Burbidge & Son Ltd, Awson Street, Coventry

Permit No: PPC/045

Woodcoating

Solvent Management Plan

2008 usage

1. Objective
To establish a Solvent Management Plan following the Secretary of State's Guidance for Wood Coating PG6/33 (04). This document particularly refers to the requirements of paragraph 5.13.

2. Definitions and Interpretations
The Guidance Note refers to specific Inputs and Outputs of organic solvent. The interpretation of the definitions in relation to Burbidge & Son Ltd is as follows;

Definition Ref	Interpretation
I_1	The input quantity of VOC will be the sum of all coatings and thinners used in the application process and solvent used for cleaning purposes
I_2	Organic solvents recovered and reused as solvent input into the process.
O_1	The emission of VOC from the exhaust stacks in the spray booths, drying ovens and paint kitchens. This is calculated as the difference between the input VOC and the other output VOC.
O_2	Burbidge & Son Ltd do not use a process where solvents are washed in water and therefore this output requirement is not applicable
O_3	The potential retention of solvent in the coating is a significant problem to the industry. This can lead to coating instability that normally becomes visible as cracks in the lacquer film and also leads to the panels sticking when stacked together and to the imprinting of packaging onto the surface. As these issues are not apparent at Burbidge & Son Ltd then we believe that no solvent is retained in the final product and therefore this output requirement is not applicable.
O_4	All mixing of the coating components, transfer of coatings and cleaning of application equipment is carried out in extracted areas. This output requirement is therefore not applicable.
O_5	None of the coatings used at Burbidge & Son Ltd generate emissions from chemical or physical reactions and therefore this output is not applicable.
O_6	Organic solvents contained in collected waste arise from the residue of coating materials left in the drums. The drums are partially vented then sealed prior to collection. There are no processes at Burbidge & Son that involve the wiping of excess solvent. There is a very low usage of rags for housekeeping purposes. A proportion of this includes contact with a small quantity of solvent but this is carried out in a spraybooth environment and it is believed that the solvent vapour is removed by the airflow into the spraybooth.

O_7	All materials mixed are used on site and not sold on as a commercially valuable product and therefore this output requirement is not applicable.
O_8	Materials are sent for recovery and resale but are not reused in the process.
O_9	To the best of our knowledge all solvent releases are accounted for in the above definitions and therefore this output is not applicable.

3. Methodology

Inputs
3.1 Input I_1
The input data for materials used in the process is calculated from information supplied by the materials manufacturers.

3.2 Input I_2
Organic solvents recovered and reused as solvent input into the process, I_2, are calculated from the capacity of the recycle still and the number of times this is used.

Outputs
The known outputs cannot realistically be calculated with this level of accuracy and traceability. In order to estimate the relevant outputs the following methodologies have been used.

3.3 Output O_6 - Organic solvents contained in collected waste arise from the residue of coating materials left in the drums.

This output is calculated from an estimated 5mm thick residual layer in a coatings container after emptying into a mixing drum or being pumped to the spray gun.

The coating VOC content used to determine O_6 is a weighted figure calculated from the total VOC weight of all materials in kg divided by the total usage of all materials in litres. (It is not an average VOC content of the materials used)

For example assuming a two material usage as follows

100 litres of material with a VOC content of 500 grams/litre

10 litres of material with a VOC content of 800 grams/litre

The simple average VOC content is

$$(500 + 800)/2 = 650$$

The weighted average taking into account relative volumes is

$$((100 \times 500) + (10 \times 800))/110 = 527$$

This weighted average is the VOC content of the mix.

For the residual waste calculation the average VOC content is determined from the data given in the annual VOC return and is calculated by dividing the total VOC by the total volume of material. In this instance

$$50.034 \text{ tonnes VOC}/ 88.252 \text{ litres materials} = 56.7\% \text{ rounded up to } 57\%.$$

The volume of material in a drum varies with the type of material. For a typical full drum the depth of material would be 500mm. The residue therefore is equivalent to 1% of the drum height and therefore volume of coating in the drum. The calculated average coating VOC content can be used to determine the VOC content of the residue then extrapolated to give a total for O_6. The average coating VOC content of the residue is 57%. Therefore the residual VOC equates to 57% of the 1% of residue i.e. 0.57%. The output O_6 is therefore 0.57% of the materials given in I_1.

3.4 Output O_8 - Materials are sent for recovery and resale but are not reused in the process.

The data for materials sent for recovery is calculated from information supplied by the recycling contractors using the average solvent content of 85% as reported in the BFM "Benchmarking solvent use in the UK furniture sector".

4. Determination of Annual Solvent Consumption
The VOC content and solids content are available from data supplied by the coating manufacturer. The VOC or solids content of the total coating used can be determined by multiplying the volume by VOC or solids content as appropriate.

The annual actual consumption of organic solvents (C) is

$$C = I_1 - O_8$$

5. Determination of Target Emission
The Target Emission for a wood coating installation in the 15 tonne or more solvent consumption band is

$$\text{Total Mass of Solids} \times 1.0 \text{ (see Table 5 PG6/33(04))}$$

Compliance with Reduction Scheme is achieved if the annual actual solvent emission determined by the Solvent Management Plan is less than or equal to the Target Emission.

6. Determination of Annual Actual Solvent Emission

The annual actual solvent emission (para 5.8 PG6/33(04)) is

$$I_1 - O_8 - O_7 - O_6$$

7. Solvent Management Plan

Using the definitions in paragraph 5.13 the input of VOC is

$$I_1$$

The outputs are

$$O_1 + O_6 + O_8 \text{ (other outputs equal zero)}$$

where

I_1 = the quantity of organic solvents used in preparations and as thinners is taken from the annual VOC return

O_1 = the quantity of organic solvent in exhaust stacks from the spray booths, drying ovens and paint kitchens and is the difference between the input VOC and the other outputs

O_6 = organic solvents contained in collected empty drums and is calculated in section 3.3

O_8 = organic solvents sent for recovery and re-sale but not re-used on site

For Burbidge & Son Ltd during 2008

I_1 = 39.868 tonnes

O_1 = 26.398 tonnes

O_6 = 0.227 tonnes

O_8 = 13.243 tonnes

The annual actual consumption (C) of organic solvents in 2008 is

$$C = 39.868 - 13.243 = 26.625 \text{ tonnes}$$

The annual actual solvent emission for Burbidge & Son Ltd in 2008 equals

$$39.868 - 13.243 - 0 - 0.227 = 26.398 \text{ tonnes}$$

The Total Mass of Solids is shown in the annual VOC return for Burbidge & Son Ltd. and is

$$23.080 \text{ tonnes}$$

The Target Emission is therefore

$$23.080 \text{ x } 1.0 = 23.080 \text{ tonnes}$$

The annual actual solvent emission is therefore greater than the target emission.