

AGENZIA NAZIONALE CERTIFICAZIONE COMPONENTI E PRODOTTI  
Settore Dispositivi di Protezione Individuale  
Via Pisacane, 46 20025 Legnano MI  
Tel. 0331/ 540392 Fax 0331/ 541467 e-mail: dpi@anccp.it

**TEST REPORT**

DPI 632 RP 001 /01

**CHEMICAL PROTECTIVE CLOTHING Type 5 - 6**  
**art. MUTEX 2**

**Performance of material**

*Applicant*

**DELTA PROTECTION**  
Z.A. De Berret  
30200 Bagnols-sur-Cèze

**Sample:** art. **MUTEX 2**

**Application date:** 23.12.2005

**Receipt date:** 03.01.2006

**Test:**

- Resistance to penetration and repellency to liquid (EN 368)
- Abrasion resistance (EN 530)
- Trapezoidal tear resistance (ISO 9073-4)
- Tensile strength (EN ISO 13934-1)
- Puncture resistance (EN 863)
- Resistance to ignition (prEN 13274-4)
- Flex cracking resistance (ISO 7854 B)
- Surface resistivity (EN 1149-1)
- Resistance to penetration by contaminated liquids under hydrostatic pressure:
  - Syntetic blood test (ISO 16603/04)
  - Bacteriophage Phi-X174 test ( ISO 16604/04)
- Resistance to penetration by infective agents due to mechanical contact with substances containing contaminated liquids (prEN ISO 22610/04)
- Resistance to penetration by contaminated liquid aerosols (ISO 22611/03)
- Resistance to penetration by contaminated solid particles (ISO 22612/05)

The test result apply only to the above mentioned test object



Date  
24.03.2006

Head PPE area  
M. Colli



## RESISTANCE TO PENETRATION AND REPELLENCY TO LIQUID

EN 368

### Test conditions

chemical: H<sub>2</sub>SO<sub>4</sub> 30%, NaOH 10%, p-xylene, butan 1 ol  
range: 10 ± 0.5 ml / 10 ± 1 s  
drain: internal diameter 125 ± 5 mm, length 300 ± 2 mm, inclination 45°;

### Results

H <sub>2</sub> SO <sub>4</sub> 30%	Penetration %	Repellency %
1 weft	0.0	97.0
2 weft	0.0	95.8
3 weft	0.0	97.8
1 warp	0.0	97.9
2 warp	0.0	99.0
3 warp	0.0	98.9
average	<b>0.0</b>	<b>97.7</b>
class	<b>3</b>	<b>3</b>

NaOH 10%	Penetration %	Repellency %
1 weft	0.0	95.8
2 weft	0.0	97.0
3 weft	0.0	95.6
1 warp	0.0	97.4
2 warp	0.0	96.2
3 warp	0.0	96.9
average	<b>0.0</b>	<b>96.5</b>
class	<b>3</b>	<b>3</b>

p-xylene	Penetration %	Repellency %
1 weft	0.0	94.6
2 weft	0.0	95.0
3 weft	0.0	96.2
1 warp	0.0	93.2
2 warp	0.0	95.0
3 warp	0.0	94.5
average	<b>0.0</b>	<b>95.0</b>
class	<b>3</b>	<b>3</b>

Butan 1 ol	Penetration %	Repellency %
1 weft	0.0	96.9
2 weft	0.0	98.0
3 weft	0.0	97.3
1 warp	0.0	96.8
2 warp	0.0	97.8
3 warp	0.0	98.4
average	<b>0.0</b>	<b>97.5</b>
class	<b>3</b>	<b>3</b>

### Classification EN 14325

Class	Repellency index
3	> 95%
2	> 90%
1	> 80%

Class	Penetration index
3	< 1%
2	< 5%
1	< 10%

Class 3 : better value  
Class 1 : lowest value

### Requirements prEN 13034:

For resistance to penetration a performance level 2 shall be obtained for at least one of the chemicals referred	<b>PASS</b>
For liquid repellency a performance level 3 shall be obtained for at least one of the chemicals referred	<b>PASS</b>

## ABRASION RESISTANCE

EN 530 - method 2

### Test conditions

Conditioning: 24h - 20 ± 2°C - 65% U.R.  
 Abrasive: 00  
 Downward pressure: 9 kPa  
 Test end: 1° hole

### Results

1° sample	cycles	2500
2° sample	cycles	2500
3° sample	cycles	2500
4° sample	cycles	2500
Lowest result	cycles	<b>2500</b>
<b>Classification:</b>		<b>6</b>

### Classification EN 14325

Class	Number of cycles
6	> 2000
5	> 1500
4	> 1000
3	> 500
2	> 100
1	> 10

Class 6 : better value  
 Class 1 : lowest value

**TRAPEZOIDAL TEAR RESISTANCE**

**EN ISO 9073-4**

**Test conditions**

Conditioning: 24h - 20 ± 2°C - 65% U.R.  
 Speed: 100±10 mm/min  
 Distance: 25 mm  
 Sample dimension: 50x150 mm

**Results**

<b>weft</b>		
1° sample	N	31.5
2° sample	N	35.5
3° sample	N	28.6
4° sample	N	32.4
5° sample	N	28.5
average	N	<b>31.3</b>
<b>Warp</b>		
1° sample	N	59.1
2° sample	N	57.1
3° sample	N	56.1
4° sample	N	56.2
5° sample	N	62.0
average	N	<b>58.1</b>
<b>Classification :</b>		<b>2</b>

**Classification EN 14325**

Class	Tear resistance
6	> 150 N
5	> 100 N
4	> 60 N
3	> 40 N
2	> 20 N
1	> 10 N

Class 6 : better value  
 Class 1 : lowest value

## TENSILE STRENGTH

EN ISO 13934-1

### Test conditions

Conditioning: 24h - 20 ± 2°C - 65% U.R.  
Speed: 100±10 mm/min  
Length: 200 mm  
Width: 50 mm

### Results

<b>weft</b>		
1° sample	N	67.1
2° sample	N	70.6
3° sample	N	70.4
4° sample	N	72.7
5° sample	N	73.9
average	N	<b>71.0</b>
<b>Warp</b>		
1° sample	N	67.1
2° sample	N	66.4
3° sample	N	66.4
4° sample	N	66.5
5° sample	N	66.1
average	N	<b>66.0</b>
<b>Classification :</b>		<b>2</b>

### Classification EN 14325

Class	Tensile strength
6	> 1000 N
5	> 500 N
4	> 250 N
3	> 100 N
2	> 60 N
1	> 30 N

Class 6 : better value  
Class 1 : lowest value

**PUNCTURE RESISTANCE**

**EN 863**

**Test conditions**

Conditioning: 24h - 20 ± 2°C - 65% U.R.  
Speed: 100±10 mm/min

**Results**

1° sample	N	20.8
2° sample	N	16.2
3° sample	N	20.8
4° sample	N	15.2
average	N	<b>18.2</b>
<b>Classification:</b>		<b>2</b>

**Classification EN 14325**

Class	Puncture resistance
6	> 250 N
5	> 150 N
4	> 100 N
3	> 50 N
2	> 10 N
1	> 5 N

Class 6 : better value  
Class 1 : lowest value

**FLEX CRACKING RESISTANCE**

**EN ISO 7854 method B**

**Results**

cycles 1.000	No damage
cycles 2.500	No damage
cycles 5.000	No damage
cycles 15.000	No damage
cycles 40.000	No damage
cycles 100.000	No damage
<b>Classification :</b>	<b>6</b>

**Classification EN 14325**

Class	cycles
6	> 100 000
5	> 40 000
4	> 15 000
3	> 5 000
2	> 2 500
1	> 1 000

Class 6 : better value  
Class 1 : lowest value



**RESISTANCE TO IGNITION**

**EN 13274-4 method 3**

**Test conditions**

Burner : vertical  
Sample : horizontal  
flame height :  $40 \pm 4$  mm

**Results**

Post-combustion:	No
Post-incandescence:	No
Droplets :	No
Holes :	No

Self-extinguishing material

**SURFACE RESISTIVITY**

**EN 1149-1/95**

**Test conditions**

electrodes:	type A
Voltage :	100 volt
Conditioning:	23 ± 1°C e 25% ± 5 U.R.
Pre-treatment:	no
n. measure :	5

**Results**

outer side

<i>Result (average)</i>	<i>Requirement</i>	
3,1 · 10 <sup>10</sup> Ω	≤ 5 x 10 <sup>10</sup> Ω	<b>PASS</b>

**RESISTANCE TO PENETRATION BY CONTAMINATED LIQUIDS  
UNDER HYDROSTATIC PRESSURE**

**SYNTETIC BLOOD TEST (ISO 16603/04)**

**Test conditions**

time: 5 minute each pressure  
Test solution: syntetic blood

**Results**

Test pressure (kPa)	0 Kpa	1.75 Kpa	3.50 Kpa	7.00 Kpa	14.00 Kpa	20.00 Kpa
sample 1	P	P	P	P	P	P
sample 2	P	P	P	P	P	P
sample 3	P	P	P	P	P	P

P = pass      the sample resists to the penetration and the synthetic blood doesn't come through the fabric  
F = fail      the sample doesn't resists to the penetration and the synthetic blood come through the fabric

## BACTERIOPHAGE PHI-X174 TEST ( ISO 16604/04)

### Test conditions

time: 5 minute normal pressure + 5 minute test pressure  
 Solution test: bacteriophage soup  
 Microrganismo di prova: bacteriophage Phi-X174, ATCC 13706-B1

### Results

pressione di prova (kPa)	0 Kpa	1.75 Kpa	3.50 Kpa	7.00 Kpa	14.00 Kpa	20.00 Kpa
provetta 1						P
provetta 2						P
provetta 3						P

bacteriophage concentration (PFU/ml):

P = pass the sample resists to the penetration and the microorganism doesn't come through the fabric  
 F = fail the sample doesn't resists to the penetration and the microorganism come through the fabric

**Classification : 6**

### Classification EN 14126

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

Class 6 : better value  
 Class 1 : lowest value

**RESISTANCE TO PENETRATION BY INFECTIVE AGENTS DUE TO MECHANICAL CONTACT WITH SUBSTANCES CONTAINING CONTAMINATED LIQUIDS** prEN ISO 22610/04

**Test conditions**

Time: 15 minute/plate  
Test microorganism: Staphylococcus Aureus ATCC 29213

**Results**

	Intervals (min.)	n. colonies 1° sample	n. colonies 2° sample	n. colonies 3° sample	n. colonies 4° sample	n. colonies 5° sample	average
Plate 1 (X1)	0-15	0	0	0	0	0	0
Plate 2 (X2)	15-30	0	0	0	0	0	0
Plate 3 (X3)	30-45	0	0	0	0	0	0
Plate 4 (X4)	45-60	0	0	0	0	0	0
Plate 5 (X5)	60-75	0	0	0	0	0	0
Plate 6 (Z) reference		424	512	457	502	487	476.4
T		424	512	457	502	487	476.4
BI		6	6	6	6	6	6
BPC		-	-	-	-	-	-

T = Z+X5+X4+X3+X2+X1  
BI = barrier index  
BPC = penetration index

**Classification : 6**

**Classification EN 14126**

Class	Breakthrough time, t Min.
6	$t > 75$
5	$60 < t \leq 75$
4	$45 < t \leq 60$
3	$30 < t \leq 45$
2	$15 < t \leq 30$
1	$\leq 15$ min

Class 6 : better value  
Class 1 : lowest value

**RESISTANCE TO PENETRATION BY CONTAMINATED LIQUID  
AEROSOLS**

**ISO 22611/03**

**Test conditions**

Test microorganism: Staphylococcus aureus (ATCC 6538)

**Results**

	Microorganisms extracted by the membranes	
	Reference (value A)	Sample (value B)
1° sample	428	0
2° sample	304	0
3° sample	377	0
4° sample	452	0
average	390.3	0
Standard deviation	65.5	0

Penetration ratio (log): > 5

**Classification : 3**

**Classification EN 14126**

Class	Penetration ratio (log)
3	log > 5
2	3 < log ≤ 5
1	1 < log ≤ 3

Class 3 : better value  
Class 1 : lowest value

**RESISTANCE TO PENETRATION BY CONTAMINATED SOLID PARTICLES**

**ISO 22612/05**

**Test conditions**

Test microorganism: *Bacillus subtilis* (ATCC 9372)  
Time: 30 minute

**Results**

Number of passed microorganisms through the sample		
N° sample	cfu	Log <sub>10</sub> cfu
1° sample	0	-
2° sample	0	-
3° sample	0	-
4° sample	0	-
5° sample	0	-
6° sample	0	-
7° sample	0	-
8° sample	0	-
9° sample	0	-
10° sample	0	-
average	<b>0</b>	-

Loads contaminating (cfu/g):  $0.67 \times 10^8$

**Classification : 3**

**Classification EN 14126**

Class	Penetration (log cfu)
3	$\leq 1$
2	$1 < \log \text{ ufc} \leq 2$
1	$2 < \log \text{ ufc} \leq 3$

Class 3 : better value  
Class 1 : lowest value