

Appendix on recent European Union (EU) emissions standards

I. Emission limits for passenger cars

Gasoline	As from ^b	CO	HC	NO _x
Euro 1 ^c	1/7/1992	4.05	0.66	0.49
Euro 2 ^c	1/1/1996	3.28	0.34	0.25
Euro 3	1/1/2000	2.30	0.20	0.15
Euro 4	1/1/2005	1.00	0.10	0.08

Table A.1
Emission Limits for Gasoline Cars (g/km)^a

CO = carbon monoxide, g/km = gram per kilometer, HC = hydrocarbons, NO_x = nitrogen oxides

^a“Euro 3 and 4” (Directive 98/69/EC): Standards also apply to light commercial vehicles (<1305 kg)

^bThe above dates refer to new vehicle types; dates for new vehicles are one year later

^cAs measured on new test cycle for application in year 2000

Diesel	As from ^b	CO	HC	NO _x	PM
Euro 1 ^c	1/7/1992	2.88	0.20	0.78	0.140
Euro 2 ^c	1/1/1996	1.06	0.19	0.73	0.100
Euro 3	1/1/2000	0.64	0.06	0.50	0.050
Euro 4	1/1/2005	0.50	0.05	0.25	0.025

Table A.2
Emission Limits for Diesel Cars (g/km)^a

CO = carbon monoxide, g/km = gram per kilometer, HC = hydrocarbons, NO_x = nitrogen oxides, PM = particulate matter

^a“Euro 3 and 4” (Directive 98/69/EC): Standards also apply to light commercial vehicles (<1305 kg)

^bThe above dates refer to new vehicle types; dates for new vehicles are one year later

^cAs measured on new test cycle for application in year 2000

II. Emission limits for light commercial vehicles (Classes N1, N2 and N3)

Table A.3

**Light Commercial Vehicles
N1 Class (<1350 kg)
Emission Limits (g/km)**

N1	As from	Fuel type	CO	HC	NO _x	HC + NO _x	PM
Euro 1 ^a	1/10/1994	All	2.72	—	—	0.97	0.140
Euro 2 ^a	1/1/1998	Gasoline	2.20	—	—	0.50	—
		Diesel	1.00	—	—	0.60	0.100
Euro 3	1/1/2001	Gasoline	2.30	0.20	0.15	—	—
		Diesel	0.64	—	0.50	0.56	0.050
Euro 4	1/1/2006	Gasoline	1.00	0.10	0.08	—	—
		Diesel	0.50	—	0.25	0.30	0.025

CO = carbon monoxide, g/km = gram per kilometer, HC = hydrocarbons, NO_x = nitrogen oxides, PM = particulate matter
^aFor Euro 1 and 2 the weight classes were N1 (<1250 kg), N2 (1250-1700 kg) and N3 (>1700 kg)

Table A.4

**Light Commercial Vehicles
N2 Class (1305-1760 kg)
Emission Limits (g/km)**

N2	As from	Fuel type	CO	HC	NO _x	HC + NO _x	PM
Euro 1 ^a	1/10/1994	All	5.17	—	—	1.40	0.19
Euro 2 ^a	1/1/1998	Gasoline	4.00	—	—	0.65	—
		Diesel	1.20	—	—	1.10	0.15
Euro 3	1/1/2002	Gasoline	4.17	0.25	0.18	—	—
		Diesel	0.80	—	0.65	0.72	0.07
Euro 4	1/1/2006	Gasoline	1.81	0.13	0.1	—	—
		Diesel	0.63	—	0.33	0.39	0.04

CO = carbon monoxide, g/km = gram per kilometer, HC = hydrocarbons, NO_x = nitrogen oxides, PM = particulate matter
^aFor Euro 1 and 2 the weight classes were N1 (<1250 kg), N2 (1250-1700 kg) and N3 (>1700 kg)

Table A.5
Light Commercial Vehicles
N3 Class (>1760 kg)
Emission Limits (g/km)

N3	As from	Fuel type	CO	HC	NO _x	HC + NO _x	PM
Euro 1 ^a	1/10/1994	All	6.90	—	—	1.70	0.25
Euro 2 ^a	1/1/1998	Gasoline	5.00	—	—	0.80	—
		Diesel	1.35	—	—	1.30	0.20
Euro 3	1/1/2002	Gasoline	5.22	0.29	0.21	—	—
		Diesel	0.95	—	0.78	0.86	0.10
Euro 4	1/1/2006	Gasoline	2.27	0.16	0.11	—	—
		Diesel	0.74	—	0.39	0.46	0.06

CO = carbon monoxide, g/km = gram per kilometer, HC = hydrocarbons, NO_x = nitrogen oxides, PM = particulate matter

^aFor Euro 1 and 2 the weight classes were N1 (<1250 kg), N2 (1250-1700 kg) and N3 (>1700 kg)

III. Emissions limits for heavy duty vehicles

Table A.6
Emission Limits for Heavy
Duty Vehicles (g/kWh)

	As from	Test cycle	CO	Total HC	Non-Methane HC	NO _x	Particulate Matter
Euro 1	1/10/1993	13-mode	4.5	1.10	—	8.0	0.612 <85 kW 0.36 >85 kW
Euro 2	1/10/1996	13-mode	4.0	1.10	—	7.0	0.15 ^a
Euro 3	1/1/2000	ESC ^c	2.1	0.66	—	5.0	0.10 0.13 ^b
		ETC ^d	5.5	0.78	1.6	5.0	0.16 0.21 ^b
Euro 4	1/10/2005	ESC ^c	1.5	0.46	—	3.5	0.02
		ETC ^d	4.0	0.55	1.1	3.5	0.03
Euro 5	1/10/2008	ESC ^c	1.5	0.46	—	2.0	0.02
		ETC ^d	4.0	0.55	1.1	2.0	0.03

Note: "Euro 1 and 2": Directive 91/542/EEC; "Euro 3, 4 and 5": Council position December 1998 and agreed with the European Parliament

CO = carbon monoxide, HC = hydrocarbons, g/kWh = gram per kilowatt-hour, NO_x = nitrogen oxides

^a Until 30/11/1998 the particulate limit for engines <700 cc per cylinder and with a rated power speed of more than 3000 rpm was 0.25 g/kWh

^bFor engines <750 cc per cylinder and with a rated power speed greater than 3000 rpm

^c Measured on the European Standard Cycle (ESC)

^d Measured on the European Transient Cycle (ETC)

IV. Relevant fuel specification limits

Table A.7
Relevant Gasoline
and Diesel Fuel
Specification
Limits

	2000	2005
Gasoline		
RVP summer	60	—
Aromatics	42	35
Benzene	1	—
Olefins	18	—
Oxygen	2.7	—
Sulfur	150	50
Diesel		
Cetane no. (min)	51	—
Density 15°C	845	—
Distillation 95°C	360	—
Polyaromatics	11	—
Sulfur	350	50

RVP = Reid vapor pressure