

# **“Formaldehyde remover with BACTAKLEEN ANTI VOC”**

## **Removal rate test**

### **Test Report**

**Sponsor : EXCELSIA TECHNOLOGIES SDN BHD**

**Testing Institution : SGS Taiwan Ltd.**

**Report No. : UG/2018/20829**

- Note:**
1. The content of this report is invalid if it is not presented as the entire report.
  2. Any unauthorized alteration, forgery or falsification of the content or appearance of this report is unlawful and offenders may be prosecuted to the fullest extent of the law.
  3. The results shown in this test report refer only to the test article(s) tested.
  4. The analytical report is the test result issued by the testing institutions as requested by the consignor. Regarding to the legitimacy of the product, it shall be determined by the authorities according to the law.

## TABLE OF CONTENTS

<b>STUDY SCHEDULE .....</b>	<b>3</b>
<b>ADDRESS INFORMATION .....</b>	<b>3</b>
<b>SIGNATURE OF STUDY PERSONNEL .....</b>	<b>4</b>
<b>OBJECTIVE .....</b>	<b>5</b>
<b>EXPERIMENTAL DESIGN .....</b>	<b>6</b>
<b>DATA CALCULATION .....</b>	<b>8</b>
<b>TEST RESULT.....</b>	<b>10</b>
<b>TEST ARTICLE PHOTO .....</b>	<b>10</b>

## STUDY SCHEDULE

Protocol No.:	UG/2018/20829
Test Article Received Date:	2018.02.26
Expected experimental starting date:	2018.04.24
Expected experimental completion date:	2018.04.25
Study completion date:	See Study Director's signature date in the report

## ADDRESS INFORMATION

### Testing Facility/Test Site

**Name:** SGS TAIWAN LTD.  
**Address:** No. 38, Wu Chyuan 7<sup>th</sup> Rd., New Taipei Industrial Park, Wu Ku Dist., New Taipei City, 24890, Taiwan

### Study Director

**Name:** Shinjyh, Chen  
**Address:** No. 38, Wu Chyuan 7<sup>th</sup> Rd., New Taipei Industrial Park, Wu Ku Dist., New Taipei City, 24890, Taiwan

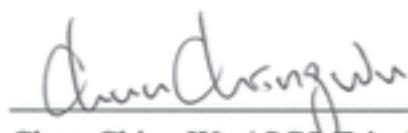
### Sponsor

**Name:** EXCELSIA TECHNOLOGIES SDN BHD  
**Address:** UNIT 103, 1<sup>ST</sup> FLOOR, LIFT 2, BLOCK C, DAMANSARA INTAN, 47400, PETALING JAYA, SELANGOR, MALAYSIA

## SIGNATURE OF STUDY PERSONNEL

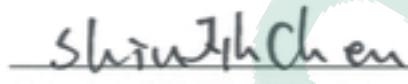
Removal rate test

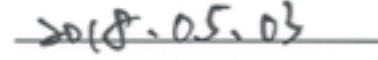
Study Director:

  
\_\_\_\_\_  
Chun-Ching Wu / SGS Taiwan Ltd.

  
\_\_\_\_\_  
Date Completed

Facility Manager:

  
\_\_\_\_\_  
Shin-Jyh CHEN / SGS Taiwan Ltd.

  
\_\_\_\_\_  
Date Completed

## Objective

This test procedure is based on the in house method. Determine the Formaldehyde(HCHO) gas compound removal rate of the product " BACTAKLEEN ANTI VOC" which provide by the client " EXCELSIA TECHNOLOGIES SDN BHD ". In this test, the dry product was set up in the environmental chamber. After injecting gas standard chemical, sampling the air sample in the chamber, analysis was performed by the equipment. Determine the removal rate by comparing the result of control and experiment group.

## Experimental Design

### 1. Instrument

Name	Brand/Lot.	Purpose
Sampling pump	GASTEC	Gas sampling
Detector tube	GASTEC/91L,91LL	Formaldehyde testing
Heating plate	-	Chemical Vaporization
1m <sup>3</sup> environmental chamber	-	Testing environment

### 2. Reagent

Compound	Brand	Purpose
Formaldehyde	Sigma-Aldrich	Standard chemical

### 3. Product/instrument preparation

#### I. Production preparation

- (1) Shake bottle then pour anti voc solution to spray gun or sprayer.
- (2) Adequately cover the surface.
- (3) Allow 10 mins to dry then spray second layer.
- (4) Repeat until 4 layers have been sprayed.
- (5) Place a light source to point at the coated surface (the surface must be exposed to light).

## II. Parameter of instrument

- (1) Before testing, check the detector is leaking or not according to the operation manual.
- (2) Sampling volume: 100 mL air sample in the chamber.

## III. Testing procedure

### Formaldehyde removal rate testing

- (1) Take 35 $\mu$ L Formaldehyde standard by auto-pipette and transfer to 10 mL glassware bottle.
- (2) Prepare the Formaldehyde standard gas from liquid (vaporize formaldehyde solution by heating plat).
- (3) Turn on the test box fan, that airflow evenly in the box cycle.
- (4) Sampling the gas in the chamber at time 0 and 24hrs after experiment starting.
- (5) The concentration of formaldehyde in the chamber was determined by detector.

## 4. Quality control

Carry out the same procedure of procedure III but excluding the product as control group.

## Data calculation

The removal rate( $\gamma_t$ ) and Natural attenuation rate( $R_t$ ) can be calculated according formula

$$R_t = \frac{(N_{0-control\ group} - N_{t-control\ group})}{N_{0-control\ group}} * 100\%$$

$R_t$ : Natural attenuation rate of time t (%)

$N_{0-control\ group}$ : initial concentration of compound of control group(ppmv)

$N_{t-control\ group}$ : time t concentration of compound of control group (ppmv)

$$\gamma_t = \frac{(n_{t-control\ group} - n_{t-experiment\ group})}{n_{t-control\ group}} * 100\%$$

where:

$\gamma_t$ : Removal rate of time t (%)

$n_{t-control\ group}$ : compound concentration of control group(ppmv)

$n_{t-experiment\ group}$ : compound concentration of experiment group (ppmv)

Sampling time t (hr)	control group (ppmv)	experiment group (ppmv)
0	10.0	10.0
24	9.50	0.25

Sampling time t (hr)	Natural attenuation rate (%)	Removal rate (%)
0	0.00	0.00
24	5.00	97.37

## Test result

### Removal rate (%) of Formaldehyde (HCHO)

Time period (hr)	Removal rate (%)
0	-
24	97.37

Note1: Limit of Quantification (LOQ)=0.01 ppmv

Note2: The testing result will be "N.D." for the value less than LOQ

### TEST ARTICLE PHOTO

**UG/2018/20829**

