

**ASSESSMENT OF BACTERICIDAL EFFICACY TESTS  
(EN 1276 - PHASE 2, STEP 1)**

**DUO MAX**

for

**DUO TECH LTD**

**HOSPITAL INFECTION RESEARCH LABORATORY  
UNIVERSITY HOSPITAL NHS FOUNDATION TRUST  
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**AUGUST 2009**

**MANUFACTURER** Duo Tech Ltd  
11-12 Queen's Square  
Bristol  
BS1 4NT

**TEST PRODUCT** Duo Max A, B, C and D

**Batch number:** Not Stated

**Lot number:** Not Stated

**STORAGE CONDITIONS**

At room temperature in a dry place out of direct sunlight.

**TEST ORGANISMS**

<i>Staphylococcus aureus</i>	NCTC 10788
<i>Pseudomonas aeruginosa</i>	NCTC 6749
<i>Escherichia coli</i>	NCTC 10418
<i>Enterococcus hirae</i>	NCTC 12367
Methicillin resistant <i>Staph. aureus</i> (MRSA)	NCTC 12493

(This test strain is not listed in the EN but was requested by the manufacturer)

## **TEST METHOD AND VALIDATION**

EN 1276 Chemical disinfectants and antiseptics - Quantitative suspension test for the evaluation of bactericidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas (Phase 2, step 1). Tests for disinfectants for medical establishments not yet ratified. Copies of EN 1276 are available from BSI, 389 Chiswick High Road, London W4 4AL.

## **PRODUCT TEST CONCENTRATION**

1:20 for all 4 products

## **CONTACT TIMES**

1 and 5 minutes

## **TEST TEMPERATURE**

20°C

## **INTERFERING SUBSTANCE**

Clean Conditions: 0.03% w/v albumin (final concentration)

Dirty Conditions: 0.3% w/v albumin (final concentration)

## **INHIBITION METHOD**

Dilution/neutralization

## **NEUTRALIZER**

Tween 80, 30g/l; saponin, 30g/l; lecithin, 3g/l; sodium thiosulphate, 5g/l; sodium lauryl sulphate, 5g/l; L-histidine, 1g/l; L-cysteine, 1g/l; sodium chloride, 8.5g/l; tryptone, 1g/l.

Tests were performed to establish the suitability of the neutralizer in neutralizing the activity of the disinfectant without being inhibitory to the test organisms (method described in EN 1276). The above neutralizer was found to be suitable with an additional dilution step.

### SUMMARY OF TEST METHOD

The test method involves mixing 1ml of the test bacteria with 1ml of interfering substance (0.3 or 3g/L albumin) and then adding 8ml of test product. After the required contact time, 0.1ml is removed and added to 8.9ml of the neutralizer and 1ml of sterile distilled water. Following a 5 minute neutralization period, 1 ml is plated onto Tryptone Soya Agar to detect surviving test bacteria.

### RESULTS

#### BACTERICIDAL ACTIVITY OF DUO MAX EN 1276 PHASE 2 STEP 1

(All tests carried out in duplicate)

#### PRODUCT A

Test Organism	Log <sub>10</sub> Initial Count (mean)	Contact Time	Log <sub>10</sub> Reduction Achieved					
			Clean Conditions (0.3% w/v albumin)			Dirty Conditions (3% w/v albumin)		
			Test 1	Test 2	Mean	Test 1	Test 2	Mean
<i>Staphylococcus aureus</i>	7.58	1 min	>6.58	>6.58	> <b>6.58</b>	>6.58	>6.58	> <b>6.58</b>
		5 mins	>6.58	>6.58	> <b>6.58</b>	>6.58	>6.58	> <b>6.58</b>
<i>Pseudomonas aeruginosa</i>	7.58	1 min	>6.58	>6.58	> <b>6.58</b>	>6.58	>6.58	> <b>6.58</b>
		5 mins	>6.58	>6.58	> <b>6.58</b>	>6.58	>6.58	> <b>6.58</b>
<i>Escherichia coli</i>	7.59	1 min	>5.99	6.96	> <b>6.48</b>	>5.99	>7.19	> <b>6.59</b>
		5 mins	>5.99	>7.19	> <b>6.59</b>	>5.99	>7.19	> <b>6.59</b>
<i>Enterococcus hirae</i>	7.46	1 min	>6.06	>6.85	> <b>6.46</b>	>6.06	>6.85	> <b>6.46</b>
		5 mins	>6.06	>6.85	> <b>6.46</b>	>6.06	>6.85	> <b>6.46</b>
MRSA	7.68	1 min	>6.07	>7.29	> <b>6.68</b>	>6.07	>7.29	> <b>6.68</b>
		5 mins	>6.07	>7.29	> <b>6.68</b>	>6.07	>7.29	> <b>6.68</b>

#### PRODUCT B

Test Organism	Log <sub>10</sub> Initial Count (mean)	Contact Time	Log <sub>10</sub> Reduction Achieved					
			Clean Conditions (0.3% w/v albumin)			Dirty Conditions (3% w/v albumin)		
			Test 1	Test 2	Mean	Test 1	Test 2	Mean
<i>Staphylococcus aureus</i>	7.58	1 min	6.25	>7.06	>6.66	6.50	>7.06	>6.78
		5 mins	6.50	>7.06	>6.78	6.80	>7.06	>6.93
<i>Pseudomonas aeruginosa</i>	7.58	1 min	5.15	>7.04	>6.10	5.14	>7.04	>6.09
		5 mins	>6.11	>7.04	>6.58	>6.11	>7.04	>6.58
<i>Escherichia coli</i>	7.59	1 min	>5.99	>7.19	>6.59	>5.99	>7.19	>6.59
		5 mins	>5.99	>7.19	>6.59	>5.99	>7.19	>6.59
<i>Enterococcus hirae</i>	7.46	1 min	>6.06	>6.85	>6.46	>6.06	>6.85	>6.46
		5 mins	>6.06	>6.85	>6.46	>6.06	>6.85	>6.46
MRSA	7.68	1 min	>6.07	>7.29	>6.68	>6.07	>7.29	>6.68
		5 mins	>6.07	>7.29	>6.68	>6.07	>7.29	>6.68

**PRODUCT C**

Test Organism	Log <sub>10</sub> Initial Count (mean)	Contact Time	Log <sub>10</sub> Reduction Achieved					
			Clean Conditions (0.3% w/v albumin)			Dirty Conditions (3% w/v albumin)		
			Test 1	Test 2	Mean	Test 1	Test 2	Mean
<i>Staphylococcus aureus</i>	7.58	1 min	6.80	>7.06	>6.93	6.50	>7.06	>6.78
		5 mins	>6.10	>7.06	>6.58	6.80	>7.06	>6.93
<i>Pseudomonas aeruginosa</i>	7.58	1 min	5.14	>7.04	>6.09	5.03	>7.04	>6.04
		5 mins	6.16	>7.04	>6.60	5.81	>7.04	>6.43
<i>Escherichia coli</i>	7.59	1 min	>5.99	>7.19	>6.59	>5.99	>7.19	>6.59
		5 mins	>5.99	>7.19	>6.59	>5.99	>7.19	>6.59
<i>Enterococcus hirae</i>	7.46	1 min	>6.06	>6.85	>6.46	>6.06	>6.85	>6.46
		5 mins	>6.06	>6.85	>6.46	>6.06	>6.85	>6.46
MRSA	7.68	1 min	>6.07	>7.29	>6.68	>6.07	>7.29	>6.68
		5 mins	>6.07	>7.29	>6.68	>6.07	>7.29	>6.68

**PRODUCT D**

Test Organism	Log <sub>10</sub> Initial Count (mean)	Contact Time	Log <sub>10</sub> Reduction Achieved					
			Clean Conditions (0.3% w/v albumin)			Dirty Conditions (3% w/v albumin)		
			Test 1	Test 2	Mean	Test 1	Test 2	Mean
<i>Staphylococcus aureus</i>	7.58	1 min	>6.10	>7.06	<b>&gt;6.58</b>	>6.10	>7.06	<b>&gt;6.58</b>
		5 mins	>6.10	>7.06	<b>&gt;6.58</b>	>6.10	>7.06	<b>&gt;6.58</b>
<i>Pseudomonas aeruginosa</i>	7.58	1 min	5.03	>7.04	<b>&gt;6.04</b>	5.08	>7.04	<b>&gt;6.06</b>
		5 mins	6.03	>7.04	<b>&gt;6.54</b>	6.03	>7.04	<b>&gt;6.54</b>
<i>Escherichia coli</i>	7.59	1 min	>5.99	>7.19	<b>&gt;6.59</b>	>5.99	>7.19	<b>&gt;6.59</b>
		5 mins	>5.99	>7.19	<b>&gt;6.59</b>	>5.99	>7.19	<b>&gt;6.59</b>
<i>Enterococcus hirae</i>	7.46	1 min	>6.06	>6.85	<b>&gt;6.46</b>	>6.06	>6.85	<b>&gt;6.46</b>
		5 mins	>6.06	>6.85	<b>&gt;6.46</b>	>6.06	>6.85	<b>&gt;6.46</b>
MRSA	7.68	1 min	>6.07	>7.29	<b>&gt;6.68</b>	>6.07	>7.29	<b>&gt;6.68</b>
		5 mins	>6.07	>7.29	<b>&gt;6.68</b>	>6.07	>7.29	<b>&gt;6.68</b>

**To meet the requirements of EN 1276 at least a 5 Log<sub>10</sub> reduction in all test bacteria within 5 minutes is required.**

The results show that the 4 Duo Max products demonstrate high activity against the 5 test bacteria ie *Staph. aureus*, MRSA, *Ent. hirae*, *Ps. aeruginosa* and *Esch. coli* and fulfil the requirements of EN 1276 following the test method as described in EN 1276.

## CONCLUSION

When tested in accordance with EN 1276, the 4 Duo Max products achieve a  $>5 \log_{10}$  reduction at 1 and 5 minutes at 20°C under both clean and dirty conditions for all the test bacteria.

**To satisfy the requirements of EN 1276, at least a 5  $\log_{10}$  reduction in specified test organisms is required within 5 minutes when the disinfectant is tested at its intended use dilution. This was achieved and, therefore, the Duo Max products meet the requirements of EN 1276.**

*Testing by the Hospital Infection Research Laboratory does not imply approval or endorsement.*

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