Wyndeham Heron

Solvent Management Plan and Compliance Summary

for the period:

1st January 2013 to 31st December 2013

Contents:

ehrc

Wyndeham Heron

Compliance Summary

for the period: **1st January 2013 to 31st December 2013**

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	11.2	Pass
Rotoman 2 (Lower dryer)	0.6	Pass
Rotoman 2 (Upper dryer)	1.8	Pass
Rotoman 3 (Lower dryer)	4.5	Pass
Rotoman 3 (Upper dryer)	6.1	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	16.99	to	18.50	%	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	8.14	to	8.97	%	Pass

Wyndeham Heron

Solvent Management Plan 2013

for the period: **1st January 2013 to 31st December 2013**

I1: Solvent Input

	Raw material by type	Average	Max	
Inks:	Flint Ink: BLACK	48662.64	48662.64	
	Flint Ink: CYAN	40695.72	40695.72	
	Flint Ink: MAGENTA	33850.05	33850.05	
	Flint Ink: YELLOW	34858.98	34858.98	
	Inks total:	**158067.39**	**158067.39**	**kg**
Other:	Varn MRC	848.45	848.45	
	Varn Natural Wash	16800.00	20160.00	
	Varn Aqua Conditioner	1.85	3.60	
	Varn EC Wash	1560.00	1600.00	
	Varn Antistatic	189.00	189.00	
	Varn KT10-5SFG (AKA Sunday Fount)	0.00	0.00	
	Varn E9133/2	264.41	344.38	
	FS2080 Flint Group High Speed Alcohol Free Fount	17.33	17.33	
	Penn White Finasil	4.00	5.00	
	Varn Pro Web Titanium Plus	0.06	0.07	
	Other total:	**19685.09**	**23167.83**	**kg**
	I1=:	**177752.48**	**181235.22**	**kg**

I2: Recovered solvent re-used in process

	Recycled material by type	Average	Max	
	None	10368.75	10368.75	
	I2=:	**10368.75**	**10368.75**	**kg**

O1: Solvents in waste gasses

	Stack emissions	Average	Max	
a	Lithoman 1	341.97	350.51	
b	Rotoman 2 (Lower dryer)	11.85	12.00	
c	Rotoman 2 (Upper dryer)	41.36	42.40	
d	Rotoman 3 (Lower dryer)	114.89	119.83	
e	Rotoman 3 (Upper dryer)	119.02	124.13	
	O1=:	**629.08**	**648.87**	**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	15615.95	23423.92	
Maximum	15615.95	23423.92	
Average O3=:	**15615.95**	**23423.92**	**kg**

O4: Stored solvent venting & uncaptured emissions

Asumed as everything else (i.e all fugitive)

	Average	*Max*	
O4=:	**29660.56**	**33073.67**	**kg**

O5: Solvents destroyed in abatement plant

See O5 for rate of abatement achieved

	Average	*Max*	
O5=:	**139914.44**	**132086.67**	**kg**

O6: Solvents in waste not recovered

	Average	*Max*	
a Waste ink	327.25	327.25	
b Rags & wipers	1973.95	2043.58	
O6=:	**2301.20**	**2370.83**	**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	0.00	0.00	
O8=:	**0.00**	**0.00**	**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=:	**177752.48**	**181235.22**	**kg**
	177.75	**181.24**	**T**

Solvent Balance check:

Solvent Balance check:			
I1	177752.48	181235.22	
I2	10368.75	10368.75	
	188121.23	**191603.97**	**kg**
O1	629.08	648.87	
O2	0.00	0.00	
O3	15615.95	23423.92	
O4	29660.56	33073.67	
O5	139914.44	132086.67	
O6	2301.20	2370.83	
O7	0.00	0.00	
O8	0.00	0.00	
O9	0.00	0.00	
	188121.23	**191603.97**	**kg**
Balance:	**0.00**	**0.00**	**kg**

Wyndeham Heron

Compliance Summary

for the period: **1st January 2013 to 31st December 2013**

Fugitive Emission Value:SED Compliance

Solvent Input:

		Average	Max	
I1 - Solvent Input		177752.48	181235.22	
I2 - Recovered solvent re-used in process		10368.75	10368.75	
	Solvent Input:	**188121.23**	**191603.97**	**kg**

Emissions:

	Average	Max	
O2 - VOC lost to water	0.00	0.00	
O4 - Uncaptured emissions of VOC	29660.56	33073.67	
O6 - VOC lost in collected waste	2301.20	2370.83	
O9 - VOC lost in other ways	0.00	0.00	
	31961.76	**35444.50**	**kg**
	16.99	**18.50**	**%**

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 2013 to 31st December 2013**

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)	405301.00	405301.00	
O6 - Waste ink	-935.00	935.00	
O6 - Waste ink on rags (1% contamination)	-4053.01	-4053.01	
Ink consumption:	**400312.99**	**402182.99**	**kg**

Emissions:

	Average	Max	
O1 - VOC remaining after waste gas treatment	629.08	648.87	
F - Fugitive emissions of VOC	31961.76	35444.50	
	32590.84	**36093.38**	**kg**
	8.14	**8.97**	**%**

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	124776.00	48662.64	48662.64
Flint	Ink	Flint Ink: CYAN	39	39	39.00	1.00	104348.00	40695.72	40695.72
Flint	Ink	Flint Ink: MAGENTA	39	39	39.00	1.00	86795.00	33850.05	33850.05
Flint	Ink	Flint Ink: YELLOW	39	39	39.00	1.00	89382.00	34858.98	34858.98
						Total:	405301.00	**158067.39**	**158067.39**

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	2601	848.45	848.45	326.2	326.2
	Blanket wash (automatic system	Varn Natural Wash	50	75	62.5	0.840	32000	16800.00	20160.00	525	630
	Water conditioner	Varn Aqua Conditioner	0.0015	0.06	0.03075	1.000	6000	1.85	3.60	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		3000	189.00	189.00	63	63
	Fount solution	Varn KT10-5SFG (AKA Sunday Fount)	1	1	1	1.100	0	0.00	0.00	#DIV/0!	#DIV/0!
		Varn E9133/2	35.4	66.1	50.75	1.042	500	264.41	344.38	528.815	688.762
	Fount solution	FS2080 Flint Group High Speed Alcohol Free Fou	30	30	30	1.090	53000	17.33	17.33	0.327	0.327
	Silicone emulsion	Penn White Finasil	3	5	4	0.990	101000	4.00	5.00	0.0396	0.0495
	Silicone emulsion	Varn Pro Web Titanium Plus	3	5	4	0.975	1500	0.06	0.07	0.039	0.04875
						Total:	201601	**19685.09**	**23167.83**		

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	19750	10368.75	10368.75
		Total:	19750	**10368.75**	**10368.75**

O1 - VOC emissions in waste gasses

O1.1	**Abated stack emissions Lithoman 1**	
Hours of use	5166 hrs	
VOC emission reading	11.2 mg/m^3	
Reading uncertainty	2.5 %	
Volumetric flowrate	5910.30 Nm^3/hr	
Average emission	341.97 kg	
Maximum emission	350.51 kg	
Lithoman 1 emissions	**341.97 kg (average)**	
	350.51 kg (max)	

O1.2	**Abated stack emissions Rotoman 2**	
Hours of use	5483 hrs	5483 hrs
VOC emission reading	0.6 mg/m^3	1.8 mg/m^3
Reading uncertainty	1.3 %	2.5 %
Volumetric flowrate	3601.90 Nm^3/hr	4191.00 Nm^3/hr
Average emission	11.85 kg	41.36 kg
Maximum emission	12.00 kg	42.40 kg
Rotoman 2 emissions	**53.21 kg (average)**	
	54.40 kg (max)	

O1.3	**Abated stack emissions Rotoman 3**	
Hours of use	5995 hrs	5995 hrs
VOC emission reading	4.5 mg/m^3	6.1 mg/m^3
Reading uncertainty	4.3 %	4.3 %
Volumetric flowrate	4258.60 Nm^3/hr	3254.50 Nm^3/hr
Average emission	114.89 kg	119.02 kg
Maximum emission	119.83 kg	124.13 kg
Rotoman 3 emissions	**233.90 kg (average)**	
	243.96 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	158067.39	158067.39	
Waste ink	327.25	327.25	
Ink on rags	1580.67	1580.67	
Ink passing through press	156159.47	156159.47	**kg**
Residual VOC range @ 10% =	**15615.95**	**15615.95**	**kg**

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

Coatings VOC consumption

	Average	Max	
Purchased ink	158067.39	158067.39	
Waste ink	327.25	327.25	
Ink on rags	1580.67	1580.67	
Ink passing through press	156159.47	156159.47	**kg**
Residual VOC range @ 15% =	**23423.92**	**23423.92**	**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	177752.48	181235.22	
I2	10368.75	10368.75	
	188121.23	**191603.97**	**kg**
O1	629.08	648.87	
O2	0.00	0.00	
O3	15615.95	23423.92	
O5	139914.44	132086.67	
O6	2301.20	2370.83	
O7	0.00	0.00	
O8	0.00	0.00	
O9	0.00	0.00	
	158460.66	**158530.30**	**kg**
O4:	**29660.56**	**33073.67**	**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:	156159.47	156159.47	
Residual in product:	15615.95	23423.92	
Max VOC available for destruction:	**140543.52**	**132735.55**	**kg**
Released emission:	629.08	648.87	
	0.45	% released	
	99.55	% efficient	

VOC destroyed in abatement plant	Average	Max	
	139914.44	132086.67	**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	935.00	327.25	327.25

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	158067.39	158067.39	1580.67	1580.67
Cleaners on wipers (blanket wash & cleaners)	2	2	2.00	19663.70	23145.43	393.27	462.91
						1973.95	**2043.58 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		0.00	0.00

O9 - VOC released in other ways