



# STwo-Line

## Protective Coveralls

### GB1500

*Think Safety,  
Think Stwo-Line*



Virus  
Protection



Safety  
Isolation



Surgical  
Coverall

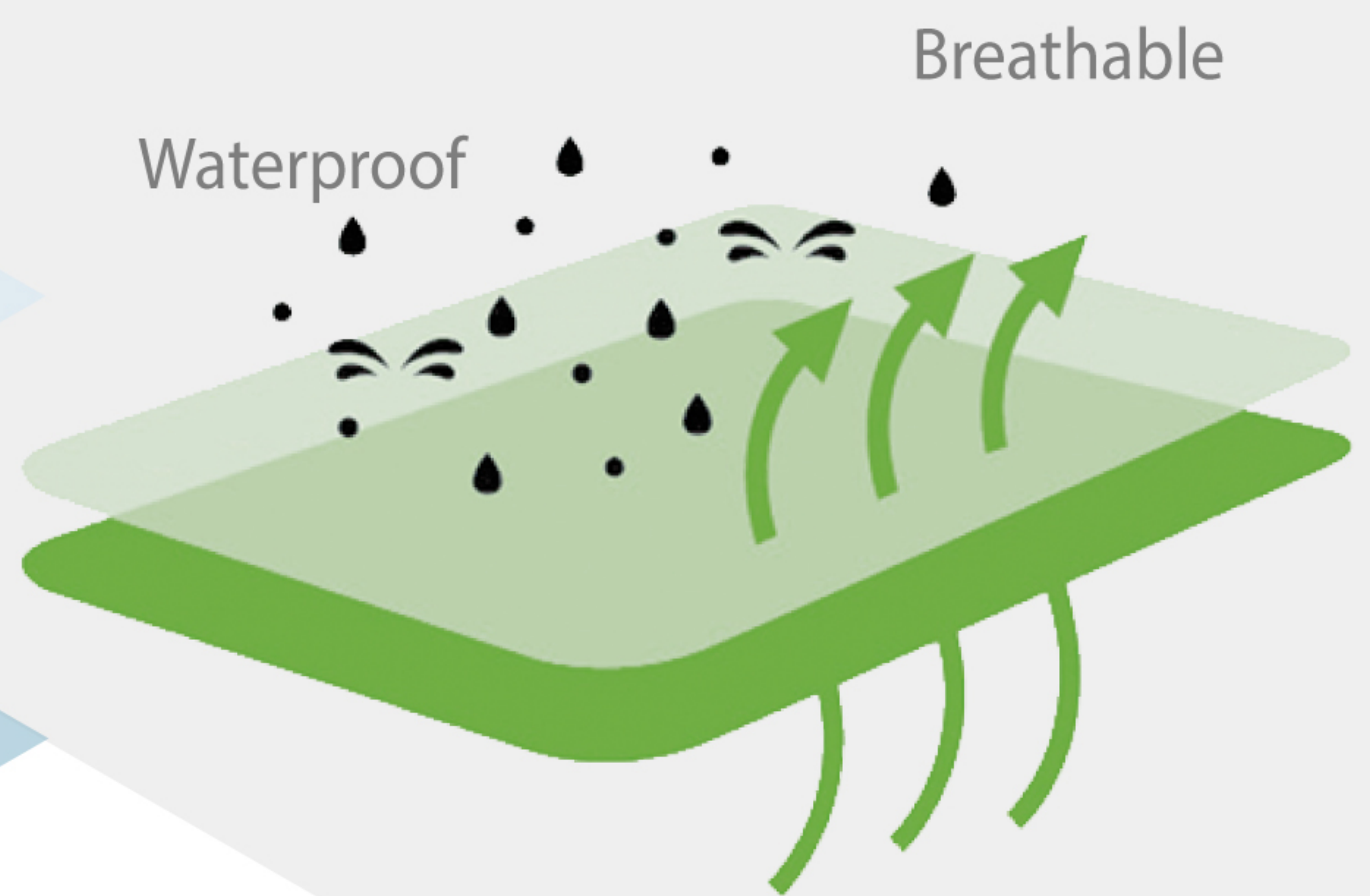


Water  
Proof



# High Quality Non-Woven Fabric

## PP+PE 54GSM



Breathable

Comfortable fit  
with air flow



Waterproof

Protection against  
liquid and blood penetration



Anti-static

Protection from  
static electricity



# Your Safety First

## Full Isolation Coveralls

## NATIONALLY CERTIFIED QUALITY

제 2017-CX-0051 호

**K<sup>s</sup>**

**안 전 인 증 서**

(주)에스투라인

대전광역시 동구 계족로438번길 7

위 사업장에서 제조하는 아래의 품목이 산업안전보건법 제34조 및 같은 법 시행규칙 제58조의4제4항에 따른 안전인증 심사 결과 안전·보건기준에 적합하므로 안전인증표시의 사용을 인증합니다.

| 품 목                            |                     |                       |
|--------------------------------|---------------------|-----------------------|
| 보호복(화학물질용 보호복)                 |                     |                       |
| 형식·모델/용량·등급/인증번호               |                     |                       |
| 형식·모델<br>GB1500                | 용량·등급<br>전신보호복, 5형식 | 인증번호<br>17-AV2CX-0051 |
| 인 증 기 준                        |                     |                       |
| 보호구 안전인증 고시(고용노동부고시 제2017-64호) |                     |                       |
| 인 증 조 건                        |                     |                       |
| 아래 주소에서 생산되는 제품에 한함.           |                     |                       |
| (주)에스투라인, 대전광역시 동구 계족로438번길 7  |                     |                       |

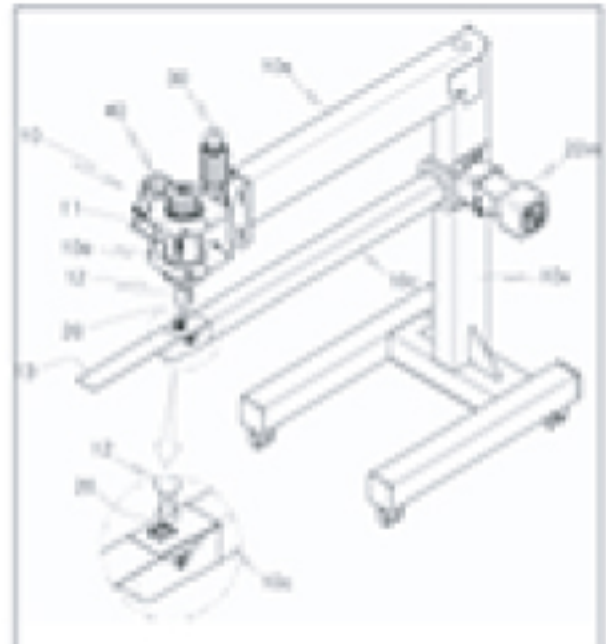
2017년 11월 17일

한국산업안전보건공단

Protective clothing certified by KOSHA  
(Korea Occupational Safety&Health Agency)  
<http://www.kosha.or.kr/english>

보호복 제조용 초음파 접합장치와 이를 이용한 보호복 제조 방법과 이에 의해 만들어진 보호복  
Ultrasonic adhering machine for protective clothing and manufacture methods thereby and protective clothing thereby

|                |   |
|----------------|---|
| (51) Int. CL   | A41H 43/04(2006.01.01) D06H 5/00(2006.01.01) A41D 27/24(2006.01.01) A41D 13/00(2019.01.01)              |
| (52) CPC       | A41H 43/04(2013.01) D06H 5/00(2013.01) A41D 27/24(2013.01) A41D 13/0002(2013.01) A41D 2300/332(2013.01) |
| (21) 출원번호/일자   | 1020160160514 (2016.12.02)  |
| (71) 출원인       | 주식회사 에스투라인  |
| (11) 등록번호/일자   | 1017422080000 (2017.06.26)  |
| (65) 공개번호/일자   |   |
| (11) 공고번호/일자   | (2017.06.15)  |
| (86) 국제출원번호/일자 |   |
| (87) 국제공개번호/일자 |   |
| (30) 우선권정보     |   |
| 법적상태           | 등록  |
| 심사진행상태         | 등록결정(일반)  |
| 심판사항           |   |
| 구분             | 국내출원/입국   |
| 원출원번호/일자       |   |
| 관련 출원번호        |   |
| 기술이전 희망        |   |
| 심사청구에 부/일자     | Y(2016.12.02)   |
| 심사청구횟수         | 12  |



Ultrasonic adhering machine and manufacturing  
methods for protective clothing



Test report No.: OS-19-047785

No. 1/2

Date: November 7, 2019

**TEST REPORT**

Requested : POLTREE CO., LTD.  
 Test sample : Non-woven fabric 2 samples  
 Test items : Resistance to synthetic blood and viral penetration  
 Received : October 28, 2019

This is to report that the results of laboratory test applied on the sample are as follows:

**1. Test results**

**1.1 Resistance to synthetic blood penetration**

| No. | Test sample  | Run No. | Test pressure (kPa) and visible liquid penetration <sup>1)</sup> |      |     |   |    |    | Judgement         |
|-----|--------------|---------|--|------|-----|---|----|----|-------------------|
|     |              |         | 0  | 1.75 | 3.5 | 7 | 14 | 20 |                   |
| 1   | PPE3-SMS-WHD | -1      | ○  | ○    | ○   | ○ | ○  | ○  | Class 6 ○<br>Pass |
|     |              | -2      | ○  | ○    | ○   | ○ | ○  | ○  |                   |
|     |              | -3      | ○  | ○    | ○   | ○ | ○  | ○  |                   |
| 2   | PPE2-SMS-WHD | -1      | ○  | ○    | ○   | ○ | ○  | ○  | Class 6 ○<br>Pass |
|     |              | -2      | ○  | ○    | ○   | ○ | ○  | ○  |                   |
|     |              | -3      | ○  | ○    | ○   | ○ | ○  | ○  |                   |

**1.2 Resistance to viral penetration**

| No. | Test sample  | Run No. | Test pressure (kPa) and visible liquid penetration <sup>1)</sup> |      |     |   |    |    | PFU/mL <sup>2)</sup> | Judgement         |
|-----|--------------|---------|--|------|-----|---|----|----|----------------------|-------------------|
|     |              |         | 0  | 1.75 | 3.5 | 7 | 14 | 20 |                      |                   |
| 1   | PPE3-SMS-WHD | -1      | ○  | +    | +   | + | +  | ○  | <1                   | Class 6 ○<br>Pass |
|     |              | -2      | ○  | +    | +   | + | +  | ○  | <1                   |                   |
|     |              | -3      | ○  | +    | +   | + | +  | ○  | <1                   |                   |
| 2   | PPE2-SMS-WHD | -1      | ○  | +    | +   | + | +  | ○  | <1                   | Class 6 ○<br>Pass |
|     |              | -2      | ○  | +    | +   | + | +  | ○  | <1                   |                   |
|     |              | -3      | ○  | +    | +   | + | +  | ○  | <1                   |                   |

Note 1) ○: No penetration, +: Penetration, -: No implementation  
 2) Classification as defined in JIS T8122, 6.3.2.1  
 3) Concentration of Plaque Forming Unit (PFU) in washout solution on the back side of specimen.  
 4) Classification as defined in JIS T8122, 6.3.3

(To be continued on No.2/2)

Kaken Test Center  
 GENERAL INCORPORATED FOUNDATION  
 Lab Address: 2-5-19, Edobori, Nishi-ku, Osaka  
 550-0002 Japan  
 Tel: +81-(0)6-6441-0399  
 Fax: +81-(0)6-6441-6803

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Test report No.: OS-19-047785

No. 2/2

Date: November 7, 2019

**TEST REPORT**  
 (Continued from No.1/2)

**2. Test method** JIS T 8060:2015 (Resistance to synthetic blood penetration),  
 Test procedure B with support screen used  
 JIS T 8061:2015 (Resistance to viral penetration),  
 Test procedure C with support screen used  
 Bacteriophage: Phi-X174 ATCC: 13706-B1  
 Host bacterium: Escherichia coli ATCC 13706

**3. Sample**

1 2

KAKEN KAKEN KAKEN KA

Kaken Test Center General Incorporated Foundation  
 Osaka Laboratories  
 Biological Test Laboratory  
 Inspector: 中野 龍太郎  
 T.Nakasono

Period:

**TEST REPORT**

APPLICANT: POLTREE KATRI NO: SREA15-00000079  
 BUYER: DATE: MAY, 10, 2015  
 APPLICANT'S PROVIDED SAMPLE DESCRIPTION: PAGE(S): 1 OF 2  
 #1: Pol-AntiV 100

RECEIVED DATE: APR. 18, 2013 \*\*\*

| TEST ITEM   | TEST RESULT |
|---|-------------|
|   | #1          |
| Penetration by Blood-Borne Pathogens Using Phi-X174 Bacteriophage: ASTM F 1671: 07 Procedure A  |             |
| Test 1  | Pass        |
| Test 2  | Pass        |
| Test 3  | Pass        |
| * Note) 1. Step 1: Observe for 5 min at 0 kPa<br>2. Step 2: Slowly increase the pressure to 13.8 kPa at rate of no more than keep the pressure at 13.8 kPa, observe for 5 min<br>3. Step 3: Turn off the pressure and open valve to the vent position. Observe<br>4. Procedure A: A retaining screen is |             |

- Continues -

*Hyunil Kim*  
 Kim, Hyunil  
 Director General

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KATRI NO: SREA15-00000079  
 PAGE(S): 2 OF 2

| TEST ITEM   | TEST RESULT |
|---|-------------|
|   | #1          |
| Penetration of synthetic blood: ASTM F 1670: 07 Procedure A   |             |
| Test 1  | Pass        |
| Test 2  | Pass        |
| Test 3  | Pass        |
| * Note) 1. Step 1: Observe for 5 min at 0 kPa<br>2. Step 2: Slowly increase the pressure to 13.8 kPa at rate of no more than keep the pressure at 13.8 kPa, observe for 5 min<br>3. Step 3: Turn off the pressure and open valve to the vent position. Observe<br>4. Procedure A: A retaining screen is |             |

#1

**TEST REPORT**

APPLICANT: Poltree KATRI NO: SREA15-00000096  
 BUYER: RECEIVED DATE: FEB. 26, 2015  
 APPLICANT'S PROVIDED SAMPLE DESCRIPTION: ISSUED DATE: MAR. 25, 2015  
 PAGE(S): 1 OF 1

| TEST ITEM  | TEST RESULT |
|--|-------------|
|  | #1          |
| Penetration of Phi-X174 Bacteriophage: ISO16604:2004   |             |
| Step 6   |             |
| Specimen 1   | Pass        |
| Specimen 2   | Pass        |
| Specimen 3   | Pass        |
| * Note) 1. Testing procedure of phi-X174 Bacteriophage (ATCC 13706-B1),<br>2. Bacteriophage at a titer of $1.0 \times 10^7$ PFU/ml is used.<br>3. Step 1: Observe for 5 min at 0 kPa.<br>4. Step 2: Slowly increase the pressure to 1.75 kPa at rate of no more than 3.5 kPa/s, keep the pressure at 1.75 kPa, observe for 5 min.<br>5. Step 3: Slowly increase the pressure to 3.5 kPa at rate of no more than 3.5 kPa/s, keep the pressure at 3.5 kPa, observe for 5 min.<br>6. Step 4: Slowly increase the pressure to 7 kPa at rate of no more than 3.5 kPa/s, keep the pressure at 7 kPa, observe for 5 min.<br>7. Step 5: Slowly increase the pressure to 14 kPa at rate of no more than 3.5 kPa/s, keep the pressure at 14 kPa, observe for 5 min.<br>8. Step 6: Slowly increase the pressure to 20 kPa at rate of no more than 3.5 kPa/s, keep the pressure at 20 kPa, observe for 5 min.<br>9. Procedure C: A retaining screen is not used. |             |

#1

*Seungyoon Leem*  
 Leem, Seungyoon  
 Director General



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Fabric penetration tested against synthetic blood  
 - ASTM F1670 (ANSI / AAMI PB70 Level 4)  
 - same as EN14126 class 6

Fabric penetration tested against blood-borne pathogens  
 - ASTM F1671 (ANSI / AAMI PB70 Level 4)  
 - same as EN14126 class 6

Testing Institutes: KATRI (Korea) and KAKEN (Japan)



# Craftsman of 20 years meticulous and sturdy design



Breathable  
& Durable



No seam &  
Waterproof



Elastic &  
Comfortable Fit





# Anywhere, Anytime Protect your safety

Safe isolation in medical facilities,  
factories, laboratories, etc.



Factories



Outdoors



Hospitals



laboratories



# Protective Coveralls

## GB1500

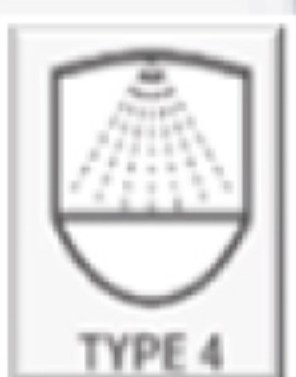
### Product Description

- ▶ Non-sewing manufacturing by ultrasonic welding method  
- Korea Patent No.1020160163514
- ▶ Completely waterproof and anti-viral performance  
- Superior to the seam sealing manufacturing
- ▶ Comfortable fit with breathable fabric

### Product Performance

- ▶ Type5 by Korea Occupational Safety & Health Agency  
- Certification number: 17-AV2CX-0051
- ▶ Type4 Performance  
- No needle hole keeps the fabric's own performance
- ▶ Fabric penetration tested against synthetic blood  
- ASTM F1670 (ANSI / AAMI PB70 Level 4) passed  
- JIS T 8060 Class 6 passed
- ▶ Fabric penetration tested against blood-borne pathogens  
- ASTM F1671 (ANSI / AAMI PB70 Level 4) passed  
- JIS T 8061 Class 6 passed  
- ISO 16604 Class 6 passed (Same as EN14126 standard)

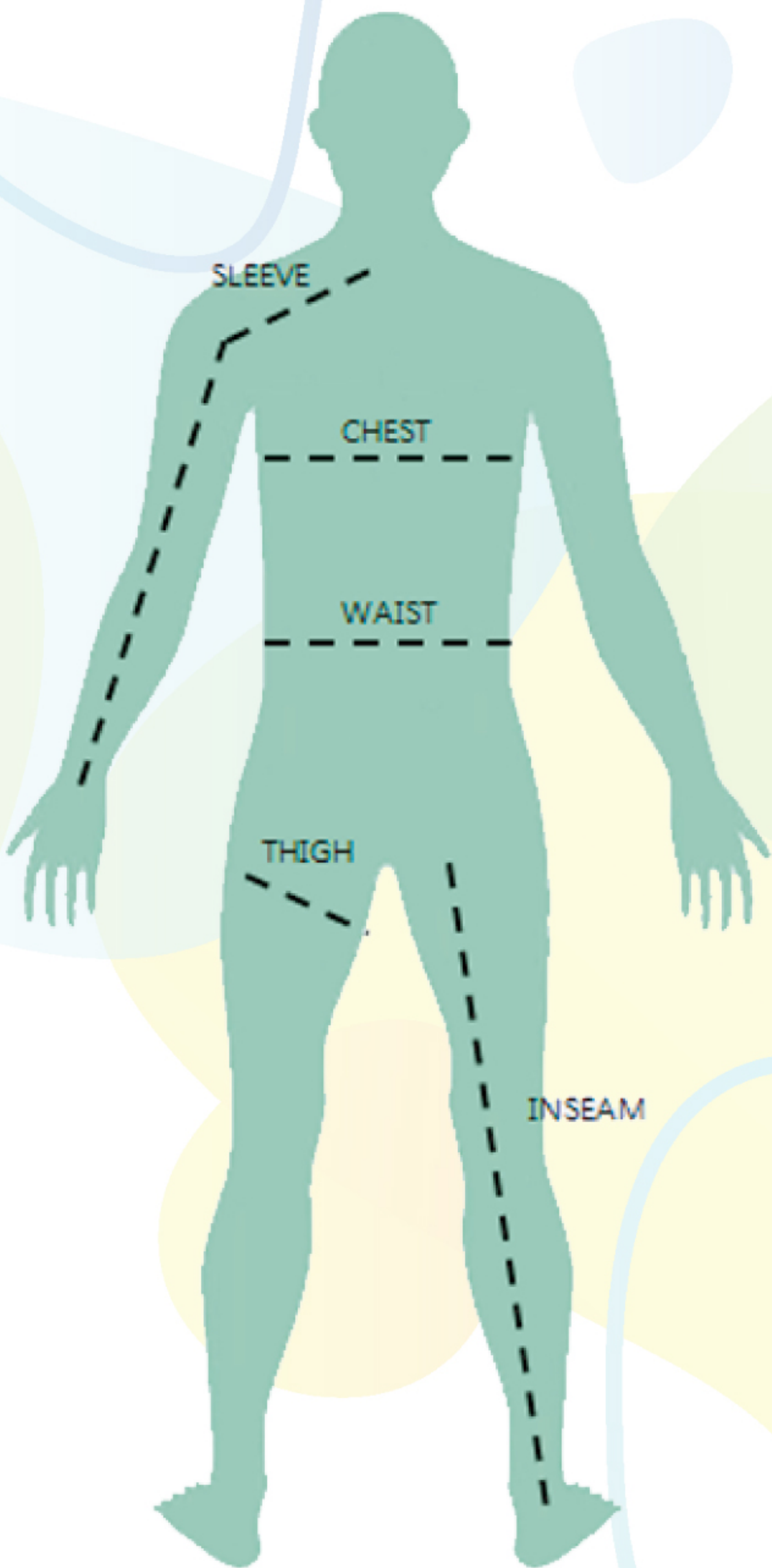
| Level <sup>1</sup> | Test   | Liquid Challenge       | Result                             |
|--------------------|--|------------------------|------------------------------------|
| 1                  | AATCC 42 Impact Penetration <sup>2</sup>                             | Water                  | = 4.5g                             |
| 2                  | AATCC 42 Impact Penetration  | Water                  | = 1.5g                             |
|                    | AATCC 127 Hydrostatic Pressure <sup>3</sup>                          | Water                  | = 20cm                             |
| 3                  | AATCC 42 Impact Penetration  | Water                  | = 1.0g                             |
|                    | AATCC 127 Hydrostatic Pressure                                       | Water                  | = 50cm                             |
| 4                  | ASTM F1670 Synthetic Blood Penetration Test (for surgical drapes)    | Surrogate Blood        | no penetration at 2 psi (13.8 kPa) |
|                    | ASTM F1671 Viral Penetration Test (for surgical and isolation gowns) | Bacteriophage Phi-X174 | no penetration at 2 psi (13.8 kPa) |





# Size can be changed upon order production

| Size Chart |         |             |
|------------|---------|-------------|
| SIZE       | XL      |             |
| SLEEVE     | 93cm    | 36.6in      |
| CHEST      | 65cm    | 25.6in      |
| WAIST      | 45~60cm | 17.7~23.6in |
| THIGH      | 38cm    | 14.9in      |
| INSEAM     | 72cm    | 28.3in      |



## How to wear protective clothing

1



Start with your legs and pull it up

2



Place your arms in the sleeves and adjust as needed

3



Pull the zipper up and adjust the cap