

Empa
Lerchenfeldstrasse 5
CH-9014 St. Gallen
T +41 58 765 74 74
F +41 58 765 74 99
www.empa.ch

CILANDER AG
Textilveredlung
Cilanderstrasse 19
9100 Herisau

Test report no 5214024741_E
Translation of test report No. 5214024741

Test order

Client
Sampling

Analysis of materials for COMMUNITY masks

CILANDER AG Textilveredlung Cilanderstrasse 19 9100 Herisau
by client

Test material

Cili1.5

Customer reference
Your order date
Inbox of test material
Test execution
Number of pages
Enclosures

Elvis Morscher
27 Apr 2020
6 May 2020
7 May 2020 bis 18 May 2020
6

Advertising regulation
General Terms and Conditions
Document SwissMedic

Recommendation National COVID-19 Science Task Force

Archiving of material

The remaining test material is archived during a period of 2 years.

401 – ell/zep/gbel/mha/hego // Kontroll-Visum: 

Empa, Swiss Federal Laboratories for Materials Science and Technology,
Laboratory for Biomimetic Membranes and Textiles
St. Gallen, 27 May 2020

Test leader



Leonie El Issawi-Frischknecht

Head of department



Prof. Dr. René Rossi

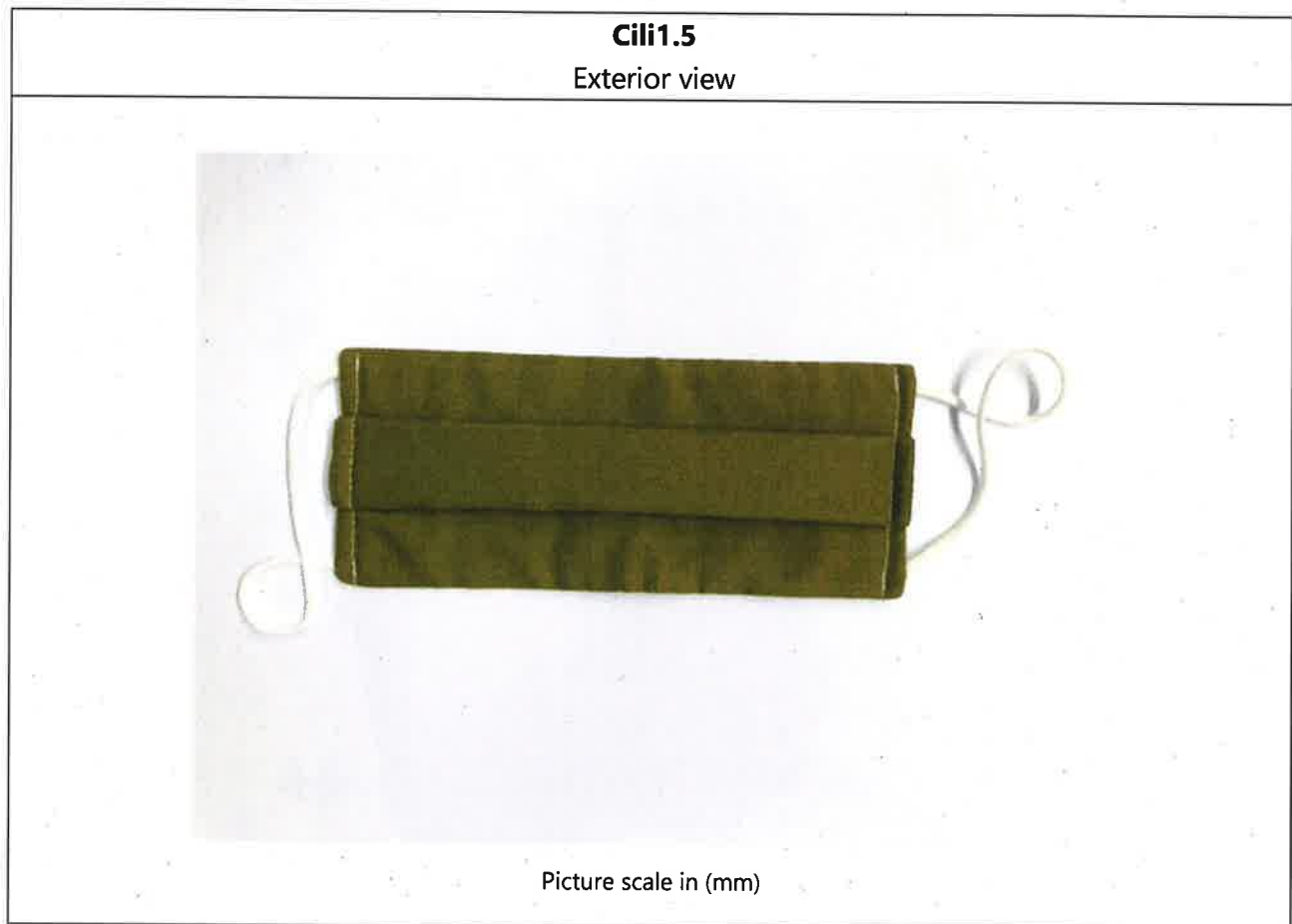
Content

1.	Tested material (decl.)	3
1.1	Pictures of material	3
2.	Determination of air permeability according to ISO 9237 (incl. calculation of the pressure difference according to EN 14683:2019-10)	3
2.1	Test conditions	3
3.	Pressure of splash resistance according to ISO 22609	4
3.1	Test conditions	4
4.	Efficiency of particle filtration	4
4.1	Conditions of test	4
5.	Resultats	5
5.1	Requirements according to the national COVID-19 Science Task Force	5
5.2	Pressure difference according to ISO 9237 and according to EN 14683:2019-10	5
5.3	Pressure of the splash resistance according to ISO 22609	5
5.4	Efficiency of particle filtration	6
6.	Result of performed measuring analysis	6
7.	Care and Liability	6
8.	Use of the report	6

1. Tested material (decl.)

Article name	Empa number	Color	Description of material
Cili1.5	23	green	71.5%CO/ 25.6%PP/2.9%PES
Received material		20 Masks	

1.1 Pictures of material



2. Determination of air permeability according to ISO 9237 (incl. calculation of the pressure difference according to EN 14683:2019-10)

A suction blower generates defined negative pressures. This causes an air flow through the applied material, which is measured. Based on 10 measurements, the result range is determined, taking the measurement uncertainty of this method into account.

2.1 Test conditions

Type of measurement	Air flow measurement
Negative pressure	30Pa / 150Pa / 250Pa
Test surface	4.9 cm ²
Test climate	≥ 4h at (21 ± 3) °C and (85 ± 5)% rel. Lf.
Number of measurements	10
Position of the mask	Inner side against negative pressure
Condition of test samples	Condition at arrival

3. Pressure of splash resistance according to ISO 22609

The mask is placed on a sample holder as described in ISO 22609. A defined quantity of coloured synthetic saliva (2.01 ± 0.04 g) is sprayed horizontally onto the outer side of the mask (side turned away from the face). In addition to the amount of liquid, the distance to the impact, the size of the orifice and the velocity of the liquid is controlled. The mask is tested at 12kPa, which corresponds to the pressure during coughing. The penetration of synthetic saliva up to the inner side (side of face) of the mask is determined visually in combination with a cosmetic tissue. If the cosmetic tissue is moistened, the test is considered as "failed". In case the cosmetic tissue remains dry, the test is considered as "passed".

3.1 Test conditions

Test surface	4.9 cm ²
Test climate	≥ 4h bei (21 ± 3) °C and (85 ± 5)% rel. Lf.
Pressure of test	12kPa
Liquid of test	Synthetic saliva dyed in red
Amount of liquid	2.01 ± 0.04 g
Number of measurements	10
Position of mask	Outer side against the spray nozzle
Condition of the mask	Condition at arrival

4. Efficiency of particle filtration

A circular test specimen of the mask / textile with a diameter of 5 cm (sample diameter 6 cm) is investigated. An aerosol consisting of polystyrene particles of 500 nm and a concentration in solution of 100 µg/ml with a flow rate of 400 µl/min by use of pressurized air (2 bar) is sprayed from a height of 18 cm onto the test specimen. By use of a pump system a constant air flow of 30 l/min is generated through the specimen, mimicking the human breathing volume at physical exertion. At the same time, the air flow is drying-up the aerosol. The particles diffusing through the specimen are quantified in real-time by use of particle analyzer "Cambusion DMS500". The particle filtration efficiency is given in % and determined after achieving a steady-state flow of particles (reached after approximately 3 minutes of exposure) by comparison without and with the filter system.

4.1 Conditions of test

Test surface	19.6 cm ²
Flow of test air	30 l/min
Test aerosol	500 nm PS particle in MilliQ water (100 µg/ml)
Duration of test	3 ± 1 min
Amount of liquid	400 µl/min (1.2 ml total)
Number of measurements	5
Position of mask	Outer side against the spray nozzle
Condition of mask	Condition at arrival

5. Resultats

5.1 Requirements according to the national COVID-19 Science Task Force

The requirements for the mask are met in case the following specifications are met:

Difference of pressure	≤ 60 [Pa/cm ²]
Pressure of splash resistance tests	10 of 10 passed with 12kPa
Efficiency of particle filtration	$\geq 70\%$

5.2 Pressure difference according to ISO 9237 and according to EN 14683:2019-10

Art. name	Pressure difference [range of measurements] [Pa/cm ²]
Cili1.5	45.7 (40.5; 50.8)

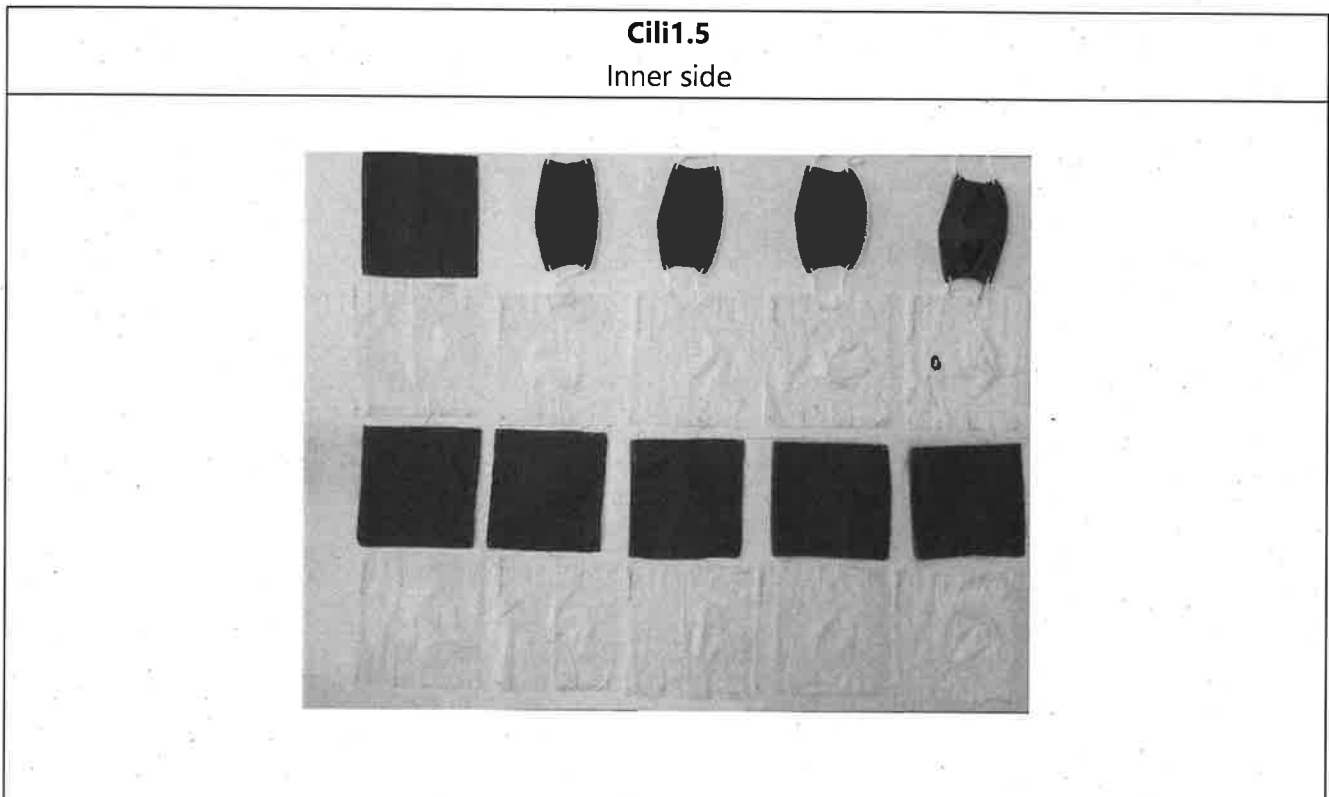
Table 1: Results of pressure difference. The range of measurements indicates the data variation (+/- 1 standard deviation determined for 10 measurements). In case the range of measurements includes the required pressure difference, the requirement is considered as fulfilled.

5.3 Pressure of the splash resistance according to ISO 22609

Art. name	Samples which passed test at splash resistance with pressure of 12kPa
Cili1.5	10 of 10 passed

Table 2: Results of splash resistance

Picture of pressure of splash resistance



5.4 Efficiency of particle filtration

Art. name	Measuring range of efficiency of particle filtration [range of measurements] for 500nm in %
Cili1.5	96.8 (95.5; 98.2)

Table 3: Results of efficiency of particle filtration. The range of measurements indicates the data variation (+/-1 standard deviation determined for 5 measurements). In case the range of measurements includes the required filtration efficiency, the requirement is considered as fulfilled.

6. Result of performed measuring analysis

The tested unwashed specimen complies with the recommendation of the national COVID-19 Science Task Force, with respect to the three tests performed as well as considering the uncertainties of measurement. Reusability and innocuity of the materials was not matter of subject within this test order.

7. Care and Liability

Empa guarantees that the material analysis will be carried out with due care and in accordance with the current state of science and technology. The measurement results refer only to the measurement data provided by the client respectively the sample material examined by Empa. Empa does not assume any liability that the measurement results will not apply for other deliveries of equal materials, textiles, etc. Liability, in particular for slight negligence, indirect and consequential damages, shall, as far as legally permitted, be excluded, regardless of legal basis.

8. Use of the report

The available material analysis doesn't represent a certification of the client's product. As a proof, the report may be used by the client to demonstrate that the test object has been analysed by Empa in accordance with the recommendations of the national COVID-19 Science Task Force. When using the report especially in literature shall comply with the «Regulation of advertising with Empa test reports" (see enclosure). The advertising permission is granted for one year from the date of signature.

* * * * *