Wyndeham Heron

Solvent Management Plan and Compliance Summary

for the period:

1st January 2012 to 31st December 2012

Contents:

ehrc

Wyndeham Heron

Compliance Summary

for the period: **1st January 2012 to 31st December 2012**

Contained VOC emission limit

A contained emission limit of 20mg/Nm^3 applies to all

Printing press	Emission (mg/Nm^3)	Pass/Fail
Lithoman 1	0	Pass
Rotoman 1 (Lower dryer)	4.9	Pass
Rotoman 1 (Upper dryer)	7.5	Pass
Rotoman 2 (Lower dryer)	3	Pass
Rotoman 2 (Upper dryer)	5.1	Pass
Rotoman 3 (Lower dryer)	1.9	Pass
Rotoman 3 (Upper dryer)	1.9	Pass

Fugitive VOC emission limit

A fugitive emission limit of 30% of solvent input applies to the installation:

Installation	Emission				Pass/Fail
Fugitive emission as % solvent input	8.44	to	9.12	%	Pass

BREF emission value associated with BAT

A 2.5-10% VOC emission limit applies to new and upgraded
A 5-15% VOC emission limit applies to existing presses

	Emission				Pass/Fail
Emission value associated with BAT	3.64	to	3.95	%	Pass

Wyndeham Heron

Solvent Management Plan 2013

for the period: **1st January 2012 to 31st December 2012**

I1: Solvent Input

	Raw material by type	Average	Max	
Inks:	Flint Ink: BLACK	101142.60	101142.60	
	Flint Ink: CYAN	102666.33	102666.33	
	Flint Ink: MAGENTA	102391.38	102391.38	
	Flint Ink: YELLOW	108368.91	108368.91	
	Inks total:	**414569.22**	**414569.22**	**kg**
Other:	Varn MRC	1096.03	1096.03	
	Varn Natural Wash	15750.00	18900.00	
	Varn Aqua Conditioner	2.77	5.40	
	Varn EC Wash	1560.00	1600.00	
	Varn Antistatic	233.04	233.04	
	Varn KT10-5SFG (AKA Sunday Fount)	11.00	11.00	
	Varn E9133/2	528.82	688.76	
	FS2080 Flint Group High Speed Alcohol Free Fount	22.24	22.24	
	Penn White Finasil	0.71	0.89	
	Varn Pro Web Titanium Plus	0.08	0.10	
	Other total:	**19204.68**	**22557.46**	**kg**
	I1=:	**433773.90**	**437126.68**	**kg**

I2: Recovered solvent re-used in process

	Recycled material by type	Average	Max	
	None	16721.25	16721.25	
	I2=:	**16721.25**	**16721.25**	**kg**

O1: Solvents in waste gasses

	Stack emissions	Average	Max	
a	Lithoman 1	0.00	0.00	
b	Rotoman 1 (Lower dryer)	42.88	47.70	
c	Rotoman 1 (Upper dryer)	47.70	70.52	
d	Rotoman 2 (Lower dryer)	30.29	31.60	
e	Rotoman 2 (Upper dryer)	35.80	37.34	
f	Rotoman 3 (Lower dryer)	27.91	29.44	
g	Rotoman 3 (Upper dryer)	26.94	28.42	
	O1=:	**211.52**	**245.03**	**kg**

O2: Solvents lost in water to drain

	Average	Max	
Asumed nil as consent forbids solvents			
O1=:	**0.00**	**0.00**	**kg**

O3: Residual solvents in products

	10%	*15%*	
Average	40957.41	61436.11	
Maximum	40957.41	61436.11	
Average O3=:	**40957.41**	**61436.11**	**kg**

O4: Stored solvent venting & uncaptured emissions

Asumed as everything else (i.e all fugitive)

	Average	*Max*	
O4=:	**32634.87**	**35948.24**	**kg**

O5: Solvents destroyed in abatement plant

See O5 for rate of abatement achieved

	Average	*Max*	
O5=:	**368405.15**	**347892.94**	**kg**

O6: Solvents in waste not recovered

	Average	*Max*	
a Waste ink	849.45	849.45	
b Rags & wipers	4529.33	4596.38	
O6=:	**5378.78**	**5445.83**	**kg**

O7: Solvents sold to third parties

Asumed nil

	Average	*Max*	
O7=:	**0.00**	**0.00**	**kg**

O8: Solvents collected in waste for external recycling

Waste by type	**Average**	**Max**	
a Mixed waste solvent	2998.00	2998.00	
O8=:	**2998.00**	**2998.00**	**kg**

O9: Other uncontrolled releases

Assumed nill

	Average	**Max**	
	0.00	0.00	
O8=:	**0.00**	**0.00**	**kg**

C: Consumption

C = I1 - O8

	Average	**Max**	
C=:	**430775.90**	**434128.68**	**kg**
	430.78	**434.13**	**T**

Solvent Balance check:

Solvent Balance check:			
I1	433773.90	437126.68	
I2	16721.25	16721.25	
	450495.15	**453847.93**	**kg**
O1	211.52	245.03	
O2	0.00	0.00	
O3	40957.41	61436.11	
O4	32634.87	35948.24	
O5	368405.15	347892.94	
O6	5378.78	5445.83	
O7	0.00	0.00	
O8	2998.00	2998.00	
O9	0.00	0.00	
	450585.73	**453966.15**	**kg**
Balance:	**-90.58**	**-118.22**	**kg**

Wyndeham Heron

Compliance Summary

for the period: **1st January 2012 to 31st December 2012**

Fugitive Emission Value:SED Compliance

Solvent Input:

		Average	Max	
I1 - Solvent Input		433773.90	437126.68	
I2 - Recovered solvent re-used in process		16721.25	16721.25	
	Solvent Input:	**450495.15**	**453847.93**	**kg**

Emissions:

	Average	Max	
O2 - VOC lost to water	0.00	0.00	
O4 - Uncaptured emissions of VOC	32634.87	35948.24	
O6 - VOC lost in collected waste	5378.78	5445.83	
O9 - VOC lost in other ways	0.00	0.00	
	38013.65	**41394.07**	**kg**
	8.44	**9.12**	**%**

Notes:

A fugitive emission limit of 30% of solvent input applies to the installation.

Special provisions in Part 2 of ANNEX VII of the SED advise that solvent residue in finished product (O3) is **not** to be considered as part of fugitive emissions.

Wyndeham Southernprint

Compliance Summary

for the period: **1st January 2012 to 31st December 2012**

BREF emission value associated with BAT

For printing with heatset web offset, the BREF considers that BAT is to use a combination of techniques for printing, cleaning, waste gas management, as well as generic BAT to **reduce the sum of fugitive emissions and the VOCs remaining after waste gas treatment**. Associated emission values for the combined isopropyl alcohol (IPA) and cleaning solvent are:

2.5-10% VOC for new and upgraded presses as wt-% of ink consumption
5-15% VOC for existing presses as wt-% of ink consumption

Data is not currently held on a 'per press' basis, thefore VOC emission as a percentage of ink consumption has been derived for the installation as a whole. Improvements to data capture should be made wherever practicable in order to provide information on a 'per press' basis.

Ink consumption:

	Average	Max	
Purchased ink (kg)	1062998.00	1062998.00	
O6 - Waste ink	-2427.00	2427.00	
O6 - Waste ink on rags (1% contamination)	-10629.98	-10629.98	
Ink consumption:	**1049941.02**	**1054795.02**	**kg**

Emissions:

	Average	Max	
O1 - VOC remaining after waste gas treatment	211.52	245.03	
F - Fugitive emissions of VOC	38013.65	41394.07	
	38225.17	**41639.09**	**kg**
	3.64	**3.95**	**%**

Notes:
Ink consumption is the weight of ink consumed NOT the VOC content of the ink.
See BREF Note Page 34 Table 2.10.

I1 - Purchased VOC

Inks

Supplier	Product	Product name	Minimum % VOC	Maximum % VOC	Average % VOC	Density	Quantity purchased (kg)	Average VOC (kg)	Max VOC (kg)
Flint	Ink	Flint Ink: BLACK	39	39	39.00	1.00	259340.00	101142.60	101142.60
Flint	Ink	Flint Ink: CYAN	39	39	39.00	1.00	263247.00	102666.33	102666.33
Flint	Ink	Flint Ink: MAGENTA	39	39	39.00	1.00	262542.00	102391.38	102391.38
Flint	Ink	Flint Ink: YELLOW	39	39	39.00	1.00	277869.00	108368.91	108368.91
						Total:	1062998.00	**414569.22**	**414569.22**

Dampening and cleaning solutions

Supplier	Product	Product name	Minimum % VOC	Maximum % VOC	Average % VOC	Density	Quantity purchased	Average VOC (kg)	Max VOC (kg)	g/l	
	Roller Cleaner	Varn MRC	46.6	46.6	46.6	0.700	3360	1096.03	1096.03	326.2	326.2
	Blanket wash (automatic system	Varn Natural Wash	50	75	62.5	0.840	30000	15750.00	18900.00	525	630
	Water conditioner	Varn Aqua Conditioner	0.0015	0.06	0.03075	1.000	9000	2.77	5.40	0.3075	0.6
	Blanket wash (applied by hand)	Varn EC Wash	95	100	97.5	0.800	2000	1560.00	1600.00	780	800
	Antistatic	Varn Antistatic			0		3699	233.04	233.04	63	63
	Fount solution	Varn KT10-5SFG (AKA Sunday Fount)	1	1	1	1.100	1000	11.00	11.00	11	11
		Varn E9133/2	35.4	66.1	50.75	1.042	1000	528.82	688.76	528.815	688.762
	Fount solution	FS2080 Flint Group High Speed Alcohol Free Fou	30	30	30	1.090	68000	22.24	22.24	0.327	0.327
	Silicone emulsion	Penn White Finasil	3	5	4	0.990	18000	0.71	0.89	0.0396	0.0495
	Silicone emulsion	Varn Pro Web Titanium Plus	3	5	4	0.975	2000	0.08	0.10	0.039	0.04875
						Total:	138059	**19204.68**	**22557.46**		

I2 - VOC recycled for re-use on site

Other

		VOC (g/l)	Quantity recycled (litres)	Average VOC (kg)	Max VOC (kg)
Varn Natural Wash	Approx VOC content	525	31850	16721.25	16721.25
		Total:	31850	**16721.25**	**16721.25**

O1 - VOC emissions in waste gasses

O1.1	**Abated stack emissions Lithoman 1**	
Hours of use	4278 hrs	
VOC emission reading	0 mg/m^3	
Reading uncertainty	5.5 %	
Volumetric flowrate	5910.30 Nm^3/hr	
Average emission	0.00 kg	
Maximum emission	0.00 kg	
Lithoman 1 emissions	**0.00 kg (average)**	
	0.00 kg (max)	

O1.2	**Abated stack emissions Rotoman 1**	
Hours of use	1890 hrs	1890 hrs
VOC emission reading	4.9 mg/m^3	7.5 mg/m^3
Reading uncertainty	11.25 %	11.2 %
Volumetric flowrate	4629.90 Nm^3/hr	4473.90 Nm^3/hr
Average emission	42.88 kg	63.42 kg
Maximum emission	47.70 kg	70.52 kg
Rotoman 1 emissions	**106.30 kg (average)**	
	118.22 kg (max)	

O1.3	**Abated stack emissions Rotoman 2**	
Hours of use	3025 hrs	3025 hrs
VOC emission reading	3 mg/m^3	5.1 mg/m^3
Reading uncertainty	4.3 %	4.3 %
Volumetric flowrate	3338.10 Nm^3/hr	2320.60 Nm^3/hr
Average emission	30.29 kg	35.80 kg
Maximum emission	31.60 kg	37.34 kg
Rotoman 2 emissions	**66.09 kg (average)**	
	68.94 kg (max)	

O1.4	**Abated stack emissions Rotoman 3**	
Hours of use	3680 hrs	3680 hrs
VOC emission reading	1.9 mg/m^3	1.9 mg/m^3
Reading uncertainty	5.5 %	5.5 %
Volumetric flowrate	3991.60 Nm^3/hr	3853.20 Nm^3/hr
Average emission	27.91 kg	26.94 kg
Maximum emission	29.44 kg	28.42 kg
Rotoman 3 emissions	**54.85 kg (average)**	
	57.87 kg (max)	

O2 - VOC lost in water

Assumed nil as discharge to sewer and drain not permitted **0 kg**

O3 - VOC residues in products

O3.0 Residual VOC in products

Dryers do not evaporate 100% of the VOC in the ink 85-90% is evaporated, leaving 10-15% in the product (which results in the desired effect of the glossy finish of the printed page). Source: Colin Morris, MEGTEC.

O3.1 O3: Assuming 10% residual VOC in products

Coatings VOC consumption

	Average	Max	
Purchased ink	414569.22	414569.22	
Waste ink	849.45	849.45	
Ink on rags	4145.69	4145.69	
Ink passing through press	409574.08	409574.08	**kg**
Residual VOC range @ 10% =	**40957.41**	**40957.41**	**kg**

O3.2 O3: Assuming 15% residual VOC in products

Coatings VOC consumption

	Average	Max	
Purchased ink	414569.22	414569.22	
Waste ink	849.45	849.45	
Ink on rags	4145.69	4145.69	
Ink passing through press	409574.08	409574.08	**kg**
Residual VOC range @ 15% =	**61436.11**	**61436.11**	**kg**

O4 - Uncaptured VOC emissions

Uncaptured VOC represent all of the other losses that cannot be measured or assumed from the installation. All known VOC outputs are subtracted from all known VOC inputs.

I1	433773.90	437126.68	
I2	16721.25	16721.25	
	450495.15	**453847.93**	**kg**
O1	120.95	126.80	
O2	0.00	0.00	
O3	40957.41	61436.11	
O5	368405.15	347892.94	
O6	5378.78	5445.83	
O7	0.00	0.00	
O8	2998.00	2998.00	
O9	0.00	0.00	
	417860.27	**417899.68**	**kg**
O4:	**32634.87**	**35948.24**	**kg**

O5 - VOC destroyed in abatement plant

O5.0 VOC destoyed in abatement plant

Abatement plant is considered to be 99% efficient in destroying evaporated VOC, and will do so from around 720°C. Higher abatement plant temperatures are however used, which is more to do with control of NOx and CO emissions rather than VOC abatement. Source: Colin Morris, MEGTEC.

O5.1 O5: Assuming 99% abatement efficiency

	Average	Max	
Ink consumption:	409574.08	409574.08	
Residual in product:	40957.41	61436.11	
Max VOC available for destruction:	**368616.67**	**348137.97**	**kg**
Released emission:	211.52	245.03	
	0.06	% released	
	99.94	% efficient	

VOC destroyed in abatement plant	Average	Max	
	368405.15	347892.94	**kg**

O6 - VOC in collected waste

O1.1 VOC in waste inks

Waste type	Best case % VOC	Worst case % VOC	Average % VOC	SG	Quantity sent to recycling (kg)	Average VOC (kg)	Max VOC (kg)
Mixed waste ink	35	35	35.00	1000	2427.00	849.45	849.45

Note:
Waste ink is put though a cementation process and sent to landfill. Whilst VOC is not released unless the ink is heated, the VOC is considered lost.

O1.2 VOC in rags and wipers

Waste type	Best case %	Worst case %	Average %	Average VOC input	Max VOC input	Average VOC (kg)	Max VOC (kg)
Ink on wipers	1	1	1.00	414569.22	414569.22	4145.69	4145.69
Cleaners on wipers (blanket wash & cleaners)	2	2	2.00	19181.65	22534.23	383.63	450.68
						4529.33	**4596.38 kg**

Note:
VOC in rags and wipers is assumed as a percentage of total solvent input

O7- VOC in preparations for sale as commercially viable products

Assumed Nil

O8 - VOC in preparations recovered for re-use but not as input

O1.1 VOC in mixed waste solvent sent for recycling

Waste type	Best case % VOC	Worst case % VOC	Average % VOC	SG	Quantity sent to recycling (l/kg)	Average VOC (kg)	Max VOC (kg)
Mixed waste solvent	5	5	5.00	1000	59960.00	2998.00	2998.00

O9 - VOC released in other ways