Forschungs- und Untersuchungs-gesellschaft mbH Aschaffenburg

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Date: 29 June 2018
Our ref.: Za
From: Daniel Zahn

Test Report

Order No.: 8321/2 Page 1 of 6

Client : CHTC JIAHUA NONWOVEN CO.,LTD
No.99,WaGou New Village,
Pengchang,Xiantao ,Hubei ,
CHINA

Date of order: 5 May 2018

Receipt of sample material: 11 May 2018

Origin of sample material: From CHTC Jiahua Nonwoven Co.,Ltd, No.99,WaGou New Village, Pengchang,Xiantao ,Hubei ,China

Purpose: Analysis of a nonwoven sample according to EN868-2 and ISO 11607-1

(Dr. Derra)

(Zahn)
Manager
Physical Material Testing

The present report refers exclusively to the samples as laid out therein, Information and statistical data on the results can be obtained on request.

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Sample Material

For analysis the following sample material was in hand:

Sample Material	Sample Designation
Nonwoven wrapping	Polypropylene SMS Blue Nonwoven 50 g/m^2

Carrying out of the Tests

Examination period: 12 May 2018 to 29 June 2018

The conditioning of the sample material and the examination of the physical characteristics took place in standard atmosphere according to ISO 187 at 23(+/-)℃ and 50 （+/-2） % relative humidity.

The sterilization by steam(134℃), ethylene and H_2O_2-plasma(see section 2 and 3 of this test report) was performed in cooperation with a partner institute.

1. Determination of Physical and Chemical Properties

In order to show compliance to ISO 11607-1,section 5.1.6 c)“physical and chemical properties” as well as to the demands ISO 1107-1, section 5.1.7 b) to 5.1.7 f), the sample was examined according to EN868-2,section 4.2.1 “General requirements” and section 4.2.2.3 “specific requirements-Nonwoven”.
The test regulation s are listed on page 3 of this test report
The number of individual values corresponds to the rules of the test regulations mentioned, regarding chemical analyses, a double determination was carried out.

Result:

The results of the tested parameters to show compliance to
ISO11607-1, section 5.1.6 c) “physical and chemical properties”
Are listed on the following page (page 3 of this test report).

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Compliance to ISO 11607-1,section 5.1.6 c)"physical and chemical properties"

Examination according to EN868-2

Order number:8321/2 **Client: CHTC Jiahua Nonwoven Co., Ltd**
Sample designation: Polypropylene SMS Nonwoven 50 g/m² **Sample arrival date: 10 May 2018**
Testing period: 11 May to 29 June 2018

Parameter	Test Regulation EN868-2	Test result	
		Average value	Standard deviation
General requirements			
Visual test	ISO 11607, sect.5.1.7 b) & d)	No objections	
Colour	Sect. 4.2.1.1, ISO6588-2	blue	
Grammage* -difference to nominal value	Sect. 4.2.1.2,DIN EN ISO 536	49.3 g/m² -1.3%	1.82 g/m²
Ph-value*	Sect. 4.2.1.3, ISO 6588-2	6.8	0.03
Mass portion -chloride* -sulphate*	 Sect. 4.2.1.4, ISO 9197 Sect. 4.2.1.5, ISO 9198	 <0.002% NaCl <0.002% Na_2SO_4	 --- ---
Fluorescent Substances* Brightening effect	Sect. 4.2.1.6,Annex B	No spots > 1mm/0.01m² <1%	
Drapability* -side A -side B	Sect. 4.2.1.7, ISO 9073-9, Method A, Φ=36 cm	 83% 82%	 2.7% 2.6%
Specific requirements-Nonwoven wrapping material			
Tearing resistance* -machine direction -cross direction	Sect. 4.2.2.3.1, ISO 1974	 5211 mN -----[2] mN	 875 mN -----mN
Bursting strength(dry)*	Sect. 4.2.2.3.2, DIN ISO 3689	>150 kPa	
Bursting strength (wet)*	sect. 4.2.2.3.3	>145 kPa	
Elongation at break(dry)* -machine direction -cross direction	Sect. 4.2.2.3.4, DIN EN ISO 1924-2	 112% 92%	 8.7% 14%
Hydrostatic pressure test[1] -side A -side B	Sect. 4.2.2.3.5, EN 20811	 570 mm 529 mm	 41.2 mm 101 mm
Tensile strength (dry)* -machine direction -cross direction	Sect. 4.2.2.3.6, DIN EN ISO 1924-2	 2.07 kN/m 1.07 kN/m	 0.06 kN/m 0.09 kN/m
Tensile strength (wet)* -machine direction -cross direction	Sect.4.2.2.3.7, DIN ISO 3781	 2.08 kN/m 1.07 kN/m	 0.16 kN/m 0.10 kN/m

1) This examination was performed in cooperation with a partner institute

2) Determination in cross direction net possible, All specimen only tear in machine direction.

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2 . Determination of the Microbial Barrier

In order to show compliance to ISO 11607-1,section 5.1.6 a) “microbial barrier”, the sample was examined according to ISO 11607-1, section 5.2.3, test method DIN 58 953-6 each after sterilization by steam (134℃), ethylene oxide and H_2O_2-plasma.

2.1 Determination of Germ Proofness with Air Permeance*

The determination was performed according to DIN 58 953-6, subclause 4. Each after sterilization by stem((134℃), ethylene oxide and H_2O_2-plasma the sample material was contaminated with the test germ on both sides.

Result:

Sterilization-Test side	Number of CFU/specimen										
	1	2	3	4	5	6	7	8	9	10	Σ
Ethylene oxide-side A:	1	0	0	0	0	0	0	0	0	0	1
side B	1	1	0	1	0	0	1	0	0	0	4
H_2O_2-Plasma-side A:	1	0	0	0	0	0	0	0	0	0	1
side B	1	0	2	0	1	0	0	0	0	0	4

CFU=colony forming unit

2.2 Determination of Germ Proofness under Humidity*

The determination was performed according to DIN 58-983-6, subclause 3. Each after sterilization by steam (134℃), ethylene oxide and H2O2-plasma the sample material was contaminated with the test germ on both sides.

Result:

Sterilization-Test side	Number of CFU/agar plate					
	1	2	3	4	5	Σ
Ethylene oxide-side A:	0	0	0	0	0	0
side B	0	0	0	0	0	0
H_2O_2-Plasma-side A:	0	0	1	0	0	1
side B	0	0	0	0	0	0

CFU=Colony forming unit

According to DIN 58953-6, section 3.7.3,a re-examination had to be performed on side A of the material sterilized by H_2O_2-Plasma due to a total number of CFU between 1 and 5.

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Result of the re-examination:

Sterilization- Test side	Number of CFU/ agar plate																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Σ
H_2O_2-Plasma-																					
side A:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
side B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CFU=Colony forming unit

Evaluation of the Microbial Barrier:

The sample material submitted for analysis was examined for its germ proofness under humidity and with air permeance after sterilization by ethylene oxide and after sterilization by H_2O_2-Plasma and is evaluated as “sufficiently germ-proof” according to DIN 58 953-6, subclause 3.7 and subclause 4.7.6.

3. Determination of Compatibility with the Sterilization Processes

In order to show compliance to ISO 11607-1, section 5.1.6 e)”compatibility with respect to the intended sterilization processes”, the sample was examined according to EN 868-2, section 4.2.2.3.4,4.2.2.3.6,4.2.2.3.7 and in analogy with DIN EN 646(without test simulants) each after sterilization by steam(134℃), ethylene oxide and H2O2-plasma.

Compliance to ISO 11607-1, section 5.1.6 e) “compatibility with respect to the intended sterilization processes” Examination according to EN 868-2

Order number:8321/2 **Client: CHTC Jiahua Nonwoven Co., Ltd**
Sample designation: Polypropylene SMS Nonwoven 50 g/m² **Sample arrival date: 5 May 2018**
Testing period: 6 May to 29 June 2018

Parameter	Test Regulation EN 868-2	Sterilization	Test result	
Visual test	ISO 11607-1 Sect. 5.1.7 b)&d)	Steam: Ethylene oxide: H_2O_2-Plasma	No objections No objection s No objections	
Colour fastness*	DIN EN 646 (without test simulants)	Steam: Ethylene oxide: H_2O_2-Plasma	5 [1)] 5 [1)] 5 [1)]	
			Average value	Standard dev.
Elongation at break(dry)* -machine direction	Sect. 4.2.2.3.4 DIN EN ISO 1924-2	Steam: Ethylene oxide: H_2O_2-Plasma	43% 106% 105%	3.9% 7.9% 6.9%
-cross direction		Steam: Ethylene oxide: H_2O_2-Plasma	42% 89% 90%	4.6% 10% 12%

Tensile strength (dry)*	Sect. 4.2.2.3.6	Steam:	1.85 kN/m	0.10 kN/m
-machine direction	DIN EN ISO 1924-2	Ethylene oxide:	2.00 kN/m	0.13 kN/m
		H_2O_2-Plasma	2.03 kN/m	0.11 kN/m
-cross direction		Steam:	0.93 kN/m	0.09 kN/m
		Ethylene oxide:	1.09 kN/m	0.09 kN/m
		H_2O_2-Plasma	1.08 kN/m	0.08 kN/m
Tensile strength (wet)*	Sect. 4.2.2.3.7	Steam:	1.92 kN/m	0.12 kN/m
-machine direction	DIN EN ISO 3781	Ethylene oxide:	2.16 kN/m	0.12 kN/m
		H_2O_2-Plasma	2.07 kN/m	0.14 kN/m
-cross direction		Steam:	0.93 kN/m	0.08 kN/m
		Ethylene oxide:	1.11 kN/m	0.06 kN/m
		H_2O_2-Plasma	1.07 kN/m	0.09 kN/m

1) Distinction is made between five evaluation grades, 1 means poor and 5 good fastness

The accreditation (Register no. D-PL-1416-01-10 and D-PI-1416-01-02) applies to the methods marked with* in the test report. **End of report.**