Test Report

SOL MA
213-152, Hwahap-ro387 beon-gil, Nam-myeon,
Yangju-si, Gyeonggi-do,
Korea

The following sample(s) was/were submitted and identified by/on behalf of the client as:-

SGS File No.	:	AYSA20-09166
Sample Description	:	ONE SAMPLE OF 66 % POLYESTER 24.3 % ANTIBACTERIAL POLYESTER 7 % POLYURETHANE 2.7 % NYLON COPPER CONDUCTIVE YARN ANTIBACTERIAL MASK FABRIC(CHILD)
Color	:	MELANGE
Style no./Item no.	:	N/A
Order No.	:	N/A
Country of Origin	:	KOREA
Country of Destination	:	N/A
Proposed care Instruction	:	N/A
Received Date	:	2020. 04. 29
Test Period	:	2020. 04. 29 to 2020. 05. 25
Purpose of Test Report	:	For Self Reference.
Test Method	:	Please refer to next page(s).
Test Results	:	Please refer to next page(s).
Report Comments	:	The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report is not related to Korea Laboratory Accreditation Scheme.
Result summary	:	Selected test(s) as requested by client

SGS Korea Co., Ltd.

Daesung Lee / Technical Manager

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Test Conducted	Results	
	FACE	BACK

Color Fastness to Washing, Grade

Test Method: ISO 105-C06:2010, A2S; Machine wash at 40 ℃ with 'ECE' reference detergent & sodium perborate with 10 steel balls

Color change	4-5	4-5
Stain (Acetate)	4-5	4-5
(Cotton)	4-5	4-5
(Nylon)	4-5	4-5
(Polyester)	4-5	4-5
(Acrylic)	4-5	4-5
(Wool)	4-5	4-5
Self-Staining	N/A	5

<Note> Grey Scale Rating is based on the 5-step scale of 1 to 5, where 1 is bad and 5 is good.

Color Fastness to Rubbing, Grade

Test Method: ISO 105-X12:2016, (Long direction: oblique, Download force: (9 ± 0.2) N), Size of rubbing finger: 16 mm dia.

Dry	4-5	4-5
Wet	4-5	4-5

<Note> Grey Scale Rating is based on the 5-step scale of 1 to 5, where 1 is bad and 5 is good.

Color Fastness to Light, Grade

Test Method: ISO 105 B02: 2014 Method 3 modified; Xenon-Arc Lamp in exposure cycle A1 / no flip-flop mode was used

Color change(BW4)	Over 4	4

<Note> Blue Scale Standard

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Test Conducted	Results	
	FACE	BACK
Color Fastness to Perspiration, Grade		
Test Method: ISO 105-E04:2013		
Alkaline		
Color change	4-5	4-5
Stain (Acetate)	4	4
(Cotton)	4-5	4-5
(Nylon)	4	4
(Polyester)	4-5	4-5
(Acrylic)	4-5	4-5
(Wool)	4-5	4
Self-Staining	N/A	5
Acid		
Color change	4-5	4-5
Stain (Acetate)	4-5	4-5
(Cotton)	4-5	4-5
(Nylon)	4-5	4-5
(Polyester)	4-5	4-5
(Acrylic)	4-5	4-5
(Wool)	4-5	4-5
Self-Staining	N/A	5

<Note> Grey Scale Rating is based on the 5-step scale of 1 to 5, where 1 is bad and 5 is good.

Water Repellency, Spray Test		
Test Method: ISO 4920:2012		
Before Washing		
	0	0
	0	0
	0	0

<Note> Nomenclature for rating :
ISO 5 : No sticking or wetting of the specimen
ISO 4 : Slight random sticking or wetting of the specimen face
ISO 3 : Wetting of specimen face at spray points
ISO 2 : Partial wetting of the specimen face beyond the spray points
ISO 1 : Complete wetting of the entire specimen face beyond the spray points
ISO 0: Complete wetting of the entire face of the specimen

Air Permeability, mm/s		
Test Method: ISO 9237: 1995		
	144	136

<Note> Test area : 20 ㎠
Test pressure : 100 pa

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Test Conducted	Results

Dimensional Stability after 1st Washing, %

Test Method: ISO 3759: 2011, ISO 5077: 2007

Procedure No 4H modified; Using horizontal axis, front-loading type machine: Machine wash at 40±3 degree C with 2kg total dry mass (ballast + specimen) and 'ECE' detergent (with sodium perborate + TAED), Flat dry

Length	-1.0
Width	-1.0

<Note> Minus (-) sign means a decrease and plus (+) sign means an increase in dimensions.

Fiber Content, %

Test Method: ISO 1833-2:2006; based on moisture regain weight, Chemical Method.

Polyester	92.1
Elastane	5.5
Nylon	2.4

<Note> Based on IX to Regulation (EU) No 1007/2011, moisture regain of Polyester 1.5 %, Elastane 1.5 % , Nylon 5.75 %

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Test Conducted **Results**

Transmittance or Blocking of Erythemally Weighted Ultraviolet Radiation through Fabrics
(AATCC 183-2010(2014)e2)

(A) –Face

As received

	Dry evaluation	Wet evaluation
Ultraviolet Protection Factor (UPF) :	2000	1999.95
Standard Deviation :	0.00	0.08
Rated UPF :	50+	50+
Protection Category :	Excellent	Excellent
Percent Transmittance, T (UV-A) :	0.005	0.005
Percent Transmittance, T (UV-B) :	0.005	0.005
The Percent Blocking, UV-A :	99.95	99.95
The Percent Blocking, UV-B :	99.95	99.95

(A) –Back

As received

	Dry evaluation	Wet evaluation
Ultraviolet Protection Factor (UPF) :	1996.23	1985.83
Standard Deviation :	2.33	0.56
Rated UPF :	50+	50+
Protection Category :	Excellent	Excellent
Percent Transmittance, T (UV-A) :	0.05	0.06
Percent Transmittance, T (UV-B) :	0.05	0.05
The Percent Blocking, UV-A :	99.95	99.94
The Percent Blocking, UV-B :	99.95	99.95

Test was conducted in wavelength range : 280 ~ 400 nm
Instrument : Labsphere Ultraviolet Transmittance Analyzer UV-2000F
No. of Scans : 6

Remarks :

(1) Ultraviolet Protection Factor (UPF) is the ratio of the average effective ultraviolet radiation (UV-R) irradiance transmitted and calculated through air to the average effective UV-R irradiance transmitted and calculated through fabric.

(2) The limits of the spectral range of ultraviolet radiation are not well defined and may vary according to the user. Committee E-2.12 of the International Commission on Illumination (CIE) distinguishes in the spectral range between 400 and 100 nm :
UV-A : 315 – 400 nm
UV-B : 280 – 315 nm
UV-R : 280 – 400 nm

(3) This method can also be used to determine the UPF of the fabric in stretched state. However, the techniques for stretching the specimens are not part of this method and are addressed in a separate test procedure. It must be noted that stretching the specimens could change the UPF properties.

(4) Refer to ASTM D6603, The UV protection category is determined the UPF values,

UPF 40 or greater	Excellent UV protection
UPF in between 25 to 39	Very Good UV Protection
UPF is between 15 to 24	Good UV protection
UPF less than 15	Unclassification

(5) The listed protection category is for reference only, the market claims for labeling UV-Protection product shall follow “Standard Guide For Labeling UV-Protection Textiles” as stated in ASTM D6603.

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Assessment of Antibacterial Activity

-. Sample: FACE
-. Reference: AATCC 100 – 2019

		Staphylococcus aureus ATCC 6538		*Klebsiella pneumoniae* ATCC 4352	
		CFU	% Reduction	CFU	% Reduction
"0" Contact time		7.4×10^5	-	9.7×10^4	-
control (B) / After 24h		1.4×10^6	-	5.2×10^5	-
Sample After 24h	1st	3.0×10^4	97.8%	<100	>99.9%
	2nd	3.4×10^4	97.5%	<100	>99.9%
	3rd	3.3×10^4	97.7%	<100	>99.9%

<Remark>
1) Sample Size : Diameter (4.8 ±0.1) cm, 5 swatches
2) Inoculum Concentration
Staphylococcus aureus : 2.6×10^5 CFU/mL
Klebsiella pneumoniae : 1.5×10^5 CFU/mL
4) Dilution Medium : Dey Engley broth

Assessment of Antibacterial Activity

-. Sample: BACK
-. Reference: AATCC 100 – 2019

		Staphylococcus aureus ATCC 6538		*Klebsiella pneumoniae* ATCC 4352	
		CFU	% Reduction	CFU	% Reduction
"0" Contact time		3.3×10^5	-	1.3×10^5	-
control (B) / After 24h		1.4×10^6	-	5.2×10^5	-
Sample After 24h	1st	1.8×10^4	98.7%	7.3×10^2	99.9%
	2nd	1.9×10^4	98.6%	8.6×10^2	99.8%
	3rd	1.9×10^4	98.7%	7.4×10^2	99.9%

<Remark>
1) Sample Size : Diameter (4.8 ±0.1) cm, 5 swatches
2) Inoculum Concentration
Staphylococcus aureus : 2.6×10^5 CFU/mL
Klebsiella pneumoniae : 1.5×10^5 CFU/mL
4) Dilution Medium : Dey Engley broth

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Test Sample:

Component List / List of Materials

Sample No.	Component	Material	Color
1	Polyester/Nylon Fabric	Textile	MELANGE+IVORY+ BROWN

pH Value in Textile

Test Method: According to ISO 3071:2020

		Result
	CAS-No.	1
pH value	--	6.6

Note: Extraction medium KCl solution
pH value of extraction medium 5.0 – 7.5
Temperature of the extraction solution 22 ± 2 °C

Free Formaldehyde

Test Method: Textile: With reference to ISO 14184-1:2011. Analysis was performed by UV/VIS spectrophotometer.

		Result
	CAS-No.	1
Formaldehyde	50-00-0	n.d.

Note: n.d. = Not detected
mg/kg = ppm
Reporting limit = 16 mg/kg

Nonylphenol (NP) & Nonylphenol Ethoxylate (NPEO)

Test Method: Textile: With reference to ISO 18254-1:2016. Analysis was performed by HPLC-MS.

		Result
	CAS-No.	1
Nonylphenol (NP)	--	n.d.
Nonylphenol Ethoxylate (NPEO)	--	n.d.

Note: n.d. = Not Detected
mg/kg = ppm
Reporting limit: NP: 3 mg/kg; NPEO: 1 mg/kg

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Azo Dyes (Direct Reduction)

Test Method: Textile: With reference to EN ISO 14362-1:2017. Analysis was conducted by GC-MS/HPLC-DAD.
Determination of 4-aminoazobenzene (CAS No.:60-09-3)-EN ISO 14362-3:2017; with the use of GC-MS/ HPLC-DAD.

		Result
	CAS-No.	1
4-Aminobiphenyl	92-67-1	n.d.
Benzidine	92-87-5	n.d.
4-Chlor-o-toluidine	95-69-2	n.d.
2-Naphthylamine	91-59-8	n.d.
o-Aminoazotoluene	97-56-3	n.d.
5-nitro-o-toluidine / 2-Amino-4-nitrotoluene	99-55-8	n.d.
4-Chloroaniline	106-47-8	n.d.
4-methoxy-m-phenylenediamine / 2,4-Diaminoanisole	615-05-4	n.d.
4,4'-Diaminodiphenylmethane	101-77-9	n.d.
3,3'-Dichlorobenzidine	91-94-1	n.d.
3,3'-Dimethoxybenzidine	119-90-4	n.d.
3,3'-Dimethylbenzidine	119-93-7	n.d.
4,4'-methylenedi-o-toluidine / 3,3'-Dimethyl-4,4'-diaminodiphenylmethane	838-88-0	n.d.
p-Cresidine	120-71-8	n.d.
4,4'-Methylene-bis-(2-chloroaniline)	101-14-4	n.d.
4,4'-Oxydianiline	101-80-4	n.d.
4,4'-Thiodianiline	139-65-1	n.d.
o-Toluidine	95-53-4	n.d.
4-methyl-m-phenylenediamine / 2,4-Toluylendiamine	95-80-7	n.d.
2,4,5-Trimethylaniline	137-17-7	n.d.
4-aminoazobenzene	60-09-3	n.d.
O-Anisidine	90-04-0	n.d.
2,6-Xylidine	87-62-7	n.d.
2,4-Xylidine	95-68-1	n.d.
4-chloro-o-toluidinium chloride+	3165-93-3	n.d.
2-Naphthylammoniumacetate+	553-00-4	n.d.
4-methoxy-m-phenylene diammonium sulphate; 2,4-diaminoanisole sulphate+	39156-41-7	n.d.
2,4,5-trimethylaniline hydrochloride+	21436-97-5	n.d.

Note: n.d. = not detectable
mg/kg = ppm
Reporting limit = 5 mg/kg (for individual compound)

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Azo Dyes (Colorant Extraction)

Test Method: Textile: With reference to EN ISO 14362-1:2017. Analysis was conducted by GC-MS/HPLC-DAD.
Determination of 4-aminoazobenzene (CAS No.:60-09-3)-EN ISO 14362-3:2017; with the use of GC-MS/ HPLC-DAD.

		Result
	CAS-No.	1
4-Aminobiphenyl	92-67-1	n.d.
Benzidine	92-87-5	n.d.
4-Chlor-o-toluidine	95-69-2	n.d.
2-Naphthylamine	91-59-8	n.d.
o-Aminoazotoluene	97-56-3	n.d.
5-nitro-o-toluidine / 2-Amino-4-nitrotoluene	99-55-8	n.d.
4-Chloroaniline	106-47-8	n.d.
4-methoxy-m-phenylenediamine / 2,4-Diaminoanisole	615-05-4	n.d.
4,4'-Diaminodiphenylmethane	101-77-9	n.d.
3,3'-Dichlorobenzidine	91-94-1	n.d.
3,3'-Dimethoxybenzidine	119-90-4	n.d.
3,3'-Dimethylbenzidine	119-93-7	n.d.
4,4'-methylenedi-o-toluidine / 3,3'-Dimethyl-4,4'-diaminodiphenylmethane	838-88-0	n.d.
p-Cresidine	120-71-8	n.d.
4,4'-Methylene-bis-(2-chloroaniline)	101-14-4	n.d.
4,4'-Oxydianiline	101-80-4	n.d.
4,4'-Thiodianiline	139-65-1	n.d.
o-Toluidine	95-53-4	n.d.
4-methyl-m-phenylenediamine / 2,4-Toluylendiamine	95-80-7	n.d.
2,4,5-Trimethylaniline	137-17-7	n.d.
4-aminoazobenzene	60-09-3	n.d.
O-Anisidine	90-04-0	n.d.
2,6-Xylidine	87-62-7	n.d.
2,4-Xylidine	95-68-1	n.d.
4-chloro-o-toluidinium chloride+	3165-93-3	n.d.
2-Naphthylammoniumacetate+	553-00-4	n.d.
4-methoxy-m-phenylene diammonium sulphate; 2,4-diaminoanisole sulphate+	39156-41-7	n.d.
2,4,5-trimethylaniline hydrochloride+	21436-97-5	n.d.

Note: n.d. = not detectable
mg/kg = ppm
Reporting limit = 5 mg/kg (for individual compound)

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Allergenous Disperse Dyes and Carcinogenic

Test Method: With reference to DIN 54231. Analysis was performed with HPLC-DAD-MS.

		Result
	CAS-No.	1
Disperse Blue 1	2475-45-8	n.d.
Disperse Blue 3	2475-46-9	n.d.
Disperse Blue 7	3179-90-6	n.d.
Disperse Blue 26	3860-63-7	n.d.
Disperse Blue 35	56524-77-7 / 56524-76-7	n.d.
Disperse Blue 102	12222-97-8	n.d.
Disperse Blue 106	12223-01-7	n.d.
Disperse Blue 124	61951-51-7	n.d.
Disperse Blue 35	56524-77-7/ 56524-76-6	n.d.
Disperse Brown 1	23355-64-8	n.d.
Disperse Orange 1	2581-69-3	n.d.
Disperse Orange 3	730-40-5	n.d.
Disperse Orange 37/76	13301-61-6	n.d.
Disperse Orange 149	85136-74-9	n.d.
Disperse Red 1	2872-52-8	n.d.
Disperse Red 11	2872-48-2	n.d.
Disperse Red 17	3179-89-3	n.d.
Disperse Yellow 1	119-15-3	n.d.
Disperse Yellow 3	2832-40-8	n.d.
Disperse Yellow 9	6373-73-5	n.d.
Disperse Yellow 23	6250-23-3	n.d.
Disperse Yellow 39	12236-29-2	n.d.
Disperse Yellow 49	54824-37-2	n.d.
Basic Violet 14	632-99-5	n.d.
Disperse Orange 11	82-28-0	n.d.
Basic Red 9	569-61-9	n.d.
Basic Violet 3	548-62-9	n.d.
Solvent Yellow 1	60-09-3	n.d.
4-Dimethylaminoazobenzene (Solvent Yellow 2)	60-11-7	n.d.
Basic Blue 26 (with Michler's ketone >0.1%)	2580-56-5	n.d.
Direct Brown 95	16071-86-6	n.d.
Direct Black 38	1937-37-7	n.d.
Direct Red 28	573-58-0	n.d.
Acid Red 26	3761-53-3	n.d.
Solvent Blue 4	6786-83-0	n.d.
Trityl Alcohol	561-41-1	n.d.
Basic Green 4 (malachite green oxalate)	2437-29-8	n.d.
Basic Green 4 (malachite green chloride)	569-64-2	n.d.
Basic Green 4 (malachite green)	10309-95-2	n.d.

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Solvent Yellow 14	842-07-9	n.d.
Direct Blue 6	2602-46-2	n.d.
Red 151	61968-47-6	n.d.
Yellow 7	6300-37-4	n.d.
Solvent red 23	85-86-9	n.d.
Yellow 56	54077-16-6	n.d.

Note: n.d. = not detected
Reporting limit = 15 mg/kg (each)

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Picture of Sample as Received :

FACE

BACK

AYSA20-09166

*** End of Report ***

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