BS EN 16210:2013

BSI Standards Publication

Transportation loads — Measurement and evaluation of climatic and other loads — Data acquisition and general requirements for measuring equipment

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PKW/0/-/6, Packaging - Testing and Testing Methods.

A list of organizations represented on this committee can be obtained on request to its secretary.

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ISBN 978 0 580 69601 5

ICS 55.180.01

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 March 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16210

March 2013

ICS 55.180.01

English Version

Transportation loads - Measurement and evaluation of climatic and other loads - Data acquisition and general requirements for measuring equipment

Charges de transport - Mesurage et évaluation des contraintes climatiques et d'autres contraintes - Acquisition de données et exigences générales relatives aux appareils de mesure

Transportbelastungen - Messen und Auswerten von klimatischen und sonstigen Belastungen - Datenerfassung und allgemeine Anforderungen an Messeinrichtungen

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 16210:2013: E

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Foreword

This document (EN 16210:2013) has been prepared by Technical Committee CEN/TC 261 “Packaging”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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Introduction

This document was originally prepared by the Packaging Standards Committee (NAVp), NA 115-01-04 AA "Requirements and Testing" of the German Standardisation Institute (DIN). It is part of a complete normative concept to acquire and describe climatic and other loads, which can occur and affect goods during transport, handling and storage.

This standard obtains a significant meaning in order to fulfil the requirements of the European Directive on Packaging and Packaging Waste (Directive 94/62/EC dated 20th December 1994). These requirements ask for avoidance or reduction of packaging waste, and that the required amount of packaging material be tuned to the expected transportation load, in order to protect the transported item adequately. However, this presumes some knowledge of the climatic and other loads which occur during shipment.

At present, basic standards which describe and characterise in adequate form the magnitude of the transportation loads, based on scientifically confirmed values do not exist in the national and international world of standards. The reasons for this are mainly the absence of published data, insufficient description of the measurements, or restrictions on the dissemination of this information.

With this document, it will be possible to measure and analyse climatic and other transportation loads, thus allowing standardised and adequately documented load values to be produced.

1 Scope

This European Standard specifies the documentation of measurements for climatic and other loads (such as sunlight, sand, dust and electromagnetic radiation) during transport, handling and storage.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1
data acquisition
acquisition of raw data by measuring the load-time function with the aid of measuring equipment

2.2
measuring equipment
recording device, consisting at least of a sensor, signal conditioner, data recorder and data storing device

2.3
measuring report
documentation covering all details acquired during the data acquisition

3 General

Table 1 shows climatic and other loads that can occur on various transported items during transport.

Table 1 — Transported items subjected to climatic and other loads

Types of loads which can occur with corresponding modes of transports											
	Nature of load										
Mode of transport/ storage	**Heat**	**Cold**	**Humidity**	**Condensation**	**Rain**	**Snow/ice**	**Salt fog**	**Sand/dust**	**Corrosive gas**	**Low pressure**	**Solar radiation**
Land transport [a], open load platform	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**1**
Land transport [a], closed load platform	**1**	**1**	**1**	**1**	**3**	**3**	**3**	**3**	**3**	**2**	**3**
Container transport, open sea, on deck	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**3**	**3**	**3**	**1**
Container transport, open sea, below deck	**1**	**1**	**1**	**1**	**3**	**3**	**2**	**3**	**3**	**3**	**3**
Air transport with pressure compensation	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Air transport without pressure compensation	**1**	**1**	**1**	**1**	**3**	**3**	**3**	**3**	**3**	**1**	**3**
Storage in non-air-conditioned building	**1**	**1**	**1**	**1**	**3**	**3**	**3**	**3**	**2**	**2**	**3**
Storage covered	**1**	**1**	**1**	**1**	**2**	**2**	**1**	**1**	**1**	**2**	**3**
Storage in open-air	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**1**
1 relevant **2 conditionally relevant** **3 non-relevant**											
The combined transport is to be arranged by selecting the types of loads relevant to the individual modes of transport.											
[a] Land transport involves trucks, trains and containers.											

The following blank forms of measuring reports attached to each annex may be copied and used for measuring purposes:

— Annex A: Road transportation;

— Annex B: In-plant transportation (including storage and handling);

— Annex C: Rail transportation;

— Annex D: Sea transportation;

— Annex E: Combined transportation;

— Annex F: Air transportation (to be developed).

4 Measuring climatic and other transportation loads

4.1 General

Measurements shall be performed in the cargo compartment (e.g. container) in which the goods are being transported and as near as possible to the transported goods. The exact location of the measuring point shall be specified (see Figures A.1 and C.1).

Climatic and other loads shall, whenever possible, be captured and recorded in an unbiased form as source data, i.e. without immediate processing.

Measuring systems and their specific parameters (e.g. frequency of measurements) shall be selected in such a way that the acquired data can be analysed universally and reused at any other time.

A deliberate containment of the measurement to a smaller measuring range than one which is possible with a technical justifiable effort, leads to faulty analysis and conclusions in certain cases and is therefore not permissible.

The measuring system shall comply with the technical state of the art, the relevant specifications and technical rules (e.g. regarding calibration) and shall comply with the measuring task.

All significant circumstances and technical parameters of the measurement shall be recorded in a measuring report. Derivations from the measuring report shall be justified.

NOTE Occasionally, after measurements have been performed, it is necessary to retrace the conditions which occurred during the data acquisition. Therefore, only a complete description of the measuring process, as required by the measuring report, enables the inspection and interpretation of the measurements. Otherwise, the acquired measured data can become invalid. In addition, apparently unimportant information (e.g. detailed description of the cargo hold and possible supply of cooling air) used for the measurement can be of great importance for later interpretation of the measured data.

4.2 Preparation of the measurement

In order to keep expensive and time consuming test-drives to a minimum, careful planning of the measurements is an absolute necessity. Here especially, the ratio between cost and profit shall be taken into account and the total costs of a measuring programme shall be compared with the possible costs which insufficient data acquisition can cause. During the planning stage of the measurement, various aspects shall be considered, in particular:

— intended utilisation of the data;

— selection and number of sensors;

— measuring ranges and measuring intervals of the temperature and humidity measurement equipment;

— number of measuring points and their spatial distribution;

— selection of the transportation route and required measuring time;

— consideration and estimation of possible error sources.

4.3 Execution of measurement

Depending on the conceptual differences of the various means of transport, the measuring report of that particular means of transport shall be completed, as follows:

— road transport (Annex A);

— in-plant transport (including storage and handling) (Annex B);

— rail transport (Annex C);

— sea transport (Annex D);

— combined transport (Annex E);

— air transport (to be developed).

NOTE The measuring report is set up in the form of a questionnaire in order to achieve uninterrupted, uniform and comparable data.

Annex A
(normative)

Road transportation
(blank form of measuring report)

NOTE The user of this measuring report is given permission to copy this document.

A.1 Data acquisition

The following statements shall be completed as far as possible prior to or during the measurement. To capture the measuring data, automatic recording instruments (“Black Box”) should be used. These instruments can be mounted inside or outside the package in order not to obstruct the transportation or storage of the package.

A.2 General Information

A.2.1 Name and address of the institution performing the measurements

……

A.2.2 Name of the test manager and other persons present during the measurements

……

A.2.3 Date (beginning) and duration (end) of measurement

……

A.2.4 Test circuit (transportation route)

……

A.3 Data on transportation vehicle

A.3.1 Technical description of transportation vehicle

A.3.1.1 Vehicle category (e.g. commercial vehicle, general purpose goods vehicle, goods trailer, road train, articulated vehicle, refrigerated truck)

……

A.3.1.2 Vehicle manufacturer and type designation according to the manufacturer

……

A.3.1.3 Vehicle identification number

……

A.3.1.4 Vehicle registration number, country of origin

……

A.3.1.5 Manufacturer of: vehicle body, articulated vehicle, trailer

……

A.3.1.6 Vehicle dead weight

……

A.3.1.7 Permissible total vehicle weight

……

A.3.1.8 Permissible payload and payload-volume

……

A.3.1.9 Vehicle body design (e.g. cargo platform of metal/wood, tarpaulin, or for containers)

……

A.3.1.10 Vehicle particularities (e.g. refrigeration facilities, year of manufacture)

……

A.3.1.11 Further relevant information concerning the test vehicle

……

NOTE As a rule, the information can be gathered from the vehicle registration papers. It is advantageous to add photos of the vehicle to the measuring report.

A.3.2 Description of actual vehicle condition

A.3.2.1 Loading condition (e.g. packed/unpacked, stapled, palletised, cargo restraint with wood, flooring)

……..

A.3.2.2 Load (amount, description of it)

……..

A.3.2.3 Volume efficiency (in % of maximum permissible volume)

……..

A.3.2.4 Type and description of refrigeration system

……..

A.3.2.5 Date of last vehicle maintenance, in particular of the refrigeration system

……..

Changes of parameters (e.g. volume efficiency) during the test drive should be recorded if possible.

A.4 Measuring points and measuring equipment

A.4.1 Measuring points inside the vehicle

A.4.1.1 Location of the sensors (see Figure A.1)

The sensors should preferably be mounted in three planes in order to capture the temperature spatially. Furthermore, it is advantageous to mount the sensors in such a way that they do not obstruct loading and unloading. For that reason, the measurements should preferably be performed with automatic recording devices.

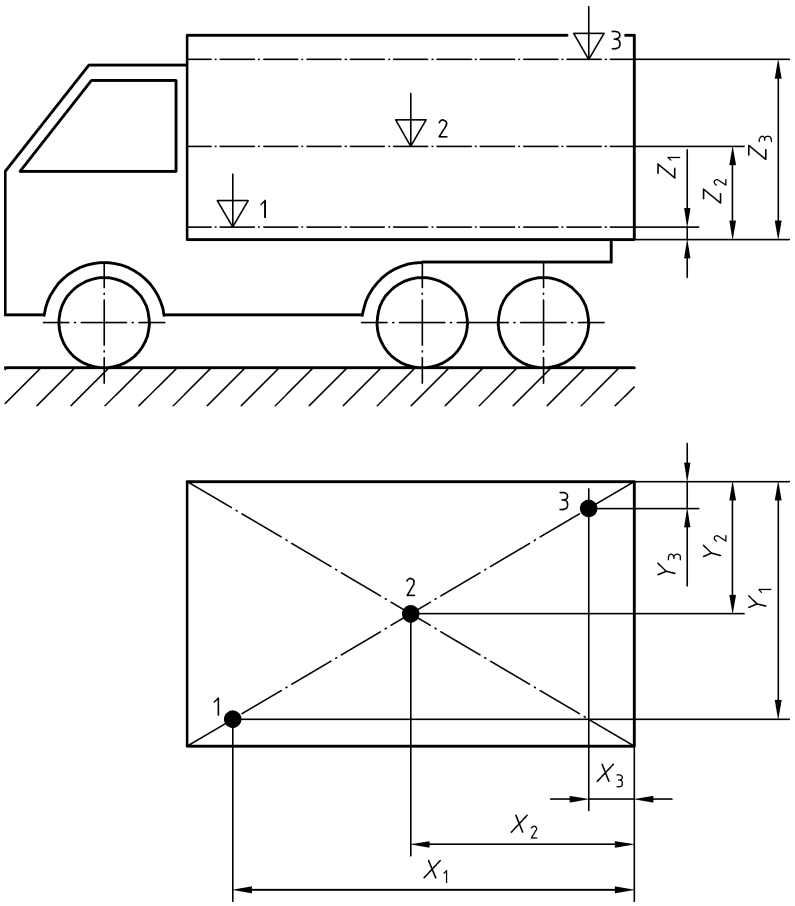

Figure A.1 — Location of the measuring points in the vehicle (example)

A.4.1.2 Method of mounting the sensors (e.g. freely suspended or screwed) (see Table A.1)

Table A.1 — Location of the measuring points in the vehicle (example – see Figure A.1)

Sensor number	Position			Method of mounting
	X mm	Y mm	Z mm	
1				
2				
3				

A.4.2 Measuring equipment

The expected level of temperature, humidity or other loads shall be estimated prior to the test.

The following particulars of the measuring equipment shall be recorded (see Table A.2).

Table A.2 — Information concerning the measuring equipment

	Number of sensor				
	1	**2**	**3**	**4**	**5**
Manufacturer of equipment					
Type, identification number					
Measuring range of relative humidity in %					
Uncertainty of humidity in %					
Temperature measuring range in °C					
Uncertainty of temperature in °C					
Date of last calibration, valid until……					
Sampling interval					

NOTE As a rule, the information required can be extracted from the technical data sheets of the instruments involved.

A.5 Performing the measurements

A.5.1 Transportation route

A.5.1.1 Description of the transportation route (course, length, perhaps sketch of route, geographical information, start of journey, destination – via)

…….

A.5.1.2 Total duration of transport, including downtime

……

A.5.2 Climatic conditions at the beginning and/or during the test drive

A.5.2.1 Air temperature outside of the vehicle in °C

……

A.5.2.2 Relative humidity outside of the vehicle in %

……

A.5.2.3 Climatic particularities (e.g. rain, snow etc.)

……

A.5.2.4 Intensity of solar irradiation (cloudless sky, cloudy, overcast)

……

NOTE The meteorological services can provide part of these data.

Annex B
(normative)

In-plant transportation (including storage and handling) (blank form of measuring report)

NOTE The user of this measuring report is given permission to copy this document.

B.1 Data acquisition

This measuring report shall be applied to acquire climatic and other loads during in-plant transportation, handling and storage on non-stationary points (e.g. means of transport) or stationary points (e.g. in buildings and on industrial properties).

To capture the measuring data, automatic recording instruments (“Black Box”) should be used. These instruments can be mounted inside or outside the package in order not to obstruct the transportation or storage of the package.

B.2 General Information

B.2.1 Name and address of the institution performing the measurements

……

B.2.2 Name of test manager and persons present during the measurement

……

B.2.3 Date (beginning) and duration (end) of measurement

……..

B.2.4 Transportation route (in-plant transportation route) or measuring location (storehouse)

……..

B.3 Data of the measuring environment

B.3.1 Technical description of the measuring environment

B.3.1.1 Type of measuring environment (e.g. warehouse, production line, open-air storage)

……..

B.3.1.2 Size of the facility or of the premises

Length……m, Width……m, Height……..m

B.3.1.3 Particularities of the measuring environment (e.g. glass roof, no windows, etc.)

……

B.3.2 Description of the actual condition of the measuring environment

B.3.2.1 Structural condition of the building (damaged roof, leaky windows)

……

B.3.2.2 Assignment (e.g. store room 50 % occupied)

……

B.4 Measuring points and measuring equipment

B.4.1 Measuring points on the means of transport (e.g. fork lift) inside the store house, open-air ground.

B.4.1.1 Location of sensors

The sensors shall be mounted in such a way, that each recorded measurement can be allocated unambiguously to that particular test object and can be reproducible (see Table B.1), e.g.:

— on the fork lifter;

— at the gate of the store house;

— in the store house on the shelf;

— on the outside of the store house (loading platform);

— below the ceiling of the store house;

— inside the cold store;

— ….

B.4.1.2 Method of mounting of the sensors (e.g. glued, screwed) (see Table B.1)

Table B.1 — Coordinates of the measuring sensors (example)

Sensor number	Description of position			Method of mounting
1				
2				
3				
…				

B.4.2 Measuring equipment

The expected level of temperature, humidity or other loads shall be estimated prior to the test.

The following particulars of the measuring equipment shall be recorded (see Table B.2).

Table B.2 — Information concerning the measuring equipment

	Number of sensor				
	1	**2**	**3**	**4**	**5**
Manufacturer of equipment					
Type, identification number					
Measuring range of relative humidity in %					
Uncertainty of humidity in %					
Temperature measuring range in °C					
Uncertainty of temperature in °C					
Date of last calibration, valid until……					
Sampling interval					

NOTE As a rule, the information required can be extracted from the technical data sheets of the instruments involved.

B.5 Performing the measurements

B.5.1 Description of the measuring environment

B.5.1.1 Description of the environment (e.g. measuring inside the building, or on the factory premises, or changing from one to the other)

……

……

B.5.1.2 Total time of in-plant transportation, including downtime, handling processes or storage

……

B.5.1.3 Total measuring time inside the premises

……

B.5.1.4 Measuring time in the open-air

……

B.5.1.5 Measuring interval

……

B.5.2 Climatic conditions during the measurements

B.5.2.1 Temperature in the room in °C

……

B.5.2.2 Outside temperature in °C

……

B.5.2.3 Relative humidity in the room in %

……

B.5.2.4 Relative humidity of the outside air in %

……

B.5.2.5 Climatic particularities (e.g. change from the deep freeze store to the commissioning area, strong wind when measuring in the open air)

……

B.5.2.6 Intensity of solar irradiation (cloudless sky, cloudy, overcast)

……..

NOTE The meteorological services can provide part of these data.

Annex C
(normative)

Rail transportation
(blank form of measuring report)

NOTE The user of this measuring report is given permission to copy this document.

C.1 Data acquisition

The following statements shall be completed as far as possible prior to or during the measurements. To capture the measuring data, automatic recording instruments (“Black Box”) should be used. These instruments can be mounted inside or outside the package in order not to obstruct the transportation or storage of the package.

C.2 General information

C.2.1 Name and address of the institution performing the measurements

……

C.2.2 Name of the test manager and persons present during the measurements

……

C.2.3 Date (beginning) and duration (end) of measurement

……

C.2.4 Test circuit (transportation route)

……

C.3 Data on transportation vehicle

C.3.1 Technical description of the freight wagon

C.3.1.1 Type of vehicle (e.g. open, covered, flat bed and tank wagon, carrier for containers, refrigerated wagon) and design type (standard or special)

……..

C.3.1.2 Railway wagon number

……..

C.3.1.3 Permissible pay load and payload-volume volume, in tons and m^3

……..

C.3.1.4 Vehicle body design (e.g. cargo platform of metal/wood, tarpaulin, posts, box car, container)

……..

C.3.1.5 Vehicle particularities (e.g. refrigerating unit)

……

C.3.1.6 Dimensional sketch of the cargo hold (see Figure C.1)

C.3.1.7 Other relevant information concerning the vehicle (if appropriate)

……

NOTE As a rule, the following information can be taken from the code of practice for rolling stock equipment.

C.3.2 Description of actual vehicle condition

C.3.2.1 Type of load (amount, description)

……

C.3.2.2 Packaging density of the payload on the cargo platform

……

C.3.2.3 Volume efficiency, in % of maximum permissible volume (change of volume efficiency during the test drive has to be recorded

……..

C.3.2.4 Date of last maintenance of the refrigerating plant

……..

C.4 Measuring points and measuring equipment

C.4.1 Mounting of the sensors on the vehicle

C.4.1.1 Location of the sensors (see Figure C.1)

The sensors should preferably be mounted in three planes in order to capture the temperature spatially. Furthermore, it is advantageous to mount the sensors in such a way that they do not obstruct loading and unloading. For that reason, the measurements should preferably be performed with automatic recording devices.

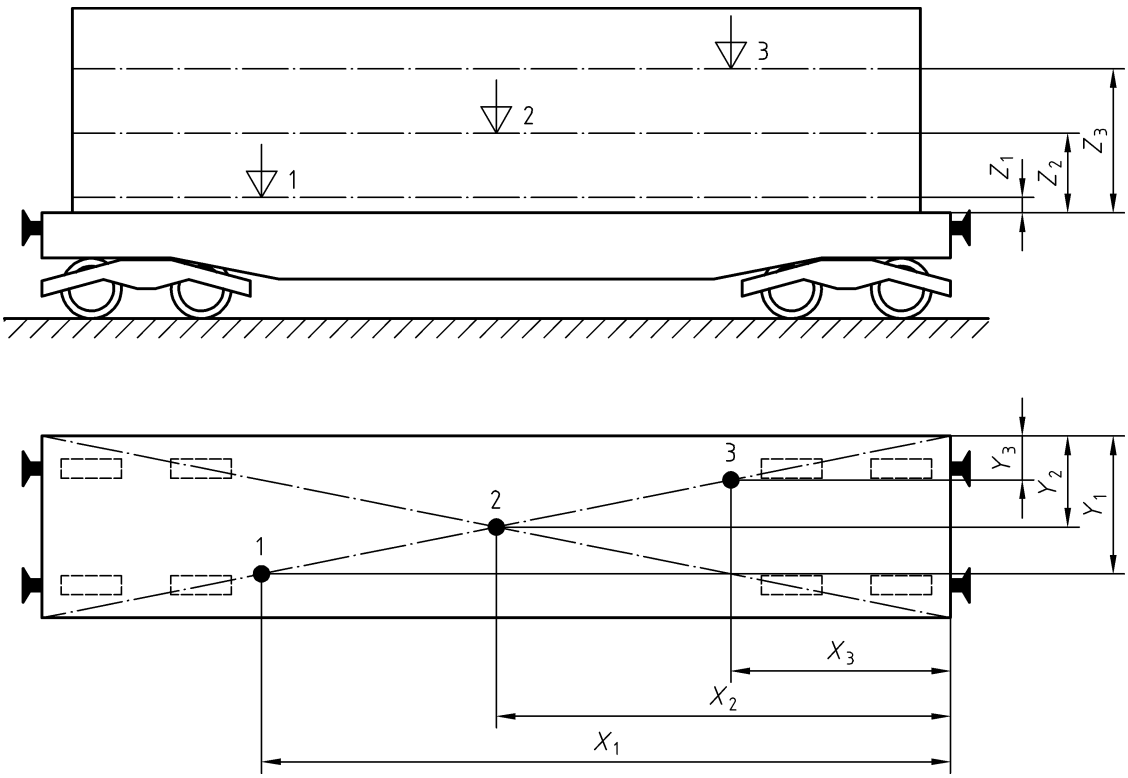

Figure C.1 — Measuring points on the vehicle (example)

C.4.1.2 Method of mounting the sensors (glued, screwed) (see Table C.1)

Table C.1 — Coordinates of the measuring sensors (example – see Figure C.1)

Sensor number	Description of position			Method of mounting
	X	Y	Z	
1				
2				
3				
…				

C.4.2 Measuring equipment

The expected level of temperature, humidity or other loads shall be estimated prior to the test.

The following particulars of the measuring equipment shall be recorded (see Table C.2).

Table C.2 — Information concerning the measuring equipment

	Number of sensor				
	1	**2**	**3**	**4**	**5**
Manufacturer of equipment					
Type, identification number					
Measuring range of relative humidity in %					
Uncertainty of humidity in %					
Temperature measuring range in °C					
Uncertainty of temperature in °C					
Date of last calibration, valid until……					
Sampling interval					

NOTE As a rule, the piece of information required can be extracted from the technical data sheets of the instruments involved.

C.5 Performing the measurements

C.5.1 Transportation route

C.5.1.1 Description of the transportation route (course, length, perhaps sketch of route, geographical information, start of journey, destination – via)

……

C.5.1.2 Total duration of transport, including downtime

……

C.5.1.3 Measuring interval

……..

C.5.2 Climatic conditions at beginning and / or during the test drive

C.5.2.1 Air temperature outside of the vehicle in °C

……

C.5.2.2 Relative humidity outside of the vehicle in %

……

C.5.2.3 Climatic particularities (e.g. rain, snow etc.)

……

C.5.2.4 Intensity of solar irradiation (cloudless sky, cloudy, overcast)

……

NOTE The meteorological services can provide part of these data.

Annex D
(normative)

Sea transportation
(blank form of measuring report)

NOTE The user of this measuring report is given permission to copy this document.

D.1 Data acquisition

This measuring report can be applied to capture climatic and other loads on ships transporting bulk goods, containers and vehicles.

To capture the measuring data, automatic recording instruments (“Black Box”) should be used. These instruments can be mounted inside or outside the package in order not to obstruct the transportation or storage of the package.

D.2 General information

D.2.1 Name and address of the institution performing the measurements

……

D.2.2 Name of the test manager and persons present during the measurements

……

D.2.3 Date (beginning) and duration (end) of measurement

……

D.2.4 Test circuit (transportation route)

……

D.3 Data of the ship

D.3.1 Technical description of the ship

D.3.1.1 Ship category (e.g. container ship, tanker ship, bulk carrier, ferry)

……..

D.3.1.2 Shipyard and type designation according to the producer

……..

D.3.1.3 Name of the ship and shipping company/charterer

……..

D.3.1.4 Land of accreditation (flag) and home port

……..

D.3.1.5 Year of construction

……

D.3.1.6 Size of ship

Length……m, Width……..m, Draught……m

……

D.3.1.7 Load capacity

Net registered tonnage (NRT)…….. Gross tonnage (BT)……

Storing space capacity (SSC) .....

NOTE The amount of storing space is given as a multiple of 20-foot containers. A 20-foot container equals 1 TEU (Twenty-Foot Equivalent Unit).

……

D.3.1.8 Particularities of the ship

……

NOTE As a rule the shipping company provides these data (shipping company/charterer). A layout showing a longitudinal and cross section of the ship could be very helpful.

D.3.2 Description of the actual condition of the ship

D.3.2.1 Loading condition e.g. packed/unpacked, stapled, palletised cargo restraint with wood, flooring)

……

D.3.2.2 Load (amount, description)

……

D.3.2.3 Volume efficiency, in % of maximum permissible volume (change of volume efficiency during the trip has to be recorded)

……..

D.3.2.4 Type and description of refrigerating system

……

D.3.2.5 Date of last maintenance of the refrigerating plant

……..

D.4 Measuring points and measuring equipment

D.4.1 Measuring points on the ship

D.4.1.1 Location of the sensors

Location of the sensors could be:

— Below deck/ above deck;

— In the cargo hold/in the container;

— Directly exposed to the sun;

— ……..

The sensors should preferably be mounted in three planes in order to capture the temperature spatially. Furthermore, it is advantageous to mount the sensors in such a way that they do not obstruct loading and unloading. The data acquisition should preferably be performed with automatic recording devices.

NOTE It is advantageous to add photos to the measuring report, showing the location of the measuring points with respect to the near environment

D.4.1.2 Method of mounting the sensors (glued, screwed) (see Table D.1)

Table D.1 — Coordinates of the sensors (example)

Sensor number	Description of position			Method of mounting
1				
2				
3				
…				

D.4.2 Measuring equipment

The expected level of temperature, humidity or other loads shall be estimated prior to the test.

The following particulars of the measuring equipment shall be recorded (see Table D.2).

Table D.2 — Information concerning the measuring equipment

	Number of sensor				
	1	**2**	**3**	**4**	**5**
Manufacturer of equipment					
Type, identification number					
Measuring range of relative humidity in %					
Uncertainty of humidity in %					
Temperature measuring range in °C					
Uncertainty of temperature in °C					
Date of last calibration, valid until…….					
Sampling interval					

NOTE As a rule, the pieces of information required can be extracted from the technical data sheets of the instruments involved.

D.5 Performing of measurements

D.5.1 Transportation route

D.5.1.1 Description of the transportation route (course, length, perhaps sketch of route, geographical information, start of journey, destination – via)

……..

D.5.1.2 Total duration of transport, including downtime

……

D.5.2 Climatic conditions during the test drive

D.5.2.1 Air temperature outside of the ship (above deck) in °C

……

D.5.2.2 Relative humidity outside the ship (above deck) in %

……

D.5.2.3 Air temperature within the ship (below deck) in °C

……...

D.5.2.4 Relative humidity within the ship (below deck) in %

……

D.5.2.5 Climatic particularities (e.g. rain, snow, heavy sea)

……

D.5.2.6 Intensity of solar irradiation (cloudless sky, cloudy, overcast)

……

NOTE The meteorological services can provide part of these data.

Annex E
(normative)

Combined transportation

E.1 Transport incidents during combined transportation

Transport incidents during combined transports can be classified principally into the following events:

— means of transport on means of transport (e.g. truck on train, truck on ferry);

— semi-trailer during combined transport (e.g. semi-trailer with separate support or supporting wheels in the saddle area);

— container (swap container), e.g. on truck, on wagon, during handling, in air transport;

— further combinations (also in view of novel technologies in combined transports).

E.2 Climatic measurements in combined transports

In combined transports, the transported goods and the means of transport (e.g. container) are interlinked in such a way, that the environmental conditions of each single means of transport possibly superimpose on each other (e.g. truck loading onto train or onto ferry), thereby requiring an extension of the measuring task.

For the accomplishment of climatic measurements, the measuring reports of the particular means of transport therefore have to be combined in a traceable and justified form.

EXAMPLE If a truck is loaded onto a low-floor train, the measuring report “Road Transportation” (Annex A) as well as the measuring report “Rail Transportation” (Annex C) have to be considered and to be filled in complementarily.

When handling, storage, and in-plant transportation of goods have to be considered, the measuring report “In-Plant Transportation” (Annex B) has to be used as well.

E.3 Basic rules for the selection of measuring reports

In combined traffic, climatic loads could appear in an unforeseen variety. The measuring reports have to be adapted to these events. As a first choice, one shall choose the measuring report of the means of transport which proportionally dominates the transportation scenery.

EXAMPLE If a truck is transported on a ferry, and the measurements start at the port of embarkation and ends at the target harbour, the measuring report “Sea Transportation” shall be used, supplemented with specific requirements of the measuring report “Road Transportation”.

When performing a road transport across Europe, which also includes a ferry transport, the measuring report “Road Transportation” is to be applied, and correspondingly combined with the particularities of a ship transport, by using the measuring report “Sea Transportation".

The rule is that for a combined transport the measuring reports of the individual means of transport shall be combined to a total measuring report. Principally the rule applies in a case-specific and plausible form.

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