

APPENDIX A
DIESEL CONTAMINANTS, EMISSION RATES
AND AIR QUALITY CRITERIA

Emission Rates and Associated Air Quality Criteria for Diesel Exhaust Locomotives

Pollutant	CAS #	Emission Factor g/bhp	Criterion $\mu\text{g}/\text{m}^3$	Averaging Period	Basis		Ratio of
							Emissions to Criterion g/bhp/g/m ³
A. CRITERIA AIR CONTAMINANTS							
Oxides of Nitrogen	10102-44-0	7.55E+00 [1]	400	1-hour	health	[9]	18870
			200	24-hour	health	[9]	37741
			200	1-hour	health (NO ₂)	[10]	37741
		1.22E+01 [2]	400	1-hour	health	[9]	30500
			200	24-hour	health	[9]	61000
			200	1-hour	health (NO ₂)	[10]	61000
Carbon Monoxide	630-08-0	5.00E+00 [1]	6000	30-minute	health	[9]	833
			100000	15-minute	health	[10]	50
			60000	30-minute	health	[10]	83
			30000	1-hour	health	[10]	167
			10000	8-hour	health	[10]	500
		2.80E+00 [2]	6000	30-minute	health	[9]	467
			100000	15-minute	health	[10]	28
			60000	30-minute	health	[10]	47
			30000	1-hour	health	[10]	93
			10000	8-hour	health	[10]	280
Sulphur Dioxide	7446-09-5	8.50E-04 [3]	275	24-hour	health & veg.	[9]	3
			690	1-hour	health & veg.	[9]	1
			20	24-hour	health	[10]	43
			500	10-minute	health	[10]	2
Nitrous Oxide	10024-97-2	1.10E-03 [3]	27000	30-minute	health	[9]	<1
			9000	24-hour	health	[9]	<1
PM2.5	n/a	5.65E-01 [1]	30	24-hour	health	[9]	18818
			25	24-hour	health	[10]	22582
PM10	n/a	5.82E-01 [1]	50	24-hour	health	[9]	11640
			50	24-hour	health	[10]	11640
TSP	n/a	6.00E-01 [1]	120	24-hour	visibility	[9]	5000
		5.00E-01 [2]	120	24-hour	visibility	[9]	4167
Volatile Organic Compounds	n/a	1.05E+00 [1]					
B. METALS							
Aluminum (Al) (as Al ₂ O ₃)	1344-28-1	6.29E-04 [4]	120	24-hour	Particulate	[9]	5
Antimony (Sb)	7440-36-0	2.26E-05 [4]	25	24-hour	health	[9]	<1
Barium (Ba)	7440-39-3	7.93E-05 [4]	10	24-hour	health	[9]	8
			120	24-hour	Particulate	[9]	<1
Cadmium (Cd)	7440-43-9	1.20E-06 [4]	0.025	24-hour	health	[9]	48
			0.005	annual	health	[9]	240
			0.005	annual	health	[11]	240
Calcium (Ca) (as CaO)	1305-78-8	1.11E-03 [4]	10	24-hour	corrosion	[9]	111
Cerium (Ce) (as CeO ₂)	1306-38-3	6.75E-05 [4]	12	30-minute	JSL (oxide)	[12]	6
			4	24-hour	JSL (oxide)	[12]	17
Cesium (Cs) (as cesium hydroxide)	21351-79-1	7.71E-05 [4]	14.4	30-minute	JSL (hydroxide)	[12]	5
			4.8	24-hour	JSL	[12]	16

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			$\mu\text{g}/\text{m}^3$	Period			
					(hydroxide)		
Chromium (Cr)	7440-47-3	2.70E-05 [4]	1.5	24-hour	health	[9]	18
Chromium (hexavalent, in PM ₁₀)		assuming all Cr is Cr(VI)	0.0004	24-hour	health (proposed)	[13]	77135
Chromium (divalent & trivalent)		assuming all Cr is Cr(II) & Cr(III)	0.5	24-hour	health (proposed)	[13]	54
Cobalt (Co)	7440-48-4	5.99E-07 [4]	0.1	24-hour	health	[9]	6
Copper (Cu)	7440-50-8	1.26E-05 [4]	50	24-hour	health	[9]	<1
Gallium	7440-55-3	1.75E-07 [4]					
Indium (In)	7440-74-6	5.99E-06 [4]	1.2	30-minute	JSL	[12]	5
			0.4	24-hour	JSL	[12]	15
Iron (metallic)	15438-31-0	5.69E-05 [4]	4	24-hour	soiling	[9]	14
as ferric oxide	1309-37-1	8.14E-05 [4]	25	24-hour	soiling	[9]	3
Lanthanum (La) (as La ₂ O ₃)	7439-91-0	9.49E-05 [4]	60	30-minute	JSL (oxide)	[12]	2
			20	24-hour	JSL (oxide)	[12]	5
Lead (Pb)	7439-92-1	1.53E-04 [4]	0.5	24-hour	health	[9]	305
			0.2	30 day	health	[9]	763
			0.5	annual	health	[11]	305
Magnesium (Mg) (as MgO)	1309-48-4	1.13E-04 [4]	120	24-hour	Particulate	[9]	<1
Manganese (Mn)		3.30E-05 [4]	2.5	24-hour	health	[9]	13
Manganese in PM _{2.5}		assuming all Mn is in PM _{2.5}	0.1	24-hour	health (proposed)	[13]	330
Manganese in PM ₁₀		assuming all Mn is in PM ₁₀	0.2	24-hour	health (proposed)	[13]	165
Manganese in TSP		assuming all Mn is in TSP	0.4	24-hour	health (proposed)	[13]	82
Manganese in TSP			0.15	annual	health	[11]	220
Mercury (Hg)	7439-97-6	6.83E-06 [4]	2	24-hour	health	[9]	3
			1	annual	health	[11]	7
Molybdenum (Mo)	7439-98-7	3.99E-07 [4]	120	24-hour	Particulate	[9]	<1
Neodymium (Nd)	7440-00-8	8.99E-06 [4]					
Nickel	7440-02-0	4.89E-06 [4]	2	24-hour	vegetation	[9]	2
Nickel in PM ₁₀		assuming all Ni is in PM ₁₀	0.1	24-hour	health (proposed)	[13]	49
Nickel in TSP		assuming all Ni is in TSP	0.2	24-hour	health (proposed)	[13]	24
Niobium (Nb)	7440-03-1	2.00E-07 [4]					
Palladium (Pd)	7657-10-1	1.80E-06 [4]	10	24-hour	health	[9]	<1
Phosphorous (as POCl ₃)	10025-87-3	4.03E-04 [4]	40	30-minute	AAQC (P ₂ O ₅)	AAQC	10
			12	24-hour	AAQC (P ₂ O ₅)	AAQC	34
Potassium (K) (as KOH)	1310-58-3	7.97E-05 [4]	120	24-hour	Particulate	[9]	<1
Rubidium (Rb)	7440-17-7	2.00E-07 [4]	30	30-minute	JSL	[12]	<1
			10	24-hour	JSL	[12]	<1

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Selenium	7782-49-2	1.10E-05 [4]	20	30-minute	health	[9]	<1
			10	24-hour	health	[9]	1
Silicon (Si)	7440-21-3	6.31E-04 [4]	60	30-minute	JSL	[12]	11
			20	24-hour	JSL	[12]	32
Silver (Ag)	7440-22-4	4.39E-06 [4]	1	24-hour	health	[9]	4
Strontium (Sr)	7440-24-6	2.00E-07 [4]	120	24-hour	Particulate	[9]	<1
Tellurium (Te)	13494-80-9	3.12E-05 [4]	10	24-hour	health	[9]	3
Tin (Sn)	7440-31-5	1.94E-05 [4]	10	24-hour	health	[9]	2
Titanium	7440-32-6	1.47E-05 [4]	120	24-hour	particulate	[9]	<1
Vanadium	7440-62-2	6.81E-06 [4]	2	24-hour	health	[9]	3
			1	24-hour	health	[11]	7
Yttrium (Y)	7440-65-5	2.00E-07 [4]	7.2	30-minute	JSL	[12]	<1
			2.4	24-hour	JSL	[12]	<1
Zinc (Zn)	7440-66-6	4.09E-04 [4]	120	24-hour	Particulate	[9]	3
Zirconium (Zr)	7440-67-7	2.00E-07 [4]	60	30-minute	JSL	[12]	<1
			20	24-hour	JSL	[12]	<1
C. VOLATILE ORGANIC COMPOUNDS							
(1-methylpropyl)benzene	135-98-8	4.68E-03 [4]	18	30-minute	JSL	[12]	260
			6	24-hour	JSL	[12]	781
(2-methylpropyl)benzene	538-93-2	1.72E-04 [4]					
1,1,2-trimethylcyclopentane	4259-00-1	1.83E-05 [4]					
2-methyl-3-ethylpentane	609-26-7	1.83E-05 [4]					
1,1,4-trimethylcyclohexane	7094-27-1	1.25E-04 [4]					
1,1-dimethylcyclohexane	590-66-9	1.07E-03 [4]					
1-octene	111-66-0	1.07E-03 [4]	24	30-minute	JSL	[12]	45
			8	24-hour	JSL	[12]	134
1,2,3-trimethylcyclopentane	2815-57-8	7.70E-05 [4]					
1,2,4-trimethylbenzene	95-63-6	7.48E-03 [4]	220	24-hour	health	[9]	34
t-butylbenzene	98-06-6	7.48E-03 [4]	3288	30-minute	JSL	[12]	2
			1096	24-hour	JSL	[12]	7
1-decene	872-05-9	7.48E-03 [4]	180000	24-hour	AAQC	AAQC	<1
			60000	30-minute	AAQC	AAQC	<1
1,2-diethylbenzene (ortho)	25340-17-4	5.25E-03 [4]	18	30-minute	JSL	[12]	292
			6	24-hour	JSL	[12]	875
1,2-dimethyl-4-ethylbenzene	934-80-5	6.16E-03 [4]					
1,3,5-trimethylbenzene	108-67-8	8.19E-03 [4]	220	24-hour	health	[9]	37
1,3-butadiene	106-99-0	3.67E-05 [4]	10	24-hour	health (proposed)	[9]	4
		7.00E-02 [6]	10	24-hour	health (proposed)	[9]	7000
		2.26E-06 [2]	10	24-hour	health (proposed)	[9]	<1
1,3-dimethyl-2-ethylbenzene	2870-04-4	9.86E-03 [4]					
1,4-dimethyl-2-ethylbenzene	1758-88-9	1.53E-02 [4]					
1-(1,1-dimethylethyl)-3,5-dimethylbenzene	4706-90-5	5.43E-03 [4]					
1-Methyl-2-isopropylbenzene	527-84-4	5.13E-03 [4]					
1-Methyl-2-n-butylbenzene	1595-11-5	4.64E-03 [4]					
1-Methyl-2-n-propylbenzene	1074-17-5	6.29E-03 [4]					

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				Period			
1-Methyl-3-ethylbenzene	620-14-4	1.33E-02 [4]	1500	30-minute	JSL	[12]	9
			500	24-hour	JSL	[12]	27
1-Methyl-3-isopropylbenzene	535-77-3	4.04E-03 [4]					
1-Methyl-3-propylbenzene	1074-43-7	1.14E-02 [4]					
1-Methyl-4-ethylbenzene	622-96-8	1.50E-02 [4]	1500	30-minute	JSL	[12]	10
			500	24-hour	JSL	[12]	30
1-Methyl-4-isopropylbenzene	99-87-6	2.58E-03 [4]	330	30-minute	JSL	[12]	8
			110	24-hour	JSL	[12]	23
1-butyne	107-00-6	3.30E-05 [4]					
1-ethyl-1-methylcyclopentane	16747-50-5	1.83E-05 [4]					
2,2,4-trimethylhexane	16747-26-5	1.83E-05 [4]					
1-hexene	592-41-6	2.24E-04 [4]	84	30-minute	JSL	[12]	3
			28	24-hour	JSL	[12]	8
1-nonene	124-11-8	2.45E-03 [4]	36	30-minute	JSL	[12]	68
			12	24-hour	JSL	[12]	204
1-pentene	109-67-1	4.80E-04 [4]	108	30-minute	JSL	[12]	4
			36	24-hour	JSL	[12]	13
1-tert-butyl-4-ethylbenzene	7364-19-4	8.81E-03 [4]					
2,2-dimethyloctane	15869-87-1	1.65E-04 [4]					
2,3,4-trimethylpentane	565-75-3	2.20E-05 [4]					
2,3-dimethylbutane		2.93E-05 [4]	7800	30-minute	JSL	[12]	<1
			2600	24-hour	JSL	[12]	<1
2,3-dimethylheptane	3074-71-3	2.24E-04 [4]					
2,3-dimethylhexane	584-94-1	4.40E-05 [4]					
2,3-dimethylpentane	565-59-3	4.76E-05 [4]	7800	30-minute	JSL	[12]	<1
			2600	24-hour	JSL	[12]	<1
2,4,4-trimethylhexane	16747-30-1	8.43E-05 [4]					
isopropylcyclopentane	3875-51-2	8.43E-05 [4]					
2,4-dimethylheptane	2213-23-2	9.16E-05 [4]					
2,4-dimethylpentane	108-08-7	1.47E-05 [4]	7800	30-minute	JSL	[12]	<1
			2600	24-hour	JSL	[12]	<1
2,5-dimethyl-hexane	592-13-2	3.89E-05 [4]					
2,4-dimethyl-hexane	589-43-5	3.89E-05 [4]					
3,3-dimethyl-hexane	563-16-6	3.89E-05 [4]					
trans,cis-1,2,4-trimethylcyclopentane	16883-48-0	3.89E-05 [4]					
2,2,3-trimethylpentane	564-02-3	3.89E-05 [4]					
2,5-dimethylheptane	2216-30-0	2.00E-04 [4]					
3,5-dimethylheptane	926-82-9	2.00E-04 [4]					
3,3-dimethylheptane	4032-86-4	2.00E-04 [4]					
2-methyl-2-pentene	625-27-4	3.30E-05 [4]					
2-methyl-2-propenal	78-85-3	1.56E-03 [4]	4.8	30-minute	JSL	[12]	325
			1.6	24-hour	JSL	[12]	976
2-methylheptane	592-27-8	2.39E-03 [4]					
2-methylhexane	591-76-4	7.70E-05 [4]	3684	30-minute	JSL	[12]	<1
			1228	24-hour	JSL	[12]	<1
2-methylnonane	871-83-0	1.17E-02 [4]					
2-methyloctane	3221-61-2	3.50E-03 [4]					
2-methylpentane	107-83-5	7.33E-05 [4]	12600	30-minute	JSL	[12]	<1

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			4200	24-hour	JSL	[12]	<1
3,3-dimethyloctane	4110-44-5	9.70E-03 [4]					
3-ethyloctane	5881-17-4	4.73E-04 [4]					
3-methyl-1-butene	563-45-1	1.39E-04 [4]	86.4	30-minute	JSL	[12]	2
			28.8	24-hour	JSL	[12]	5
3-methylheptane	589-81-1	1.16E-04 [4]					
3-ethylhexane	619-99-8	1.16E-04 [4]	4200	30-minute	JSL	[12]	<1
			1400	24-hour	JSL	[12]	<1
cis,trans-1,2,4-trimethylcyclopentane	4850-28-6	1.16E-04 [4]					
cis-1,3-dimethylcyclohexane	638-04-0	1.16E-04 [4]					
3-methylhexane	589-34-4	1.14E-04 [4]	7800	30-minute	JSL	[12]	<1
			2600	24-hour	JSL	[12]	<1
3-methylnonane	5911-04-6	9.65E-03 [4]					
3-methyloctane	2216-33-3	2.11E-03 [4]					
3,3-diethylpentane	1067-20-5	2.11E-03 [4]					
3-ethylheptane	15869-80-4	2.11E-03 [4]					
3-methylpentane	96-14-0	1.14E-04 [4]	4200	30-minute	JSL	[12]	<1
			1400	24-hour	JSL	[12]	<1
4,4-dimethylheptane	1068-19-5	7.88E-05 [4]					
2,2-dimethylheptane	1071-26-7	7.88E-05 [4]					
2,6-dimethylheptane	1072-05-5	7.88E-05 [4]					
cis-1,2-dimethylcyclohexane	2207-01-4	7.88E-05 [4]					
4-ethyltoluene	622-96-8	5.06E-03 [4]	1500	30-minute	JSL	[12]	3
			500	24-hour	JSL	[12]	10
2,3-dimethyloctane	7146-60-3	5.06E-03 [4]					
4-methyl-1-pentene	691-37-2	1.12E-04 [4]					
3-methyl-1-pentene	760-20-3	1.12E-04 [4]					
4-methylheptane	589-53-7	2.47E-05 [4]					
3-methyl-3-ethylpentane	1067-08-9	2.47E-05 [4]					
methylcyclohexane	108-87-2	2.47E-05 [4]	19320	30-minute	JSL	[12]	<1
			6440	24-hour	JSL	[12]	<1
3,4-dimethylhexane	583-48-2	2.47E-05 [4]					
4-n-propyltoluene	1074-55-1	5.17E-03 [4]					
n-butylbenzene	104-51-8	5.17E-03 [4]	328.8	30-minute	JSL	[12]	16
			109.6	24-hour	JSL	[12]	47
1,3-dimethyl-5-ethylbenzene	934-74-7	5.17E-03 [4]					
Acetaldehyde	75-07-0	1.78E-02 [4]	500	24-hour	health	[9]	36
			500	30-minute	health	[9]	36
		1.50E-02 [5]	500	24-hour	health	[9]	30
			500	30-minute	health	[9]	30
		1.12E-02 [2]	500	24-hour	health	[9]	22
			500	30-minute	health	[9]	22
Acetylene	74-86-2	1.12E-02 [4]	56000	24-hour	odour	AAQC	<1
Acrolein	107-02-8	4.18E-03 [4]	0.08	24-hour	health	[9]	52228
			0.24	30-minute	health	[9]	17409
			4.5	1-hour	health (proposed)	[13]	929
			0.4	24-hour	health (proposed)	[13]	10446

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		3.50E-03 [5]	0.08	24-hour	health	[9]	43750
			0.24	30-minute	health	[9]	14583
			4.5	1-hour	health (proposed)	[13]	778
			0.4	24-hour	health (proposed)	[13]	8750
		3.30E-03 [2]	0.08	24-hour	health	[9]	41250
			0.24	30-minute	health	[9]	13750
			4.5	1-hour	health (proposed)	[13]	733
			0.4	24-hour	health (proposed)	[13]	8250
Benzaldehyde	100-52-7	2.34E-03 [4]	6	30-minute	JSL	[12]	390
			2	24-hour	JSL	[12]	1171
Benzene	71-43-2	1.01E-02 [4]	2.3	24-hour	health (proposed)	[13]	4387
		7.90E-02 [6]	2.3	24-hour	health (proposed)	[13]	34348
		2.84E-06 [2]	2.3	24-hour	health (proposed)	[13]	1
Butylcyclohexane	1678-93-9	6.36E-03 [4]					
Cis,trans-1,2,4-trimethylcyclohexane	7667-60-9	7.50E-03 [4]					
Cis-1,3-dimethylcyclopentane	2532-58-3	4.03E-05 [4]					
Cis-2-Nonene	6434-77-1	9.90E-05 [4]					
Cis-2-butene	590-18-1	6.96E-05 [4]					
Cis-2-pentene	627-20-3	3.67E-05 [4]					
Crotonaldehyde	123-73-9	2.74E-03 [4]	10.2	30-minute	JSL	[12]	268
			3.4	24-hour	JSL	[12]	805
Cyclohexane	110-82-7	1.25E-04 [4]	6100	24-hour	health	[9]	<1
Cyclohexene	110-83-8	4.03E-05 [4]	720	30-minute	JSL	[12]	<1
			240	24-hour	JSL	[12]	<1
Cyclopentane	287-92-3	3.67E-05 [4]	12300	30-minute	JSL	[12]	<1
			4100	24-hour	JSL	[12]	<1
Cyclopentene	142-29-0	5.13E-05 [4]	15	30-minute	JSL	[12]	3
			5	24-hour	JSL	[12]	10
Dimethylcyclopentane		7.33E-06 [4]					
Ethane	74-84-0	3.15E-04 [4]	14400	30-minute	JSL	[12]	<1
			4800	24-hour	JSL	[12]	<1
Ethylbenzene	100-41-4	5.03E-03 [4]	1000	24-hour	health	[9]	5
Ethylene	74-85-1	6.00E-02 [4]	40	24-hour	vegetation	[9]	1501
Formaldehyde	50-00-0	5.62E-02 [4]	65	24-hour	health	[9]	864
			100	30-minute	health	[11]	562
		2.72E-02 [5]	65	24-hour	health	[9]	418
			100	30-minute	health	[11]	272
2.38E-02 [2]	65	24-hour	health	[9]	366		
	100	30-minute	health	[11]	238		
Hexaldehyde	66-25-1	9.75E-04 [4]	6	30-minute	JSL	[12]	162
			2	24-hour	JSL	[12]	487
Indan	496-11-7	5.86E-05 [4]					
Isopentane	78-78-4	1.76E-04 [4]	21240	30-minute	JSL	[12]	<1
			7080	24-hour	JSL	[12]	<1

Emission Rates and Associated Air Quality Criteria for Diesel Exhaust Locomotives

Pollutant	CAS #	Emission Factor g/bhp	Criterion $\mu\text{g}/\text{m}^3$	Averaging Period	Basis		Ratio of Emissions to Criterion g/bhp/g/m ³
Isoprene	78-79-5	1.50E-04 [4]					
Isopropylbenzene	98-82-8	3.03E-03 [4]	400	24-hour	health	[9]	8
Isopropylcyclohexane	696-29-7	6.41E-04 [4]					
Isovaleraldehyde	590-86-3	3.01E-03 [4]	2160	30-minute	JSL	[12]	1
			720	24-hour	JSL	[12]	4
Methane	74-82-8	1.18E-03 [4]					
		1.50E-04 [3]					
Methyl ethyl ketone	78-93-3	3.52E-04 [4]	1000	24-hour	health	[9]	<1
Methylcyclopentane	96-37-7	2.43E-03 [4]	600	30-minute	JSL	[12]	4
			200	24-hour	JSL	[12]	12
N-butane	106-97-8	2.24E-04 [4]	22800	30-minute	JSL	[12]	<1
			7600	24-hour	JSL	[12]	<1
N-butylcyclopentane	2040-95-1	3.55E-03 [4]					
N-decane	124-18-5	5.39E-02 [4]	60000	1-hour	odour & health	AAQC	<1
N-heptane	142-82-5	3.69E-03 [4]	11000	24-hour	health	[9]	<1
N-hexane	110-54-3	1.13E-03 [4]	2500	24-hour	health	[9]	<1
N-hexylbenzene	1077-16-3	1.70E-02 [4]					
N-nonane	111-84-2	4.38E-02 [4]	12600	30-minute	JSL	[12]	3
			4200	24-hour	JSL	[12]	10
N-pentane	109-66-0	8.80E-05 [4]	12600	30-minute	JSL	[12]	<1
			4200	24-hour	JSL	[12]	<1
N-propylbenzene	103-65-1	6.91E-03 [4]	60	30-minute	JSL	[12]	115
			20	24-hour	JSL	[12]	345
Propane	74-98-6	2.16E-04 [4]	21600	30-minute	JSL	[12]	<1
			7200	24-hour	JSL	[12]	<1
Propionaldehyde	123-38-6	3.57E-03 [4]	7	30-minute	odour	AAQC	509
Propylene	115-07-1	2.66E-02 [4]	4000	24-hour	health	[9]	7
Trans,cis-1,2,4-trimethylcyclohexane	7667-60-9	2.20E-04 [4]					
Trans-1,3-dimethylcyclohexane	2207-03-6	1.47E-05 [4]					
Trans-1,4-dimethylcyclohexane	2207-04-7	8.80E-05 [4]					
Trans-2-butene	624-64-6	1.72E-04 [4]					
Trans-2-hexene	4050-45-7	7.33E-06 [4]					
Trans-2-octene	13389-42-9	3.67E-05 [4]					
Trans-2-pentene	646-04-8	7.33E-05 [4]					
Trans-3-nonene	20063-92-7	1.87E-04 [4]					
Unknown		3.46E-01 [4]					
cis/trans-4-methyl-2-pentene	4461-48-7	4.03E-05 [4]					
m/p-xylene	1330-20-7	7.54E-03 [4]	730	24-hour	health	[9]	10
3,4-dimethylheptane	922-28-1	7.54E-03 [4]					
methylcyclohexane	108-87-2	2.35E-04 [4]	10320	30-minute	JSL	[12]	<1
			6440	24-hour	JSL	[12]	<1
2,2-dimethylhexane	590-73-8	2.35E-04 [4]					
n-octane	111-65-9	9.39E-03 [4]	45400	30-minute	odour	AAQC	<1
trans-1,2-dimethylcyclohexane	6876-23-9	9.39E-03 [4]					
n-pentylbenzene	538-68-1	1.94E-03 [4]					
trans-1-methyl-2-(4-methylpentyl)cyclopentane	66553-50-2	1.94E-03 [4]					
n-propylcyclopentane	2040-96-2	1.10E-03 [4]					

Emission Rates and Associated Air Quality Criteria for Diesel Exhaust

Locomotives

Pollutant	CAS #	Emission Factor g/bhp	Criterion $\mu\text{g}/\text{m}^3$	Averaging Period	Basis		Ratio of Emissions to Criterion g/bhp/g/m ³	
ethylcyclohexane	1678-91-7	1.10E-03 [4]	2244	30-minute	JSL	[12]	<1	
			748	24-hour	JSL	[12]	1	
cis-cis-1,3,5-trimethylcyclohexane	1795-27-3	1.10E-03 [4]						
n-undecane	1120-21-4	1.98E-02 [4]						
1,2-dimethyl-3-ethylbenzene	933-98-2	1.98E-02 [4]						
1,2,4,5-tetramethylbenzene	95-93-2	1.98E-02 [4]	60	30-minute	JSL	[12]	330	
			20	24-hour	JSL	[12]	990	
o-xylene	95-47-6	4.21E-03 [4]	300	30-minute	JSL	[12]	14	
			100	24-hour	JSL	[12]	42	
			730	24-hour	health (xylenes)	[9]	<1	
1,1,2-trimethylcyclohexane	7094-26-0	4.21E-03 [4]						
toluene	108-88-3	5.51E-03 [4]	2000	24-hour	odour	[9]	3	
2,3,3-trimethylpentane	560-21-4	5.51E-03 [4]						
D. POLYAROMATIC HYDROCARBONS								
							[9]	
Naphthalene	91-20-3	1.91E-03 [2]	36	30-minute	odour	[9]	53	
			22.5	24-hour	health	[9]	85	
			50	10-minute	odour	[9]	38	
2-methylnaphthalene	91-57-6	5.23E-04 [2]	30	30-minute	JSL	[12]	17	
			10	24-hour	JSL	[12]	52	
Acenaphthylene	208-96-8	3.00E-04 [2]	10.5	30-minute	JSL	[12]	29	
			3.5	24-hour	JSL	[12]	86	
Acenaphthene	83-32-9	2.80E-05 [2]						
Fluorene	86-73-7	1.22E-04 [2]						
Phenanthrene	85-01-8	4.67E-04 [2]						
Anthracene	120-12-7	7.30E-05 [2]	0.6	30-minute	JSL	[12]	122	
			0.2	24-hour	JSL	[12]	365	
Fluoranthene	206-44-0	5.20E-05 [2]	420	30-minute	JSL	[12]	<1	
			140	24-hour	JSL	[12]	<1	
Pyrene	129-00-0	8.50E-05 [2]	0.6	30-minute	JSL	[12]	142	
			0.2	24-hour	JSL	[12]	425	
Benzo(a)anthracene	56-55-3	1.80E-05 [2]						
Chrysene	218-01-9	6.00E-06 [2]						
Benzo(b)fluoranthene	205-99-2	3.00E-06 [2]						
Benzo(k)fluoranthene	207-08-9	3.00E-06 [2]						
Benzo(e)pyrene	192-97-2	3.00E-06 [2]						
Benzo(a)pyrene	50-32-8	2.00E-06 [2]	0.0033	30-minute	health	[9]	606	
			0.0011	24-hour	health	[9]	1818	
			0.00005	24-hour	health (proposed)	[13]	40000	
			2.56E-06 [7]	0.0033	30-minute	health	[9]	776
			0.0011	24-hour	health	[9]	2328	
0.00005	24-hour	health (proposed)	[13]	51216				
Indeno(123-cd)pyrene	193-39-5	2.00E-06 [2]						
Benzo(ghi)perylene	191-24-2	3.00E-06 [2]	3.6	30-minute	health	[9]	<1	
			1.2	24-hour	health	[9]	3	

