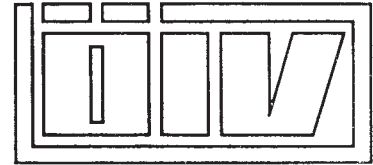


ÖSTERREICHISCHES INSTITUT FÜR VERPACKUNGSWESEN

AN DER WIRTSCHAFTSUNIVERSITÄT WIEN

STAATLICH AUTORISIERTE VERSUCHSANSTALT

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T E S T R E P O R T A N D L I C E N C E

Gutachten

Nr. 3780/7/91

1. Submitted Samples

1.1. Applicant

1.2. Packaging Manufacturer

Identical to applicant

1.3. Description of the packaging

Folding boxes made of double wall corrugated fibreboard ("AC" flute, sort of corrugated board "6910", composition according to the manufacturer of the packagings: 400 KL/127 FL/300 TL/150 FL/300 KL) with top and bottom flaps meeting;

manufactured with a stitched joint;

Box closure: double-L closure with fibreglass-reinforced plastic adhesive tape (75 mm wide)

1.3.1. Packaging design "28/21"

Outside dimensions: 375 x 280 x 335 mm (L x W x H)

Maximum gross mass of the filled and sealed package:

- for use for Packaging Group I, II and III: 21 kg
- for use for Packaging Group II and III: 30 kg
- for use for Packaging Group III: 40 kg

1.3.2. Packaging design "40/30"

Outside dimensions: 445 x 330 x 335 mm (L x W x H)

Maximum gross mass of the filled and sealed package:

- for use for Packaging Group I, II and III: 30 kg
- for use for Packaging Group II and III: 40 kg
- for use for Packaging Group III: 45 kg

Original filling material: solid materials or inner packagings

For the tests barley (partly together with bags filled with lead shot inserted to increase the mass) was used.

2. Requested Investigations

In accordance with the general packaging regulations laid down in appendix A.5 of the European Agreement concerning the international carriage of dangerous goods by road (ADR) each packaging, except the inner packagings of combination packagings, must conform with a packaging design that has been tested and licenced in accordance with the regulations of section IV of the above named appendix.

Similar regulations are in force for the transport by train (RID), by ship (IMDG-Code) as well as by plane (ICAO-Code), whereby the test requirements regarding the packagings for carrying dangerous goods by the various transport operators have been largely harmonised, because of the acceptance of the UN-Recommendations ("Orange book", Recommendations prepared by the United Nations Committee of Experts on the Transport of Dangerous Goods, sixth revised edition, 1990).

The submitted samples should be tested for the packaging specification 4 G ("fibreboard boxes") for the different Packaging Groups in relation to the gross masses and in case of positive results UN-Markings (packaging licence No.) should be established.

3. Legal Basis

The European Agreement regarding the Carriage of Dangerous Goods by Road (ADR) including the signing record and enclosures, Federal Law Gazette No. 522/1973 in the version of Federal Law Gazette No. 43/1990.

Federal Law regarding the Carriage of Dangerous Goods by Road and amendment of the Motor Traffic Regulation 1967 and the Highway Traffic Regulation 1960 (GGSt), Federal Law Gazette No. 209/1979 in the version of Federal Law Gazette No. 181/1988.

Amendments to the enclosures A and B of the European Agreement regarding International Carriage of Dangerous Goods by Road (ADR), Federal Law Gazette No. 154 of 1985-04-30.

Regulations for the International Transport of Dangerous Goods by Rail (RID) in the version of Federal Law Gazette No. 57/1990.

in connection with:

State-authorization of the Austrian Institute for Packaging (ÖIV) by the Republic of Austria, Federal Ministry for Buildings and Technics (notification of 1970-09-16, Zl. 552.579-III/18/70, finally extended by notification of 1989-08-03, Zl. 91.468/7-IX/1a/89 of the Federal Ministry of Economical Affairs).

Notification of the Republic of Austria, Federal Ministry of Transport, Section IV, concerning the allocation of a short marking to identify packagings which had been tested by the ÖIV in accordance with Federal Law Gazette No. 143 of 1981-03-13 (Notification of 1981-09-21, Zl. 75.170/1-IV/6-81).

4. Investigations Carried out - Results of Investigations

The air-conditioning of the test samples was done under the standard climate condition 23°C/50 % relative humidity till the achievement of constant weight. The tests were carried out under the same climatic conditions.

4.1. Test of Packaging Material

Determination of water absorption capacity - Cobb-Test

The test was carried out in accordance with ISO-standard 535-1976 (see also ÖNORM A 1104), with an exposure time of 30 minutes; the test was carried out only on the outer cover (top surface) of the corrugated fibreboard.

A capacity of water absorption of **101,3 g/m²** resulted as the arithmetical mean of four tests.

4.2. Tests on Filled Packaging

The tests were carried out in accordance with the instructions of the ADR (as described in Appendix A.5 section IV).

4.2.1. Drop-Test

The drop of the packages was started by means of a pneumatic hook, the impact target was a steel plate. Straps were used for the hanging up and the positioning of the samples.

Drop heights (varied according to the required Packaging Group):

- **1,8 m** for packaging design "28/21" with 21 kg and for packaging design "40/30" with 30 kg
- **1,2 m** for packaging design "28/21" with 30 kg and for packaging design "40/30" with 40 kg
- **0,8 m** for packaging design "28/21" with 40 kg and for packaging design "40/30" with 45 kg

None of the tested samples was leaking or showed any appreciable damage after the tests.

4.2.2. Stacking Test

The test was carried out with an electronic box compression tester, type No. 835 supplied by Messrs. Frank, and with a mechanical compression tester. The test samples were subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical filled packages, which might be stacked on it, up to a height of 3 metres (including test sample). Duration of the test: 24 hours. The highest possible gross mass was used in this test.

The following constant pressure loads were applied to the samples:

- packaging design "28/21" (point 1.3.1.) **3130 Newton.**
- packaging design "40/30" (point 1.3.2.) **3520 Newton.**

None of the samples tested showed any appreciable damage. During and after the tests no deformation or other signs of early breakdown were detected that could effect the strength of the cases or could cause an instability of the stack.

5. Evaluation

The evaluation of the testing of the packaging material (water absorption capacity) was effected according to the requirements of Margin-No. 3530, section III, appendix A.5 of the ADR which stipulates a maximum water absorption of 155 g/m². The tested packaging material met these requirements.

The filled packagings also passed the tests according to the requirements of section IV, appendix A.5 of the ADR.

The tested packaging designs are in accordance with the test requirements for packagings for the carriage of dangerous goods as stated in appendix A.5 of the ADR. This also covers the requirements of the RID (for rail traffic) as well as the IMDG-Code (for shipping).

Packagings of this tested designs may be mass-produced. The manufacturer must guarantee that the mass-produced packagings are in accordance with the requirements of this designs.

6. Marking

The corrugated fibreboard boxes, when mass-produced in accordance with the tested designs, must be durably and visibly marked as follows:

- packaging design "28/21"
(point 1.3.1.)



X 21
4G/Y 30/S/..*)/A/PA-02/3780
Z 40

- packaging design "40/30"
(point 1.3.2.)



X 30
4G/Y 40/S/..*)/A/PA-02/3780
Z 45

*) The last two digits of the year of production of the corrugated boxes
All digits and letters must be at least 13 mm in size.

By printing the UN-Marking on the packagings the manufacturer guarantees that the mass-produced packagings meet all requirements of the tested and licenced packaging designs.

In addition to the UN-Marking the packagings have to carry other prescribed markings, symbols and dangerous goods labels.

7. Use

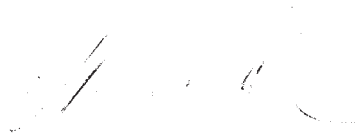
Packagings, mass-produced in accordance with the tested packaging designs and marked according to point 6. may be used for dangerous goods, if such packagings are permitted by ADR (and RID or IMDG-Code). If used for transportation by ship, suitable qualities of papers for liners and flutes should be used and the glue of the corrugated board should be wet strength.

The content of the boxes may be solids or inner packagings, i.e. combination packagings. In this case the packager/shipper has to ensure provable (e.g. by additional drop tests or considering Margin-No. 3558, paragraph 2, ADR, or point 8.1.6, annex I, IMDG-Code) that the filled packages can meet the same requirements as the tested packaging design.

According to the capability of the packagings, dangerous goods to be transported must, depending on the allowed maximum gross mass, be classified in the according packaging groups. The gross mass of the packages must not exceed the values quoted in point 1.3.

The applicant named in point 1.1. has to ensure provable that all conditions concerning the usage of these packagings are well known to everybody who uses/fills these packagings for/with dangerous goods.

AUSTRIAN INSTITUTE FOR PACKAGING



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Institutsleiter

PB Nr. 3780/7/91

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