PTS Test Report
No. 36.720

Customer	Papierfabriek Schut BV Anouk Dantuma Quality and R&D Manager Kabeljauw 2 6866 NE Heelsum THE NETHERLANDS		
Date of order	19 December 2025		
Receipt of samples	5 January 2026	**Testing Period**	10 January – 10 February 2026
Person in charge	Dr. Melanie Horbens PTS – Institut für Fasern & Papier gGmbH Pirnaer Straße 37 01809 Heidenau Germany Tel. +49 3529 551-690		

PTS is a testing laboratory accredited according to DIN EN ISO/ IEC 17025. Test methods falling within the scope of accreditation are marked with an asterisk (*) in this report.

DAkkS Deutsche Akkreditierungsstelle D-PL-23019-01-00

Heidenau, 20 February 2026

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1 Task and sample material

Introduction

PTS has been assigned to test archival paper according to **ISO 16245:2023** (Information and documentation – Boxes, file covers and other enclosures, made from cellulosic materials, for storage of paper and parchment documents), **point 6 "Requirements for file covers and folders**". The following measurement methods were used:

- Alkali reserve according to ISO 10716:2022-02*
- pH value of the cold extract ISO 6588-1*
- Kappa number according to ISO 302:2015-08*
- Grammage according to DIN EN ISO 536:2020-05*
- Bleeding of dye and optical brightener Strength – Folding endurance (Schopper) according to ISO 5626:1993-11*

The degree of polymerization according to ISO 23404 was not examined as agreed.
Since the paper was visually recognizable coloured of more than 0.2, the optical density according to ISO 5-3/ISO 5-4 was not determined.

Sample Material

The following sample material was handed over by the client for testing:

Sample	Labelling
1	R5850-70666

The paper was blue-grey-coloured.

2 Applied Methods

Sample preparation

The samples were stored for at least 24 hours at standard climatic conditions according to DIN EN ISO 187:2023-02 at 23 ± 1 °C and 50 ± 2 % rel. humidity and were tested at the same climatic conditions.

Alkali reserve

The alkali reserve was determined according to ISO 10716:2022-02. Alkaline pigments or other alkaline materials that have been added to the paper to counteract acidic degradation can be determined.

The sample is boiled in water containing a defined amount of hydrochloric acid (HCl) and then the unused amount of HCl is determined by titration with sodium hydroxide (NaOH) solution. The alkaline reserve is calculated as mol/kg. A double determination was carried out.

pH value (cold extract)

The pH value of the cold extract was determined according to ISO 6588-1:2021-11.

The representative sample is torn into smaller pieces (approx. 1 cm^2) or cut with clean scissors and additionally split. 2.0 g of air-dried sample is extracted in deionized water in a sealed Erlenmeyer flask at 20 - 25 °C for one hour. The extract is swirled several times during this time and then transferred to another glass flask via a glass frit and mixed with 2 ml of a 1 M KCl solution and the measurement is started immediately.

The pH value was determined using the Sentix® 81 electrode and the pH meter from WTW. The pH meter is calibrated with 3 buffer solutions. The pH value is read as soon as there is no measurable drift within 30 seconds. A double determination was carried out.

Kappa number

The Kappa number was determined according to ISO 302:2015-08. It is an indicator of the degree of pulping based on the residual lignin content.

The sample was disintegrated for 20 minutes, filtrated and air dried. The dry content was determined according to ISO 638:2008-10. For the determination, the amount of 0.02 mol/l potassium permanganate solution consumed under the specified conditions by one gram of pulp (calculated on an oven-dry basis) was measured. The analysis is based on the fact that potassium permanganate acts as an oxidizing agent on lignin. A double determination was carried out.

Grammage

The determination of the grammage was conducted according to DIN EN ISO 536:2020-05 with the analytical balances from Sartorius with an accuracy of 1/1000 g. Deviating from the standard, the test area was 100 cm^2. A mean value in g/m^2 was calculated from 20 single values.

Bleeding

The Bleeding was determined according to point 6.5 of ISO 16245:2023. Material containing optical brighteners, dyes or pigments must be tested for their bleeding. For this purpose, defined filter papers are impregnated with deionized water and the sample is covered with these on both sides. This setup is loaded with approx. 2 kg (12 kPa) for 20 min and the filter papers are dried.

The filter papers are evaluated visually under daylight conditions. No colour may transfer to the filter paper and it must not fluoresce under a UV lamp.

Folding endurance (Schopper)

The test was carried out according to ISO 5626:1993-11 (Schopper method) with a double fold tester QM0177 of the company Frank-PTI GmbH. The instrument is specified in ISO 5626:1993-11, normative Annex A1.

A 15 mm wide strip is clamped at both ends under a load of 9.8 N. The test strip is folded almost 180° to both sides until it tears. The folding endurance is calculated using the number of double folds with the following equation:

Folding endurance = log10 (number of double folds)

20 strips were measured in each paper direction and a mean value was calculated

The thickness of the paper was conducted according to DIN EN ISO 534:2012-02 with the micrometre gauge of the company Lorentzen & Wettre in order to classify the double fold number. From 5 single values one mean value was calculated.

3 Results and Evaluation

General

The results with average and standard deviation are summarized in the table below. Following abbreviations are used:

MV	– Mean value	MD	– Machine direction
SD	– Standard deviation	CD	– Cross direction
n	– Number of single measurements		

Table of Results

Point of standard	Property			Sample 1 R5850-70666	Requirement acc. ISO 16245
6.2 Paper and board	**Alkali reserve** in mol/kg		**MV**	**1.7**	**≥ 0,4**
	pH value (cold extract)		**MV**	**8.7** [1)]	**7.5 – 10.0**
	Kappa number		**MV**	**< 1** [2)]	**< 5**
	Grammage in g/m²		**MV**	**137**	**≥ 100**
			SD	*1.24*	
			n	20	
6.5 Bleeding	**Bleeding**		**No bleeding of the colour** was visible on the filter papers of the top and bottom side, neither under daylight nor under a UV lamp		**No bleeding**
6.6 Strength	**Folding endurance**	**MD**	**MV**	**3.27**	**≥ 1.9** (paper thickness ≤ 0.25 mm, A1)
			SD	*0.10*	
			n	20	
		CD	**MV**	**2.59**	**≥ 1.9** (paper thickness ≤ 0.25 mm, A1)
			SD	*0.14*	
			n	20	
	Thickness in mm		**MV**	**0.19**	**≤ 0.25 mm** (for requirement of folding)
			SD	*0.003*	
			n	**5**	

Table of Results – footnotes

1) The pH value of the used water was 7.36 at 23.5 °C and the conductivity 0.718 µS/cm.

2) The sample was coloured, which can influence the measurement of the kappa number.

Evaluation

The paper sample (R5850-70666) meets the verified requirements (shown in the results table) according to ISO 16245:2023, point 6 “Requirements for file covers and folders”.