

---

*The information contained herein is for the use of employees and clients of S. M. T. L. and is not for publication without prior approval. The report shall not be reproduced except in full without the written approval of S. M. T. L.*

---

Title: **Antibacterial Testing of Films**

Date: **As per approval signature at end.**

Other Keywords:

Report No: **15/4601/3**

Author(s)

**Pamela Ashman**

Location

**Princess of Wales**

---

Pages Text: 17	Other: 0	Total: 17
No. Figures: 0	No. Tables: 14	No. Refs.: 0

---

## CONTENTS

1. Name & Address of Client/Requesting Authority .....	1
2. Introduction .....	1
3. Test Product(s)/Sample(s).....	2
3.1 Departures/Abnormalities of Sample Condition.....	2
4. Date of Testing.....	2
5. Testing Details .....	2
5.1 Test Method - Report 14/4601/1.....	2
5.2 Test Method- Report 14/4601/2.....	3
5.3 Calculations.....	3
5.4 Standards relevant to the test method.....	4
5.5 Deviations/exclusions from, and additions to standard methods.....	4
5.6 Sampling Details.....	4
6. Results.....	5
6.1 Antibacterial Activity against MRSA.....	5
6.2 Antibacterial Activity against <i>E.coli</i> .....	8
6.3 Antibacterial Activity against <i>Klebsiella pneumoniae</i> .....	10
6.4 Antibacterial Activity against <i>Streptococcus pyogenes</i> .....	12
7. Summary .....	14

---

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

---

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamel@ Exp \$

LIST OF TABLES

TABLE 1. Test Product(s)/Sample(s) tested by SMTL .....	2
TABLE 2. MRSA 0.5hr incubation (1/50 NB) .....	5
TABLE 3. MRSA 1hr incubation (1/50 NB) .....	6
TABLE 4. MRSA 24hr incubation (1/50 NB) .....	7
TABLE 5. MRSA 24hr Incubation (1/500 NB) .....	7
TABLE 6. <i>E.coli</i> 0.5hr incubation .....	8
TABLE 7. <i>E.coli</i> 1hr incubation .....	8
TABLE 8. <i>E.coli</i> 24hr incubation .....	9
TABLE 9. <i>K.pneumoniae</i> 0.5hr incubation .....	10
TABLE 10. <i>K.pneumoniae</i> 1hr incubation .....	10
TABLE 11. <i>K.pneumoniae</i> 24hr incubation .....	11
TABLE 12. <i>S.pyogenes</i> 0.5hr incubation .....	12
TABLE 13. <i>S.pyogenes</i> 1hr incubation .....	12
TABLE 14. <i>S.pyogenes</i> 24hr incubation .....	13

**S . M . T . L .**

subject: **Antibacterial Testing of Films**

date: **As per approval signature at end.**

from: **Pamela Ashman  
Princess of Wales  
Tel: +44-1656-752820**

**Report No: 15/4601/3**

*Test Report*

15/4601/3

**1. Name & Address of Client/Requesting Authority.**

Malcolm Fairbairn  
Hi-Bond Tapes Ltd  
1 Crucible Rd  
Phoenix Parkway  
Corby  
Northamptonshire  
NN17 5TS

Email:MFairbairn@hi-bondtapes.co.uk

**2. Introduction**

The report details the antibacterial activity results for the treated and untreated film samples supplied by the client as stated in reports 14/4601/1 and 14/4601/2.

---

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

---

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamela Exp \$

### 3. Test Product(s)/Sample(s)

TABLE 1. Test Product(s)/Sample(s) tested by SMTL.

Manufacturer	Item	Cat No	Batch/Lot No	Quantity	Date Received	SMTL Sample I.D.
HI-Bond Tapes Ltd	Antibacterial Film Clear Diamond 60x60mm	CD 712	NS	30	4/7/14	44096
HI-Bond Tapes Ltd	Antibacterial Film Clear Diamond 60x60mm	CD 712	NS	30	20/8//14	44308
HI-Bond Tapes Ltd	Control Film Green Liner 60x60mm	CD 858T	NS	30	4/7/14	44097
HI-Bond Tapes Ltd	Control Film Green Liner 60x60mm	CD 858T	NS	30	20/8/14	44309
HI-Bond Tapes Ltd	Antibacterial Film Clear Diamond 60x60mm	CD 712	NS	12	20/10/14	44734
HI-Bond Tapes Ltd	Control Film Green Liner 60x60mm	CD 858T	NS	12	20/10/14	44735

**NOTE: The test results in this report relate only to the test sample(s) analysed.**

#### 3.1 Departures/Abnormalities of Sample Condition

None

#### 4. Date of Testing

Testing for report 14/4601/1 was performed 12th August - 1st September 2014

Testing for report 14/4601/2 was performed 22nd-27th October 2014

#### 5. Testing Details

Antibacterial testing was performed based upon BS EN ISO 22196<sup>(1)</sup> against *E-Coli* ATCC 8739, MRSA NCTC 12493, *Klebsiella Pneumoniae* ATCC 4352 and *Streptococcus pyogenes* ATCC 19615), at various incubation times (30 mins, 1hr & 24hrs)

##### 5.1 Test Method - Report 14/4601/1

The test samples measuring 6cm x 6cm were inoculated with 0.4ml of the relevant culture containing approximately  $\times 10^6$  cfu/ml in nutrient broth (NB) (1/50 dilution). The product was tested in triplicate against each organism. The inoculum was held in contact with the sample using a piece of polyethylene sheeting (4cm x 4cm). All samples were then incubated for either 0.5hr, 1hr or 24 hours at 30-35°C. After incubation the samples were rinsed with 10ml of neutraliser (DE broth). The extracts were then serially diluted in phosphate buffered saline (PBS) and the bacteria enumerated using a pour plate method with Tryptone Soya Agar (TSA). The plates were incubated at 30-35°C for 40-48 hours and any resultant colonies counted.

The controls used were the film samples without the active agent. Each control was prepared by inoculating the control samples, measuring 6cm x 6cm, with the broth culture and incubating as described above. The controls were tested in triplicate. 3 samples were extracted immediately after inoculation, as well as at the 3 time points. The extracts were treated as described above and the resultant colonies counted.

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coily Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamelax Exp 5

### 5.2 Test Method- Report 14/4601/2

The testing in report 14/4601/2 was performed as described above except the nutrient broth was at a 1/500 dilution. This tested was performed against MRSA NCTC 12493 at 24 hours only.

### 5.3 Calculations

The number of viable bacteria per cm<sup>2</sup> (N) was determined using the formula

$$N = (100 \times C \times D \times V) / A$$

Where :-

- C= Average plate count for duplicate plates
- D= Dilution factor for plates counted
- V= Volume of neutraliser (10ml)
- A= Surface area of cover film in mm<sup>2</sup> (1600)

The geometric mean for the triplicate samples was then calculated.

The antibacterial activity (R) was calculated compared to the control at time 0 or the control at time t using the formulae

$$R = U_t - A_t$$

or

$$R = U_0 - A_t$$

Where :-

- U<sub>t</sub>= Average log of viable bacteria cfu/cm<sup>2</sup>, recovered from the control after either 0.5, 1 or 24hrs
- U<sub>0</sub>= Average log of viable bacteria cfu/cm<sup>2</sup>, recovered from the control immediately after inoculation (0hr)
- A<sub>t</sub>= Average log of viable bacteria cfu/cm<sup>2</sup>, recovered from the treated samples after either 0.5, 1 or 24hrs

#### 5.4 Standards relevant to the test method.

- Measurement of antibacterial activity on plastic & other non-porous surfaces BS EN ISO 22196<sup>(1)</sup>

#### 5.5 Deviations/exclusions from, and additions to standard methods.

##### 5.5.1 Report 14/4601/1

- The standard requires only a 24 hour incubation
- The average number of bacteria recovered immediately after inoculation for *E.Coli* was  $4.47 \times 10^4$  cfu/cm<sup>2</sup> and for MRSA was  $2.91 \times 10^4$  cfu/cm<sup>2</sup> (for 1 & 24 Hrs tests). This is greater than the range specified in the standard ( $6.2 \times 10^3$  -  $2.5 \times 10^4$  cfu/cm<sup>2</sup>) and resulted in a slightly greater challenge to the product.
- The initial inoculum was prepared in 1/50 NB, not 1/500 NB which is a more nutritious medium chosen to ensure the survival of the non-standard organisms. Based on previous experience at SMTL with this test.
- The organisms stated in the standard are *E-Coli* & *Staphylococcus aureus*

##### 5.5.2 Report 14/4601/2

- The average number of bacteria recovered immediately after inoculation was  $3.34 \times 10^4$  cfu/cm<sup>2</sup>. This is greater than the range specified in the standard ( $6.2 \times 10^3$  -  $2.5 \times 10^4$  cfu/cm<sup>2</sup>) resulting in a slightly greater challenge to the product.
- The organisms stated in the standard are *E-Coli* & *Staphylococcus aureus*

#### 5.6 Sampling Details

All samples were supplied by the client.

---

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

---

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamel@ Exp S

## 6. Results

### 6.1 Antibacterial Activity against MRSA

The antibacterial activity results against MRSA are shown in Tables 2- 5

**TABLE 2.** MRSA 0.5hr incubation (1/50 NB)

Sample No	Control T=0	Control T=0.5hrs	Treated Film T=0.5hrs
<b>1 (cfu/cm<sup>2</sup>)</b>	1.41x10 <sup>4</sup>	9.38x10 <sup>3</sup>	3.97x10 <sup>3</sup>
<b>2 (cfu/cm<sup>2</sup>)</b>	9.0x10 <sup>3</sup>	5.31x10 <sup>3</sup>	6.28x10 <sup>3</sup>
<b>3 (cfu/cm<sup>2</sup>)</b>	8.28x10 <sup>3</sup>	5.06x10 <sup>3</sup>	5.03x10 <sup>3</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	1.02x10 <sup>4</sup>	6.32x10 <sup>3</sup>	5.01x10 <sup>3</sup>
<b>Antibacterial Activity (R) control T=0.5hr</b>	-	-	0.1
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.31

#### Note

- i. Initial inoculum was 0.4ml of 6.8x10<sup>5</sup> cfu/ml



**TABLE 3.** MRSA 1hr incubation (1/50 NB)

Sample No	Control T=0	Control T=1hr	Treated Film T=1hr
1 (cfu/cm <sup>2</sup> )	2.94x10 <sup>4</sup>	2.16x10 <sup>4</sup>	1.5x10 <sup>4</sup>
2 (cfu/cm <sup>2</sup> )	2.88x10 <sup>4</sup>	NA	1.06x10 <sup>4</sup>
3 (cfu/cm <sup>2</sup> )	NA	NA	1.44x10 <sup>4</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	2.91x10 <sup>4</sup>	2.16x10 <sup>4</sup>	1.32x10 <sup>4</sup>
<b>Antibacterial Activity (R) control T=1hr</b>	-	-	0.21
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.34

**Note**

- i. Initial inoculum was 0.4ml of 1.31x10<sup>6</sup> cfu/ml
- ii. NA - Not performed as insufficient samples

**TABLE 4.** MRSA 24hr incubation (1/50 NB)

Sample No	Control T=0	Control T=24hrs	Treated Film T=24hrs
1 (cfu/cm <sup>2</sup> )	2.94x10 <sup>4</sup>	2.06x10 <sup>5</sup>	5.13x10 <sup>2</sup>
2 (cfu/cm <sup>2</sup> )	2.88x10 <sup>4</sup>	4.59x10 <sup>4</sup>	4.94x10 <sup>2</sup>
3 (cfu/cm <sup>2</sup> )	NA	NA	2.34x10 <sup>3</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	2.91x10 <sup>4</sup>	9.72x10 <sup>4</sup>	8.40x10 <sup>2</sup>
<b>Antibacterial Activity (R) control T=24hr</b>	-	-	2.06
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	1.54

**Note**

- i. Initial inoculum was 0.4ml of 1.31x10<sup>6</sup> cfu/ml
- ii. NA - Not performed as insufficient samples

**TABLE 5.** MRSA 24hr Incubation (1/500 NB)

Sample No	Control T=0	Control T=24hrs	Treated Film T=24hrs
1 (cfu/cm <sup>2</sup> )	3.22x10 <sup>4</sup>	2.81x10 <sup>4</sup>	77.5
2 (cfu/cm <sup>2</sup> )	3.56x10 <sup>4</sup>	3.16x10 <sup>4</sup>	<0.63*
3 (cfu/cm <sup>2</sup> )	3.25x10 <sup>4</sup>	3.88x10 <sup>4</sup>	<0.63*
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	3.34x10 <sup>4</sup>	3.25x10 <sup>4</sup>	<3.12
<b>Antibacterial Activity (R) control T=24hr</b>	-	-	>4.02 †
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	>4.03 †

**Note**

- i. Initial inoculum was 0.4ml of 1.58x10<sup>6</sup> cfu/ml
- ii. \* Below limit of detection, therefore reported as less than limit. The limit was used for further calculations.
- iii. † Reported as greater than, because some of the results were below the limit of detection.

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

## 6.2 Antibacterial Activity against *E.coli*

The antibacterial activity results against *E.coli* are shown in Tables 6, 7 & 8

**TABLE 6.** *E.coli* 0.5hr incubation

Sample No	Control T=0	Control T=0.5hrs	Treated Film T=0.5hrs
1 (cfu/cm <sup>2</sup> )	4.38x10 <sup>4</sup>	3.75x10 <sup>4</sup>	1.60x10 <sup>4</sup>
2 (cfu/cm <sup>2</sup> )	4.44x10 <sup>4</sup>	3.69x10 <sup>4</sup>	3.19x10 <sup>4</sup>
3 (cfu/cm <sup>2</sup> )	4.59x10 <sup>4</sup>	3.47x10 <sup>4</sup>	2.59x10 <sup>4</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	4.47x10 <sup>4</sup>	3.63x10 <sup>4</sup>	2.36x10 <sup>4</sup>
<b>Antibacterial Activity (R) control T=0.5hr</b>	-	-	0.19
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.28

**Note**

- i. Initial inoculum was 0.4ml of 2.11x10<sup>6</sup> cfu/ml

**TABLE 7.** *E.coli* 1hr incubation

Sample No	Control T=0	Control T=1hr	Treated Film T=1hr
1 (cfu/cm <sup>2</sup> )	4.38x10 <sup>4</sup>	5.16x10 <sup>4</sup>	1.28x10 <sup>4</sup>
2 (cfu/cm <sup>2</sup> )	4.44x10 <sup>4</sup>	4.16x10 <sup>4</sup>	1.63x10 <sup>4</sup>
3 (cfu/cm <sup>2</sup> )	4.59x10 <sup>4</sup>	3.34x10 <sup>4</sup>	1.09x10 <sup>4</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	4.47x10 <sup>4</sup>	4.15x10 <sup>4</sup>	1.32x10 <sup>4</sup>
<b>Antibacterial Activity (R) control T=1hr</b>	-	-	0.50
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.53

**Note**

- i. Initial inoculum was 0.4ml of 2.11x10<sup>6</sup> cfu/ml

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamela Exp \$

**TABLE 8.** *E.coli* 24hr incubation

Sample No	Control T=0	Control T=24hrs	Treated Film T=24hrs
1 (cfu/cm <sup>2</sup> )	4.38x10 <sup>4</sup>	5.06x10 <sup>6</sup>	<0.63*
2 (cfu/cm <sup>2</sup> )	4.44x10 <sup>4</sup>	7.81x10 <sup>6</sup>	3.13
3 (cfu/cm <sup>2</sup> )	4.59x10 <sup>4</sup>	7.59x10 <sup>6</sup>	4.69
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	4.47x10 <sup>4</sup>	6.69x10 <sup>6</sup>	2.10
<b>Antibacterial Activity (R) control T=24hr</b>	-	-	>6.50
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	>4.33

**Note**

- i. Initial inoculum was 0.4ml of 2.11x10<sup>6</sup> cfu/ml
- ii. \* Below limit of detection, therefore reported as less than limit. The limit is used for further calculations.

### 6.3 Antibacterial Activity against *Klebsiella pneumoniae*

The antibacterial activity results against *Klebsiella pneumoniae* are shown in Tables 9, 10 & 11

**TABLE 9.** *K.pneumoniae* 0.5hr incubation

Sample No	Control T=0	Control T=0.5hrs	Treated Film T=0.5hrs
1 (cfu/cm <sup>2</sup> )	2.41x10 <sup>4</sup>	1.78x10 <sup>4</sup>	1.94x10 <sup>4</sup>
2 (cfu/cm <sup>2</sup> )	2.34x10 <sup>4</sup>	1.94x10 <sup>4</sup>	1.0x10 <sup>4</sup>
3 (cfu/cm <sup>2</sup> )	1.72x10 <sup>4</sup>	1.69x10 <sup>4</sup>	1.13x10 <sup>4</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	2.13x10 <sup>4</sup>	1.8x10 <sup>4</sup>	1.3x10 <sup>4</sup>
<b>Antibacterial Activity (R) control T=0.5hr</b>	-	-	0.14
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.22

**Note**

- i. Initial inoculum was 0.4ml of 1.37x10<sup>6</sup> cfu/ml

**TABLE 10.** *K.pneumoniae* 1hr incubation

Sample No	Control T=0	Control T=1hr	Treated Film T=1hr
1 (cfu/cm <sup>2</sup> )	2.41x10 <sup>4</sup>	2.0x10 <sup>4</sup>	3.5x10 <sup>3</sup>
2 (cfu/cm <sup>2</sup> )	2.34x10 <sup>4</sup>	1.28x10 <sup>4</sup>	2.94x10 <sup>3</sup>
3 (cfu/cm <sup>2</sup> )	1.72x10 <sup>4</sup>	2.16x10 <sup>4</sup>	3.63x10 <sup>3</sup>
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	2.13x10 <sup>4</sup>	1.77x10 <sup>4</sup>	3.34x10 <sup>3</sup>
<b>Antibacterial Activity (R) control T=1hr</b>	-	-	0.72
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	0.80

**Note**

- i. Initial inoculum was 0.4ml of 1.37x10<sup>6</sup> cfu/ml

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamel Exp 5

**TABLE 11.** *K.pneumoniae* 24hr incubation

Sample No	Control T=0	Control T=24hrs	Treated Film T=24hrs
<b>1 (cfu/cm<sup>2</sup>)</b>	2.41x10 <sup>4</sup>	8.16x10 <sup>6</sup>	0.94
<b>2 (cfu/cm<sup>2</sup>)</b>	2.34x10 <sup>3</sup>	7.16x10 <sup>6</sup>	2.53x10 <sup>2</sup>
<b>3 (cfu/cm<sup>2</sup>)</b>	1.72x10 <sup>3</sup>	6.34x10 <sup>6</sup>	<0.63*
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	2.13x10 <sup>4</sup>	7.18x10 <sup>6</sup>	5.31
<b>Antibacterial Activity (R) control T=24hr</b>	-	-	>6.13
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	>3.6

**Note**

- i. Initial inoculum was 0.4ml of 1.37x10<sup>6</sup> cfu/ml
- ii. \* Below limit of detection, therefore reported as less than limit. The limit is used for further calculations.

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamela Exp \$

#### 6.4 Antibacterial Activity against *Streptococcus pyogenes*

The antibacterial activity results against *Streptococcus pyogenes* are shown in Tables 12, 13 & 14

**TABLE 12.** *S.pyogenes* 0.5hr incubation

Sample No	Control T=0	Control T=0.5hrs	Treated Film T=0.5hrs
1 (cfu/cm <sup>2</sup> )	2.16x10 <sup>4</sup>	1.34x10 <sup>4</sup>	1.69x10 <sup>4</sup>
2 (cfu/cm <sup>2</sup> )	1.47x10 <sup>4</sup>	1.44x10 <sup>4</sup>	1.3x10 <sup>4</sup>
3 (cfu/cm <sup>2</sup> )	1.31x10 <sup>4</sup>	1.84x10 <sup>4</sup>	1.72x10 <sup>4</sup>
Geometric mean (cfu/cm <sup>2</sup> )	1.61x10 <sup>4</sup>	1.53x10 <sup>4</sup>	1.56x10 <sup>4</sup>
Antibacterial Activity (R) control T=0.5hr	-	-	-0.01
Antibacterial Activity (R) control T=0hr	-	-	0.01

**Note**

- i. Initial inoculum was 0.4ml of 2.39x10<sup>6</sup> cfu/ml

**TABLE 13.** *S.pyogenes* 1hr incubation

Sample No	Control T=0	Control T=1hr	Treated Film T=1hr
1 (cfu/cm <sup>2</sup> )	2.16x10 <sup>4</sup>	1.38x10 <sup>4</sup>	6.44x10 <sup>3</sup>
2 (cfu/cm <sup>2</sup> )	1.47x10 <sup>4</sup>	1.72x10 <sup>4</sup>	7.31x10 <sup>3</sup>
3 (cfu/cm <sup>2</sup> )	1.31x10 <sup>4</sup>	2.09x10 <sup>4</sup>	5.66x10 <sup>3</sup>
Geometric mean (cfu/cm <sup>2</sup> )	1.61x10 <sup>4</sup>	1.71x10 <sup>4</sup>	6.43x10 <sup>3</sup>
Antibacterial Activity (R) control T=1hr	-	-	0.42
Antibacterial Activity (R) control T=0hr	-	-	0.40

**Note**

- i. Initial inoculum was 0.4ml of 2.39x10<sup>6</sup> cfu/ml

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamel Exp \$

**TABLE 14.** *S.pyogenes* 24hr incubation

Sample No	Control T=0	Control T=24hrs	Treated Film T=24hrs
<b>1 (cfu/cm<sup>2</sup>)</b>	2.16x10 <sup>4</sup>	1.81x10 <sup>4</sup>	<0.63*
<b>2 (cfu/cm<sup>2</sup>)</b>	1.47x10 <sup>4</sup>	1.0x10 <sup>4</sup>	<0.63*
<b>3 (cfu/cm<sup>2</sup>)</b>	1.31x10 <sup>4</sup>	1.53x10 <sup>4</sup>	<0.63*
<b>Geometric mean (cfu/cm<sup>2</sup>)</b>	1.61x10 <sup>4</sup>	1.4x10 <sup>4</sup>	<0.63*
<b>Antibacterial Activity (R) control T=24hr</b>	-	-	>4.35
<b>Antibacterial Activity (R) control T=0hr</b>	-	-	>4.41

**Note**

- i. Initial inoculum was 0.4ml of 2.39x10<sup>6</sup> cfu/ml
- ii. \* Below limit of detection, therefore reported as less than limit. The limit is used for further calculations.

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamela Exp \$



## 7. Summary

The standard does not state any requirements for antibacterial activity. However a log 3 reduction (i.e., a 99.9% reduction in the initial inoculum) is a well accepted reference value that has been used for many years<sup>(2)</sup>

The treated sample when tested against MRSA at 1/50 NB showed a log reduction of 0.1 (21%) after 0.5hr, 0.21 (39%) after 1hr and 2.06 (99%) after 24hrs when compared to the non-treated product at the same time point.

The treated sample when tested against MRSA to the standard (low nutrient conditions 1/500 NB) showed a greater than 4 log reduction (>99.99%) after 24hrs when compared to the non-treated sample.

The treated sample against *E.coli* showed a log reduction of 0.19 (35%) after 0.5hr, 0.50 (68%) after 1hr and greater than 6.5 (>99.99%) after 24hrs when compared to the non-treated product at the same time point.

The treated sample against *K.pneumoniae* showed a log reduction of 0.14 (28%) after 0.5hr, 0.72 (81%) after 1hr and greater than 6.13 (>99.99%) after 24hrs when compared to the non-treated product at the same time point.

The treated sample against *S.pyogenes* showed a log growth of 0.01 after 0.5hr and a log reduction of 0.42 (62%) after 1hr and greater than 4.35 (>99.99%) after 24hrs when compared to the non-treated product at the same time point.

Note figures in brackets refer to percentage reductions

APPROVED:



Peter Phillips, Director, SMTL.

Date

18/1/15

*References*

1. "Measurement of antibacterial activity on plastic and other non-porous surfaces.," *BS EN ISO 22196: 2011*, British Standards Institution, (2011).
2. Peterson LR and Shanholtzer CJ, "Tests for bactericidal effects of antimicrobial agents: technical performance and clinical relevance.," *Clin Microbiol Rev.* **5 (4)** pp. 420-32 (1992).

---

The information contained in this report is proprietary, and is not for circulation without the consent of the Surgical Material Testing Laboratory (S. M. T. L.), or the commissioning authority/company. This report shall not be reproduced except in full without the written approval of S. M. T. L., Princess of Wales Hospital, Coity Road, Bridgend, CF31 1RQ.

---

RCS Version Info: \$Header: /projects/4601/Reports/report-3-combined-4601.v 1.5 2015/01/16 11:45:28 pamel@ Exp \$