EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15946

August 2011

ICS 55.040; 97.195

English Version

Conservation of cultural property - Packing principles for transport

Conservation des biens culturels - Principes d'emballage pour le transport

Erhaltung des kulturellen Erbes - Verpackungsverfahren für den Transport

This European Standard was approved by CEN on 29 July 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 15946:2011: E

Contents

Page

Foreword

This document (EN 15946:2011) has been prepared by Technical Committee CEN/TC 346 “Conservation of cultural property”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard provides recommendations (the word should is used) and lists requirements (the word shall is used) for safe and secure packing of cultural property for transport.

It is intended for individuals or organizations involved in the preservation of cultural property in order to reduce the risk of damage.

The standard proposes a common terminology and procedures for packing.

The appropriate range of knowledge, skills and competencies is required by every party involved with packing cultural property for transport.

1 Scope

This European Standard specifies the packing process for objects considered by the owner/custodian as ready to be moved.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15898:2011, *Conservation of cultural property — Main general terms and definitions*

EN ISO 780, *Packaging — Pictorial marking for handling of goods (ISO 780:1997)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15898:2011 and the following apply.

3.1
accompanying condition report
document recording the present state of an object and of any changes during transit

3.2
accompanying documents
set of documents accompanying cultural property during its transport

3.3
consignee
person or organization to whom the shipment of cultural property is to be delivered

NOTE The last consignee is called final consignee.

3.4
courier
person authorized by the owner/custodian and with adequate training/experience to escort shipment of cultural property from the collecting point to the final consignee

3.5
crate
rigid box, case or container forming an outside layer of packaging for an object

3.6
cushioning
material or devices incorporated in a packaging system in order to maintain the physical integrity of cultural property

NOTE Adapted from EN 14182:2002.

3.7
custodian
person or organization to whom possession of the cultural property has been granted by the owner

3.8
facility report
document giving information about the premises, its physical, technical, environmental and security specifications

3.9
owner
person or organization who has legal title of ownership

3.10
packaging
materials or constructions used for packing of cultural property

3.11
packing list
list of the packages in a single consignment attached to the shipping, delivery and receipt notes

3.12
representative
any person acting through delegated authority on behalf of the owner or custodian of cultural property

3.13
site visit
technical survey of an object and its placement prior to its packing and transport

4 Symbols and abbreviated terms

CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora.

5 Before packing

5.1 Risk assessment

5.1.1 General principles

Packing, materials and the type of transport shall be selected according to a risk assessment. All parties involved should share the relevant information.

It should result from a mutual agreement.

The final decision shall be taken by the owner/custodian.

Some packing solutions according to risk are proposed in Annex A. To make a risk assessment, the following considerations shall be made: the object itself, the number, size and weight of all objects in the consignment and everything related to their moving.

5.1.2 Risks related to the object

Risks directly related to the object depend on its nature, manufacturing technique, its condition, any previous intervention and environmental conditions.

The object should be examined by a conservator-restorer in order to contribute to the decision making process to move the object and to indicate any area of fragility and vulnerability of the object. Recommendations for preventive conservation, display (mounting, frame, base, etc.), conservation-restoration, as well as handling, packing and transportation should be given.

5.1.3 Risks related to moving cultural property

Several factors shall be taken into account when selecting packaging:

a) international working conditions and regulations, security risks;

b) the availability of professional packing and transport companies experienced in handling cultural property;

c) situation and accessibility at the points of collection and delivery (access routes, type of pathway, floor; goods lift, elevator; lighting; security, etc.); refer to the final consignee's facility report;

d) handling (manual or mechanical);

e) means of transport (by truck, plane, ship or train; exclusive or consolidated transport; hand carried or freight; direct trip or not; transport with or without transhipment);

f) logistics, total journey time and any overnight stops;

g) physical environment during transport (state of roads, weather, etc.);

h) presence of a courier or not.

5.1.4 Information on moving the object to be communicated to the packer/transporter

The request for service should arrive in a range of 2 to 4 months before the planned date for packing, according to the size and complexity of that service, and shall provide the following information for each object:

a) purpose of transport;

b) identity of the owner/custodian (name, status, contact details);

c) date(s), name(s) and precise address(es) (number and name of the street, number or name of the building, city, state or department, country) of the collecting point, of the delivery location and of the return location, if it differs from the collecting point;

d) details of the collecting point, the delivery location and the return location, if necessary (floor, goods lift, access, etc.);

e) name of the author/creator of the object, if known;

f) title or name of the object;

g) inventory number or any identifying number;

h) date of creation of the object, if known;

i) nature of the object (techniques, materials);

j) dimensions (height, length, depth, diameter) and weight of the object, with and without frame, base or mounting; for an installation or multi-part object, give the dimensions and weight of each part and number of parts;

k) special conditions under which the object is kept or transported, if any (environment, security, hazards, legal requirements or permissions, for example);

l) colour photographs, if necessary;

m) insurance value of the object, if necessary;

n) insurance arranged by;

o) period covered by the insurance;

p) customs status of the object, at the collecting point, if any;

q) export licence and CITES certificates, if any;

r) requirements of the owner/custodian (presence of courier(s), type of packaging and transport).

Confidentiality of information shall be taken into account.

An example of a form completed by the owner/custodian and the final consignee with information for the packer/transporter is given in Annex B. This form may be of any type (e.g. spreadsheet).

5.1.5 Site visit

Before packing, in order to measure the object and to evaluate its condition and the risks of transport, a site visit should be made by the packer/transporter.

For this site visit, the packer or transport company shall have access to the object and meet a representative of the owner/custodian who has full knowledge of the object's file. A conservator-restorer should be present on site during this visit.

Following this visit, suggestions may be made by the packer/transporter and conservator-restorer, to be agreed by the owner/custodian. It may also be necessary to visit the delivery location.

5.2 Choice of packaging

5.2.1 General principles

Packaging shall provide appropriate protection to the object, in accordance with the risk assessment. It should comprise material in contact with the object which shall not abrade or otherwise harm, cushioning, and protection against shocks, vibrations and changes in environmental conditions.

Packaging shall maintain all its protective properties during use. It shall be taken into account that packaging is designed for transport purposes and therefore not necessarily suitable to be used for permanent storage.

If monitoring devices and control indicators accompany the object, packaging shall include provision for them.

Packaging shall be designed to facilitate manual or mechanical handling and should be free standing. Dimensions shall be adapted to those of the object and take into account the constraints of the selected means of transport (truck, plane, etc.). External dimensions shall be compatible with the narrowest point to be passed during the object's journey. Small objects should be packed together if they are compatible and going to the same destination.

Wherever possible, sustainability should be kept in mind when choosing materials to be employed and means of transport.

5.2.2 Surface protection

The surface protection for the object should mainly protect the object from deposits and abrasion. It shall be chemically as inert as possible.

In some cases, the surface of the object shall not be in direct contact with any packaging to avoid damage.

5.2.3 Cushioning

Cushioning is selected for its capacity to absorb shocks and vibrations.

The type, density, thickness, quantity and position of cushioning shall be selected according to means of transport and its physical environment, weight of object, weight of packaging, surface of the object in contact with the cushioning and vulnerability of the object.

Cushioning material should be such that it does not remain distorted upon impact.

5.2.4 External protection

Material for external protection should be rigid in order to protect the object from impact.

It shall protect the object from water under normal conditions.

Insulation materials should limit variations in humidity and temperature during transport.

5.3 Accompanying condition report

To record any possible changes to the object, an accompanying condition report with images shall be prepared and signed by the representative of the owner/custodian of the object. It shall be performed by a conservator-restorer or a representative of the owner/custodian.

The purpose of this accompanying condition report is to describe the specific object and to list any changes occurring as a result of this particular transaction.

The accompanying condition report shall be completed at the collecting point before packing; it shall form part of the file created for this particular transaction and shall accompany the object throughout.

The owner/custodian shall be notified immediately if any changes occur to the object. It is one of the reference documents that can be used in case of a claim.

The accompanying condition report shall be checked, annotated and countersigned by the courier, if there is one, and by a representative of the consignee, at each stage. Final check shall be performed on receipt of the object at the final destination by the owner/custodian together with the last courier if there is one.

The condition check shall be carried out in a clean and safe place. The examination shall be performed under “daylight” quality lighting. If specific conditions of examination are necessary in order to view particular characteristics, these requirements shall be noted on the accompanying condition report so that the inspection will be made under similar conditions.

The terminology used in the accompanying condition report shall be precise and unequivocal. The authors of the accompanying condition report should be able to check against a pre-established list with a defined glossary.

The accompanying condition report should contain the following information:

a) information related to the object:

   1) title or name of the object;

   2) name of the author/creator of the object, if known;

   3) inventory number or any number allowing identification of the object;

   4) dimensions and weight of the object;

5) materials;

6) techniques of making;

7) number of constituent parts;

8) environmental conditions under which the object is usually kept;

b) information relating to movement of the object:

1) name of the collection site;

2) name of the place(s) of reception;

3) name of the return location, if it differs from the collecting point;

4) dates of the exhibitions or events;

c) record of changes of the object:

1) general condition of the object. Information on the condition shall contribute to assessment of the risks which the object could meet during movement: vulnerability, description and location of fragile areas and/or their history to be checked at any stage of the movement;

2) structural condition of the object (cohesion, construction, former interventions, etc.);

3) surface condition of the object;

4) condition of the mounting/frame/base;

5) dated images with inventory number or any identification number of the object;

6) images that document any changes;

7) any unusual event that may cause change to the object;

d) requirements for:

1) handling;

2) assembly and installation of the object;

3) environmental conditions, if necessary;

4) type and description of the packaging and recommendations for its storage;

5) unpacking;

e) dates and signatures:

1) before packing: date on which the accompanying condition report is created; name and position of the writer of the report;

2) at each stage of the movement of the object: date on which the accompanying condition report is checked; name and position of the various signatories of the accompanying condition report.

6 Packing

6.1 General principles

Packing shall be performed in the presence and under the supervision of a representative of the owner/custodian. It should take place immediately after the accompanying condition report and should be undertaken by an adequate number of trained, specialized staff, informed about the project. It shall be carried out in a sequence according to an agreed previously determined methodology. If there is a courier he/she shall be present during packing.

Packing should be undertaken in a safe, secure, clean, well-lit place whose environmental conditions are similar to those of the collecting point. If not, the packaging shall be acclimatized before.

The place where packing is performed shall be spacious enough to allow safe handling of the object, the packaging and of the appropriate equipment, if necessary.

Packing and handling shall be undertaken according to the risk assessment and any changes shall be made only with the agreement of the owner/custodian.

Objects should only be handled or moved when strictly necessary.

6.2 Preparation of packing

Before handling or moving an object each step of the process shall be planned in advance and communicated to all involved. A methodology should be determined.

Before starting packing, the following arrangements shall be made:

a) deliver and open the empty packaging at the collecting point at least 24 h before packing, unless it is decided by the owner/custodian;

b) check the packaging and its condition;

c) check the dimensions of the packaging in relation to those of the object;

d) clear the routes before moving the object;

e) check the state of the object against the accompanying condition report.

6.3 Handling

Handling shall be done according to the recommendations following the risk assessment.

Only qualified staff shall use mechanical equipment.

Appropriate clothing shall be worn; accessories and tools that may damage the objects shall be removed.

For the security of the objects, appropriate protection, as gloves (see Annex C) shall be used when coming in direct contact with the object.

Staff shall be protected from hazards.

6.4 Packing process

6.4.1 How objects are placed in the packaging

Objects shall be secured inside the crate according to their characteristics and the risk assessment.

Cushioning shall enclose and support the object but shall never compress it.

Appropriate support should be provided for heavy parts of the object.

Marking should be made inside the crate and the cushioning to facilitate packing, unpacking and repacking.

6.4.2 Accompanying documents

The documents which should accompany the object or group of objects during movement are:

a) original document of the accompanying condition report, created upon departure from the collection location. It shall be checked and annotated at each stage of the journey;

b) packing list;

c) exit permit i.e. document issued by the legal authority of the export of object(s), if any;

d) customs declaration, if any.

A copy of all documents including updated annotations which constitute the travel file shall be kept by the owner/custodian. The owner/custodian shall be notified immediately if any changes occur to the object.

Confidentiality of information shall be taken into account.

If necessary, specific instructions for unpacking should be included.

6.5 External marking

Marking shall be done without compromising the security of the object and the security of the transport.

Marking shall be done according to EN ISO 780, with durable materials.

Any mandatory legal marking shall be present on the packaging.

Packed crates should be clearly marked as ‘packed’ or ‘full’. Unpacked crates should be clearly marked as ‘unpacked’ or ’empty’.

7 Unloading and reception

Unloading and reception shall be planned in advance. The appropriate human resources and equipment shall be available.

On receipt of the packaging, each item shall be identified against the packing list.

Before storing the packaging for acclimatization, the exterior should be checked to identify any damage or irregularities on the packaging itself which occurred during transport or to the external control indicators. All modifications or irregularities observed shall be documented immediately on the proper document (delivery receipt, accompanying condition report, etc.).

If infestation is suspected or detected, the shipment shall be isolated and the owner/custodian shall be notified immediately.

8 Unpacking

8.1 General principles

Unpacking shall be performed under the supervision of the consignee and, if required, by a representative of the owner/custodian, preferably a conservator-restorer. It shall be done by an adequate number of trained, specialist staff, informed about the project and undertaken in a sequence according to an agreed previously determined methodology. Unpacking shall be undertaken in a safe, secure, clean, well-lit place whose environmental conditions are similar to those of the destination of the object, according to the requirements given by the owner/custodian.

8.2 Preparation for unpacking

Before unpacking, a space shall be identified where the objects can be placed for checking.

The place where unpacking is performed shall be spacious enough to allow safe handling of the object, the packaging and of the appropriate equipment, if necessary.

Before opening the packaging, it should be allowed to acclimatize to the conditions of the place of destination for as long as specified by the owner/custodian, preferably advised by a conservator-restorer.

Check if suitable equipment and/or human resources are available and adapted for heavy objects or for objects that need special handling.

8.3 Unpacking

Unpacking instructions given by the owner/custodian or by his representative shall be followed.

Documentation may be added regarding the unpacking sequence, the method of packing and the orientation of the object in order to facilitate repacking.

The content of the packaging shall be checked against the list of objects and/or constitutive items.

After removing the objects, a check shall be carried out to see that there are no pieces left in the packaging.

In case of suspicion of infestation the packaging and its whole content shall be isolated and the owner/custodian shall be notified immediately.

Immediately after unpacking, the condition of the objects shall be checked and documented by a representative of the consignee and, if available, a representative of the owner/custodian. One of them should be conservator-restorer.

If the packing method is considered unsuitable for the object or the journey the packing method shall be revised. The final decision shall be taken by the owner/custodian.

8.4 Storing packaging

Unless specified, all original packaging should be kept together. If there is a crate, packaging shall be placed inside.

The crate internal fittings shall not be removed.

Empty packaging to be reused for repacking should be stored in a clean, secure storage area, preferably in conditions (temperature and relative humidity) as similar as possible to those in the area where objects are collected. If this is not possible, these materials should be acclimatized to those conditions prior to repacking until they are in equilibrium with the objects.

Packaging shall be labelled for identification and to indicate if they are full or empty.

9 Repacking

All specifications applying to packing also apply to repacking.

Immediately before repacking, the condition of the objects shall be checked and documented by a representative of the consignee and, if required by the owner/custodian, a representative of the owner/custodian. One of them should be a conservator-restorer.

Repacking shall be performed under the supervision of the consignee and, if required, by the owner/custodian or his representative. It shall be done by an adequate number of trained, specialized staff, informed about the project, to be carried out in a sequence according to an agreed previously determined methodology.

Repacking shall be undertaken in a safe, secure, clean, well-lit place whose environmental conditions are similar to those under which the object has been kept.

Repacking with original materials may only take place if there have been no changes to the object, to the packaging or to the result of the risk assessment. If one of those factors has changed, the packing method shall be re-evaluated.

If the packaging has deteriorated during its first use, it shall be replaced by identical or equivalent materials.

Annex A
(informative)

Packing solutions according to risks

Various categories of risk associated with the entire transportation process are identified in Table A.1. Risk categories are ranked by frequency of occurrence.

Table A.1 — Packing solutions according to risk

Risk categories	Identified causes	Packing solution
1. Physical forces	object (i.e. the intrinsic fragility of the considered object) shocks and vibrations liable to occur during the transportation or handling process (i.e. risk associated with the mode of transportation and with the type of packaging: e.g. size, weight) risk of distortion on the object risk of toppling	use of protective materials for the surface, adapted to the nature of the object use of protective materials against piercing and penetration use of absorbing materials against shock, acceleration and vibration use of appropriate packaging (e.g. double crates) and assembly use of appropriate handling
2. Inappropriate temperature levels	variations or incorrect values in temperature	thermal insulation (including an initial period of acclimatization before the packaging is opened) protection of the object's direct perimeter or surroundings
3. Inappropriate level of relative humidity	variations in temperature, relative humidity or atmospheric pressure incorrect values in relative humidity	use of vapour barrier use of buffering materials acclimatization before opening the packaging
4. Separation of the various parts that constitute the object	incomplete packing list absence of marking of the various parts absence or inadequacy of installation and deinstallation procedures	marking of the various parts of the object, or of the packaging when parts cannot be marked directly installation and deinstallation procedures packing list

Table A.1 — Packing solutions according to risk *(continued)*

Risk categories	Identified causes	Packing solution
5. Pollution	emission of noxious substance(s) by inappropriate packaging or mounting or frame or base materials or from the object itself, direct contact with the object during handling (i.e. contact with skin, use of gloves inadequate to the nature of the object)	isolate the concerned item generating vapours use of appropriate materials (i.e. not generating vapours, dust, etc.) use of anti-steam film wear gloves adapted to the nature of the object
6. Water and other liquids	precipitation, rain flooding pipe breakage	application of an external waterproof film (e.g. plastic film, paint) raise the packaging from the ground (by using pallets, shelves, “skids”, battens, etc.)
7. Infestation	infestation of the object already existent upon departure infestation of the environment of the object infestation of the packaging	isolate the object or packaging disinfection of the object disinfection of the premises or storage area, the packaging use of specially treated materials, certified
8. Theft and vandalism	lack of supervision in transit unsuitable packaging	absence of indication on the packaging of the owner/ custodian, the final consignee of the object, or of the nature of the contained object avoid using over-small packaging multiple screw system with washers is preferred to clip system security seals may be used

Annex B
(informative)

Example of form for the information to be communicated to the packer/transporter

1 INFORMATION ON THE OWNER/CUSTODIAN

Status of the owner/custodian:

museum

gallery

private

other specify :

Name of the owner/custodian :

Contact: last name: first name:

tel: fax:

Email:

2 DATES AND LOCATION FOR COLLECTING, DELIVERY, RETURN

Date of collection at the owner/custodian's : YYYYMMDD

Name of the collecting point :

Address:

number and name of the street :
number and name of the building :
city : state or department : country :

Date of delivery : YYYYMMDD

Name of the delivery location :

Address:

number and name of the street :
number and name of the building :
city : state or department : country :

Date of collection at the final consignee's : YYYYMMDD

Date of return at the owner/custodian's : YYYYMMDD

Name of the return location (if different from the collecting point):

Address (if different from the collecting point):

number and name of the street :
number and name of the building :
city : state or department : country :

Characteristics of the collecting point :

access path: height : width : type of floor:
level: goods lift : yes no

Characteristics of the delivery location :

access path: height: width: type of floor:
level: goods lift: yes no

Characteristics of the return location (if different from the collecting point) :

access path: height: width: type of floor:
level: goods lift: yes no

3 INFORMATION ON THE OBJECT TO BE PACKED

Name of the author/creator of the object (if it is known) :

Title or name of the object :

Date of creation of the object (if it is known) :

Nature of the object :

techniques :

materials :

special legal requirements and permissions :

Inventory number or any number for identification :

Colour photographs of the object, if necessary :

Insurance arranged by: owner/custodian recipient transport company

Name of broker / insurance company, if known:

Governmental indemnity:

Insurance value, if necessary :

Period covered by the insurance :

Customs status of the object, at the collecting point :

Dimensions of the object with frame with base with mounting

height:	height:	
length:	length:	
depth/thickness:	depth/thickness:	
diameter:	diameter:	
weight:	weight:	

(for an installation or multi-part-object, give the dimensions of each part and number of parts)

Access to the object if it presents particular difficulties :

Special conditions under which the object is kept, if necessary:

environment:

security:

hazards:

others:

4 REQUIREMENTS OF THE OWNER/CUSTODIAN

Type of packaging:

Type of transport: by truck by plane by boat

Presence of courier: yes no

If yes, how many :

Annex C
(informative)

Different types of gloves for the handling of various types of objects

C.1 General principles for the selection of gloves

Gloves should be worn to handle objects for protection against chemical action from skin secretions and, in some cases, for the user's protection against the object's degradation chemicals.

Gloves should be clean, changed regularly and fit the user's hand size.

Hands should be washed and rinsed before changing gloves.

Gloves containing chlorinated compounds such as polychloroprene should not be used.

Gloves should be washed and rinsed carefully (after washing they could contain detergent residue). Otherwise, single-use gloves could be an alternative.

There is a large choice of quality gloves with many different shapes available on the market. It is recommended to refer to the information supplied by the manufacturers when choosing gloves.

The information supplied by the manufacturers should be analysed according to the criteria which are defined in C.2 in order to evaluate the type of gloves appropriate for the object (see Table C.1).

C.2 Criteria for the choice of gloves

C.2.1 Reference to statutory requirements relative to the use of gloves

When handling objects, gloves manufactured specifically for the following uses should be used:

a) personal protective equipment

The following information should be found in the manufacturer's instructions:

— the principal of protective gloves, according to EN 420 which defines general requirements and test methods for glove design and construction, resistance of glove materials to water penetration, innocuousness, comfort, efficiency and marking;

— protection against mechanical risks, according to EN 388 which defines four levels of performance for abrasion, blade cut, tear and puncture resistance to be indicated in association with the pictogram in Figure C.1 in the marking CE on the product or an associated support;

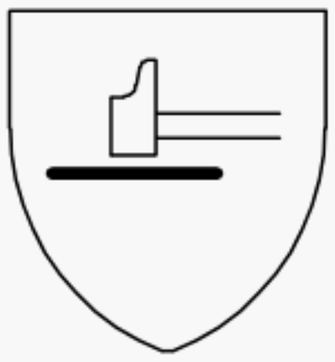

Figure C.1 — "Mechanical risks" pictogram (EN 388)

b) food contact

The pictogram in Figure C.2 should be found in the manufacturer's information;

Figure C.2 — "Food contact" pictogram

c) medical use

Concerns medical gloves for single use as defined in EN 455-3.

C.2.2 Absence of products intended to improve contact with the skin

The gloves' interior should be exempt from powdery material and cream that can transmit residue during their removal or following puncture.

C.2.3 Impermeability

The handling of certain types of objects requires wearing gloves which exclude exchanges between the skin and the object surface.

EXAMPLE 1 Natural history specimens have often been treated in the past with arsenic or pesticides such as the DDT.

EXAMPLE 2 Chemical degradation on copper objects can occur when the copper is in contact with skin secretions through some types of gloves.

C.2.4 Safe handling

Gloves should ensure a secure grip on the object. This can be achieved by a moulded relief or a textured finish.

The use of gloves with rubber dots is a potential danger for some objects.

C.2.5 Solidity

Gloves should be tear, puncture and cut resistant. Solidity is an important criterion for the handling of heavy and/or large objects.

C.2.6 Thinness

The thinness of gloves is a requirement for handling small or very fragile objects.

C.2.7 Flexibility and comfort

These are important criteria for handling delicate and fragile objects.

Table C.1 — Recommendations for the use of gloves for handling objects

Material or type of surface[a]	Types of gloves									
	Bare hands	Non-fluffy cotton[b]	Natural latex[d]	Leather[e]	Polyamide[f]	Polyethylene[g]	Vinyl[h]	Nitrile rubber[i]	Gloves with rubber nubs	Thin structured surface gloves
Metals: iron, copper, brass, silver, etc.	N	Y	Y	Y	Y	Y	Y	I	N	Y
Metals: lead, tin	N	N	N	Y	N	N	N	Y	N	Y
Metals: gold, gilded surfaces	N	N	Y	N	N	N	Y	Y	N	N
Stone: limestone, diorite, granite, marble, etc.	I	Y	Y	Y	Y	Y	Y	Y	I	Y
Inorganic materials with fragile surface: alabaster, plaster, raw clay, etc.	N	Y	Y	Y	N	N	Y	Y	N	I
Ceramic, glass	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
Untreated wood	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wood with finishes	N	N	Y	N	N	N	Y	Y	N	N

Table C.1 — Recommendations for the use of gloves for handling objects *(continued)*

Material or type of surface [a]	Types of gloves									
	Bare hands	Non-fluffy cotton [c]	Natural latex [d]	Leather [e]	Polyamide [f]	Polyethylene [g]	Vinyl [h]	Nitrile rubber [i]	Gloves with rubber nubs	Thin structured surface gloves
Wax, plasticine, etc.	N	N	Y	N	N	N	Y	Y	N	N
Natural history specimen	N	N	N	N	N	N	N	Y	N	N
Horn, teeth, ivory, bone	I	Y	Y	I	N	N	Y	Y	N	Y
Works on paper	I	Y	Y	N	N	N	Y	Y	N	N
Photographs	N	Y	Y	N	N	N	Y	N	N	N
Textiles	I	I	Y	N	N	N	Y	Y	N	N
Cellulose nitrate	N	N	N	N	N	N	N	Y	N	N
Synthetic polymers: acrylic, polyester, etc.	I	Y	Y	N	N	I	Y	Y	N	I
Paint layers	N	I	Y	N	N	N	Y	Y	N	N
Composite objects, ethnographic objects	I	I	I	I	I	I	I	I	I	I
Other media [b] (video, DVD, CD, etc.)	I	Y	Y	N	I	I	Y	I	I	I

Key

Y = yes

N = no

I = individually, i.e. case by case, according to the situation

NOTE 1 The choice of gloves adapted for the handling of very small objects, large and/or heavy objects is made on a case-by-case basis.

NOTE 2 Natural rubber, neoprene, butylic rubber, polyvinyl acetate, and/or polytetrafluoroethylene (PTFE) gloves are not currently used for handling art objects.

[a] For frames refer to the concerned surface.

[b] These objects are made of a variety of different materials. Most of them are handled in boxes.

[c] Cotton gloves can be abrasive when handling very fragile textiles, gold or gilded and metallic surfaces. They should not be used when handling surfaces that are rough and textured where the fibres could catch on the surface of the object. They should not be used when handling wax or plasticine objects. The use of cotton gloves should be avoided when handling heavy and/or large objects.

[d] Natural latex gloves offer a better tear resistance but a limited puncture resistance. They offer the best flexibility and good tactile sensitivity but can cause allergies.

[e] Thick leather gloves lack flexibility but offer a good grip for very heavy objects.

[f] Polyamide gloves are not always flexible. When they are fine, seam-free with a polyurethane coating, they offer a good grip for heavy objects. They are waterproof and relatively flexible.

[g] Even when they are thin, polyethylene gloves generally lack flexibility and form folds which can mark the objects.

[h] The thinnest vinyl gloves offer a higher sensitivity and dexterity as well as a better grip compared to cotton gloves.

[i] Nitrile gloves offer a good protection for skin but should not be used when handling silver, objects containing silver, photographic collections (they may contain sulphur residue due to the vulcanization process).

Bibliography

[1] EN 14182:2002, *Packaging — Terminology — Basic terms and definitions*

[2] EN 388, *Protective gloves against mechanical risks*

[3] EN 420, *Protective gloves — General requirements and test methods*

[4] EN 455-3, *Medical gloves for single use — Part 3: Requirements and testing for biological evaluation*

[5] ÖNORM D 1000:1999, *Transportation services — Fine arts transports — Requirements for the service and the provisions of the service*

[6] *Art in transit: handbook for packing and transporting paintings*, edited by Richard, M., Mecklenburg, MF, Mervill, RM. Washington, DC : National Gallery of Art, 1991, 372 p.

[7] DUBUS, M., SARRAILH, S., WALLENS, A. de. Transports et climat : l'expérience de dix ans de collaboration avec le département des peintures du musée du Louvre. *Technè : la science au service de l'histoire de l'art et des civilisations*, 2005, n° 21, p. 117-120

[8] ISPM n° 15. *Regulation of wood packaging material in international trade*. Rome : FAO, 2009

[9] KAMBA, N., NISHIURA, T. Measurement of the dimensional change of wood in a closed case. In ICOM Committee for conservation. *10th Triennial meeting Washington, DC, 22-27 August 1993: preprints*. London : James & James, 1993, p. 406-409

[10] KAMBA, N. Rh-temperature variation in a transport package. In *Cultural property and its environment, October 11 - October 13, 1990, 14th International symposium on the conservation and restoration of cultural property*. Tokyo : Tokyo National Research Institute of Cultural Properties, 1995, p. 119-129

[11] *Loans between national and non-national museums: new standards and practical guidelines*. London : National Museum Directors'Conference, 2003, 22 p

[12] MARCON, P., MICHALSKI, S. Mechanical risks to large paintings such as *Guernica* during transit. In Fundación Marcelino Botín. *El Guernica y los problemas éticos y técnicos de la manipulación de obras de arte*. Santander : Fundación Marcelino Botín, 2002, p. 87-98

[13] NEHER, A. Can it go? *V&A conservation journal*, 1998, n° 26, p. 14-15

[14] RICHARD, M. The benefits and disadvantages of adding silica gel to microclimate packages for panel paintings. In *Museum microclimates: contributions to the Copenhagen conference, 19-23 November 2007*, edited by Padfield, T., Borchensen, K., Christensen, MC. Copenhagen : National Museum of Denmark, 2007, p. 237-243

[15] SAUNDERS, D. Monitoring shock and vibration during the transportation of paintings. *National Gallery technical bulletin*, 1998, vol. 19, p. 64-73

[16] SAUNDERS, D., SLATTERY, M., GODDARD, P. Packing case design and testing for the transportation of pastels. In ICOM Committee for conservation. *12th Triennial meeting, Lyon, 29 August-3 September 1999: preprints*. London : James & James, 1999, p. 100-105

[17] SAUNDERS, D. The effect of painting orientation during air transportation. In ICOM Committee for conservation. *14th Triennial meeting, The Hague, 12-16 September 2005: preprints*. London : James & James, 2005, p. 700-707

[18] SOFER, P. The traveling technician: the role of a technician as courier. *V & A conservation journal*, 2006, n° 53, p. 6-8

[19] *Standards for touring exhibitions*. London : Museums & Galleries Commission, 1995, 124 p

[20] TOISHI, K., GOTOH, T. A note on the movement of moisture between the components in a sealed package. *Studies in conservation*, 1994, vol. 39, n° 4, p. 265- 271