

## TEST REPORT

**2020CN0355**

### DATE OF RECEPTION

21/05/2020

### DATE TESTS

Starting: 22/05/2020

Ending: 23/06/2020

### APPLICANT

GUANGDONG CONNAUGHT MEDICAL  
TECHNOLOGY CO.,LTD  
2nd floor, east side of building 1, No.2 Road,  
dongpu Indust  
Puning  
Guangdong

### IDENTIFICATION AND DESCRIPTION OF SAMPLES

#### REFERENCES

COVERALL KND-1006

COVERALL KND-1007

### TESTS CARRIED OUT

- ERGONOMICS.
- SIZING.
- REFERENCE TEST METHOD FOR RELEASE OF NICKEL FROM OBJECTS INSERTED INTO PERFORATED PARTS OF THE BODY AND PRODUCTS INTENDED TO COME INTO DIRECT AND PROLONGED CONTACT WITH THE SKIN.
- DETERMINATION OF PH VALUE.
- DETERMINATION OF FORBIDDEN AZO COLORANTS (CANCEROGENIC ARYLAMINES).
- SPECIFIC DESIGN REQUIREMENTS.
- DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS.
- DETERMINATION OF FLEX CRACKING AND CRACK GROWTH.
- DETERMINATION OF TEAR RESISTANCE.
- DETERMINATION OF BREAKING STRENGTH AND ELONGATION.
- PUNCTURE RESISTANCE.
- RESISTANCE TO FLAMING.
- RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY SYNTHETIC BLOOD.
- RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY BLOOD-BORNE PATHOGENS USING PHI-X174.
- SEAM STRENGTH RESISTANCE.
- DETERMINATION OF INWARD LEAKAGE OF AEROSOLS OF FINE PARTICLES INTO SUITS.



## RESULTS

### ERGONOMICS

**Standard**

EN ISO 13688:2013, EN 340:2003 Annex C

**Reference**

COVERALL KND-1006  
COVERALL KND-1007

**Test date**

28/05/2020

**Remark**

The ergonomics verification has been performed by physical dimensions commensurate with the size found.

According to the inspection of the garment, this fulfills ergonomics requirement.

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## RESULTS

### SIZING

#### Standard

EN ISO 13688:2013 Apdo. 6

#### Test uncertainty

The test uncertainty is  $\pm 1\%$  of the measurand's value, for a coverage value of  $K=2$  (95%)

#### Size

XXL

Reference	Coverall KND-1006	
Bust girth (cm)	Arm height (cm)	Total height (cm)
134,0	72,0	171,0

#### Size

XXL

Reference	Coverall KND-1007	
Bust girth (cm)	Arm height (cm)	Total height (cm)
134,0	72,0	164,0

#### Start and finish test date

29/05/2020 - 29/05/2020

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## RESULTS

### REFERENCE TEST METHOD FOR RELEASE OF NICKEL FROM OBJECTS INSERTED INTO PERFORATED PARTS OF THE BODY AND PRODUCTS INTENDED TO COME INTO DIRECT AND PROLONGED CONTACT WITH THE SKIN

#### Standard

UNE-EN 1811:2011+A1:2016

#### Start date test

25/05/2020 End date test 01/06/2020

Zipper Test surface 2 cm<sup>2</sup> Test volume 25 ml

#### Method L.C.

5 ppb

Reference	Nickel liberation (µg/cm <sup>2</sup> /week)	Compliance	Uncertainty experimental
COVERALL KND-1006	Reply 1 < 0,1    Reply 2 < 0,1    Reply 3 < 0,1	PASS	± 0,26

According to the norm and due to the combined uncertainty of measurement of 46%, the samples analyzed, with a migration limit of 0.5 µg/cm<sup>2</sup>/week, do not meet the standard when the nickel release is greater than or equal to 0, 88 µg/cm<sup>2</sup>/week. Articles whose result is inferior must be accepted. In the case of a migration limit of 0.2 µg/cm<sup>2</sup>/week, the result should be greater than or equal to 0.35 µg/cm<sup>2</sup>/week

#### Remark

According to European Parliament and Council Regulation (CE) No 1907/2006 (REACH), the rate of nickel release shall not be greater than 0,5 µg/cm<sup>2</sup>/week

According to UNE-EN 12472:2006+A1:2010, the reference underwent accelerated wear and corrosion tests for the detection of nickel release from coated items.

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## RESULTS

### DETERMINATION OF PH VALUE

**Standard**

EN ISO 3071:2006

**Determination date**

26/05/2020

**Extractor solution**A - H<sub>2</sub>O**pH Extractor solution**

21,0

**Temperature**

6.80 °C

Reference	pH	Uncertainty
COVERALL KND-1006	9.30	± 5 %

**REQUISITE**

In accordance with Standard EN ISO 13688:2013, the pH value shall be greater than 3.5, and less than 9.5.

**PASS**

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## RESULTS

### DETERMINATION OF FORBIDDEN AZO COLORANTS (CANCEROGENIC ARYLAMINES)

**Standard**

UNE-EN 14362-1:2017

**Test Methods**

GC/MSD

**Apparatus**

Gas Chromatograph 7890A

**Uncertainty**

± 9 mg/Kg

**Detectors**

Mass Spectrometer 5975C

Reference	Results
COVERALL KND-1007 (BLUE PIPPING)	< 30* mg/Kg

\*For all forbidden azo dyes listed below.

The textile products subject to control are according to the Standard EN ISO 13688:2013 on the use of Azo Colorants which release carcinogenic amines listed in the Standard Test

**PASS**

**Forbidden Azo dyes**

4-Aminodiphenyl, Benzidine, 4-Chlor-o-toluidine, 2-Naphthylamine, o-Aminoazotoluene, 2-Amino-4-nitrotoluene, p-Chloraniline, 2,4-Diaminoanisole, 4,4'-Diaminodiphenylmethane, 3,3'-Dichlorobenzidine, 3,3'-Dimethoxybenzidine, 3,3'-Dimethylbenzidine, 3,3'-Dimethyl-4,4'-diaminodiphenylmethane, p-Cresidine, 4,4'-Methylene-bis-2-chloraniline, 4,4'-Oxydianiline, 4,4'-Thiodianiline, o-Toluidine, 2,4-Toluylenediamine, 2,4,5-Trimethylaniline, o-Anisidine, 4-Aminoazobenzene

**REQUISITE**

In accordance with standard EN ISO 13688:2013, by detecting Azo colorants the limited established is not detected by standard EN 14362-1

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## RESULTS

### SPECIFIC DESIGN REQUIREMENTS

#### REFERENCE

COVERALL KND-1006  
COVERALL KND-1007

#### STANDARD

EN 340:2003 and EN ISO 13688:2013

#### DESIGN REQUIREMENTS

The protection clothing design makes easy its correct placement and wearing staying with no movement during the use period intended.	PASS
The design of the protective clothing applies elements from other protective or equipment clothing, which are used to create a comprehensive protective outfit.	PASS
The clothing has no rough, sharp or hard surfaces or edges that could damage or irritate the user.	PASS
The clothing is not enough narrow for causing flow blood restriction.	PASS
The clothing is not enough loose and heavy for interfering the user's movement.	PASS

#### Remark

N/A: Not applicable

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## RESULTS

### SPECIFIC DESIGN REQUIREMENTS

#### REFERENCE

COVERALL KND-1006  
COVERALL KND-1007

#### STANDARD

EN 14126:2003/AC, punto / point 4.3

#### DESIGN REQUIREMENTS

Protective clothing against infective agents meets the requirements that apply of the Standard ISO 13688:2013	PASS
Protective clothing against infective agents meets the requirements specified in the appropriate chemical protection Standard	PASS
The garment allows the user to move freely, in as much comfort as possible, in accordance with the protection the garment provides.	PASS

#### Remark

N/A: Not applicable

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## RESULTS

### SPECIFIC DESIGN REQUIREMENTS

#### REFERENCE

COVERALL KND-1006  
COVERALL KND-1007

#### STANDARD

EN ISO 13982-1:2004/A1:2010, point 4.3

#### DESIGN REQUIREMENTS

The type 5 chemical protection clothing meets the general requirements of the Standard EN 340:2003	PASS
The clothing at least protects the torso, the arms and the legs, and is a one piece overall or a two piece suit.	PASS
The garment allows the user to move freely, in as much comfort as possible, in accordance with the protection the garment provides.	PASS

#### Remark

N/A: Not applicable

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## RESULTS

### DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS

#### Standard

EN ISO 12947-2:2016

#### Apparatus

Martindale Abrasion Tester

Conditioning date

22/05/2020

Test date

27/05/2020

#### Atmosphere for conditioning and testing according accordance EN ISO 139:2005/A1:2011

Temperature

(20±2) °C

Relative humidity

(65±4) %

#### Testing conditions

Abrasive paper Trizact Grit A65

#### Technical characteristics of the sample

Not indicated by the client

#### Testing pressure

9 kPa

#### End point

Specimen breakdown

#### Reference

COVERALL KND-1006

Specimens	No. of cycles in the inspection interval before the end of the test is reached
1	100 < n < 400
2	100 < n < 400
3	100 < n < 400
4	100 < n < 400
<b>Lowest individual result</b>	<b>100 &lt; n &lt; 400</b>

#### Remarks

The end test is performed by hydrostatic head end-point determination, according standard EN 14325:2018, point 4.4.2.3.

#### REQUISITE ACCORDING STANDARD EN 14126:2003

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 10 cycles	> 40 cycles	> 100 cycles	> 400 cycles	> 1000 cycles	> 2000 cycles

**PERFORMANCE LEVEL 3**

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## RESULTS

### WATER PENETRATION RESISTANCE. TEST UNDER HYDROSTATIC PRESSURE

#### Standard

EN 20811:1992 (Obsolete)

#### Apparatus

Hydrostatic Head Tester

#### Atmosphere for conditioning and testing

Temperature (20±2) °C      Relative humidity (65±4) %

#### Water temperature

20 °C

#### Rate of increase of water pressure

10 cm H<sub>2</sub>O/min ((980±50)Pa/min)

#### Surface exposed

External side

#### After abrasion test

According to standard EN 14325:2018 pto. 4.4.

Reference	Specimen	Pressure (mm/H <sub>2</sub> O)
COVERALL KND-1006	1	>200
	2	>200
	3	>200
	4	>200

#### Remark

The edition of the standard used, does not correspond to the latest version released.

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## RESULTS

### DETERMINATION OF FLEX CRACKING AND CRACK GROWTH

#### Standard

EN ISO 7854:1997 Method B

#### Used apparatus

Crumpleflex equipment.

#### Number of specimens

6

#### Test temperature

23,0 °C and 50,0 % RH

Reference Specimen	COVERALL KND-1006	
	Direction	Flex cycles
Specimen 1	Warp	100000
Specimen 2	Warp	100000
Specimen 3	Warp	100000
Specimen 4	Weft	100000
Specimen 5	Weft	100000
Specimen 6	Weft	100000

#### Remark:

According to EN 14126: 2003/AC: 2004, the mechanical requirements must be tested and classified according to EN 14325: 2018 point 4.5.2.1.

**PERFORMANCE LEVEL ACCORDING TO STANDARD EN 14325:2018 LEVEL 6**

Classification of resistance to flex cracking according to Standard EN 14325: 2018 point 4.5.2.1.

Performance levels	Cycles
6	> 50000
5	> 20000
4	> 8000
3	> 3000
2	> 1250
1	> 500

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## RESULTS

### Requirements according to Standard EN ISO 13982-1:2004+A1:2010

According the standard EN ISO 13982-1:2004+A1:2010 The materials of type 5 chemical protective clothing must be tested and classified in accordance with the provisions of EN 14325: 2004 pto. 4.5.

**PERFORMANCE LEVEL ACCORDING TO STANDARD EN 14325:2018      LEVEL 6**

### Classification of resistance to flex cracking according to Standard EN 14325:2004

Performance levels	Cycles
6	> 100000
5	> 40000
4	> 15000
3	> 5000
2	> 2500
1	> 1000

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## RESULTS

### DETERMINATION OF FLEX CRACKING AND CRACK GROWTH

**Standard**

EN ISO 7854:1997 Method B

**Used apparatus**

Crumpleflex equipment.

**Number of specimens**

6

**Test temperature**

-30,0 °C

Reference Specimen	COVERALL KND-1006	
	Direction	Flex cycles
Specimen 1	Warp	> 4000
Specimen 2	Warp	>4000
Specimen 3	Warp	>4000
Specimen 4	Weft	>4000
Specimen 5	Weft	>4000
Specimen 6	Weft	>4000

**Remark:**

According to EN 14126: 2003/AC: 2004, the mechanical requirements must be tested and classified according to EN 14325: 2018 point 4.6.

**PERFORMANCE LEVEL ACCORDING TO STANDARD EN 14325:2018    LEVEL 6**

**Classification of resistance to flex cracking according to Standard EN 14325: 2018 point 4.6.**

Performance levels	Cycles
6	> 4000
5	> 2000
4	> 1000
3	> 500
2	> 200
1	> 100

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## RESULTS

### Requirements according to Standard EN ISO 13982-1:2004+A1:2010

According to the standard EN ISO 13982-1:2004+A1:2010 The materials of type 5 chemical protective clothing must be tested and classified in accordance with the provisions of EN 14325: 2004 pt. 4.6.

**PERFORMANCE LEVEL ACCORDING TO STANDARD EN 14325: 2004    LEVEL 6**

### Classification of resistance to flex cracking according to Standard EN 14325:2004

Performance levels	Cycles
6	> 4000
5	> 2000
4	> 1000
3	> 500
2	> 200
1	> 100

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## RESULTS

### DETERMINATION OF TEAR RESISTANCE

#### Standard

EN ISO 9073-4:1997

#### Apparatus

INSTRON Dynamometer

Conditioning date

22/05/2020

Test date

08/06/2020

#### Atmosphere for conditioning testing

Temperature (20±2) °C

Relative humidity

(65±2) %

#### N° of specimens

Tested 5 for each direction

Rejected

0

#### The calculation of averages has been made

For electronic device

#### Reference

COVERALL KND-1006

Tear	Average load (N)	C.V. (%)
Lengthwise	78.30	5.36
	79.41	
	84.44 81.30	
	87.28	
	77.08	
Crosswise	56.48	7.80
	57.43	
	50.25 53.27	
	47.72	
	54.47	

#### REQUISITE ACCORDING TO STANDARD EN ISO 13982-1:2004/A1:2010

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>10N	> 20N	> 40N	> 60N	> 100N	> 150N

PERFORMANCE LEVEL 3

#### REQUISITE ACCORDING TO STANDARD EN 14126:2003/AC:2004

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>10N	> 20N	> 40N	> 60N	> 100N	> 150N

PERFORMANCE LEVEL 3

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## RESULTS

### DETERMINATION OF BREAKING STRENGTH AND ELONGATION

**Standard**

EN ISO 13934-1:2013

**Apparatus**

INSTRON Dynamometer

**Conditioning date**

22/05/2020

**Test date**

01/06/2020

**Atmosphere for conditioning testing**
**Temperature**

(20±2) °C

**Relative humidity**

(65±4) %

**Gauge length**
**Lengthwise**

100 mm.

**Crosswise**

100 mm.

**Test velocity**
**Lengthwise**

100 mm/min

**Crosswise**

100 mm/min

**Pretension**
**Lengthwise**

2 N

**Crosswise**

2 N

**N° of specimens**
**Tested**

5 for each direction

**Rejected**

0

**State of the specimens**

Conditioned

**Reference**

COVERALL KND-1006

Direction	Maximum average load (N)	C.V. (%)	Average elongation (%)	C.V. (%)
Lengthwise	83	6.0	92.0	17.0
	96		125	
	84 87		83.0 105	
	88		122	
	85		104	
Crosswise	62.0	5.0	140	7.8
	66.0		159	
	65.0 63.0		149 143	
	59.0		136	
	62.0		131	

**Remark**

The relative expanded uncertainty of Tensile strength resistance is ±5% assay value of the measured, for a probability of coverage of 95%.

**REQUISITE ACCORDING TO STANDARD EN 14126:2003/AC:2004**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>30N	> 60N	> 100N	> 250N	> 500N	> 1000N

<b>PERFORMANCE LEVEL 1</b>
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## RESULTS

### PUNCTURE RESISTANCE

**Standard**

EN 863:1995

**Apparatus**

INSTRON Dynamometer

**Conditioning date**

22/05/2020

**Test date**

08/06/2020

**Atmosphere for conditioning testing**
**Temperature** (20±2) °C

**Relative humidity**

(65±5) %

**Type of fabric**

Coated fabric

**Previous treatment**

Null

Reference	Maximum force (N)	Average resistance (N)
COVERALL KND-1006	7,08	7,76
	7,65	
	8,46	
	7,28	
	8,32	

**Remark**

The relative expanded uncertainty of puncture resistance is ±11% assay value of the measured, for a probability of coverage of 95%.

**REQUISITE ACCORDING TO STANDARD EN 13982-1:2004/A1:2010**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>5N	> 10N	> 50N	> 100N	> 150N	> 250N

<b>PERFORMANCE LEVEL 1</b>
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**REQUISITE ACCORDING TO STANDARD EN 14126:2003/AC:2004**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
>5N	> 10N	> 50N	> 100N	> 150N	> 250N

<b>PERFORMANCE LEVEL 1</b>
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## RESULTS

### RESISTANCE TO FLAMING

**Standard**

EN 13274-4:2001 (Method 3). Moving burner test

**Apparatus**

PROTERMIC-TX 13043II2

**Verification of the apparatus**

Application flame. The thermometer submitted to test is mounted so that it she could go on across a flame to a temperature  $(800 \pm 50)$  °C to a speed of  $(60 \pm 5)$  mm/s

**Test date**

25/05/2020

**Conditioned**

24h. in indoor ambiantal conditions at  $(20 \pm 2)$  °C and  $(65 \pm 5)$  % RH

**Ambient conditions test**

23,7°C and 53,4% RH

**Gas used**

Propane

**Observation or deviation from the standard**

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**Face exposed to the flame**

Outer surface

**Uncertainty of test**

$\pm 0.06$  s

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## RESULTS

**Reference** COVERALL KND-1006

**Pre-Treatment** As received

Specimen	1	2	3
After flame time (s)	0,0	0,0	0,0
Swollen drops	No	No	No

**Remark:**

According to EN 14126: 2003/AC: 2004, the flammability requirements must be tested and classified according to EN 14325: 2018.

**PERFORMANCE LEVEL ACCORDING TO STANDARD EN 14325:2018      PASS**

**Requirements according to EN 14325:2018:**

According to point 4.14 of the Standard EN 14325:2018: all tests specimens of the protective clothing material shall not form droplets and shall prove to be "self-extinguishing", i.e. it shall not be of a high flammable nature and shall not continue to burn for more than 5 s after removal from the flame

**ACCORDING TO STANDARD EN 13982-1:2004+A1:2010      PASS**

**Requirements according to EN 13982-1:2004+A1:2010**

"The material of the protective clothing must not melt and the residual flame must not be > 5 s".

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## RESULTS

### PERFORMANCE LEVEL

Specimen	As recived specimen (mbar)	Sample after resistance to inflammation without stopping (mbar)	Difference (mbar)
Specimen 1	10	< 5	> 5
Specimen 2	10	< 5	> 5
Specimen 3	10	< 5	> 5

ACCORDING TO STANDARD EN 14325:2004

NO PASS

Level	Exposure to flame
3	The sample is exposed to the flame for 5 s
2	The sample is exposed to the flame for 1 s
1	The sample passes over the flame without stopping

#### Requirements according to EN 14325:2004 point 4.15:

“The difference in pressure change between a new sample and one subjected to the inflammation test should not exceed 100 Pa (1 mbar) in 1 minute”

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## RESULTS

### RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY SYNTHETIC BLOOD

Standard: ISO 16603:2004 Procedure: C

Principle:

A specimen is subjected to a body fluid stimulant (synthetic blood) for a specified time and pressure sequence. A visual observation is made to determine when, or if, penetration occurs. Any evidence of synthetic blood penetration constitutes failure. Results are reported as PASS / FAIL.

In the method, the specimen is inserted in the penetration cell with the normal outside surface of the textile towards the cell reservoir which is further filled with synthetic blood. The other face is in contact with retaining screen (which ensures a good bearing of the textile during the pressure application).

The pressure application procedure is the following:

- 0 KPa for 5 min
- 1,75 KPa for 5 min
- 3,5 KPa for 5 min
- 7 KPa for 5 min
- 14 KPa for 5 min
- 20 KPa for 5 min

Test date: 2/06/2020

Environmental condition: 21 °C and 39 % H.R

Tested side: External side

Pretreatment: ---



## RESULTS

### RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY SYNTHETIC BLOOD

Results:

Reference of the sample	COVERALL KND-1006		
Results	Replicate 1	Replicate 2	Replicate 3
0 KPa for 5 min	PASS	PASS	PASS
1,75 KPa for 5 min	PASS	PASS	PASS
3,5 KPa for 5 min	PASS	PASS	PASS
7 KPa for 5 min	PASS	PASS	PASS
14 KPa for 5 min	PASS	PASS	PASS
20 KPa for 5 min	PASS	PASS	PASS
Retaining screen specifications	Not used		



## RESULTS

### RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY BLOOD-BORNE PATHOGENS USING Phi-X174

**Standard:** ISO 16604:2004.

**Procedure:** C.

**Principle:**

In the method, the material is placed in the test cell. The good side of the test material is directly in contact with a suspension of bacteriophage (phi-X174) After assembly, the cell is placed in the apparatus as defined in the standard and the corresponding pressure is applied:

- 5 minutes in contact without pressure application.
- 5 minutes at 20 kPa.

End of test, the sample surface that has not been in contact with the bacteriophage suspension is clarified. The rinsing liquid is then placed on an agar plate which has previously been inoculated with *Escherichia coli* (used as host bacteria of bacteriophage). The plates are incubated for 24 hours at 37 ° C, the presence of colonies on the agar surface means that the bacteriophage has passed through the sample.

Results are expressed in the form: PASS or FAIL test. The detection of only one plaque constitutes a failure of the textile.

**Date test:** 05/06/2020 – 09/06/2020

**Sample reference:** Disposable protection coverall referenced according to customer

**Dimension of the test specimens:** 7,5 cm x 7,5 cm.

**Bacteriophage:** Bacteriophage Phi-X174 (ATCC 13706-B1).

**Host bacteria of the used of bacteriophage:** *Escherichia Coli* (ATCC 13706).

**Retaining screen:** not use.



## RESULTS

### RESISTANCE OF MATERIALS USED IN PROTECTIVE CLOTHING TO PENETRATION BY BLOOD-BORNE PATHOGENS USING Phi-X174

#### Results:

Reference	<u>Test 1</u>	<u>Test 2</u>	<u>Test 3</u>
Coverall KND-1006	PASS (-)	PASS (-)	PASS (-)
<b>Negative Control</b>	(-)	(-)	(-)
<b>Positive Control</b>	(+)	(+)	(+)

#### Remarks:

- Symbols used in the table of results meaning the following:

(+) = Penetration of bacteriophages.

(-) = No penetration of bacteriophages.

- In accordance with the standard point 4.1.4.1, the product should be classified as **CLASS 6** according with the following table:

Table of classification of resistance to penetration of contaminated liquids under hydrostatic pressure.

Class	Hydrostatic pressure at which the material passes the test
6	20 kPa
5	14 kPa
4	7 kPa
3	3,5 kPa
2	1,75 kPa
1	0 kPa <sup>a</sup>

<sup>a</sup> Means that the material is only exposed to the hydrostatic pressure of the liquid in the test cell.



## RESULTS

### SEAM STRENGTH RESISTANCE

**Standard**

EN ISO 13935-2:2014

**Apparatus**

INSTRON Dynamometer

**Conditioning date**

22/05/2020

**Test date**

01/06/2020

**Gauge length**

100 mm

**Atmosphere for conditioning and testing**

Temperature	(20±2) °C	Relative Humidity (H.R.)	(65±4) %
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**N° of specimens**

Tested	5	Rejected	0
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**The break of the seam is produced for:**

Torn fabric in the clamp

Reference	Specimens	Maximum force to seam rupture (N)		C.V. (%)
<b>COVERALL KND-1006</b>	1	1108.45	<b>100.85</b>	7.94
	2	102.40		
	3	108.12		
	4	94.68		
	5	90.60		

**Remark**

The relative expanded uncertainty of Seams resistance is ±6% assay value of the measured, for a probability of coverage of 95%.

**REQUISITE ACCORDING STANDARD EN ISO 13982-1:2004/A1:2010**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 30N	> 50N	> 75N	> 125N	> 300N	> 500N

<b>PERFORMANCE LEVEL 3</b>
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**REQUISITE ACCORDING STANDARD EN 14126:2003/AC:2004**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 30N	> 50N	> 75N	> 125N	> 300N	> 500N

<b>PERFORMANCE LEVEL 3</b>
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## RESULTS

### SEAM STRENGTH RESISTANCE

**Standard**

EN ISO 13935-2:2014

**Apparatus**

INSTRON Dynamometer

**Conditioning date**

22/05/2020

**Test date**

01/06/2020

**Gauge length**

100 mm

**Atmosphere for conditioning and testing**

Temperature	(20±2) °C	Relative Humidity (H.R.)	(65±4) %
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**N° of specimens**

Tested	5	Rejected	0
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**The break of the seam is produced for:**

Torn fabric in the clamp

Reference	Specimens	Maximum force to seam rupture (N)	C.V. (%)
COVERALL KND-1007	1	115.35	6.58
	2	106.18	
	3	110.79	
	4	126.45	
	5	113.79	
		114.51	

**Remark**

The relative expanded uncertainty of Seams resistance is ±6% assay value of the measured, for a probability of coverage of 95%.

**REQUISITE ACCORDING STANDARD EN ISO 13982-1:2004/A1:2010**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 30N	> 50N	> 75N	> 125N	> 300N	> 500N

<b>PERFORMANCE LEVEL 3</b>
----------------------------

**REQUISITE ACCORDING STANDARD EN 14126:2003/AC:2004**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 30N	> 50N	> 75N	> 125N	> 300N	> 500N

<b>PERFORMANCE LEVEL 3</b>
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## RESULTS

### DETERMINATION OF THE ABRASION RESISTANCE OF FABRICS

**Standard**

EN 530:2010 Method 2

**Apparatus**

Martindale Abrasion Tester

**Conditioning date**

22/05/2020

**Test date**

27/05/2020

**Atmosphere for conditioning testing**
**Temperature** (20±2) °C

**Relative humidity**

(65±4) %

**Testing conditions**

Rubbing against abradant paper 00

**Testing pressure**

9kPa

**End point**

Hole

**Technical characteristics of the sample**

Not indicated by the client

**Previous treatment**

Null

**Reference**

COVERALL KND-1006

Specimens	Nº of cycles (n)
1	500<n<1000
2	500<n<1000
3	500<n<1000
4	500<n<1000

**Remarks**

The end test is performed by visual inspection.

The number of cycles corresponding to the rupture of the specimen.

The performance level is among the most unfavorable value of the pieces tested

**REQUISITE ACCORDING STANDARD EN 13982-1:2004/A1:2010**

LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4	LEVEL 5	LEVEL 6
> 10 cycles	> 100 cycles	> 500 cycles	> 1000 cycles	> 1500 cycles	> 2000 cycles

<b>PERFORMANCE LEVEL 3</b>
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## RESULTS

### DETERMINATION OF INWARD LEAKAGE OF AEROSOLS OF FINE PARTICLES INTO SUITS

**Standard**

EN ISO 13982-2:2004

**Test date**

11/06/2020 – 12/06/2020

**Reference**

COVERALL KND-1006

The physical dimensions of the wearers are shown below

Wearer	Height (m)	Chest (cm)	Size of the suit
BOJ	1.82	101	XXL
JES	1.80	101	XXL
JUA	1.81	105	XXL
PAB	1.82	106	XXL
PEI	1.80	100	XXL

**Pre-treatment**

As received

**Description of the suit**

The suit is a white material one-piece hooded coverall incorporating elasticated wrists, waist, ankles and hood. There is a single action zip at the front of the suit, which runs from the crotch to the neck, which is covered during use by one flap with adhesive.

**Description of the undergarment**

Wearer wore close fitting polyester/cotton long trousers and long sleeve T-shirts.

**Description of any additional equipment**

Half mask, wellington boots and nitrile disposable gloves.

**Deviation of the standard**

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## RESULTS

### Ambient conditions test

Temperature= (20.2-23.4)°C

Relative Humidity= (46.8-57.3)%

### The outcomes of the tests were as follows:

In response to the question "does the suit fit", test subject answered "Yes".

After testing in accordance with the movements defined in clause 4.3.2 of EN ISO 13982-2:2004, no damage to the suit was observed.

### Sequence of movements according to standard

	Mov. 1	Mov. 2	Mov. 3
<b>Suit 1</b>	Pass	Pass	Pass
<b>Suit 2</b>	Pass	Pass	Pass
<b>Suit 3</b>	Pass	Pass	Pass
<b>Suit 4</b>	Pass	Pass	Pass
<b>Suit 5</b>	Pass	Pass	Pass
<b>Suit 6</b>	Pass	Pass	Pass
<b>Suit 7</b>	Pass	Pass	Pass
<b>Suit 8</b>	Pass	Pass	Pass
<b>Suit 9</b>	Pass	Pass	Pass
<b>Suit 10</b>	Pass	Pass	Pass

>>>



## RESULTS

### Measurement of concentrations

	Concentration				
	Before the test (%)			Inside the chamber after the stabilization (mg/m <sup>3</sup> )	Inside the chamber at the end of all exercises of the test (mg/m <sup>3</sup> )
	Knee	Waist	Chest		
<b>Suit 1</b>	0.009	0.007	0.015	4.85	4.54
<b>Suit 2</b>	0.008	0.001	0.001	5.14	4.89
<b>Suit 3</b>	0.021	0.048	0.023	5.03	4.99
<b>Suit 4</b>	0.016	0.009	0.010	4.76	5.12
<b>Suit 5</b>	0.046	0.031	0.040	4.58	4.31
<b>Suit 6</b>	0.021	0.040	0.036	6.87	6.67
<b>Suit 7</b>	0.002	0.003	0.002	6.35	6.37
<b>Suit 8</b>	0.072	0.061	0.064	6.57	6.66
<b>Suit 9</b>	0.138	0.104	0.112	6.32	6.22
<b>Suit 10</b>	0.170	0.140	0.137	6.53	6.16

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## RESULTS

Inward leakage individual results are (%):

WEARER	POSITION	Knee	Waist	Chest	Average
BOJ	Stand	11.600	18.840	10.100	13.513
	Walk	4.000	2.800	2.750	3.183
	Squat	19.510	16.010	19.610	18.377
	Average	11.703	12.550	10.820	11.691
BOJ	Stand	2.740	1.980	2.250	2.323
	Walk	3.290	4.560	6.410	4.753
	Squat	16.850	11.280	16.940	15.023
	Average	7.627	5.940	8.533	7.367
JES	Stand	7.140	8.090	10.290	8.507
	Walk	5.070	7.870	16.430	9.790
	Squat	13.320	23.210	26.760	21.097
	Average	8.510	13.057	17.827	13.131
JES	Stand	7.550	9.530	7.670	8.250
	Walk	3.410	4.130	5.540	4.360
	Squat	9.750	16.790	18.200	14.913
	Average	6.903	10.150	10.470	9.174
JUA	Stand	14.630	14.480	19.770	16.293
	Walk	5.940	5.840	9.270	7.017
	Squat	10.590	14.490	21.540	15.540
	Average	10.387	11.603	16.860	12.950
JUA	Stand	6.870	7.850	14.260	9.660
	Walk	4.700	3.440	7.510	5.217
	Squat	7.050	9.430	11.720	9.400
	Average	6.207	6.907	11.163	8.092
PAB	Stand	5.530	6.090	8.660	6.760
	Walk	3.340	2.950	7.610	4.633
	Squat	15.450	11.030	14.030	13.503
	Average	8.107	6.690	10.100	8.299
PAB	Stand	6.190	7.590	12.910	8.897
	Walk	5.530	6.710	10.990	7.743
	Squat	19.080	14.830	17.910	17.273
	Average	10.267	9.710	13.937	11.304
PEI	Stand	0.810	4.210	9.290	4.770
	Walk	1.510	3.880	11.520	5.637
	Squat	16.090	18.130	16.020	16.747
	Average	6.137	8.740	12.277	9.051
PEI	Stand	2.510	3.840	4.500	3.617
	Walk	3.000	4.840	8.340	5.393
	Squat	18.050	15.350	12.950	15.450
	Average	7.853	8.010	8.597	8.153

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## RESULTS

Total inward leakage by wearer (%):

WEARER	Average
BOJ	9.529
JES	11.153
JUA	10.521
PAB	9.802
PEI	8.602
Average	9.921

Total inward leakage (%):

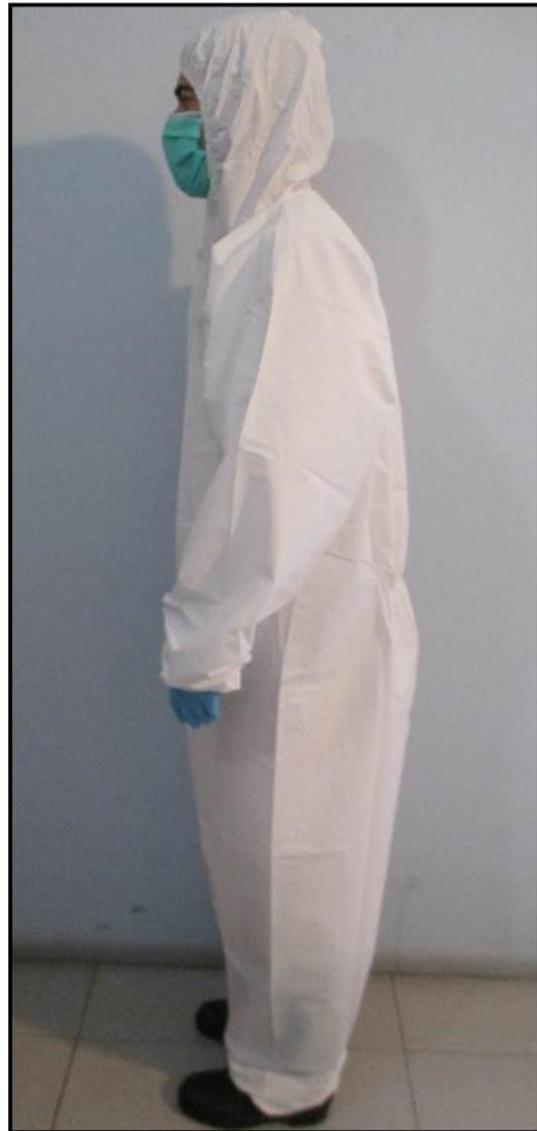
POSITION	Knee	Waist	Chest	Average
Stand	6.557	8.250	9.970	8.259
Walk	3.979	4.702	8.637	5.773
Squat	14.574	15.055	17.568	15.732
Average	8.370	9.336	12.058	9.921

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## RESULTS

### Pictures



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## RESULTS

**IL<sub>82/90</sub>**: the inward leakage value (in percent). equal to or superior to 82/90 (91.1%) of all IL values measured (all exercises. all sampling position. all suits):

Ordination	Value	Ordination	Value	Ordination	Value	Ordination	Value
1	0.810	24	5.070	47	9.270	69	14.830
2	1.510	25	5.530	48	9.290	70	15.350
3	1.980	26	5.530	49	9.430	71	15.450
4	2.250	27	5.540	50	9.530	72	16.010
5	2.510	28	5.840	51	9.750	73	16.020
6	2.740	29	5.940	52	10.100	74	16.090
7	2.750	30	6.090	53	10.290	75	16.430
8	2.800	31	6.190	54	10.590	76	16.790
9	2.950	32	6.410	55	10.990	77	16.850
10	3.000	33	6.710	56	11.030	78	16.940
11	3.290	34	6.870	57	11.280	79	17.910
12	3.340	35	7.050	58	11.520	80	18.050
13	3.410	36	7.140	59	11.600	81	18.130
14	3.440	37	7.510	60	11.720	82	18.200
15	3.840	38	7.550	61	12.910	83	18.840
16	3.880	39	7.590	62	12.950	84	19.080
17	4.000	40	7.610	63	13.320	85	19.510
18	4.130	41	7.670	64	14.030	86	19.610
19	4.210	42	7.850	65	14.260	87	19.770
20	4.500	43	7.870	66	14.480	88	21.540
21	4.560	44	8.090	67	14.490	89	23.210
22	4.700	45	8.340	68	14.630	90	26.760
23	4.840	46	8.660				

**TILS<sub>8/10</sub>**: the “total inward leakage per suit” value. equal or superior to 80% of all TILS-values:

Suit	Average
1	7.367
2	8.092
3	8.153
4	8.299
5	9.051
6	9.174
7	11.304
8	11.691
9	12.950
10	13.131

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## RESULTS

### REQUIREMENTS ACCORDING TO STANDARD EN ISO 13982-2:2004

When tested in accordance with EN ISO 13982-2:2004 the type 5 protective clothing shall be characterized by the following parameters according to EN ISO 13982-1:2004/A1:2010:

- $IL_{82/90}$ : the inward leakage value (in percent), equal to or superior to 82/90 (91.1%) of all IL values measured (all exercises, all sampling position, all suits)
- $TILS_{8/10}$ : the “total inward leakage per suit” value, equal or superior to 80% of all TILS-values.

Type 5 chemical protective clothing shall meet at least the following requirements:

- $IL_{82/90} \leq 30\%$  and
- $TILS_{8/10} \leq 15\%$

ACCORDING TO STANDARD EN ISO 13982-1:2004/A1:2010

PASS

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## RESULTS

### DETERMINATION OF INWARD LEAKAGE OF AEROSOLS OF FINE PARTICLES INTO SUITS

#### Standard

EN ISO 13982-2:2004

#### Test date

10/06/2020 – 11/06/2020

#### Reference

COVERALL KND-1007

The physical dimensions of the wearers are shown below

Wearer	Height (m)	Chest (cm)	Size of the suit
PEI	1.80	100	XXL
POM	1.75	97	XXL
BJA	1.82	101	XXL
JES	1.80	101	XXL
PAB	1.82	106	XXL

#### Pre-treatment

As received

#### Description of the suit

The suit is a white material one-piece hooded coverall with overtaped seams incorporating elasticated wrists, waist, ankles and hood. There is a single action zip at the front of the suit, which runs from the crotch to the neck, which is covered during use by one flap with adhesive.

#### Description of the undergarment

Wearer wore close fitting polyester/cotton long trousers and long sleeve T-shirts.

#### Description of any additional equipment

Half mask, wellington boots and nitrile disposable gloves.

#### Deviation of the standard

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## RESULTS

### Ambient conditions test

Temperature= (20.1-22.8)°C

Relative Humidity= (41.3-56.4)%

### The outcomes of the tests were as follows:

In response to the question "does the suit fit", test subject answered "Yes".

After testing in accordance with the movements defined in clause 4.3.2 of EN ISO 13982-2:2004, no damage to the suit was observed.

### Sequence of movements according to standard

	Mov. 1	Mov. 2	Mov. 3
Suit 1	Pass	Pass	Pass
Suit 2	Pass	Pass	Pass
Suit 3	Pass	Pass	Pass
Suit 4	Pass	Pass	Pass
Suit 5	Pass	Pass	Pass
Suit 6	Pass	Pass	Pass
Suit 7	Pass	Pass	Pass
Suit 8	Pass	Pass	Pass
Suit 9	Pass	Pass	Pass
Suit 10	Pass	Pass	Pass

>>>



## RESULTS

### Measurement of concentrations

	Concentration				
	Before the test (%)			Inside the chamber after the stabilization (mg/m <sup>3</sup> )	Inside the chamber at the end of all exercises of the test (mg/m <sup>3</sup> )
	Knee	Waist	Chest		
<b>Suit 1</b>	0.091	0.089	0.066	7.28	6.77
<b>Suit 2</b>	0.160	0.140	0.121	5.57	5.71
<b>Suit 3</b>	0.322	0.251	0.242	7.23	7.34
<b>Suit 4</b>	0.026	0.019	0.019	5.59	5.88
<b>Suit 5</b>	0.024	0.035	0.011	5.66	5.71
<b>Suit 6</b>	0.017	0.033	0.009	5.82	6.13
<b>Suit 7</b>	0.038	0.033	0.047	5.57	5.44
<b>Suit 8</b>	0.026	0.041	0.030	5.81	6.06
<b>Suit 9</b>	0.001	0.001	0.001	6.19	6.25
<b>Suit 10</b>	0.276	0.242	0.198	5.84	5.61

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## RESULTS

Inward leakage individual results are (%):

WEARER	POSITION	Knee	Waist	Chest	Average
PEI	Stand	10.870	4.980	9.330	8.393
	Walk	4.260	5.110	11.550	6.973
	Squat	32.870	15.720	16.850	21.813
	Average	16.000	8.603	12.577	12.393
PEI	Stand	8.520	12.610	9.350	10.160
	Walk	2.100	4.090	7.370	4.520
	Squat	13.850	16.910	20.590	17.117
	Average	8.157	11.203	12.437	10.599
POM	Stand	1.720	3.540	4.900	3.387
	Walk	1.310	2.180	4.600	2.697
	Squat	10.650	10.180	13.430	11.420
	Average	4.560	5.300	7.643	5.834
POM	Stand	4.380	6.430	6.850	5.887
	Walk	2.930	3.490	8.180	4.867
	Squat	13.950	15.250	18.840	16.013
	Average	7.087	8.390	11.290	8.922
BJA	Stand	2.930	7.390	10.280	6.867
	Walk	4.140	4.440	5.130	4.570
	Squat	10.080	13.520	14.580	12.727
	Average	5.717	8.450	9.997	8.054
BJA	Stand	1.330	4.260	16.900	7.497
	Walk	3.560	4.400	11.950	6.637
	Squat	8.560	11.600	16.490	12.217
	Average	4.483	6.753	15.113	8.783
JES	Stand	7.660	4.040	6.710	6.137
	Walk	3.010	3.400	6.030	4.147
	Squat	7.100	14.290	20.480	13.957
	Average	5.923	7.243	11.073	8.080
JES	Stand	0.350	1.650	1.750	1.250
	Walk	2.080	4.030	6.320	4.143
	Squat	7.590	13.280	22.200	14.357
	Average	3.340	6.320	10.090	6.583
PAB	Stand	24.060	15.100	31.570	23.577
	Walk	3.320	2.820	6.380	4.173
	Squat	17.710	15.130	16.640	16.493
	Average	15.030	11.017	18.197	14.748
PAB	Stand	7.580	5.760	9.450	7.597
	Walk	2.890	2.450	8.320	4.553
	Squat	20.270	20.080	22.290	20.880
	Average	10.247	9.430	13.353	11.010

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## RESULTS

Total inward leakage by wearer (%):

WEARER	Average
PEI	11.496
POM	7.378
BJA	8.419
JES	7.332
PAB	12.879
Average	9.501

Total inward leakage (%):

POSITION	Knee	Waist	Chest	Average
Stand	6.940	6.576	10.709	8.075
Walk	2.960	3.641	7.583	4.728
Squat	14.263	14.596	18.239	15.699
Average	8.054	8.271	12.177	9.501

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## RESULTS

### Pictures



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## RESULTS

**IL<sub>82/90</sub>**: the inward leakage value (in percent). equal to or superior to 82/90 (91.1%) of all IL values measured (all exercises. all sampling position. all suits):

Ordination	Value	Ordination	Value	Ordination	Value	Ordination	Value
1	0.350	24	4.140	47	7.660	69	14.290
2	1.310	25	4.260	48	8.180	70	14.580
3	1.330	26	4.260	49	8.320	71	15.100
4	1.650	27	4.380	50	8.520	72	15.130
5	1.720	28	4.400	51	8.560	73	15.250
6	1.750	29	4.440	52	9.330	74	15.720
7	2.080	30	4.600	53	9.350	75	16.490
8	2.100	31	4.900	54	9.450	76	16.640
9	2.180	32	4.980	55	10.080	77	16.850
10	2.450	33	5.110	56	10.180	78	16.900
11	2.820	34	5.130	57	10.280	79	16.910
12	2.890	35	5.760	58	10.650	80	17.710
13	2.930	36	6.030	59	10.870	81	18.840
14	2.930	37	6.320	60	11.550	82	20.080
15	3.010	38	6.380	61	11.600	83	20.270
16	3.320	39	6.430	62	11.950	84	20.480
17	3.400	40	6.710	63	12.610	85	20.590
18	3.490	41	6.850	64	13.280	86	22.200
19	3.540	42	7.100	65	13.430	87	22.290
20	3.560	43	7.370	66	13.520	88	24.060
21	4.030	44	7.390	67	13.850	89	31.570
22	4.040	45	7.580	68	13.950	90	32.870
23	4.090	46	7.590				

**TILS<sub>8/10</sub>**: the “total inward leakage per suit” value. equal or superior to 80% of all TILS-values:

Suit	Average
1	5.834
2	6.583
3	8.054
4	8.080
5	8.783
6	8.922
7	10.599
8	11.010
9	12.393
10	14.748

>>>



## RESULTS

### REQUIREMENTS ACCORDING TO STANDARD EN ISO 13982-2:2004

When tested in accordance with EN ISO 13982-2:2004 the type 5 protective clothing shall be characterized by the following parameters according to EN ISO 13982-1:2004/A1:2010:

- $IL_{82/90}$ : the inward leakage value (in percent), equal to or superior to 82/90 (91.1%) of all IL values measured (all exercises, all sampling position, all suits)
- $TILS_{8/10}$ : the “total inward leakage per suit” value, equal or superior to 80% of all TILS-values.

Type 5 chemical protective clothing shall meet at least the following requirements:

- $IL_{82/90} \leq 30\%$  and
- $TILS_{8/10} \leq 15\%$

ACCORDING TO STANDARD EN ISO 13982-1:2004/A1:2010

PASS

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**Lucia Martinez**  
**Head of PPE and Ballistics department**

#### LIABILITY CLAUSES

- 1.- AITEX is liable only for the results of the methods of analysis used, as expressed in the report and referring exclusively to the materials or samples indicated in the same which are in its possession, the professional and legal liability of the Centre being limited to these. Unless otherwise stated, the samples were freely chosen and sent by the applicant.
- 2.- AITEX shall not be liable in any case of misuse of the test materials nor for undue interpretation or use of this document
- 3.- The Offer and / or Order to which the applicant gives approval through signature and seal, constitutes the Legally Executable Agreement in which AITEX is responsible for safeguarding and guaranteeing the absolute confidentiality of the management of all the information obtained or created during the performance of the contracted activities.
- 4.- In the eventuality of discrepancies between reports, a check to settle the same will be carried out in the head offices of AITEX. Also, the applicants undertake to notify AITEX of any complaint received by them as a result of the report, exempting this Centre from all liability if such is not done, the periods of conservation of the samples being taken into account.
- 5.- AITEX is not responsible for the information provided by customers, which is reflected in the Report, and may affect the validity of the results.
- 6.- AITEX will provide at the request of the person concerned, the treatment of complaints procedure.
- 7.- AITEX is not responsible for an inadequate state of the sample received that could compromise the validity of the results, expressing such circumstance, in the test reports.
- 8.- AITEX may include in its reports, analyses, results, etc., any other evaluation which it considers necessary, even when it has not been specifically requested.
- 9.- When a Declaration of Conformity is requested, if not indicated otherwise, the decision rule will be applied according to ILAC-G8 & ISO 10576-1, in case of ambiguity, or indeterminacy
- 10.- The uncertainties of tests, which are made explicit in the Results Report, have been estimated for a  $k = 2$  (95% probability of coverage). If not informed, they are available to the client in AITEX.
- 11.- The original materials and rests of samples, not subject to test, will be retained in AITEX during the twelve months following the issuance of the report, so that any check or claim which, in his case, wanted to make the applicant, should be exercised within the period indicated.
- 12.- This report may only be sent or delivered by hand to the applicant or to a person duly authorised by the same.
- 13.- The results of the tests and the statement of compliance with the specification in this report refer only to the test sample as it has been analyzed / tested and not the sample / item which has taken the test sample.
- 14.- The client must attend at all times, to the dates of the realization of the tests.
- 15.- According to Resolution EA (33) 31, the test reports must include the unique identification of the sample, and any brand or label of the manufacturer may be added. It is not allowed to re-issue test reports of untested sample names (references), they can only be re-issued for error correction or inclusion of omitted data that were already available at the time of the test. The laboratory can not assume responsibility for declaring that the product with the new trade name / trademark is strictly identical to the one originally tested; This responsibility belongs to the client.