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Empa
Materials Science and Technology

Bruli SA,
Via Laveggio 3,
CH – 6855 Stabio

Test report no 5214025878-E

Test order	**Analysis of materials for COMMUNITY masks**
Customer	Bruli SA, Via Laveggio 3, CH – 6855 Stabio
Sampling	by the customer
Test material	**BRULI MY MASK**
Customer reference	Marco Brülisauer
Order date	13 Oct 2020
Test material received	14 Oct 2020
Test performed	16 Oct 2020 till 23 Oct 2020
Number of pages	6
Attachments	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.

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

Test leader

L. El Issawi

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Content

1. Tested material (decl.)

Article name	Empa number	Color	Description of material
BRULI MY MASK	1	dark blue	Specified 3-layer Community Mask, SWISS Technology SWISS MADE 72% CO / 25% PP / 3% PES
Received material		20 masks	

1.1 Pictures of the material

BRULI MY MASK
Outer side view

Picture scale in (mm)

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 at (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 4.6 cm (sample diameter 6 cm) is tested. An aerosol consisting of neutralized sugar particles of 20 to 3000 nm diameter and a concentration in air of 8-9 $\cdot 10^5$ $dN/dlogD_p/cm^3$ (particle number normalized over detector bandwidth) the most intense particle size (240 nm) is lead over the test specimen. By use of a pump system a constant air flow of 8 l/min (8 cm/s) is generated through the specimen, mimicking the human breathing volume at light physical exertion and based on DIN EN 14683. The particles diffusing through the specimen are quantified in real-time by use of a particle analyzer "Cambustion DMS500". The particle filtration efficiency is given in % and determined after achieving a steady-state flow of particles (after approx. 3 minutes) by comparison without and with the filter system. Results are reported in particle ranges around 100 (87-205) nm, 500 (205-750) nm, 1000 (750-1540) nm and 2000 (1540-2740) nm.

4.1 Conditions of test

Test surface	16.6 cm^2
Flow of test air	8 L/min (8 cm/s)
Test aerosol	sugar solution (1.5 g/mL) in 24 L/min air flow, neutralized
Duration of test	approx. 3 min, last 30 s of this
Concentration	8-9 $\cdot 10^5$ $dN/dlogD_p/cm^3$ per second at 240 nm maximum
Number of measurements	5
Position of mask	Outer side (colored/smooth/marked) towards aerosol inlet
Condition of mask	Condition at arrival

5. Results

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 (1µm)	≥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]
BRULI MY MASK	32.2 [26.2; 38.3]

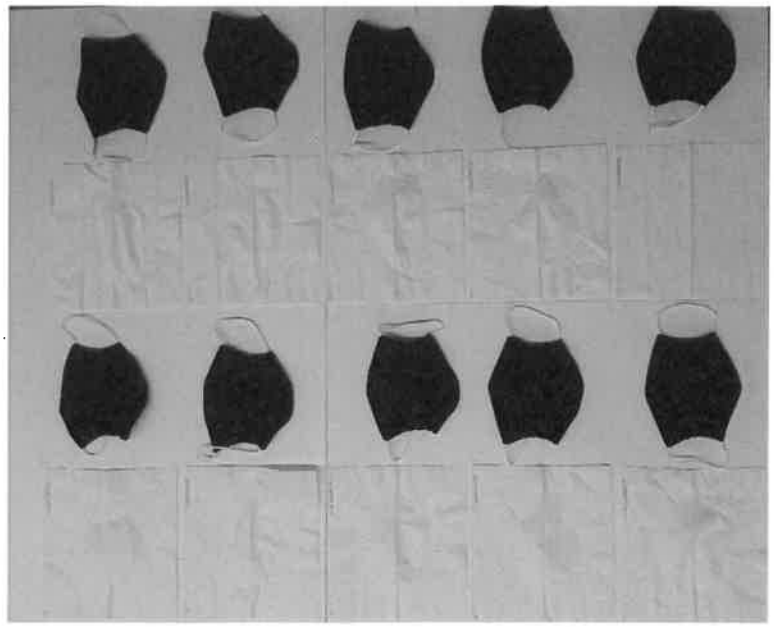
Table 1: Results of pressure difference. The range of measurements indicates the data variation (+/- 1 standard deviation determined for 10 measurements). In case the range of measurements includes the required pressure difference, the requirement is considered as fulfilled. Measurement results that do not meet the requirements are marked yellow.

5.3 Pressure of the splash resistance according to ISO 22609

Art. name	Samples which passed test at splash resistance with pressure of 12kPa
BRULI MY MASK	10 von 10 bestanden

Table 2: Results of splash resistance. Measurement results that do not meet the requirements are marked yellow.

Picture of pressure of splash resistance

BRULI MY MASK Inner side


5.4 Efficiency of particle filtration

Art. Name	Results Efficiency of particle filtration [range of measurements]in % for			
	100 nm	500 nm	1 µm	2 µm
BRULI MY MASK	56.5 [50.2; 62.8]	65.5 [58.9; 72.2]	87.8 [83.2; 92.5]	100.0 [100.0; 100.0]

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. Measurement results that do not meet the requirements are marked yellow.

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 analyzed 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.

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