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FORSCHUNGSINSTITUT
HOHENSTEIN

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SCHLOSS HOHENSTEIN · D-74357 BÖNNIGHEIM

Testing Laboratory Textile Services & Innovations

Trevira GmbH
Textiles Prüfwesen
Max-Fischer-Straße 11

D-86397 Bobingen

Certified by the DAP Deutsches Akkreditierungssystem Prüfwesen GmbH (German Certifying System).

The certification is valid for the testing procedures indicated in the certificate - in the test report marked with *.

Deutscher Akkreditierungs Rat DAR DAP-PL-1603.00

Contact Person	Extension	Our Reference	Date
Eugenie Bockelmann	271-719	bo-ts	27.05.2004

Expert Report

Investigation No.: 04.6.9.0001

Client:	Textiles Prüfwesen, Mr. Michael Bösch, Max-Fischer-Straße 11, D-86397 Bobingen
Test material received:	11 x 2 samples upholstery fabrics
Parts of test material examined:	11 x 2 samples upholstery fabrics
Date received:	25.02.2004
Aim of investigation:	Examination of behaviour of fabric when exposed to lengthy soiling and extent to which soiling can be removed using the recommended cleaning procedure.

Soiling test of textile fabrics with subsequent cleaning:

Tests were carried out on selected upholstery fabrics with regard to their tendency to soil when subjected to lengthy soiling with standard powder. Also investigated was the extent to which the soiling could be removed using an established cleaning procedure for fabrics processed as fixed covers (combination fabric/foam). Samples were soiled twice in total and subsequently underwent cleaning.

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Forschungsinstitut Hohenstein Prof. Dr. Jürgen Mecheels GmbH & Co KG, Court of Registration: Vaihingen/Enz HRA 392-Bes., personally liable associate: Holding Company Hohenstein GmbH, HRB 155-Bes., Managing Directors: Dr. Stefan Mecheels, Prof. Dr. Jürgen Mecheels

The intensity of soiling and its removal were evaluated visually using the grey scale for assessing change in colour according to ISO 105-A02 and/or assessing staining to ISO 105-A03. In measuring intensity of soiling Grade 1 indicates severe soiling, Grade 5 signifies slight soiling or none. In assessing the extent to which cleaning is successful, Grade 1 indicates soiling not removed and/or a poor cleaning result, while Grade 5 means very good soil removal and/or a very good cleaning performance.

Soiling of the sample materials was done by the client as per procedural instruction no.: WP/42- version 0. Cleaning procedures were carried out at the Forschungsinstitut Hohenstein according to procedural instruction no.: WP/42- version 0. The degree of soil removal was assessed after the samples treated had dried at room temperature. Grade 1 indicates no removal of soiling. Grade 5 means very good soil removal.

The client described the upholstery materials used in the tests as follows:

Article	Category	Description	Colour	m²-weight in grams
6	4	Trevira CS	Cream-yellow	342
15	2	Modacrylic/velours	Light brown	410
16	3	Wool (non-flammable finish)	Plain yellow	448
19	1	Trevira CS	Dark blue – turquoise	525
20	1	Trevira CS	Dark blue - gold	491
22	4	Trevira CS + anti-soil finish	Ochre-light brown	341
23	5	Trevira CS + anti-soil finish	Beige-ochre	473
26	4	Trevira CS + anti-soil finish	Cream	233
29	2	Trevira CS velour	Red	479
32	3	Trevira CS	Grey-beige	412
33	5	Trevira CS	Beige-apricot	377

Key:
Category 1 = double fabric
Category 2 = velour
Category 3 = coarse uneven surface
Category 4 = flat fabric
Category 5 = chenille effect

The following tables show how the intensity of soiling and the degree of success in cleaning were assessed after the second cycle:

Assessment of intensity of soiling (lengthy experiment)

Article	Category	Description	Grade
6	4	Trevira CS	2
15	2	Modacrylic velour	3
16	3	Wool (non-flammable finish)	2
19	1	Trevira CS	3
20	1	Trevira CS	3-4
22	4	Trevira CS + anti-soil finish	2
23	5	Trevira CS + anti-soil finish	2
26	4	Trevira CS + anti-soil finish	1-2
29	2	Trevira CS Velours	3
32	3	Trevira CS	2-3
33	5	Trevira CS	2-3

Assessment of degree of success in cleaning (lengthy experiment)

Article	Category	Description	Grade
6	4	Trevira CS	4
15	2	Modacrylic velour	4
16	3	Wool (non-flammable finish)	4
19	1	Trevira CS	4-5
20	1	Trevira CS	4-5
22	4	Trevira CS + anti-soil finish	3-4
23	5	Trevira CS + anti-soil finish	3-4
26	4	Trevira CS + anti-soil finish	3
29	2	Trevira CS velour	4-5
32	3	Trevira CS	4-5
33	5	Trevira CS	4

Interpretation of Results

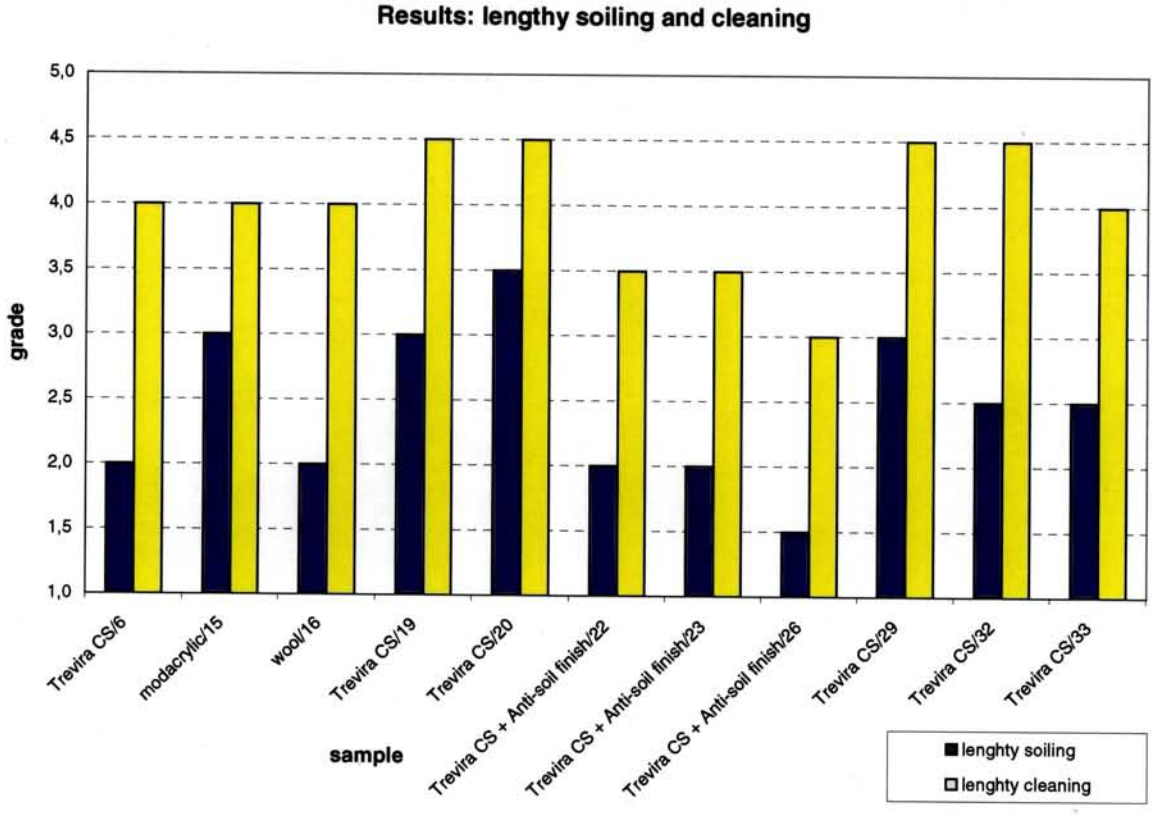


Diagram: results from lengthy soiling with subsequent cleaning

The diagram above shows the results of lengthy soiling with subsequent cleaning.

The x-axis indicates the furniture upholstery fabrics examined, while the y-axis shows the assessment of lengthy soiling and cleaning results. In the assessment of lengthy soiling Grade 1 indicates severe soiling. Grade 5 means slight soiling or none. In the assessment of degree of success of cleaning Grade 1 means a poor result in cleaning, while Grade 5 indicates very good removal of soiling and a good cleaning performance.

Soiling, or the evidence of soiling and the extent to which soiling is removed on a textile material, depends on the properties of the actual type of fibres, on the yarn and fabric construction and on the surface structure. On light textiles any soiling is naturally more evident than is the case with dark materials. Likewise there is better removal of soiling from dark articles. This is due to the soiling being less evident on dark materials than on light ones. Taking these factors into consideration, the assessment results of lengthy soiling with subsequent cleaning can be interpreted as follows:

Except in the case of sample 6, all the Trevira CS furniture upholstery fabrics without anti-soil finish that were examined display less tendency to soil compared with the wool sample (sample 16). In terms of tendency to soil, sample 6 achieved the same grade as the wool sample.

The wool sample (16) and the Trevira CS sample (32) have a similar weight and a comparable granular surface structure. The Trevira CS material has less tendency to soil and a better cleaning performance.

Sample 15 (modacrylic) and 29 (Trevira CS) are velour fabrics. Both samples displayed the same soiling behaviour, but the Trevira CS material had a better cleaning result.

The Trevira CS upholstery fabrics with anti-soil finish (anti-soil finish on fluorocarbon resin basis), numbers 22, 23 & 26, show greater tendency to soil than Trevira CS qualities not treated in this way. 22. 23 & 26 also displayed worse cleaning results than the untreated Trevira CS fabrics.

Note:

The appendix contains 4 photographic displays of the soiling procedure and of the cleaning procedure carried out on two Trevira CS upholstery fabrics.

Summary of Results

1. In tests carried out on lengthy soiling the Trevira CS furniture upholstery fabrics that were examined did not display any greater tendency to soil when compared with the wool and modacrylic samples.

2. The Trevira CS qualities without anti-soil finish that were tested showed good cleaning results after lengthy soiling. In the case of Trevira CS materials with comparable surface structures cleaning results were better than those of the velour sample in modacrylic and those of the wool treated with an inflammable finish.

3. The Trevira CS materials with anti-soil finish on a fluorocarbon basis showed a greater tendency to soil than untreated qualities. Trevira CS fabrics with finish produced cleaning results that were clearly worse than materials without finish.

Conclusions:

The recommended cleaning procedure that has been developed involves a practical, economic and effective method for cleaning Trevira CS furniture upholstery fabrics processed as fixed covers (fabric/foam combination).

Separate tests in the Siemens AG fire laboratories have indicated further that the cleaning procedure as described here does not exercise a negative influence on the burning behaviour of Trevira CS furniture upholstery materials. In contrast to this, an additional anti-soil finish on fluorocarbon basis does have a negative influence on the burning behaviour of Trevira CS upholstery fabrics.

The expert report includes 6 pages and 1 appendix (4 pages).

Schloss Hohenstein, 27.05.2004

Director of the Department
Textile Services & Innovations
pp:

Wilhelm Weiss

Forschungsinstitut Hohenstein * Schloß Hohenstein *

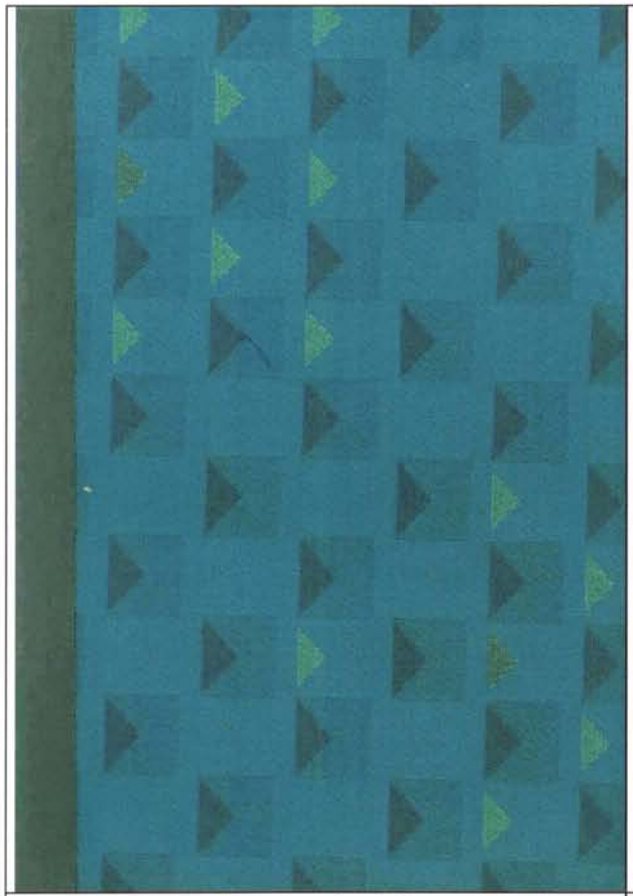
Head of Department
Textile Analysis:

Textiling. Eugenie Bockelmann

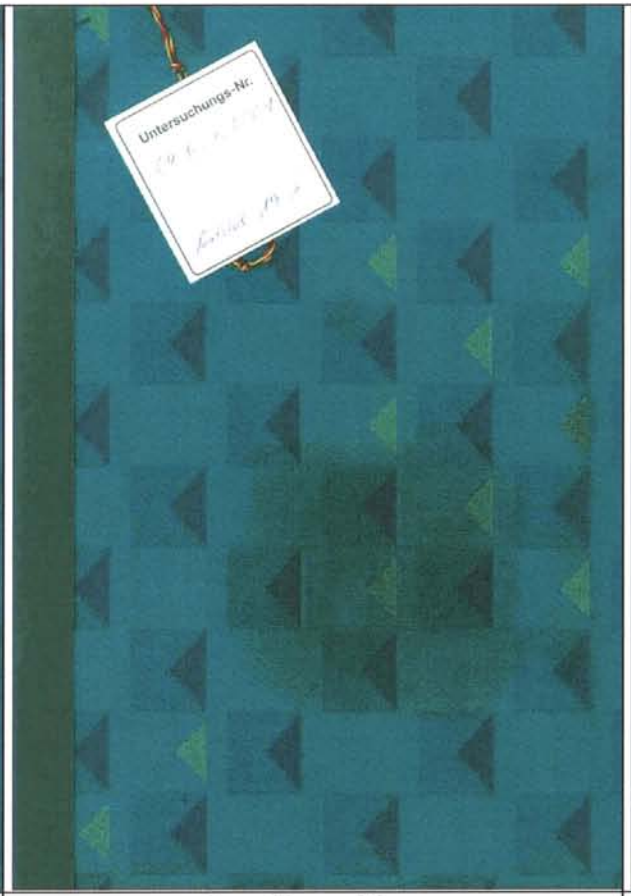
Appendix to Investigation report no. 04.6.9.0001

new material	lengthy soiling	result of cleaning
Trevira CS – article 19		plate 19-0

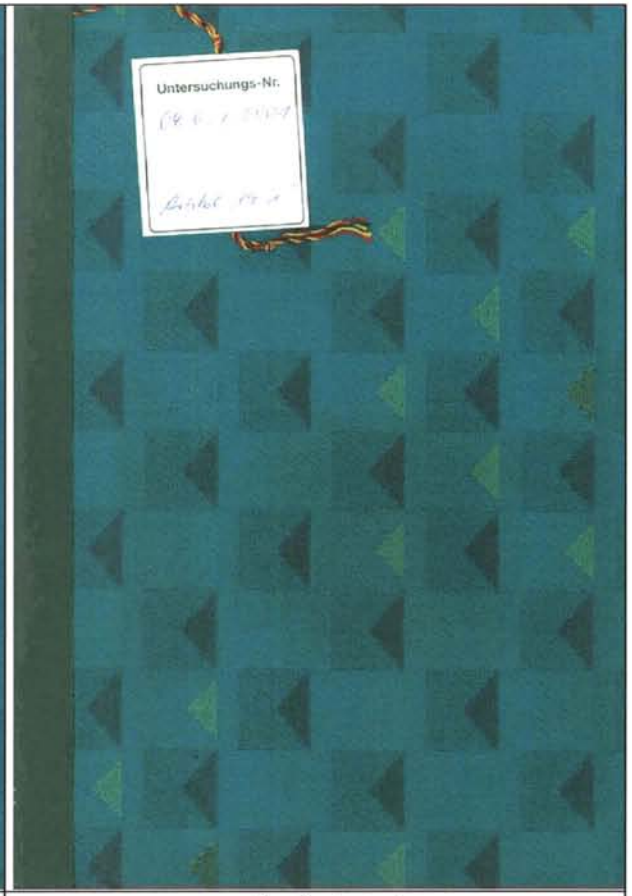
Appendix to Investigation report no. 04.6.9.0001



new material



lengthy soiling

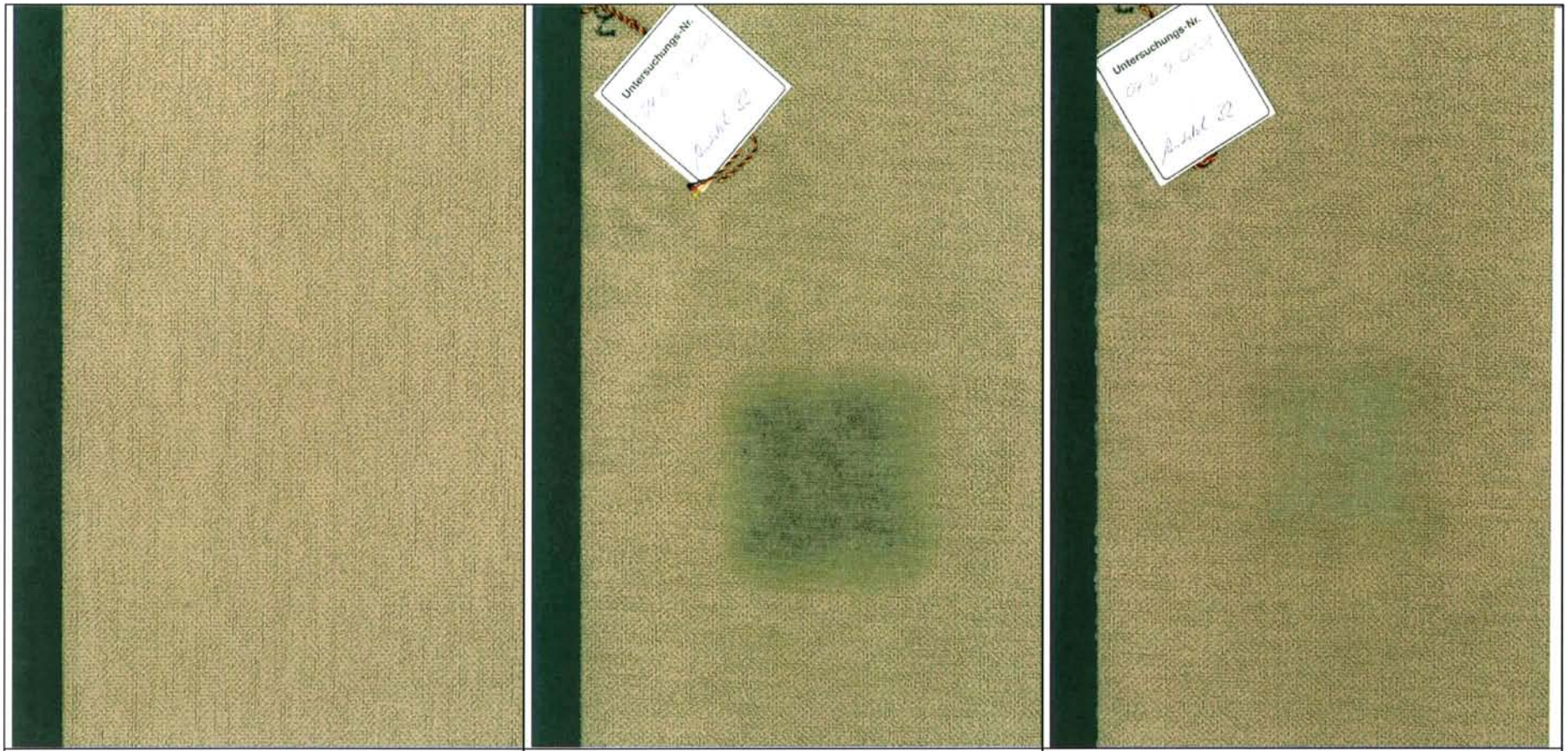


result of cleaning

Trevira CS - article 19

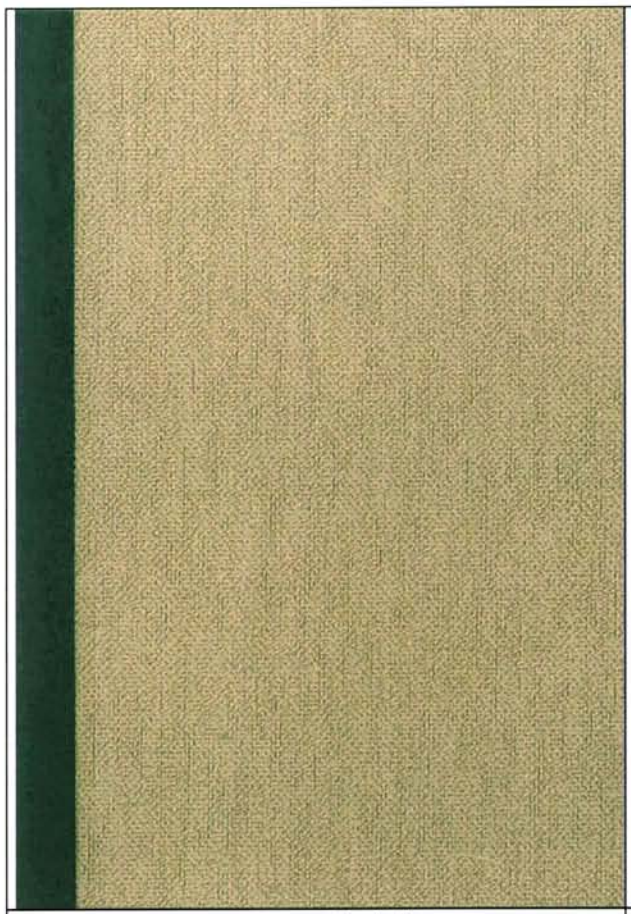
plate 19-1

Appendix to Investigation report no. 04.6.9.0001

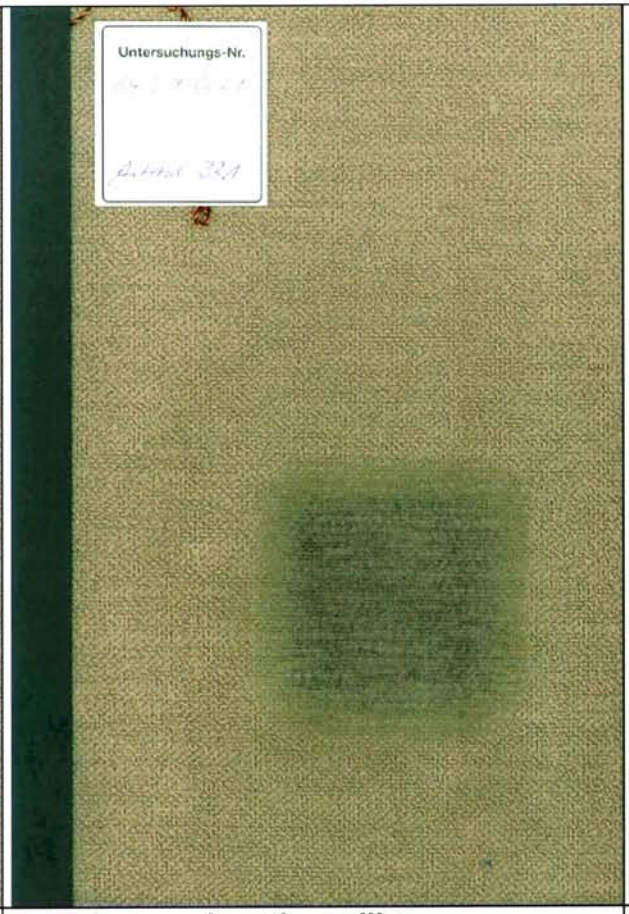


new material	lengthy soiling	result of cleaning
Trevira CS - article 32		plate 32-0

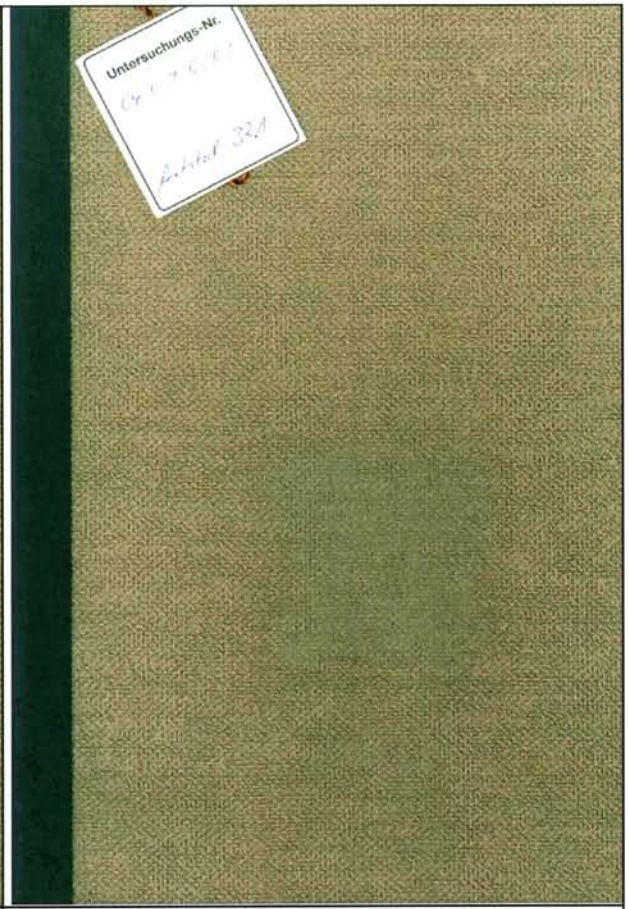
Appendix to Investigation report no. 04.6.9.0001



new material



lengthy soiling



result of cleaning

Trevira CS – article 32

plate 32-1