



SUMMARY OF THE  
EFFICACY OF DUPLEX STEAM  
CLEANING EQUIPMENT

DUPLEX (UK) Ltd

CARRIED OUT BY HOSPITAL INFECTION RESEARCH  
LABORATORY, QUEEN ELIZABETH HOSPITAL, BIRMINGHAM  
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Full Test report can be seen at our office.

**TEST METHOD**

**Test organisms**

<i>Staphylococcus aureus</i> NCTC 10788	A gram positive bacterium that survives well in the environment.
<i>Pseudomonas aeruginosa</i> NCTC 6749	A gram negative bacterium that will not survive well in the environment but may be representative of faecal contamination.
<i>Bacillus subtilis</i> NCTC 10073 spore suspension.	A sporing organism that will not be killed by the recommended cleaning methods so physical removal can be assessed. This spore may be representative of contamination with <i>Clostridium difficile</i> .

**TEST SOIL**

The test soil consisted of 10ml of each of an overnight culture of *Staph. aureus* and *Ps. aeruginosa* with 10ml spore suspension and 10ml of sheep blood. The test soil was painted onto a vinyl floor and allowed to dry for a minimum of 15 minutes before sampling for pre counts followed by cleaning and sampling for post counts.

## Cleaning methods

Three tests were performed with each cleaning method and five samples were collected from the floor surface before and after cleaning.

The methods assessed were

- Jet Vacuum Ultima
- Duplex Steam Cleaner
- Duplex Steam Cleaner with Clean Air Kit
- Duplex Steam Cleaner (with no steam)
- Mop and bucket

The detergent used was a general purpose neutral detergent.

## Assessment of cleaning – floor sampling

Test surfaces were swabbed before and after cleaning for the presence of the test micro-organisms. A 25 cm<sup>2</sup> area of the pre-defined site was swabbed using a moistened swab and a template. The swab was placed into 10ml of tryptone soya broth and vortexed for 1 minute to re-suspend any microorganisms present. The broth was then ten-fold diluted and the broth and dilutions plated onto tryptone soya agar. After 18 hours incubation at 37°C the number of colony forming units were enumerated and the counts converted to log<sub>10</sub>. The post counts were subtracted from the pre counts to establish the log reductions.

**Table 1 Surface sampling**

Test	Log10 reductions obtained														
	Jet Vacuum Ultima			Duplex Steam			Duplex plus Clean Air Kit			Duplex (no steam)			Mop & bucket (reference)		
	Bacillus	Staph	Ps	Bacillus	Staph	Ps	Bacillus	Staph	Ps	Bacillus	Staph	Ps	Bacillus	Staph	Ps
Pre	6.01	5.43	5.03	5.79	5.17	4.49	4.61	4.09	3.03	5.43	5.14	3.58	4.95	3.79	3.68
1	1.33	2.51	4.73	3.12	3.64	4.49	2.14	2.53	3.03	2.01	3.56	2.98	0.63	0.70	0.82
2	3.20	4.43	5.03	3.42	3.92	4.49	2.39	3.09	3.03	1.85	2.74	2.02	0.95	0.63	1.21
3	3.01	3.74	5.03	3.38	3.51	4.49	2.69	4.09	3.03	1.90	3.10	1.72	0.77	0.94	0.87
Mean	2.51	3.56	4.93	3.31	3.69	4.49	2.41	3.23	3.03	1.92	3.13	2.24	0.79	0.76	0.97
Kill rate%	99.69	99.97	99.998	99.95	99.979	99.99	99.60	99.94	99.906	98.97	99.92	99.42	83.70	82.62	89.28



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