



Fachverband Faltschachtel-Industrie e.V.



Technical Guidelines

QUALITY CHARACTERISTICS OF CARTONBOARD

Contents

Introduction	3
Grade categories and grammages	3
Ordering, delivery and invoicing	3
Order/supply quantity tolerances	4
Order types	4
Sheet number tolerance	4
Sampling to deal with complaints	5
Sample preparation and testing conditions	5
Grammage	5
Thickness	5
Bending stiffness	5
Moisture content	6
pH level (surfaces)	6
Cobb level (water absorption)	6
Plybond	6
Creasability	6
Cutting	6
Stacking characteristics	6

INTRODUCTION

These quality characteristics have been compiled by the Cartonboard Section (VMK) of the German Paper and Pulp Association and the German Folding Carton Association (FFI).

They are intended to be guidelines for the production, supply, acceptance and processing of folding carton board.

Fundamental supply chain optimisation and a reduction in waste and complaints are the objectives of these quality characteristics. Mutual trust and a basic understanding of partnership relationships between the companies involved are essential for the application of these quality characteristics.

These quality characteristics are updated on an ongoing basis to take account of technical progress and developments in market requirements.

These quality characteristics are recommendations and need to be referred to in specific or general purchasing contracts if they are to apply between business partners in individual or all cases.

Any additional requirements attributable to the specific application for the board (e.g. for food products, toys, medical/pharmaceutical products, cosmetics etc.) need to be agreed separately.

These quality characteristics apply to all folding carton board orders, irrespective of the quantity ordered.

All the measuring equipment used must be in good, calibrated condition.

The previous version of these quality characteristics of 26th March 1998 ceased to apply when these quality characteristics were introduced on 20th March 2015.

GRADE CATEGORIES AND GRAMMAGES

These quality characteristics cover the grade categories of coated board (GZ, GN1, GN4, GC1, GC2, GT1, GT4, GD1, GD2, GD3) and uncoated board (UZ, UN4, UC1, UC2, UT1, UT2, UT4, UD1, UD2, UD3) as well as "coated liners".

Individual arrangements need to be made for subsequently finished board, e.g. cast coated grades (AZ, AC1 etc.) or coated grades.

Grammages range from 180 g/m² to 600 g/m².

ORDERING, DELIVERY AND INVOICING

These "Quality characteristics" are based on the following ordering, delivery and invoicing principle.

1. Folding carton board order consisting of the following information:
 - a. Specific number of folding carton board sheets ("ordered sheets"; specified by size, grammage and grade) and
 - b. The corresponding tonnage ("ordered weight" = nominal weight of the order, calculated from the size, grammage and number of sheets)
2. Delivery of counted sheets
3. Invoicing of the tonnage corresponding to the sheets delivered (calculated from the number of sheets supplied, the sheet size and the (nominal) grammage ordered)

It is up to the business partners to decide who determines the corresponding tonnage ("ordered weight") specified in No. 1b.

ORDER/SUPPLY QUANTITY TOLERANCES

(agreed supply tolerance above or below the ordered quantity; see No. 1 above)

Acceptable tolerances for the actually delivered tonnage above and below the ordered weight are:

Quantity ordered in tonnes	Tolerance as % of the quantity ordered
≤ 1 tonne	± 10 %
> 1 tonne ≤ 5 tonnes	± 6 %
> 5 tonnes	± 2,5 %

When the agreed tolerances above and below the ordered weight are taken into consideration, the result is the actually delivered tonnage, which in turn corresponds to the number of sheets delivered.

Together with the tonnage supplied, the corresponding number of counted sheets (per order, call-off / part delivery, pallet) must be indicated in the delivery documents / on the labels.

ORDER TYPES

Quantity within the above-mentioned **tolerances**. The quantity delivered is within the above-mentioned ± tolerances.

Examples:

- Quantity ordered 2 tonnes, quantity delivered 1.88 to 2.12 tonnes.
- Quantity ordered 6 tonnes, quantity delivered 5.85 to 6.15 tonnes.

Agreement of a minimum quantity that must always be reached.

The quantity delivered is the minimum quantity plus a quantity within the possible tolerance range.

Examples:

- Quantity ordered 2 tonnes, quantity delivered 2 to 2.24 tonnes.
- Quantity ordered 6 tonnes, quantity delivered 6 to 6.3 tonnes.

Agreement of a maximum quantity that must not be exceeded.

The quantity delivered is the maximum quantity minus a quantity within the possible tolerance range.

Examples:

- Quantity ordered 2 tonnes, quantity delivered 1.76 to 2 tonnes.
- Quantity ordered 6 tonnes, quantity delivered 5.7 to 6 tonnes.

SHEET NUMBER TOLERANCE

(agreed deviation between the number of sheets actually delivered and the number indicated on the pallet label / delivery note / invoice; see No. 2 above)

- For Orders ≤ 5 tonnes a sheet number tolerance of ± 1 % per package shall apply; for the total number of sheets delivered (order) a sheet number tolerance of ± 1 % is accepted.
- For Orders > 5 tonnes a sheet number tolerance of ± 1 % per package shall apply; for the total number of sheets delivered (order) a sheet number tolerance of ± 0.5 % is accepted.

If no agreement is reached in complaints about the sheet number tolerance, a system that can be calibrated (e.g. measurement using scales) should be used.

SAMPLING TO DEAL WITH COMPLAINTS

Quantity supplied (Unit load)	no. of pallets/reels to be checked	sample sheets per pallet/reel
1–5	all	1
6–19	5	1
20–99	10	1

Except when there are 1–5, the pallets/reels that are to be tested must be selected at random. The number of readings taken must be in accordance with the applicable testing standards.

Sheet samples must be taken as follows: at least ten sheets below the top in the case of pallets and after the second to fifth layer in the case of reels.

Samples must be taken in accordance with DIN EN ISO 186.

SAMPLE PREPARATION AND TESTING CONDITIONS

Samples must be prepared at 23°C and 50 % relative humidity (in accordance with DIN EN 20187). The testing conditions are 23°C and 50 % relative humidity.

Class 1: ± 1°C and ± 3 % relative humidity.

GRAMMAGE

Acceptable range: average of the delivery differs from the required weight (weight ordered) by ± 2.0 %. Testing in accordance with DIN EN ISO 536 (samples as delivered).

Note: compliance with the “moisture content” specifications under the standard conditions leads to grammage variations that must be taken into consideration when assessing the results.

THICKNESS

Acceptable ranges: ± 5 % of the required thickness at a grammage of ≤ 350 g/m²

± 3 % of the required thickness at a grammage of > 350 g/m²

100 % of all the readings must be within these ranges.

An individual reading is defined as the average of a sheet in accordance with DIN EN ISO 534.

BENDING STIFFNESS

Acceptable range: -15 % of the required stiffness. (for all virgin fibre and recycled board grades except “coated liners”)

100 % of all the readings must be within this range. An individual reading is defined as the average of 5 readings per sheet.

Bending stiffness must be measured on the samples in both directions. The bending stiffness of each individual sample is the average of the readings in both directions. Testing according to DIN 53121 (beam principle):

Sample width 38.1 mm; free clamped length 50 mm; bending angle 5 degrees; or according to DIN 53123-1 (resonance method).

MOISTURE CONTENT

Relative humidity:

Standard levels up to a grammage of 400 g/m²:
45–60 % relative humidity
Above 400 g/m²: 50–65 % relative humidity
Testing at 20° C using an electric hygrometer.

Absolute moisture content:

Acceptable level: ± 1 % of the required moisture content. Testing according to DIN EN ISO 287.

PH LEVEL (SURFACES)

Acceptable level: > 4.5 up to a maximum of 10.
Testing according to the Zellcheming technical information sheet V/17/80.

COBB LEVEL (WATER ABSORPTION)

Acceptable level: water absorption of 30–80 g/m² on the top side, 20–200 g/m² on the reverse side.
Testing according to DIN EN 20535.

PLYBOND

Bond strength of the top layer for offset printing. Plybond strength must be sufficient to cope with normal processing operations. Requirements exceeding normal plybond strength levels, e.g. in finishing processes, must be specified when placing the order. Testing according to DIN 54516.

CREASABILITY

Testing according to FFI Guideline “Good Creasability” (February 2015)

CUTTING

Must be carried out by state-of-the-art principles so that edge fibres are kept to a minimum.

Sheet cutting accuracy:

Dimensions no smaller than specified. Accuracy max. + 2 mm, for sizes over 100 cm: 0.2 %. Testing on a measuring table.

Maximum angular deviation: 1 mm over a cut length of 100 cm. Testing on a measuring table.

STACKING CHARACTERISTICS

Absolute flatness – no wavy edges – no waviness throughout the sheet – no warped or dished sheets. Visual check.

The temperature of the board must be allowed to adjust to the temperature in the processing environment before the original packaging is removed.

The “list of folding carton board defects” issued by the IRD (Institute for Efficient Management in the Printing Industry) is used to facilitate agreement when assessing test results.

(Grade definitions in accordance with DIN 19 303: September 2000)

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