes, annotating the recording with the date and time at which the reading was taken (interval programmable by the operator).

The maximum uncertainty tolerated on the measurement of time is of +/- 1/1800 seconds (+/- 1/3600 seconds).

The temperatures have to be measured with a maximum uncertainty of 0,5°C (0,1°C) in the interval between -20 and +30°C.

The instrument has to allow for the continuous recording of the temperatures for at least 48 hours (unlimited autonomy).

Functional test of instrument for trial on refrigerated means of transport

Necessary equipment:

- climate chamber with integral internal metallic casing, large enough to contain the entire instrument, excluding the parts which interface with the operator,

- calibrated thermometer [standard] with margin of measurement less than 0,1°C and remote reading of the temperature,

- calibrated chronometer [standard] with margin of measurement less than 1/3600 seconds.

Testing procedure to be repeated at most every 12 months:

- Place the sensitive part of the sample thermometer and the entire instrument, excluding its interface towards the operator, inside the climate chamber.

- Start up the calibrated chronometer and the system of measurement.

- Bring the temperature of the climate chamber to +30 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to +15 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels do not exceed the prescribed uncertainty.

- Extract the part of the system intended for the measurement of the external environment from the climate chamber.

- Bring the temperature of the climate chamber to 0 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to -10 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to -20 +/-2°C and let it stabilize for at least 1 hour.

- Check that the readings of the various channels inside the climate chamber do not exceed the prescribed uncertainty.

- Check that the time measured by the instrument does not exceed the prescribed uncertainty.

- Bring the temperature of the climate chamber to -40 +/-2°C and maintain it for at least 43 hours.

- Check that the readings of the various channels tally with the indication of the sample thermometer to within +/-5°C.

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