

GasSimLite Supplement 1: GasSimLite Release Version 1.5

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1. REVISIONS TO GASSIMLite 1.5

This supplement to the GasSimLite manual covers the 2006 update to GasSimLite, in readiness for PI reporting in 2007. The software has been aligned to GasSim 1.5, including all bug fixes from GasSim 1.00 – 1.52. The user should download the supplements to the GasSim manual for details of bug fixes. Functionality has been limited to that required for PI reporting, but PI reports can now be produced for different years. The gas generation curve has been extended to show the full simulation period. Further improvements include a new Trace Gas database incorporating revised PI reporting thresholds, and new waste composition files for each of the Devolved Administrations, aligning GasSimLite 1.5 with the database provided with GasSim2.

Any simulations or risk assessments requiring more than the PI reporting function associated with GasSimLite 1.5 should be performed in GasSim2.

Trace Gas Database

The trace gas database has been updated to reflect the new PI reporting thresholds (Environment Agency, 2005). Within the trace gas list, the distributions of priority trace gas components, as defined by the Environment Agency (2004a), have been updated in accordance with Environment Agency R&D Technical Report P1-491/TR Environment Agency (2004b). The list of trace components with specific impact on odour has likewise been refreshed in review of Environment Agency guidance (2004b).

Table 1 Trace Gas Distributions used in the Old and New Versions

ID	Name	Old Distribution	New Distribution
1	Dioxins and Furans (modelled as 2,3,7,8-TCDD)	SINGLE(0)	SINGLE(0)
2	Hydrochlorofluorocarbons (HCFCs) (Total)	LOGTRIANGULAR(0.02, 128.8, 916.2)	LOGTRIANGULAR(0.02, 128.8, 916.2)
3	Chlorofluorocarbons (CFCs) (Total)	LOGTRIANGULAR(0.06, 102.3, 1230)	LOGTRIANGULAR(0.06, 102.3, 1230)
4	Halons	SINGLE(0)	SINGLE(0)
5	Acetalehyde (ethanal)	LOGTRIANGULAR(0.1,0.2, 52)	LOGUNIFORM(0.075,2.546)
6	Benzene	LOGTRIANGULAR(0.001, 0.1, 114)	LOGTRIANGULAR(3.1, 15, 73)
7	Chlorobenzene	LOGUNIFORM(0.002, 3000)	LOGUNIFORM(0.002, 3000)
8	Butadiene (modelled as 1,3-Butadiene)	LOGTRIANGULAR(5e-2, 1.45, 6)	LOGUNIFORM(1e-30,0.02)
9	Butene Isomers	LOGTRIANGULAR(0.001, 0.2, 1.8)	LOGTRIANGULAR(0.001, 0.2, 1.8)
10	Vinyl Chloride (chloroethene, chloroethylene)	LOGTRIANGULAR(0.001, 0.01, 7660)	LOGTRIANGULAR(1.1, 31, 730)
11	Chloroform (trichloromethane)	LOGTRIANGULAR(0.001, 0.2, 70)	LOGTRIANGULAR(0.001, 0.2, 70)
12	Methyl Chloride (chloromethane)	LOGTRIANGULAR(0.006, 0.2, 10)	LOGTRIANGULAR(0.006, 0.2, 10)
13	Para-Dichlorobenzene (modelled as 1,4-Dichlorobenzene)	LOGTRIANGULAR(0.006, .05, 2.7)	LOGTRIANGULAR(0.006, .05, 2.7)
14	Ethylene Dichloride	LOGTRIANGULAR(0.006, 0.01, 1820)	LOGTRIANGULAR(0.006, 0.01, 1820)
15	Dichloromethane (methylene chloride)	LOGTRIANGULAR(0.001, .02, 1524)	LOGTRIANGULAR(0.001, .02, 1524)
16	Dimethyl Disulphide	LOGTRIANGULAR(0.001, 0.02, 40)	LOGTRIANGULAR(0.03, 0.17, 12)
17	Toluene	LOGTRIANGULAR(0.01, 0.1, 1250)	LOGTRIANGULAR(0.01, 0.1, 1250)
18	Ethyl Toluene (all isomers)	LOGTRIANGULAR(0.001, 0.01, 8.3)	LOGTRIANGULAR(0.001, 0.01, 8.3)
19	Formaldehyde (methanal)	LOGTRIANGULAR(0.2, 0.2, 52)	LOGTRIANGULAR(0.026,0.068,0.188)
20	Pentene (all isomers)	LOGTRIANGULAR(0.001, 0.2, 11)	LOGTRIANGULAR(0.24, 3.5, 12)
21	Tetrachloroethane (modelled as 1,1,2,2-Tetrachloroethane)	LOGUNIFORM(0.001,50)	LOGUNIFORM(0.001,50)
22	Tetrachloroethylene (Tetrachloroethene)	LOGTRIANGULAR(0.001, 0.01, 7700)	LOGTRIANGULAR(0.001, 0.01, 7700)
23	Methyl Chloroform (1,1,1-Trichloroethane)	LOGTRIANGULAR(0.001, 180, 1600)	LOGTRIANGULAR(0.001, 180, 1600)
24	Trichloroethylene (trichloroethene)	LOGTRIANGULAR(.01, 2.0, 608)	LOGTRIANGULAR(0.25, 1.65, 88)
25	Trimethylbenzene (all isomers)	LOGTRIANGULAR(0.001, .01, 187)	LOGTRIANGULAR(0.001, .01, 187)
27	Xylene (all isomers)	LOGTRIANGULAR(0.001, 0.001, 61784)	LOGTRIANGULAR(0.001, 0.001, 61784)

28	Total Fluoride (reported as HF)	LOGTRIANGULAR(5.6, 251.2, 735)	LOGTRIANGULAR(5.6, 251.2, 735)
29	Hydrogen Sulphide	LOGTRIANGULAR(0.00057, 2.4, 5570)	LOGTRIANGULAR(2.4, 53, 580)
30	Total Non-Methane Volatile Organic Compounds (NMVOCs)	LOGUNIFORM(5e-2, 1473)	LOGUNIFORM(5e-2, 1473)
31	Carbon Monoxide	LOGTRIANGULAR(0.11, 1.1, 5000)	LOGTRIANGULAR(0.11, 1.1, 5000)
32	Carbon Disulphide	LOGTRIANGULAR(1e-2, 0.1, 11)	LOGUNIFORM(0.9,170)
33	Carbon Tetrachloride (tetrachloromethane)	LOGTRIANGULAR(2e-4, 0.2, 152)	LOGUNIFORM(1e-30, 0.02)
34	Total Chloride (reported as HCl)	LOGTRIANGULAR(14.7, 79.5, 850)	LOGTRIANGULAR(14.7, 79.5, 850)
36	Nitrogen Oxides (NOx)	SINGLE(0)	SINGLE(0)
37	Sulphur Dioxide	LOGUNIFORM(30.8, 430.5)	LOGUNIFORM(30.8, 430.5)
39	Hydrofluorocarbons (HFCs) (Total)	SINGLE(0)	SINGLE(0)
40	Perfluorocarbons (PFCs) (Total)	SINGLE(0)	SINGLE(0)
41	Benzo(a)pyrene	UNIFORM(2E-6,6E-6)	UNIFORM(2E-6,6E-6)
42	Hexachlorocyclohexane (all isomers)	SINGLE(0)	SINGLE(0)
43	Trichlorobenzene (all isomers)	LOGTRIANGULAR(.01, 0.01, 0.13)	LOGTRIANGULAR(.01, 0.01, 0.13)
44	PAH (reported as Naphthalene)	LOGTRIANGULAR(1e-3, 0.2, 17)	LOGTRIANGULAR(1e-3, 0.2, 17)
45	Diethyl Disulphide	LOGTRIANGULAR(0.001, 0.02, 2.6)	LOGTRIANGULAR(0.001, 0.02, 2.6)
46	Dimethyl Sulphide	LOGTRIANGULAR(1e-3, 0.01, 60)	LOGTRIANGULAR(0.03, 0.73, 24.3)
47	Ethanethiol (ethyl mercaptan)	LOGTRIANGULAR(0.01, 0.01, 41.9)	LOGUNIFORM(1e-30,0.08)
48	Limonene	LOGTRIANGULAR(0.001, 0.1, 240)	LOGTRIANGULAR(0.001, 0.1, 240)
49	Methanethiol (methyl mercaptan)	LOGTRIANGULAR(5e-3, 0.01, 87)	LOGUNIFORM(1e-30,0.3)
50	Propanethiol	LOGTRIANGULAR(0.2, 0.2, 2.1)	LOGUNIFORM(1e-30, 0.09)
51	Sulphide, Total Simulations with H2S	LOGTRIANGULAR(1e-3,2.4,5575)	LOGTRIANGULAR(1e-3,2.4,5575)
52	Sulphide, Total Simulations without H2S	LOGTRIANGULAR(5e-4,8e-3,3.5)	LOGTRIANGULAR(5e-4,8e-3,3.5)
53	1,1,1,2-Tetrafluorochloroethane	LOGTRIANGULAR(2e-3, 0.2, 2)	LOGTRIANGULAR(2e-3, 0.2, 2)
54	1,1,1-Trichlorotrifluoroethane	LOGTRIANGULAR(5e-3, 0.4, 8)	LOGTRIANGULAR(5e-3, 0.4, 8)
55	1,1-Dichlorotetrafluoroethane	LOGTRIANGULAR(5e-2, 0.25, 6.4)	LOGTRIANGULAR(5e-2, 0.25, 6.4)
56	Chlorofluoromethane	LOGTRIANGULAR(8e-3, 0.2, 110)	LOGTRIANGULAR(8e-3, 0.2, 110)
57	Dichlorofluoromethane	LOGTRIANGULAR(1e-3, 0.01, 602)	LOGTRIANGULAR(1e-3, 0.01, 602)
58	Chlorodifluoromethane	LOGTRIANGULAR(0.005, 0.1, 9900)	LOGTRIANGULAR(0.005, 0.1, 9900)
59	1-Chloro-1,1-Difluoroethane	LOGTRIANGULAR(0.04, 0.57, 31)	LOGTRIANGULAR(0.04, 0.57, 31)

60	Trichlorofluoromethane	LOGTRIANGULAR(.001, 0.01, 1000)	LOGTRIANGULAR(.001, 0.01, 1000)
61	Dichlorodifluoromethane	LOGTRIANGULAR(1e-2, 9, 790)	LOGTRIANGULAR(1e-2, 9, 790)
62	Chlorotrifluoromethane	LOGTRIANGULAR(0.1, 0.2, 49)	LOGTRIANGULAR(0.1, 0.2, 49)
63	2-Chloro-1,1,1-Trifluoroethane	LOGUNIFORM(5e-2, 1.5)	LOGUNIFORM(5e-2, 1.5)
65	Freon 113	LOGTRIANGULAR(0.013, 4.8, 125)	LOGTRIANGULAR(0.013, 4.8, 125)
66	1,2-Dichlorotetrafluoroethane	LOGTRIANGULAR(1e-2, 9.8, 300)	LOGTRIANGULAR(1e-2, 9.8, 300)
67	Trichlorotrifluoroethane	LOGTRIANGULAR(1e-3, 4.8, 24)	LOGTRIANGULAR(1e-3, 4.8, 24)
68	1,1,2-Trichloroethane	LOGTRIANGULAR(4e-3, 1, 10)	LOGTRIANGULAR(4e-3, 1, 10)
69	1,1-Dichloroethane	LOGTRIANGULAR(1e-3, 0.1, 61800)	LOGTRIANGULAR(0.02, 0.28, 3.9)
70	1,1-Dichloroethene	LOGTRIANGULAR(1e-3, 0.01, 1516)	LOGTRIANGULAR(0.03, 2.8, 19)
71	1,2-Dichloropropane	SINGLE(0)	SINGLE(0)
72	2-Propanol	LOGTRIANGULAR(5e-3, 2, 34)	LOGTRIANGULAR(5e-3, 2, 34)
73	Acetone	LOGTRIANGULAR(5e-3, 0.1, 50)	LOGTRIANGULAR(5e-3, 0.1, 50)
74	Acrylonitrile	LOGTRIANGULAR(0.02, 0.4, 38)	LOGTRIANGULAR(0.02, 0.4, 38)
75	Bromodichloromethane	SINGLE(0)	SINGLE(0)
76	Butane	LOGTRIANGULAR(0.19, 1.0, 709)	LOGTRIANGULAR(0.19, 1.0, 709)
77	Carbonyl sulphide	LOGTRIANGULAR(.006, 0.2, 4.4)	LOGTRIANGULAR(.006, 0.2, 4.4)
79	Chloroethane	LOGTRIANGULAR(1e-3, 0.01, 6146)	LOGUNIFORM(1e-30, 5.3)
80	Ethane	LOGTRIANGULAR(5e-3, 6.25, 200)	LOGTRIANGULAR(5e-3, 6.25, 200)
81	Ethanol	LOGTRIANGULAR(5e-3, 0.2, 810)	LOGTRIANGULAR(5e-3,0.2,810)
82	Ethylbenzene	LOGTRIANGULAR(1e-3, 0.001, 875)	LOGTRIANGULAR(1e-3, 0.001, 875)
84	Ethylene Dibromide	SINGLE(0)	SINGLE(0)
85	Fluorotrichloromethane	LOGTRIANGULAR(.001, 0.01, 1000)	LOGTRIANGULAR(.001, 0.01, 1000)
86	Hexane	LOGTRIANGULAR(.001, 9.6, 44)	LOGTRIANGULAR(.001, 9.6, 44)
87	Mercury	SINGLE(0)	LOGUNIFORM(0.00017,0.00133)
88	Methyl Ethyl Ketone (2-butanone)	LOGTRIANGULAR(5e-3, 5E-3, 73)	LOGTRIANGULAR(5e-3, 5E-3, 73)
89	Methyl Isobutyl Ketone	LOGTRIANGULAR(5e-3, 0.2, 9.9)	LOGTRIANGULAR(5e-3, 0.2, 9.9)
91	Pentane	LOGTRIANGULAR(0.02, 0.3, 105)	LOGTRIANGULAR(0.02, 0.3, 105)
92	Propane	LOGTRIANGULAR(0.001, 1.9, 12.9)	LOGTRIANGULAR(0.001, 1.9, 12.9)
94	t-1,2-Dichloroethene	LOGTRIANGULAR(0.006, 1.0, 41)	LOGTRIANGULAR(0.02,0.24,2.6)
95	Nitric Acid	SINGLE(0)	SINGLE(0)

96	PM10s	SINGLE(0)	SINGLE(0)
97	Odour Units (Predicted)	TRIANGULAR(50000, 125000, 250000)	TRIANGULAR(50000, 125000, 250000)
98	Ethylene	UNIFORM(0.2,5.8)	UNIFORM(0.2,5.8)
99	Phenol	SINGLE(0)	SINGLE(0)
100	Nitrogen Monoxide (NO)	N/A	SINGLE(0)
101	Nitrogen Dioxide (NO ₂)	N/A	SINGLE(0)
102	Total Volatile Organic Compounds (VOCs)	N/A	LOGUNIFORM(5e-2, 1473)
103	1-Butanethiol	N/A	LOGUNIFORM(1e-30,0.08)
104	2-Butoxy ethanol	N/A	LOGUNIFORM(1e-30,0.05)
105	Arsenic	N/A	LOGTRIANGULAR(1e-4,0.0074,0.43)
106	Butyric Acid	N/A	LOGTRIANGULAR(1e-30,0.1,17.5)
107	Ethyl Butyrate	N/A	LOGUNIFORM(0.41,42)
108	Furan	N/A	LOGTRIANGULAR(0.02,0.82,6.2)

Waste Composition Files

Separate waste composition files have been created to reflect the difference between the composition of waste in each of the four Devolved Administrations using data compiled by ERM (2006) (Tables 2 – 5). The domestic waste data for England was compiled using Parfitt (2002), for Wales using NAW (2003), for Scotland using SEPA(2005) and for Northern Ireland using EHSNI (2005) and ERM(2005). The Civic Amenity data for England was also taken from Parfitt (2002) and for Wales from NAW (2003). For Northern Ireland and Wales, Civic Amenity data was not available so consequently the data for England was used. Likewise for commercial and industrial waste, data was only available for England and hence the data for each constituent country uses the information available for England, originally taken from Environment Agency (2003).

The waste compositions for subsequent years are obtained using government proposed targets for reducing biodegradable domestic waste (Waste Strategy 2000). In each year the biodegradable domestic waste of each country was reduced by the government reduction targets. The percentage of non-biodegradable domestic waste was then calculated as being the surplus, thus making 100%. All compositions for the remaining categories of waste remain unchanged throughout the time periods.

The commercial and industrial waste composition defaults represent the average industrial and commercial waste composition for England (ERM, 2006).

Table 2 Waste Composition for England 2000-2010

	Domestic	Civic Amenity	Commercial	Industrial	Inert	Liquid Inert	Sewage Sludge	Composted Organic Material	Incinerator Ash	Residue from MRF	Recycling Schemes	Chemical Sludge	Industrial Liquid Waste	Water (%)	Cellulose (%)	Hemi-Cellulose (%)	Decomposition (%)
Newspapers	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (48.5)	SINGLE (9)	SINGLE (35)
Magazines	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (42.3)	SINGLE (9.4)	SINGLE (46)
Other Paper	SINGLE (19.8)	SINGLE (3.3)	SINGLE (28.8)	SINGLE (8.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (87.4)	SINGLE (8.4)	SINGLE (98)
Liquid Cartons	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Card Packaging	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Other Card	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Wood	SINGLE (3.0)	SINGLE (11.2)	SINGLE (3.3)	SINGLE (5.0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (21)	SINGLE (11)	SINGLE (75)
Textiles	SINGLE (3.3)	SINGLE (2.3)	SINGLE (1.1)	SINGLE (0.3)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (25)	SINGLE (20)	SINGLE (20)	SINGLE (50)
Disposable Nappies	SINGLE (3.3)	SINGLE (2.9)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Other Misc. Combustibles	SINGLE (0.3)	SINGLE (4.2)	SINGLE (10.4)	SINGLE (17.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Garden Waste	SINGLE (16)	SINGLE (32.1)	SINGLE (9.8)	SINGLE (4.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (25.7)	SINGLE (13)	SINGLE (62)
Other Putrescible	SINGLE (25.6)	SINGLE (14.8)	SINGLE (10.4)	SINGLE (6.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (55.4)	SINGLE (7.2)	SINGLE (76)
10mm Fines	SINGLE (4.1)	SINGLE (1.2)	SINGLE (1.9)	SINGLE (0.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (40)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Sewage Sludge	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (70)	SINGLE (14)	SINGLE (14)	SINGLE (75)
Composted Organic Material	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	UNIFORM (7.47, 9.59)	UNIFORM (7.47, 9.59)	SINGLE (57)
Incinerator Ash	SINGLE (0)	SINGLE (0)	SINGLE (0.2)	SINGLE (25.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	TRIANGULAR (0.5, 0.7, 1.5)	TRIANGULAR (0.5, 0.7, 1.5)	SINGLE (57)
Non Degradable	SINGLE (24.6)	SINGLE (28.0)	SINGLE (34.1)	SINGLE (30.7)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)

Table 3 Waste Composition for Wales 2000-2010

	Domestic	Civic Amenity	Commercial	Industrial	Inert	Liquid Inert	Sewage Sludge	Composted Organic Material	Incinerator Ash	Residue from MRF	Recycling Schemes	Chemical Sludge	Industrial Liquid Waste	Water (%)	Cellulose (%)	Hemi-Cellulose (%)	Decomposition (%)
Newspapers	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (48.5)	SINGLE (9)	SINGLE (35)
Magazines	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (42.3)	SINGLE (9.4)	SINGLE (46)
Other Paper	SINGLE (21.0)	SINGLE (3.3)	SINGLE (28.8)	SINGLE (8.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (87.4)	SINGLE (8.4)	SINGLE (98)
Liquid Cartons	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Card Packaging	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Other Card	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Wood	SINGLE (2.8)	SINGLE (11.2)	SINGLE (3.3)	SINGLE (5.0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (21)	SINGLE (11)	SINGLE (75)
Textiles	SINGLE (1.8)	SINGLE (2.3)	SINGLE (1.1)	SINGLE (0.3)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (25)	SINGLE (20)	SINGLE (20)	SINGLE (50)
Disposable Nappies	SINGLE (2.3)	SINGLE (2.9)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Other Misc. Combustibles	SINGLE (7.0)	SINGLE (4.2)	SINGLE (10.4)	SINGLE (17.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Garden Waste	SINGLE (12.7)	SINGLE (32.1)	SINGLE (9.8)	SINGLE (4.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (25.7)	SINGLE (13)	SINGLE (62)
Other Putrescible	SINGLE (17.8)	SINGLE (14.8)	SINGLE (10.4)	SINGLE (6.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (55.4)	SINGLE (7.2)	SINGLE (76)
10mm Fines	SINGLE (5.2)	SINGLE (1.2)	SINGLE (1.9)	SINGLE (0.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (40)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Sewage Sludge	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (70)	SINGLE (14)	SINGLE (14)	SINGLE (75)
Composted Organic Material	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	UNIFO RM(7.4 7, 9.59)	UNIFO RM(7.4 7, 9.59)	SINGLE (57)
Incinerator Ash	SINGLE (0)	SINGLE (0)	SINGLE (0.2)	SINGLE (25.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	TRIAN GULAR (0.5, 0.7, 1.5)	TRIAN GULAR (0.5, 0.7, 1.5)	SINGLE (57)
Non Degradable	SINGLE (29.4)	SINGLE (28.0)	SINGLE (34.1)	SINGLE (30.7)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)

Table 4 Waste Composition for Scotland 2000-2010

	Domestic	Civic Amenity	Commercial	Industrial	Inert	Liquid Inert	Sewage Sludge	Composted Organic Material	Incinerator Ash	Residue from MRF	Recycling Schemes	Chemical Sludge	Industrial Liquid Waste	Water (%)	Cellulose (%)	Hemi-Cellulose (%)	Decomposition (%)
Newspapers	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (48.5)	SINGLE (9)	SINGLE (35)
Magazines	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (42.3)	SINGLE (9.4)	SINGLE (46)
Other Paper	SINGLE (25.0)	SINGLE (9.3)	SINGLE (28.8)	SINGLE (8.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (87.4)	SINGLE (8.4)	SINGLE (98)
Liquid Cartons	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Card Packaging	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Other Card	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Wood	SINGLE (1.2)	SINGLE (12.6)	SINGLE (3.3)	SINGLE (5.0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (21)	SINGLE (11)	SINGLE (75)
Textiles	SINGLE (4.8)	SINGLE (2.2)	SINGLE (1.1)	SINGLE (0.3)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (25)	SINGLE (20)	SINGLE (20)	SINGLE (50)
Disposable Nappies	SINGLE (3.8)	SINGLE (0.3)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Other Misc. Combustibles	SINGLE (3.7)	SINGLE (13.7)	SINGLE (10.4)	SINGLE (17.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Garden Waste	SINGLE (6.7)	SINGLE (18.0)	SINGLE (9.8)	SINGLE (4.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (25.7)	SINGLE (13)	SINGLE (62)
Other Putrescible	SINGLE (21.4)	SINGLE (3.2)	SINGLE (10.4)	SINGLE (6.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (55.4)	SINGLE (7.2)	SINGLE (76)
10mm Fines	SINGLE (0.5)	SINGLE (0.8)	SINGLE (1.9)	SINGLE (0.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (40)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Sewage Sludge	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (70)	SINGLE (14)	SINGLE (14)	SINGLE (75)
Composted Organic Material	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	UNIFO RM(7.4 7, 9.59)	UNIFO RM(7.4 7, 9.59)	SINGLE (57)
Incinerator Ash	SINGLE (0)	SINGLE (0)	SINGLE (0.2)	SINGLE (25.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	TRIAN GULAR (0.5, 0.7, 1.5)	TRIAN GULAR (0.5, 0.7, 1.5)	SINGLE (57)
Non Degradable	SINGLE (32.9)	SINGLE (39.9)	SINGLE (34.1)	SINGLE (30.7)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)

Table 5 Waste Composition for Northern Ireland 2000-2010

	Domestic	Civic Amenity	Commercial	Industrial	Inert	Liquid Inert	Sewage Sludge	Composted Organic Material	Incinerator Ash	Residue from MRF	Recycling Schemes	Chemical Sludge	Industrial Liquid Waste	Water (%)	Cellulose (%)	Hemi-Cellulose (%)	Decomposition (%)
Newspapers	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (48.5)	SINGLE (9)	SINGLE (35)
Magazines	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (42.3)	SINGLE (9.4)	SINGLE (46)
Other Paper	SINGLE (18.2)	SINGLE (3.3)	SINGLE (28.8)	SINGLE (8.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (87.4)	SINGLE (8.4)	SINGLE (98)
Liquid Cartons	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Card Packaging	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Other Card	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	SINGLE (57.3)	SINGLE (9.9)	SINGLE (64)
Wood	SINGLE (2.8)	SINGLE (11.2)	SINGLE (3.3)	SINGLE (5.0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (21)	SINGLE (11)	SINGLE (75)
Textiles	SINGLE (1.8)	SINGLE (2.3)	SINGLE (1.1)	SINGLE (0.3)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (25)	SINGLE (20)	SINGLE (20)	SINGLE (50)
Disposable Nappies	SINGLE (2.3)	SINGLE (2.9)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Other Misc. Combustibles	SINGLE (7.1)	SINGLE (4.2)	SINGLE (10.4)	SINGLE (17.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (20)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Garden Waste	SINGLE (14.2)	SINGLE (32.1)	SINGLE (9.8)	SINGLE (4.7)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (25.7)	SINGLE (13)	SINGLE (62)
Other Putrescible	SINGLE (19.8)	SINGLE (14.8)	SINGLE (10.4)	SINGLE (6.8)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (65)	SINGLE (55.4)	SINGLE (7.2)	SINGLE (76)
10mm Fines	SINGLE (5.4)	SINGLE (1.2)	SINGLE (1.9)	SINGLE (0.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (40)	SINGLE (25)	SINGLE (25)	SINGLE (50)
Sewage Sludge	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (70)	SINGLE (14)	SINGLE (14)	SINGLE (75)
Composted Organic Material	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	UNIFO RM(7.4 7, 9.59)	UNIFO RM(7.4 7, 9.59)	SINGLE (57)
Incinerator Ash	SINGLE (0)	SINGLE (0)	SINGLE (0.2)	SINGLE (25.5)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (30)	TRIAN GULAR (0.5, 0.7, 1.5)	TRIAN GULAR (0.5, 0.7, 1.5)	SINGLE (57)
Non Degradable	SINGLE (28.4)	SINGLE (28.0)	SINGLE (34.1)	SINGLE (30.7)	SINGLE (100)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)	SINGLE (0)

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