

24 FEB 2016

Mr David Griffiths,  
Natural Resources Wales,  
Rivers House,  
St Mellons Business Park,  
St Mellons,  
CARDIFF,  
CF3 OEY

22<sup>nd</sup> February 2016

Direct Tel: 01633 486232  
Fax No: 01633 486228

PERMIT NUMBER EPR/BR8212IK  
VARIATION NUMBER EPR/BR8212IK/V004

Dear Mr Griffiths,

Please find attached a report as per improvement condition IC4, detailing the relative proportion volumetric flow through emission point A3 that originates at the curing ovens and cooling zone.

Also attached is the sampling report from NWL.

I trust this answers the improvement condition requirement however if you have any further questions or queries please do not hesitate to contact myself.

Yours sincerely

Warren Christy  
Health, Safety, Environmental & Systems Manager

(Authorised to sign on behalf of Knauf Insulation Limited)

BS EN ISO 9002: 1994



FM01768 Q06047 FM00608  
FM12162

BS EN ISO 14001: 1996



BMS 52854

**KNAUF INSULATION LTD.**

PONT -Y -FELIN, CWMBRAN, TORFAEN, NP44 2YQ, UK.

TEL: 01633 486220 FAX: 01633 486228

[www.knaufinsulation.co.uk](http://www.knaufinsulation.co.uk)

REGISTERED OFFICE: STAFFORD ROAD, ST HELENS, MERSEYSIDE, WA10 3NS, UK. REGISTERED IN ENGLAND, COMPANY NUMBER 1926842.

#### Improvement Condition IC4

As requested within the improvement condition IC4 of the permit variation number as above:

*For some parameters the BAT ELV for curing ovens and cooling zones differ. As emissions from these are released through a common emission point (A3), the Operator shall measure the volumetric flow of emissions to air from:*

- (1) the Curing Ovens; and
- (2) the Cooling Zone

*A report shall be submitted to Natural Resources Wales detailing the relative proportion of volumetric flow through emission point A3 that originates in each of these areas.*

Northumberland Water Limited were commissioned to undertake volumetric flow measurements from sample points whereby gaseous flow from the cooling zone and curing ovens were the only gaseous flow past these sample points. A third sample was used, to emission point A3, to measure the total flow of gas which would be the total of the above two gaseous flow rates and that from the forming area. The flow rate samples were taken in compliance with BS EN 13284.

The volumetric flow rates measured for each sample point was therefore as follows:

|                     |   |                          |
|---------------------|---|--------------------------|
| (1) Curing Ovens    | - | 1166 m <sup>3</sup> /min |
| (2) Cooling Zone    | - | 795 m <sup>3</sup> /min  |
| (3) Sample point A3 | - | 6994 m <sup>3</sup> /min |

The volumetric flow rate therefore from the forming area can be calculated as:

$$\text{Forming Fans} \quad - \quad 6994 - 1166 - 795 \quad = \quad 5033 \text{ m}^3/\text{min}$$

The relative proportion of volumetric flow through emission point A3 is therefore:

|                  |   |            |
|------------------|---|------------|
| (1) Curing Ovens | - | <b>17%</b> |
| (2) Cooling Zone | - | <b>11%</b> |
| (3) Forming Fans | - | <b>72%</b> |

The report issued by NWL is attached below:

Results Summary

Process Status During Monitoring  
Reference Conditions

Operating as normal (10 Spinners)  
273K, 101.3 Kpa, Wet Gas

| Location     | Date of Sampling | Start and End Times | Velocity (m/s) | Normalised Velocity (Nm/s) | Vol. Flow (m <sup>3</sup> /min) | Normalised Vol. Flow (Nm <sup>3</sup> /min) | Monitoring Method Reference | Accreditation for use of Method |
|--------------|------------------|---------------------|----------------|----------------------------|---------------------------------|---------------------------------------------|-----------------------------|---------------------------------|
| Forming      | 15-Feb-16        | 10:30-10:35         | 16.7           | 14.5                       | 6994                            | 6077                                        | BS EN 13284                 | MCERTS                          |
| Cooling Zone | 15-Feb-16        | 12:00-12:05         | 6.6            | 6.0                        | 795                             | 721                                         |                             |                                 |
| Curing Ovens | 15-Feb-16        | 11:00-11:05         | 20.7           | 17.4                       | 1166                            | 981                                         |                             |                                 |

## RESULTS TABLES

CLIENT: Knauf

SAMPLE DATE:

15-Feb-16

LOCATION: Cwmbran

TIME OF SAMPLING:

10:30-10:35

STACK: Forming

| SAMPLING DATA                                                              |  | Flow   |
|----------------------------------------------------------------------------|--|--------|
| Pitot tube constant, $C_p$                                                 |  | 0.84   |
| Temperature DGM (°C)                                                       |  | 4      |
| Temperature stack (°C)                                                     |  | 37     |
| Mean pitot tube pressure drop (traverse), $\Delta P$ (cm H <sub>2</sub> O) |  | 1.7    |
| Barometric Pressure (kPa)                                                  |  | 99.9   |
| X-sectional area of stack (m <sup>2</sup> )                                |  | 6.97   |
| Reference Conditions                                                       |  |        |
| Temperature (K)                                                            |  | 273    |
| Pressure (kPa)                                                             |  | 101.3  |
| As a wet gas                                                               |  |        |
| Flow Data                                                                  |  |        |
| Velocity, actual (m/s)                                                     |  | 16.7   |
| Velocity, ntp (m/s)                                                        |  | 14.5   |
| Vol.Flow, actual (m <sup>3</sup> /min)                                     |  | 8993.7 |
| Vol.Flow, ntp wet gas                                                      |  | 6077.3 |

## RESULTS TABLES

CLIENT: Knauf

SAMPLE DATE:

15-Feb-16

LOCATION: Cwmbran

TIME OF SAMPLING:

12:00-12:05

STACK: Cooling Zone

| SAMPLING DATA                                                           |  | Flow  |
|-------------------------------------------------------------------------|--|-------|
| Pitot tube constant, Cp                                                 |  | 0.84  |
| Temperature DGM (°C)                                                    |  | 4     |
| Temperature stack (°C)                                                  |  | 24    |
| Mean pitot tube pressure drop (traverse), delta P (cm H <sub>2</sub> O) |  | 0.3   |
| Barometric Pressure (kPa)                                               |  | 99.9  |
| X-sectional area of stack (m <sup>2</sup> )                             |  | 2.01  |
| Reference Conditions                                                    |  |       |
| Temperature (K)                                                         |  | 273   |
| Pressure (kPa)                                                          |  | 101.3 |
| As a wet gas                                                            |  |       |
| Flow Data                                                               |  |       |
| Velocity, actual (m/s)                                                  |  | 6.6   |
| Velocity, ntp (m/s)                                                     |  | 6.0   |
| Vol.Flow, actual (m <sup>3</sup> /min)                                  |  | 794.7 |
| Vol.Flow, ntp wet gas                                                   |  | 721.0 |

## RESULTS TABLES

CLIENT: Knauf

SAMPLE DATE:

15-Feb-16

LOCATION: Cwmbran

TIME OF SAMPLING:

11:00-11:05

STACK: Curling Ovens

| SAMPLING DATA                                                           |  | Flow   |
|-------------------------------------------------------------------------|--|--------|
| Pilot tube constant, Cp                                                 |  | 0.84   |
| Temperature DGM (°C)                                                    |  | 4      |
| Temperature stack (°C)                                                  |  | 39     |
| Mean pitot tube pressure drop (traverse), delta P (cm H <sub>2</sub> O) |  | 2.5    |
| Barometric Pressure (kPa)                                               |  | 99.9   |
| X-sectional area of stack (m <sup>2</sup> )                             |  | 0.94   |
| Reference Conditions                                                    |  |        |
| Temperature (K)                                                         |  | 273    |
| Pressure (kPa)                                                          |  | 101.3  |
| As a wet gas                                                            |  |        |
| Flow Data                                                               |  |        |
| Velocity, actual (m/s)                                                  |  | 20.7   |
| Velocity, ntp (m/s)                                                     |  | 17.4   |
| Vol.Flow, actual (m <sup>3</sup> /min)                                  |  | 1165.6 |
| Vol.Flow, ntp wet gas                                                   |  | 981.2  |