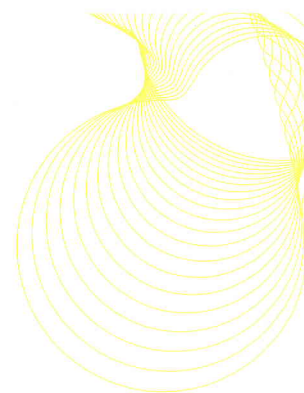




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Prepared for: Mr Iredale

Commercial-in-confidence

**Determination of the emission of VOCs and formaldehyde according to ISO 16000-10:2006, 28 days emission rates wallpaper sample- Non Woven Backed FBV**



**Sampling**

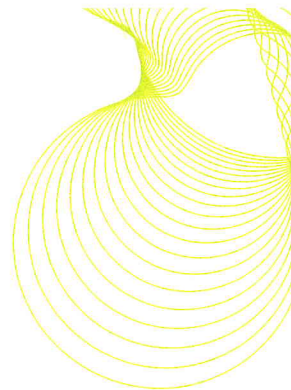
|                          |                                                                                                                            |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Sample conditioned:      | As received stored in wrapping at 23°C until tested                                                                        |
| Sampling                 | sample cut 1m from end and 0.5 m from side immediately before testing, folded around glass substrate and taped in position |
| Test condition           | FLEC nominal 50%RH at 23°C area specific flow rate 0.5 m <sup>3</sup> m <sup>-2</sup> hr <sup>-1</sup>                     |
| Sampling time            | 28 days after start of test                                                                                                |
| Sample collection device | Tenax air sampling tube, Waters Sepak DNPH cartridge                                                                       |

**VOC Analysis**

|                        |                                                                                     |
|------------------------|-------------------------------------------------------------------------------------|
| Date samples analysed: | 16/09/2011, 20/09/11                                                                |
| Analysis by:           | VOC Analytical Laboratory, BRE                                                      |
| Analysis method:       | Thermal desorption (280°C for 5 minutes) and capillary gas chromatography (SP8/18W) |
| Identification:        | Perkin Elmer Turbomass (mass spectrometer)                                          |
| Quantification:        | External standards and flame ionisation detection                                   |
| Calibration identity:  | VOCC038                                                                             |

**Formaldehyde Analysis**

|                         |                                                                                                     |
|-------------------------|-----------------------------------------------------------------------------------------------------|
| Analysis by:            | Air Sampling Laboratory, BRE                                                                        |
| Analysis method:        | High Performance Liquid Chromatography, reverse phase gradient elution with UV detection (SP8/20/W) |
| Quantification:         | External standards and UV detection                                                                 |
| Calibration used:       | Calibration AN plus instrument response checks                                                      |
| Date samplers analysed: | 24/08/11, 05/09/11                                                                                  |

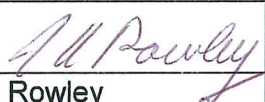


## Results

| ISO 16000-10 28 days   | None Woven Backed FBV                                                                             |                                                                |                |
|------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------|
| compound               | concentration ( $\mu\text{g m}^{-3}$ ) <sup>3</sup> at 0.5 $\text{m}^3\text{m}^{-2}\text{h}^{-1}$ | area specific emission rate $\mu\text{g m}^{-2}\text{hr}^{-1}$ | Class          |
| Formaldehyde           | <6                                                                                                | <3                                                             | A <sup>+</sup> |
| Acetaldehyde           | <6                                                                                                | <3                                                             | A <sup>+</sup> |
| Toluene                | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| Tetrachloroethylene    | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| Xylenes                | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| 1,2,4 trimethylbenzene | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| Ethylbenzene           | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| 2-Butoxyethanol        | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| Styrene                | <40                                                                                               | <20                                                            | A <sup>+</sup> |
| TVOC                   | 290                                                                                               | 140                                                            | A <sup>+</sup> |

Class as defined in the French Arette of 19 April 2011 supplied by Muraspec to BRE.  
The VOCs comprised mostly C<sub>9</sub> –C<sub>14</sub> hydrocarbons.

TVOC = Total volatile organic compounds. The TVOC value is the sum of VOCs eluting between and including n-hexane and n-hexadecane, detected with a flame ionisation detector and quantified as toluene.

|                    |                                                                                     |           |                                                   |
|--------------------|-------------------------------------------------------------------------------------|-----------|---------------------------------------------------|
| Analysed by:       |  | Date:     | 04-10-11                                          |
| Name               | Mr Pawan Kumar                                                                      | Position: | Scientist,<br>Environmental Consultancy           |
| Final approval by: |  | Date:     | 04-10-11                                          |
| Name               | Mr J Rowley                                                                         | Position: | Principal scientist,<br>Environmental Consultancy |