

<https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#pc-dispersion-factor>

Uncorrected for operating hours

5 emission points

- 1 Repair booth
- 2 E-coat
- 3 Powder cure
- 4 Lip extract 1
- 5 Lip extract 2

Steps:

- 1 Calculate process contribution (PC)
- 2 Identify insignificant PCs and remove
- 3 Calculate Predicted Environmental Concentration (PEC) for each substance $PEC = PC + \text{Ambient}$
- 4 Identify if emission is insignificant and remove
- 5 Detailed modelling if required
- 6 Compare with Environmental Standards (PC and PEC)
- 7 Confirm if further action required
- 8 Complete further assessments

Substance	Period	Limit	Standard
VOC (Benzene)	Annual	5 micrograms/m ³	Ambient Air Directive Limit
PM10	24 hr	50 micrograms/m ³	Ambient Air Directive Limit
PM10	Annual	40 micrograms/m ³	Ambient Air Directive Limit

A = annual

24 hour = hourly rate x 0.59

PC always measured in micrograms/m³

PC to ground not required (metals only)

5 x stacks each between 3.0m and 4.76m above roof apex

Building height 13m

	BH	Stack height		
1 Repair booth	13	4.76	17.76	
2 E-Coat	13	3	16	
3 Powder oven	13	3	16	
4 Lip extract 1	13	4.76	17.76	
5 Lip extract 2	13	4.76	17.76	

Assumptions:

L = Height of building OR diagonal distance of building Whichever is the shorter)

Therefore L = 13m

No other buildings within 5 x L (65m) (Heavy products yard = approx 94 metres itself)

Where the stacks are =>3m above building, but <2.5 times the building height:

- 1 Use actual height of release (roof plus stack)
- 2 Minus height of tallest building within 5 x L (=0) therefore use height of existing building
- 3 Multiply by 1.66

Dispersion Factors

		Height of release (metres)	Height of building (metres)	Difference between roof and height of release	Difference x 1.66	Dispersion factors taken from website and graphed for actual stack heights		
						Annual	Monthly	Hourly
1	Repair boo	17.76	13	4.76	7.9016	60	175	1250
2	E-Coat	16	13	3	4.98	95	275	2000
3	Powder ovr	16	13	3	4.98	95	275	2000
4	Lip extract	17.76	13	4.76	7.9016	60	175	1250
5	Lip extract	17.76	13	4.76	7.9016	60	175	1250

- 1 Repair booth 7.9016
- 2 E-coat 4.98
- 3 Powder cure 4.98
- 4 Lip extract 1 7.9016
- 5 Lip extract 2 7.9016

Annual dispersion factor (air emiss

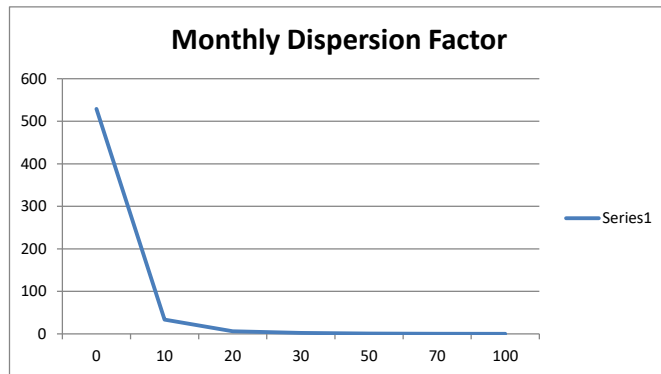
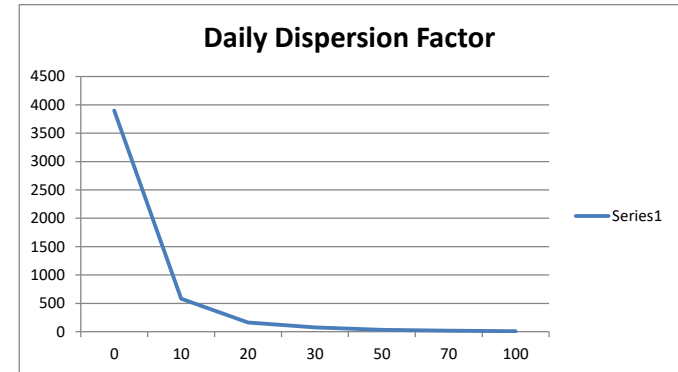
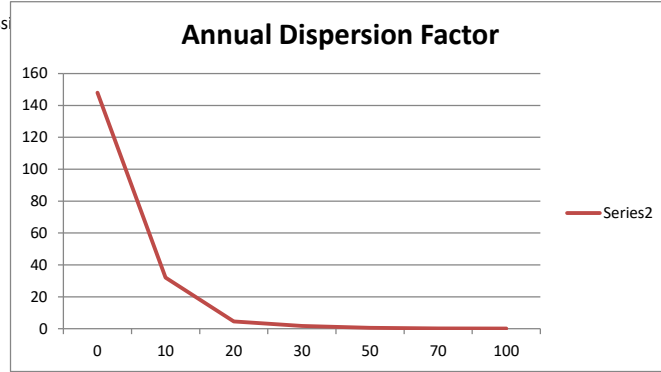
0	148
10	32
20	4.6
30	1.7
50	0.52
70	0.24
100	0.11

Monthly

0	529
10	33.7
20	6.2
30	2.3
50	0.68
70	0.31
100	0.13

Hourly

0	3900
10	580
20	161
30	77
50	31
70	16
100	8.6



Calculate Process Contribution to Air

Dispersion factor (micrograms/m³- g/s) x release rate (g/sec)

Release rate = flow rate /sec x monitoring results from 2017 (converted from mg to g)

			Dispersion factor	Flow rate	Monitoring	release rate	PC
1 Repair Booth exhaust a	A	PM	60	4.99	0.00027	0.0013	0.0808
		VOC	60	4.99	0.00218	0.0109	0.6527
	M	PM	175	4.99	0.00027	0.0013	0.2358
		VOC	175	4.99	0.00218	0.0109	1.9037
	H	PM	1250	4.99	0.00027	0.0013	1.6841
		VOC	1250	4.99	0.00218	0.0109	13.5978

			Dispersion factor	Flow rate	Monitoring	release rate	PC
Repair Booth exhaust b	A	PM	60	5.07	0.00025	0.0013	0.0761
		VOC	60	5.07	0.00291	0.0148	0.8852
	M	PM	175	5.07	0.00025	0.0013	0.2218
		VOC	175	5.07	0.00291	0.0148	2.5819
	H	PM	1250	5.07	0.00025	0.0013	1.5844
		VOC	1250	5.07	0.00291	0.0148	18.4421

TOTAL PC to air	A		M		H	
Repair Booth	PM	VOC	PM	VOC	PM	VOC
	0.1569	1.5379	0.4576	4.4856	3.2685	32.0399

			Dispersion Factor	Flow Rate	Monitoring	Release rate	PC
2 E-coat over	A	PM	95	1.64	0.0005	0.0008	0.0779
		VOC	95	1.64	0.0126	0.0207	1.96308
	M	PM	275	1.64	0.0005	0.0008	0.2255
		VOC	275	1.64	0.0126	0.0207	5.6826
	H	PM	2000	1.64	0.0005	0.0008	1.64
		VOC	2000	1.64	0.0126	0.0207	41.328

TOTAL PC to air	A		M		H	
Repair Booth	PM	VOC	PM	VOC	PM	VOC
	0.0779	1.9631	0.2255	5.6826	1.6400	41.3280

TOTAL PC (micrograms/m³)

Compare against: VOC (Benzene) Annual Mean 5 micrograms/m³
 PM Annual 40 micrograms/m³
 PM 24hr 50 micrograms/m³

VOC Annual		PM Annual		PM10 24 hour	
1	1.5379	1	0.1569	1	3.2685
2	1.9631	2	0.0779	2	1.6400
3	1.7897	3	0.1043	3	2.1951
4		4		4	
5		5		5	

Correct for shutdown period	4.7619303	0.3391	7.1036
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None of the releases are deemed 'insignificant'

No VOCs on pre-treat releases?

No PMs on pre-treat releases?

Any Sulphur dioxide created over time through hydrolysis?

NO2?