II

*(Preparatory Acts)*

# COMMISSION

## Proposal for a Council Directive amending Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by gases from the engines of motor vehicles

*COM(85) 288 final*

*(submitted by the Commission to the Council pursuant to the second paragraph of Article 149 of the EEC Treaty on 21 June 1985)*

(85/C 245/01)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 100 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas the first programme of action of the European Communities on the environment, which was adopted by the Council on 22 November 1973, calls for account to be taken of the latest scientific progress in combating air pollution caused by exhaust gases from motor vehicles and for Directives adopted previously to be amended accordingly, and whereas the third programme of action provides for further efforts to reduce considerably the present level of emissions of pollutants from motor vehicles;

Whereas, Directive 70/220/EEC (1) lays down limit values for emissions of carbon monoxide and unburnt hydrocarbons from such engines; whereas these limit values were lowered for the first time by Directive 74/290/EEC (2) and supplemented, pursuant to Directive 77/102/EEC (3) with limit values for permissible emissions of oxides of nitrogen; whereas the limit values for these three pollutants were successively reduced by Directives 78/665/EEC (4) and 83/351/EEC (5);

Whereas the work undertaken by the Commission in connection with its policy of pursuing a comprehensive approach to the development of rules for the motor industry has shown that the Community industry already has, or is currently perfecting, engine technology which will allow a further reduction in limit values; whereas this reduction does not compromise, for the period in question, the objectives of Community policy in other fields, particularly that of the rational use of energy;

Whereas the Community has an obligation to implement Directives on the protection of the environment which, as far as vehicle emissions are concerned, make it possible to obtain values adapted to European conditions so that their effect on the enviroment is equivalent to that of US standards for vehicle emissions; whereas this is also essential for reasons of innovation and industrial competitiveness; whereas, to achieve this objective, it is advisable to provide for a differentiated solution for the various categories of vehicle engine capacity so as to allow, as far as possible, compliance with Community requirements at reasonable cost and using different technical means; whereas the limit values laid down for vehicles with an engine capacity of less than 1,4 litres reflect the current technical and economic conditions of European manufacturers in this section of the market and whereas the limit values

(1) OJ No L 76, 6. 4. 1970, p. 1.
(2) OJ No L 159, 15. 6. 1974, p. 61.
(3) OJ No L 32, 3. 2. 1977, p. 32.
(4) OJ No L 223, 14. 8. 1978, p. 48.
(5) OJ No L 197, 20. 7. 1983, p. 1.

applicable in 1993/1994 should be fixed in 1987;

Whereas the limit values in this Directive are based on the test method laid down in Directive 70/220/EEC but this procedure must be adapted subsequently so that it reflects not only traffic conditions in congested urban centres but those outside such centres; whereas a decision concerning such adaptation should be taken by 1987 at the latest;

Whereas the Directive 70/220/EEC refers in its Article 5 to the possibility of adapting the provision of the Annexes to take account of technical progress;

Whereas petrol engines in all vehicles caught by this Directive should be designed to run exclusively on unleaded petrol so as to make it possible to abandon the use of lead-based additives in petrol and thus make a decisive contribution to the reduction of environmental pollution by this element;

Whereas it is necessary to ensure that the provisions relating to the compression-ignition engines of vehicles covered by this Directive remain compatible, with due regard to the specific nature of all the pollutants emitted by such engines, with the subsequent evolution of provisions relating to the other pollutants emitted by such engines and covered by Directive 72/306/EEC;

Whereas, during the interim period between the adoption of European standards and the implementation of the modified European test cycle, it is desirable that vehicles which obtain type approval in accordance with equivalent standards on Community export markets also qualify for EEC type-approval;

Whereas, with due regard for the Treaty's rules, Member States which so wish may apply in advance the new values laid down in this Directive, on the understanding that if they do so they may not prohibit the marketing or use of vehicles, whether manufactured at home or imported, which comply with Community requirements,

HAD ADOPTED THIS DIRECTIVE:

*Article 1*

Annexes I, II, III, VI and VII to Directive 70/220/EEC shall be amended in accordance with the Annex to this Directive. A new Annex III A shall be introduced.

*Article 2*

1. From 1 January 1986, Member States, for reasons connected with pollution of the air by exhaust gases or with engine fuel requirements, may:

— neither refuse, in respect of a motor-vehicle type, to grant EEC type-approval, to issue the document provided for in the last indent of Article 10 (1) of Directive 70/156/EEC or to grant national type-approval,

— nor prohibit the initial entry of the vehicles into free circulation,

if emissions of polluting gases from that type of motor vehicle, or from those vehicles, and the engine fuel requirements satisfy the provisions of Directive 70/220/EEC, as amended by this Directive.

2. From 1 October 1988 as regards vehicle types with an engine capacity of over 2 000 $cm^3$,

from 1 October 1990 as regards vehicle types with an engine capacity of 1 400 $cm^3$ or less, and

from 1 October 1991 as regards vehicle types with an engine capacity of and between 1 401 $cm^3$ and 2 000 $cm^3$,

Member States may:

— cease to issue the document provided for in the last indent of Article 10 (1) of Directive 70/156/EEC for a motor-vehicle type, and

— refuse national approval for a motor-vehicle type,

whose emissions of polluting gases and whose engine fuel requirements do not satisfy the provisions in the Annexes to Directive 70/220/EEC, as amended by this Directive.

3. From 1 October 1989 as regards vehicle types with an engine capacity of over 2 000 $cm^3$,

from 1 October 1991 as regards vehicle types with an engine capacity of 1 400 $cm^3$ or less, and

from 1 October 1993 as regards vehicle types with an engine capacity of and between 1 401 $cm^3$ and 2 000 $cm^3$,

Member States may prohibit the initial entry of vehicles into free circulation whose emissions of polluting gases and whose engine fuel requirements do not satisfy the provisions in the Annexes of Directive 70/220/EEC, as amended by this Directive.

*Article 3*

By 31 December 1987 at the latest,

— the limit values to be applied from 1993/94 to vehicles with an engine capacity of 1 400 $cm^3$ or less, or equivalent, shall have been adopted in accordance with Article 100 of the Treaty;

— the Council, acting by qualified majority, on proposals from the Commission, shall have amended the test contained in Annex III to Directive 70/220/EEC in order to adapt it to traffic conditions both in and outside congested urban centres.

*Article 4*

The Member States shall bring into force, before 1 January 1986, the provisions necessary to comply with this Directive and shall forthwith inform the Commission thereof.

*Article 5*

This Directive is addressed to the Member States.

*ANNEX*

## Amendments to the Annexes to Directive 70/220/EEC

*ANNEX I*

The following new point shall be added:

'3.2.4. a description of the measures taken to ensure that the vehicle can be supplied only with unleaded petrol in accordance with the provisions of Directive 85/210/EEC(1). By way of example, this condition is deemed to be met if it can be demonstrated that the inlet orifice of the fuel tank is so designed that it enables the tank to be filled only from a petrol pump delivery nozzle which has an external diameter not exceeding 2,1 cm and a straight section with a minimum length of 6,3 cm.'

In item 5.1, the existing text shall be numbered 5.1.1.

The following new point shall be added:

'5.1.2. the vehicle must be designed to run on unleaded petrol as specified by Directive 85/210/EEC.'

Point 5.2.1.1.4 shall read as follows:

'5.2.1.1.4. Subject to the requirements of 5.2.1.1.4.2 and 5.2.1.1.5 the test is to be carried out three times. The mass of the carbon monoxide, the combined mass of the hydrocarbons and the nitrogen oxides and the mass of the nitrogen oxides obtained in the test must be less than the amounts shown in the table below, for the corresponding vehicle categories:

| Cubic capacity<br>C<br>($cm^3$) | Mass of carbon monoxide<br>$L_1$<br>(g/test) | Combined mass of hydrocarbons and oxides of nitrogen<br>$L_2$<br>(g/test) | Mass of oxides of nitrogen<br>$L_3$<br>(g/test) |
|---|---|---|---|
| $C > 2\,000$ | 25 | 6,5 | 3,5 |
| $1\,401 \leqslant C \leqslant 2\,000$ | 30 | 8 | 4 |
| $C \leqslant 1\,400$ | 45 | 15 | 6 |

Vehicles equipped with compression-ignition engines whose cubic capacity exceeds 1 401 $cm^3$ must comply with the limit values corresponding or equivalent to the category of cubic capacities ranging between 1 401 $cm^3$ and 2 000 $cm^3$.'

In points 5.2.1.1.4.1, 5.2.1.1.4.2, 5.2.1.1.5.1 and 5.2.1.1.5.2, the words 'and the mass of nitrogen oxides' or 'and the emissions of oxides of nitrogen' shall be added after any reference to combined figures for hydrocarbons and oxides of nitrogen.

The table in point 7.1.1.1 shall be replaced by the following:

| Cubic capacity<br>C<br>($cm^3$) | Mass of carbon monoxide<br>$L_1$<br>(g/test) | Combined mass of hydrocarbons and oxides of nitrogen<br>$L_2$<br>(g/test) | Mass of oxides of nitrogen<br>$L_3$<br>(g/test) |
|---|---|---|---|
| $C > 2\,000$ | 30 | 8,1 | 4,4 |
| $1\,401 \leqslant C \leqslant 2\,000$ | 36 | 10 | 5 |
| $C \leqslant 1\,400$ | 54 | 19 | 7,5 |

(1) OJ No L 96, 3. 4. 1985.

Vehicles equipped with compression-ignition engines whose cubic capacity exceeds 1 401 $cm^3$ must comply with the limit values corresponding or equivalent to the category of cubic capacities ranging between 1 401 $cm^3$ and 2 000 $cm^3$.'

The second paragraph of point 7.1.1.2 shall read as follows:

'L is the limit value laid down in 7.1.1.1 for the emissions of carbon monoxide, the combined emissions of hydrocarbons and oxides of nitrogen and the emissions of oxides of nitrogen;'.

Point 8.1 shall read as follows:

'8.1. The limit values specified in the tables set out in 5.2.1.1.4 and 7.1.1.1 in Annex I to Directive 70/220/EEC, as amended by Directive 83/351/EEC, shall apply for the type approval and verification of production conformity of the following vehicles:

— vehicles other than those of category $M_1$;

— passenger vehicles of category $M_1$ designed to carry more than six occupants including the driver or whose maximum mass exceeds 2 500 kg; and

— vehicles designed for use off the public highway.'

The following new point shall be added:

'8.3. Test equivalent to the type I test for verifying emissions after a cold start.

8.3.1. Until a modified version of the test specified in 5.2.1.1 (European cycle) enters into force and for the type approval and verification of production conformity of passenger vehicles of category $M_1$ equipped with an engine whose cubic capacity exceeds 1 401 $cm^3$, designed to carry not more than six occupants including the driver and/or having a maximum mass not exceeding 2 500 kg, the technical service may, at the request of a maufacturer, carry out the equivalent test described in Annex III A (EPA cycle) instead of that described in 5.2.1.1. If so, the following provisions shall apply:

8.3.1.1. For vehicle type-approval, the limit values specified in the table set out in 5.2.1.1.4 shall be replaced by the following:

— Mass of carbon monoxide ($L_1$): 2,1 g/km

— Combined mass of hydrocarbons and oxides of nitrogen ($L_2$): 0,9 g/km

— Mass of oxides of nitrogen ($L_3$): 0,6 g/km.

These limit values are deemed to be met if they are not exceeded by the results of tests on a vehicle type multiplied by a factor of 1,3.

8.3.1.2. For the verification of production conformity, the limit values specified in the table set out in 7.1.1.1 shall be replaced by those of 8.3.1.1. They are deemed to be met if the conditions set out in 7 are satisfied.'

*ANNEX II*

A footnote reference '(4)' shall be inserted after 1.4 and 1.5.

A footnote reference '(5)' shall be inserted after 1.7.

The following footnotes shall be added:

'(4) This figure must be rounded off to the nearest tenth of a millimetre.

(5) This value must be calculated with $\pi = 3{,}1416$ and rounded off to the nearest $cm^3$.'

*ANNEX III*

Point 3.1.7 shall be deleted.

*ANNEX VI*

**(Specifications of reference fuels)**

The table set out in point 1 shall be replaced by the following:

1. TECHNICAL DATA OF THE REFERENCEE FUEL TO BE USED FOR TESTING VEHICLES EQUIPPED WITH A GASOLINE-FUELLED ENGINE

**CEC reference fuel RF-08-T-85**

Type: Premium gasoline, unleaded

| | Limits and units | | ASTM method |
|---|---|---|---|
| | Minimum | Maximum | |
| Research octane number | 95,0 | | D 2699 |
| Motor octane number | 85,0 | | D 2700 |
| Sensivity | | | D 2699/D 2700 |
| Delta R at 100 °C | | | IP 325/D 2699 |
| Density at 15 °C | 0,745 | 0,765 | D 1298 |
| Reid vapour pressure | 0,56 bar | 0,64 bar | D 323 |
| Distillation | | | |
| — initial boiling point | 24 °C | 40 °C | D 86 |
| — 10 % vol point | 42 °C | 58 °C | D 86 |
| — 50 % vol point | 90 °C | 110 °C | D 86 |
| — 90 % vol point | 155 °C | 180 °C | D 86 |
| — final boiling point | 190 °C | 215 °C | D 86 |
| Residue | | 2 % | D 86 |
| Hydrocarbon analysis | | | |
| — olefins | | 20 % Vol. | D 1319 |
| — aromatics | (Including maximum 5 % vol benzene*) | 45 % vol | D 1319<br>*D 3606/D 2267 |
| — saturates | | balance | D 1319 |
| Carbon/hydrogen ratio | ratio | | |
| Oxidation stability | 480 min. | | D 525 |
| Existent gum | | 4 mg/100 ml | D 381 |
| Potential gum | | — | D 873 |
| Sulphur content | | 0,04 % mass | D 1266/D 2622/<br>D 2785 |
| Copper corrosion at 50 °C | | 1 | D 130 |
| Lead content | | 0,005 g/l | D 3237 |
| Scavenger | | | |
| Organic lead compound | | | |
| Phosphorous content | | 0,0013 g/l | D 3231 |
| Other additives | | | |

*ANNEX VII*

The following words shall be inserted at the end of the first line of point 14:

'carried out in accordance with Annex III/Annex III A 1'.

The following words shall be inserted at the end of the first line of point 14.1:

'carried out in accordance with Annex III 1'.

The following new item shall be inserted after point 14.1:

'14.2. Type I test carried out in accordance with Annex III A 1:

CO: . . . g/km HC: . . . g/km $NO_X$: . . . g/km'.

Point 14.2 shall become 14.3.

Point 14.3 shall become 14.4.

*ANNEX III A*

## TEST EQUIVALENT TO THE TYPE I TEST FOR VERIFYING EMISSIONS AFTER A COLD START

1. INTRODUCTION

... defined in 8.3, Annex I.

2. OPERATING CYCLE ON THE CHASSIS DYNAMOMETER

2.1. Description of the cycle

The operating ..... in the table depicted in the graph in Appendix 1.

The breakdown ..... Appendix.

2.2. (id. 2.2, Annex III).

2.3. **Transmissions**

2.3.1. All test conditions, except as noted, shall be run according to the manufacturer's recommendations to the ultimate purchaser, provided that such recommendations are representative of what may reasonably be expected to be followed by the ultimate purchaser under in-use conditions.

2.3.2. Vehicles equipped with free wheeling or overdrive, except as noted, shall be tested with these features operated according to the manufacturer's recommendations to the ultimate purchaser.

2.3.3. Idle modes shall be run with automatic transmission in 'drive' and the wheels braked: manual transmissions shall be in gear with the clutch disengaged, except first idle.

The vehicle shall be driven with minimum accelerator pedal movement to maintain the desired speed.

2.3.4. Accelerations shall be driven smoothly following representative shift speeds and procedures. For manual transmissions, the operator shall release the accelerator pedal during each shift and accomplish the shift with minimum time. If the vehicle cannot accelerate at the specified rate, the vehicle shall be operated at maximum available power until the vehicle speed reaches the value prescribed for that time in the driving schedule.

2.3.5. The deceleration modes shall be run in gear using brakes or accelerator pedal as necessary to maintain the desired speed. Manual transmission vehicles shall have the clutch engaged and shall not change gears from the previous mode. For those modes which decelerate to zero, manual transmission clutches shall be depressed when the speed drops below 24,1 km/h, when engine roughness is evident, or when engine stalling is imminent.

2.3.6. *Manual transmission*

2.3.6.1. In the case of test vehicles equipped with manual transmissions, the transmission shall be shifted in accordance with procedures which are representative of shift patterns that may reasonably be expected to be followed by vehicles in use in terms of such variables as vehicle speed or percent rated engine speed. At the administrator's discretion, a test vehicle may also be shifted according to the shift procedures recommended by the manufacturer to the ultimate purchaser, if such procedures differ from those which are reasonably expected to be followed by vehicles in use.

2.3.6.2. A manufacturer may recommend to the ultimate purchaser shift procedures other than those used in testing by the technical service, provided that all shift procedures (including multiple shift speeds) which the manufacturer proposes to supply to the ultimate purchaser are provided to the administrator as part of the manufacturer's application for certification.

2.3.7. Downshifting is allowed at the beginning of or during a power mode in accordance with the shift procedure determined in paragraph 2.3.6.1 of this section.

2.4. **Tolerances**

2.4.1. The dynamometer driving schedule is listed in Appendix 1. The driving schedule is defined by a smooth trace drawn through the specified speed vs. time relationships. It consists of a non-repetitive series of idle, acceleration, cruise, and deceleration modes of various time sequences and rates.

2.4.2. The dynamometer driving schedule is prescribed in Appendix 1. The speed tolerances at any given time for this schedule, or for a driver's aid chart approved by the administrator, when conducted to meet the provisions of 6.2 are:

— The upper limit is 3,2 km/h higher than the highest point on the trace within 1 second of the given time.

— The lower limit is 3,2 km/h lower than the lowest point on the trace within 1 second of the given time.

— Speed variations greater than the tolerances (such as may occur during gear changes) are acceptable provided they occur for less than 2 seconds on any occasion.

— Speeds lower than those prescribed are acceptable provided the vehicle is operated at maximum available power during such occurrences.

— The speed tolerance shall be as specified above, except that the upper lower limits shall be 6,4 km/h.

— The following figures show the range of acceptable speed tolerances for typical points. Figure A is typical of portions of the speed curve which are increasing or decreasing throughout the 2-second time interval. Figure B is typical of portions of the speed curve which include a maximum or minimum.

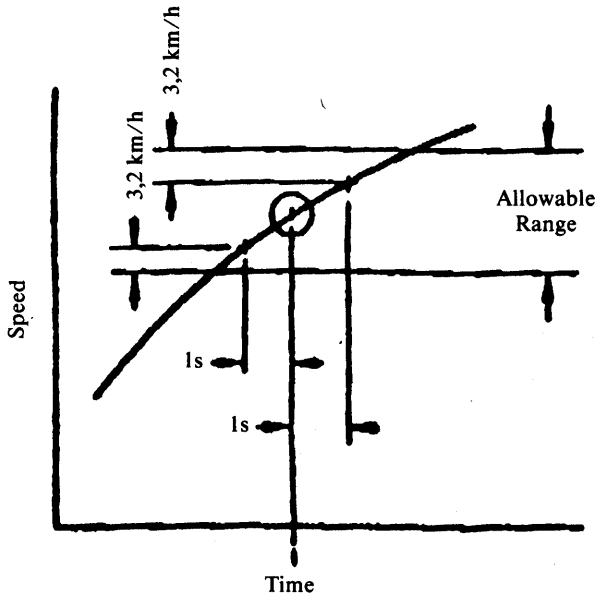



*Figure A*

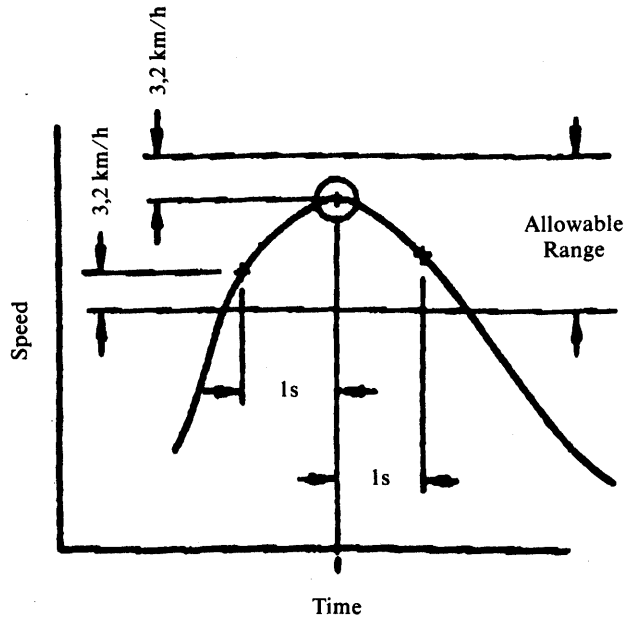



*Figure B*

3. VEHICLE AND FUEL

3.1. **Test vehicle**

3.1.1.
3.1.2.
3.1.3.
3.1.4.
3.1.5.
3.1.6. } id. 3.1.1 to 3.1.6, Annex III.

3.2. **Fuel**

id. 3.2, Annex III
(+ unleaded fuel).

4. TEST EQUIPMENT

4.1. **Chassis**

4.1.1.
4.1.2.
4.1.3. } id. 4.1.1, 4.1.2 and 4.1.3, Annex III.

4.1.4. *Accuracy*

4.1.4.1. id. 4.1.4.1, Annex III.

4.1.4.2. In the case of a dynamometer with a fixed load curve the accuracy of the load setting at 60,5 km/h must be 5 %. In the case of a dynamometer with an adjustable load curve, the accuracy of matching a dynamometer load to road must be 5 % at 80,5,60 and 40 km/h and 10 % at 20 km/h. Below this, dynamometer absorption must be positive.

4.1.4.3.
4.1.4.4. } id. 4.1.4.3 and 4.1.4.4, Annex III.

4.1.5. *Load and inertia setting*

4.1.5.1. Dynamometer with a fixed load curve: the load simulator must be adjusted to absorb the power exerted on the driving wheels at a steady speed of 80,5 km/h. The means by which a load is determined and set are described in Appendix 3.

4.1.5.2. Dynamometer with an adjustable load curve: the load simulator must be adjusted in order to absorb the power exerted on the driving wheels at steady speeds of 20, 40, 80 and 80,5 km/h. The means by which these loads are determined and set are described in Appendix 3.

4.1.5.3. id. 4.1.5.3, Annex III.

4.2.
4.3.
4.4.
4.5. } id. 4.2. to 4.7, Annex III.
4.6.
4.7.

5. PREPARING THE TEST

5.1. **Adjustment of inertia simulators**

| Reference mass of the vehicle | Equivalent inertial mass |
|---|---|
| Pr ⩽ 480 | 450 |
| 480 < Pr ⩽ 540 | 510 |
| 540 < Pr ⩽ 600 | 570 |
| 600 < Pr ⩽ 650 | 625 |
| 650 < Pr ⩽ 700 | 680 |
| 700 < Pr ⩽ 780 | 740 |
| 780 < Pr ⩽ 820 | 800 |
| 820 < Pr ⩽ 880 | 850 |
| 880 < Pr ⩽ 940 | 910 |
| 940 < Pr ⩽ 990 | 960 |
| 990 < Pr ⩽ 1 050 | 1 020 |
| 1 050 < Pr ⩽ 1 110 | 1 080 |
| 1 110 < Pr ⩽ 1 160 | 1 130 |
| 1 160 < Pr ⩽ 1 220 | 1 190 |
| 1 220 < Pr ⩽ 1 280 | 1 250 |
| 1 280 < Pr ⩽ 1 330 | 1 300 |
| 1 330 < Pr ⩽ 1 390 | 1 360 |
| 1 390 < Pr ⩽ 1 450 | 1 420 |
| 1 450 < Pr ⩽ 1 500 | 1 470 |
| 1 500 < Pr ⩽ 1 560 | 1 530 |
| 1 560 < Pr ⩽ 1 620 | 1 590 |
| 1 620 < Pr ⩽ 1 670 | 1 640 |
| 1 670 < Pr ⩽ 1 730 | 1 700 |
| 1 730 < Pr ⩽ 1 790 | 1 760 |
| 1 790 < Pr ⩽ 1 870 | 1 810 |
| 1 870 < Pr ⩽ 1 980 | 1 930 |
| 1 980 < Pr ⩽ 2 100 | 2 040 |
| 2 100 < Pr ⩽ 2 210 | 2 150 |
| 2 210 < Pr ⩽ 2 320 | 2 270 |
| 2 320 < Pr ⩽ 2 440 | 2 380 |
| 2 440 < Pr ⩽ 2 610 | 2 490 |
| 2 610 < Pr ⩽ 2 830 | 2 720 |
| 2 830 < Pr | 2 940 |

Flywheels electrical or other means of simulating test weight as shown in the following table shall be used. If the equivalent test weight specified is not available on the dynamometer being used, the next higher equivalent test weight (not to exceed 125 kg) available shall be used.

*NB:* the reference mass of the vehicle is the mass of the vehicle in running order less the uniform mass of the driver and increased by a uniform mass of 136 kg.

5.2. Setting of the dynamometer: id. 5.2, Annex III.

5.3. **Conditioning of vehicle**

5.3.1. Before the test, the vehicle must be kept in a room in which the temperature remains relatively constant between 20 and 30° C. This conditioning must be carried out for at least 12 hours and continue until the engine oil temperature and coolant, if any, are within ±2° C of the temperature of the room.

If the manufacturer so requests, the test must be carried out not later than 36 hours after the vehicle has been run at its normal temperature.

5.3.2. id. 5.3.2, Annex III.

6. PROCEDURE FOR BENCH TESTS

6.1. to 6.1.4. id. 5.1 to 6.1.4, Annex III.

6.2. **Test and sampling**

6.2.1. The vehicle shall be stored prior to the emission test in such a manner that precipitation (e.g., rain or dew) does not occur on the vehicle. The complete dynamometer test consists of a cold-start drive of 12,1 km and simulates a hot-start drive of 12,1 km. The vehicle is allowed to stand on the dynamometer during the 10-minute time period between the cold and hot start tests. The cold start test is divided into two periods. The first period, representing the cold start 'transient' phase, terminates at the end of the deceleration which is scheduled to occur at 505 seconds of the driving schedule. The second period, representing the 'stabilized' phase, consists of the remainder of the driving schedule including engine shutdown. The hot-start test similarly consists of two periods. The first period, representing the hot-start 'transient' phase, terminates at the same point in the driving schedule as the first period of the cold-start test. The second period of the hot-start test, 'stabilized' phase, is assumed to be identical to the second period of the cold start test. Therefore the hot-start test terminates after the first period (505 seconds) is run.

6.2.2. The following steps shall be taken for each test:

6.2.2.1. Place drive wheels of vehicle on dynamometer without starting engine. Reset and enable the roll revolution counter.

6.2.2.2. Open the vehicle engine compartment cover and position the cooling fan.

6.2.2.3. With the sample selector valves in the 'standby' position, connect evacuated sample collection bags to the dilute exhaust and dilution air sample collection systems.

6.2.2.4. Start the CVS (if not already on), the sample pumps, the temperature recorder, the vehicle cooling fan and the heated hydrocarbon analysis recorder (diesel only). (The heat exchanger of the constant volume sampler, if used, diesel hydrocarbon analyzer continuous sample line and filter (if applicable) should be preheated to their respective operating temperatures before the test begins.)

6.2.2.5. Adjust the sample flow rates to the desired flow rate (minimum of 0,28 $m^3/h$) and set the gas flow measuring devices to zero.

*NB:* CFV-CVS sample flow rate is fixed by the venturi design.

6.2.2.6. Attach the flexible exhaust tube to the vehicle tailpipe(s).

6.2.2.7. Start the gas flow measuring device, position the sample selector valves to direct the sample flow into the 'transient' exhaust sample bag and the 'transient' dilution air sample bag (turn on the diesel hydrocarbon analyzer system integrator and mark the recorder chart, if applicable), turn the key on and start cranking the engine.

6.2.2.8. Fifteen seconds after the engine starts, place the transmission in gear.

6.2.2.9. Twenty seconds after the engine starts, begin the initial vehicle acceleration of the driving schedule.

6.2.2.10. Operate the vehicle according to the dynamometer driving schedule.

6.2.2.11. At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously switch the sample flows from the 'transient' bags to the 'stabilized' bags, switch off gas flow measuring device No 1 (and the diesel hydrocarbon integrator No 1 — mark the diesel hydrocarbon recorder chart) and start gas flow measuring device No 2 (and diesel hydrocarbon inte-

grator No 2). Before the acceleration which is scheduled to occur at 510 seconds, record the measured roll or shaft revolutions and reset the counter or switch to a second counter. As soon as possible transfer the 'transient' exhaust and dilution air samples to the analytical system and process the samples according to obtain a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

6.2.2.12. Turn the engine off 2 seconds after the end of the last deceleration (at 1 369 seconds).

6.2.2.13. Five seconds after the engine stops running, simultaneously turn off gas flow measuring device No 2 (and the diesel hydrocarbon integrator No 2, mark the hydrocarbon recorder chart, if applicable) and position the sample selector valves to the 'standby' position. Record the measured roll or shaft revolutions and reset the counter. As soon as possible transfer the 'stabilized' exhaust and dilution air samples to the analytical system and process the samples in order to obtain a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

6.2.2.14. Immediately after the end of the sample period turn off the cooling fan and close the engine compartment cover.

6.2.2.15. Turn off the CVS or disconnect the exhaust tube from the tailpipe of the vehicle.

6.2.2.16. Repeat the steps in paragraph 6.2.2.2 through 6.2.2.10 of this section for the hot-start test, except only one evacuated sample bag is required for sampling exhaust gas and one for dilution air. The key-on operation step described in paragraph 6.2.2.7 of this section shall begin between 9 and 11 minutes after the end of the sample period for the cold-start test.

6.2.2.17. At the end of the deceleration which is scheduled to occur at 505 seconds, simultaneously turn off gas flow measuring device No 1 (and diesel hydrocarbon integrator No 1, mark the diesel hydrocarbon recorder chart, if applicable) and position the sample selector valve to the 'standby' position (engine shutdown is not part of the hot-start test sample period). Record the measured roll or shaft revolutions.

6.2.2.18. As soon as possible transfer the hot start 'transient' exhaust and dilution air samples to the analytical system and process the samples in order to obtain a stabilized reading of the exhaust sample on all analyzers within 20 minutes of the end of the sample collection phase of the test.

6.3. **Engine starting and restarting**

6.3.1. *Gasoline-fuelled vehicles:* This paragraph applies to gasoline-fuelled vehicles.

6.3.1.1. The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts.

6.3.1.2. Choke operation: (*) Vehicles equipped with automatic chokes shall be operated according to the manufacturer's operating instructions in the owner's manual, including choke setting and 'kick-down' from cold fast idle.

(*) Vehicles equiped with manual chokes shall be operated according to the manufacturer's operating instructions in the owner's manual.

6.3.1.3. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

6.3.1.4. The operator may use the choke, accelerator pedal, etc., where necessary to keep the engine running.

6.3.1.5. If the manufacturer's operating instructions in the owner's manual do not specify a warm engine starting procedure, the engine (automatic- and manual-choke engines) shall be started by depressing the accelerator pedal about half-way and cranking the engine until it starts.

6.3.2. *Diesel vehicles:* The engine shall be started according to the manufacturer's recommended starting procedures in the owner's manual. The initial 20-second idle period shall begin when the engine starts. The transmission shall be placed in gear 15 seconds after the engine is started. If necessary, braking may be employed to keep the drive wheels from turning.

6.3.3. If the vehicle does not start after 10 seconds of cranking, cranking shall cease and the reason for failure to start shall be determined. The gas flow measuring device on the constant volume sampler (usually a revolution counter) or CFV (and the hydrocarbon integrator when testing diesel vehicles) shall be turned off and the sampler selector valves placed in the 'standby' position during this diagnostic period. In addition, either the CVS should be turned off, or the

exhaust tube disconnected from the tailpipe during the diagnostic period. If failure to start is an operational error, the vehicle shall be rescheduled for testing from a cold start.

6.3.3.1. If a failure to start occurs during the cold portion of the test and is caused by a vehicle malfunction, corrective action of less than 30 minutes duration may be taken and the test continued. All sampling system(s) shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If failure to start is caused by vehicle malfunction and the vehicle cannot be started, the test shall be voided.

6.3.3.2. If a failure to start occurs during the hot-start portion of the test and is caused by vehicle malfunction, the vehicle must be started within one minute of key on. All sampling systems(s) shall be reactivated at the same time cranking begins. When the engine starts, the driving schedule timing sequence shall begin. If the vehicle cannot be started within 1 minute of key on, the test shall be voided.

6.3.4. If the engine 'false starts' the operator shall repeat the recommended starting procedure (such as resetting the choke, etc.)

6.3.5. Stalling: (*) If the engine stalls during an idle period, the engine shall be restarted immediately and the test continued. If the engine cannot be started soon enough to allow the vehicle to follow the next acceleration as prescribed, the driving schedule indicator shall be stopped. When the vehicle restarts, the driving schedule indicator shall be reactived.

(*) If the engine stalls during some operating mode other than idle, the driving schedule indicator shall be stopped, the vehicle shall than be restarted and accelerated to the speed required at the point in the driving schedule and the test continued.

(*) If the vehicle will not restart within 1 minute, the test shall be voided.

7. PROCEDURE FOR ANALYSES

7.1. id. 7.2.2, Annex III.

7.2. id. 7.2.3, Annex III.

7.3. id. 7.2.4, Annex III.

7.4. id. 7.2.5, Annex III.

7.5. id. 7.2.6, Annex III.

7.6. id. 7.2.7, Annex III.

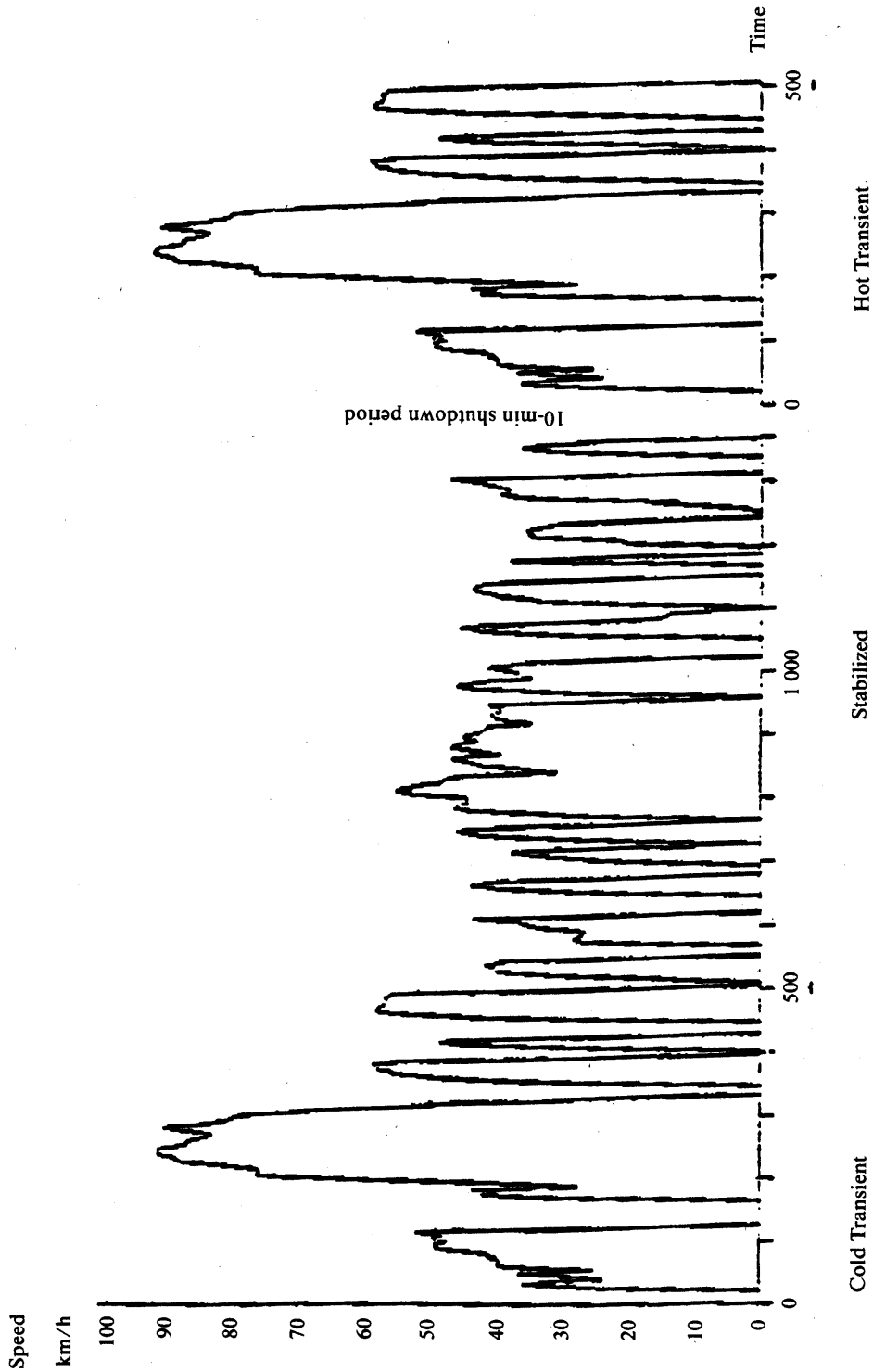
7.7. id. 7.2.8, Annex III.

8. DETERMINATION OF THE QUANTITY OF GASEOUS POLLUTANTS

8.1.
8.2. id. 8.1. and 8.2, Annex III.

*APPENDIX I*

**OPERATING CYCLE**



| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0,0 | 20 | 0,0 | 40 | 24,0 | 60 | 38,9 | 80 | 41,4 | 100 | 48,8 | 120 | 24,8 |
| 1 | 0,0 | 21 | 4,8 | 41 | 24,5 | 61 | 39,6 | 81 | 42,0 | 101 | 49,4 | 121 | 19,5 |
| 2 | 0,0 | 22 | 9,5 | 42 | 24,9 | 62 | 40,1 | 82 | 43,0 | 102 | 49,7 | 122 | 14,2 |
| 3 | 0,0 | 23 | 13,8 | 43 | 25,7 | 63 | 40,2 | 83 | 44,3 | 103 | 49,9 | 123 | 8,9 |
| 4 | 0,0 | 24 | 16,5 | 44 | 27,5 | 64 | 39,6 | 84 | 46,0 | 104 | 49,7 | 124 | 3,5 |
| 5 | 0,0 | 25 | 23,0 | 45 | 30,7 | 65 | 39,4 | 85 | 47,2 | 105 | 48,9 | 125 | 0,0 |
| 6 | 0,0 | 26 | 27,2 | 46 | 34,0 | 66 | 39,8 | 86 | 48,0 | 106 | 48,0 | 126 | 0,0 |
| 7 | 0,0 | 27 | 27,8 | 47 | 36,5 | 67 | 39,9 | 87 | 48,4 | 107 | 48,1 | 127 | 0,0 |
| 8 | 0,0 | 28 | 29,1 | 48 | 36,9 | 68 | 39,8 | 88 | 48,9 | 108 | 48,6 | 128 | 0,0 |
| 9 | 0,0 | 29 | 33,3 | 49 | 36,5 | 69 | 39,6 | 89 | 49,4 | 109 | 49,4 | 129 | 0,0 |
| 10 | 0,0 | 30 | 34,9 | 50 | 36,4 | 70 | 39,6 | 90 | 49,4 | 110 | 50,2 | 130 | 0,0 |
| 11 | 0,0 | 31 | 36,0 | 51 | 34,3 | 71 | 40,4 | 91 | 49,1 | 111 | 51,2 | 131 | 0,0 |
| 12 | 0,0 | 32 | 36,2 | 52 | 30,6 | 72 | 41,2 | 92 | 48,9 | 112 | 51,8 | 132 | 0,0 |
| 13 | 0,0 | 33 | 35,6 | 53 | 27,5 | 73 | 41,4 | 93 | 48,8 | 113 | 52,1 | 133 | 0,0 |
| 14 | 0,0 | 34 | 34,6 | 54 | 25,4 | 74 | 40,9 | 94 | 48,9 | 114 | 51,8 | 134 | 0,0 |
| 15 | 0,0 | 35 | 33,6 | 55 | 25,4 | 75 | 40,1 | 95 | 49,6 | 115 | 51,0 | 135 | 0,0 |
| 16 | 0,0 | 36 | 32,8 | 56 | 28,5 | 76 | 40,2 | 96 | 48,9 | 116 | 46,0 | 136 | 0,0 |
| 17 | 0,0 | 37 | 31,9 | 57 | 31,9 | 77 | 40,9 | 97 | 48,1 | 117 | 40,7 | 137 | 0,0 |
| 18 | 0,0 | 38 | 27,6 | 58 | 34,8 | 78 | 41,8 | 98 | 47,5 | 118 | 35,4 | 138 | 0,0 |
| 19 | 0,0 | 39 | 24,0 | 59 | 37,3 | 79 | 41,8 | 99 | 48,0 | 119 | 30,1 | 139 | 0,0 |
| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
| 140 | 0,0 | 160 | 0,0 | 180 | 41,5 | 200 | 67,8 | 220 | 80,5 | 240 | 91,2 | 260 | 87,1 |
| 141 | 0,0 | 161 | 0,0 | 181 | 43,8 | 201 | 70,0 | 221 | 81,4 | 241 | 91,2 | 261 | 86,6 |
| 142 | 0,0 | 162 | 0,0 | 182 | 42,6 | 202 | 72,6 | 222 | 82,1 | 242 | 90,9 | 262 | 85,9 |
| 143 | 0,0 | 163 | 0,0 | 183 | 38,6 | 203 | 74,0 | 223 | 82,9 | 243 | 90,9 | 263 | 85,3 |
| 144 | 0,0 | 164 | 5,3 | 184 | 36,5 | 204 | 75,3 | 224 | 84,0 | 244 | 90,9 | 264 | 84,7 |
| 145 | 0,0 | 165 | 10,6 | 185 | 31,2 | 205 | 76,4 | 225 | 85,6 | 245 | 90,9 | 265 | 83,8 |
| 146 | 0,0 | 166 | 15,9 | 186 | 28,5 | 206 | 76,4 | 226 | 87,1 | 246 | 90,9 | 266 | 84,3 |
| 147 | 0,0 | 167 | 21,2 | 187 | 27,7 | 207 | 76,1 | 227 | 87,9 | 247 | 90,9 | 267 | 83,7 |
| 148 | 0,0 | 168 | 26,6 | 188 | 29,1 | 208 | 76,0 | 228 | 88,4 | 248 | 90,8 | 268 | 83,5 |
| 149 | 0,0 | 169 | 31,9 | 189 | 29,9 | 209 | 75,6 | 229 | 88,5 | 249 | 90,3 | 269 | 83,2 |
| 150 | 0,0 | 170 | 35,7 | 190 | 32,2 | 210 | 75,6 | 230 | 88,4 | 250 | 89,8 | 270 | 82,9 |
| 151 | 0,0 | 171 | 39,1 | 191 | 35,7 | 211 | 75,6 | 231 | 87,9 | 251 | 88,7 | 271 | 83,0 |
| 152 | 0,0 | 172 | 41,5 | 192 | 39,4 | 212 | 75,6 | 232 | 87,9 | 252 | 87,9 | 272 | 83,4 |
| 153 | 0,0 | 173 | 42,5 | 193 | 43,9 | 213 | 75,6 | 233 | 88,2 | 253 | 87,2 | 273 | 83,8 |
| 154 | 0,0 | 174 | 41,4 | 194 | 49,1 | 214 | 76,0 | 234 | 88,7 | 254 | 86,9 | 274 | 84,5 |
| 155 | 0,0 | 175 | 40,4 | 195 | 53,9 | 215 | 76,3 | 235 | 89,3 | 255 | 86,4 | 275 | 85,3 |
| 156 | 0,0 | 176 | 39,8 | 196 | 58,3 | 216 | 77,1 | 236 | 89,6 | 256 | 86,3 | 276 | 86,1 |
| 157 | 0,0 | 177 | 40,2 | 197 | 60,0 | 217 | 78,1 | 237 | 90,3 | 257 | 86,7 | 277 | 86,9 |
| 158 | 0,0 | 178 | 40,6 | 198 | 63,2 | 218 | 79,0 | 238 | 90,6 | 258 | 86,9 | 278 | 88,4 |
| 159 | 0,0 | 179 | 40,9 | 199 | 65,2 | 219 | 79,7 | 239 | 91,1 | 259 | 87,1 | 279 | 89,2 |

S = speed (km/h)
t = time (s)

| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 280 | 89,5 | 300 | 79,0 | 320 | 44,3 | 340 | 0,0 | 360 | 49,0 | 380 | 58,7 | 400 | 0,0 |
| 281 | 90,1 | 301 | 78,2 | 321 | 39,9 | 341 | 0,0 | 361 | 50,9 | 381 | 58,6 | 401 | 0,0 |
| 282 | 90,1 | 302 | 77,4 | 322 | 34,6 | 342 | 0,0 | 362 | 51,7 | 382 | 57,9 | 402 | 0,0 |
| 283 | 89,8 | 303 | 76,0 | 323 | 32,3 | 343 | 0,0 | 363 | 52,3 | 383 | 56,5 | 403 | 4,2 |
| 284 | 88,8 | 304 | 74,2 | 324 | 30,7 | 344 | 0,0 | 364 | 54,1 | 384 | 54,9 | 404 | 9,5 |
| 285 | 87,7 | 305 | 72,4 | 325 | 29,8 | 345 | 0,0 | 365 | 55,5 | 385 | 53,9 | 405 | 14,5 |
| 286 | 86,3 | 306 | 70,5 | 326 | 27,4 | 346 | 0,0 | 366 | 55,7 | 386 | 50,5 | 406 | 20,1 |
| 287 | 84,5 | 307 | 68,6 | 327 | 24,9 | 347 | 1,6 | 367 | 56,2 | 387 | 46,7 | 407 | 25,4 |
| 288 | 82,9 | 308 | 66,8 | 328 | 20,1 | 348 | 6,9 | 368 | 56,0 | 388 | 41,4 | 408 | 30,7 |
| 289 | 82,9 | 309 | 64,9 | 329 | 17,4 | 349 | 12,2 | 369 | 55,5 | 389 | 37,0 | 409 | 36,0 |
| 290 | 82,9 | 310 | 62,0 | 330 | 12,9 | 350 | 17,5 | 370 | 55,8 | 390 | 32,7 | 410 | 40,2 |
| 291 | 82,2 | 311 | 59,5 | 331 | 7,6 | 351 | 22,9 | 371 | 57,1 | 391 | 28,2 | 411 | 41,2 |
| 292 | 80,6 | 312 | 56,6 | 332 | 2,3 | 352 | 27,8 | 372 | 57,9 | 392 | 23,3 | 412 | 44,3 |
| 293 | 80,5 | 313 | 54,4 | 333 | 0,0 | 353 | 32,2 | 373 | 57,9 | 393 | 19,3 | 413 | 46,7 |
| 294 | 80,6 | 314 | 52,3 | 334 | 0,0 | 354 | 36,2 | 374 | 57,9 | 394 | 14,0 | 414 | 48,3 |
| 295 | 80,5 | 315 | 50,7 | 335 | 0,0 | 355 | 38,1 | 375 | 57,9 | 395 | 8,7 | 415 | 48,4 |
| 296 | 79,8 | 316 | 49,2 | 336 | 0,0 | 356 | 40,6 | 376 | 57,9 | 396 | 3,4 | 416 | 48,3 |
| 297 | 79,7 | 317 | 49,1 | 337 | 0,0 | 357 | 42,8 | 377 | 57,9 | 397 | 0,0 | 417 | 47,8 |
| 298 | 79,7 | 318 | 48,3 | 338 | 0,0 | 358 | 45,2 | 378 | 58,1 | 398 | 0,0 | 418 | 47,2 |
| 299 | 79,7 | 319 | 46,7 | 339 | 0,0 | 359 | 46,3 | 379 | 58,6 | 399 | 0,0 | 419 | 46,3 |
| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
| 420 | 45,1 | 440 | 0,0 | 460 | 54,1 | 480 | 56,6 | 500 | 21,2 | 520 | 25,7 | 540 | 40,6 |
| 421 | 40,2 | 441 | 0,0 | 461 | 56,0 | 481 | 56,3 | 501 | 16,6 | 521 | 28,5 | 541 | 40,2 |
| 422 | 34,9 | 442 | 0,0 | 462 | 56,5 | 482 | 56,5 | 502 | 11,6 | 522 | 30,6 | 542 | 40,2 |
| 423 | 29,6 | 443 | 0,0 | 463 | 57,3 | 483 | 56,6 | 503 | 6,4 | 523 | 32,3 | 543 | 40,2 |
| 424 | 24,3 | 444 | 0,0 | 464 | 58,1 | 484 | 57,1 | 504 | 1,6 | 524 | 33,6 | 544 | 39,3 |
| 425 | 19,0 | 445 | 0,0 | 465 | 57,9 | 485 | 56,6 | 505 | 0,0 | 525 | 35,4 | 545 | 37,2 |
| 426 | 13,7 | 446 | 0,0 | 466 | 58,1 | 486 | 56,3 | 506 | 0,0 | 526 | 37,0 | 546 | 31,9 |
| 427 | 8,4 | 447 | 0,0 | 467 | 58,3 | 487 | 56,3 | 507 | 0,0 | 527 | 38,3 | 547 | 26,6 |
| 428 | 3,1 | 448 | 5,3 | 468 | 57,9 | 488 | 56,3 | 508 | 0,0 | 528 | 39,4 | 548 | 21,2 |
| 429 | 0,0 | 449 | 10,6 | 469 | 57,5 | 489 | 56,0 | 509 | 0,0 | 529 | 40,1 | 549 | 15,9 |
| 430 | 0,0 | 450 | 15,9 | 470 | 57,9 | 490 | 55,7 | 510 | 0,0 | 530 | 40,2 | 550 | 10,6 |
| 431 | 0,0 | 451 | 21,2 | 471 | 57,9 | 491 | 55,8 | 511 | 1,9 | 531 | 40,2 | 551 | 5,3 |
| 432 | 0,0 | 452 | 26,6 | 472 | 57,3 | 492 | 53,9 | 512 | 5,6 | 532 | 40,2 | 552 | 0,0 |
| 433 | 0,0 | 453 | 31,0 | 473 | 57,1 | 493 | 51,5 | 513 | 8,9 | 533 | 40,2 | 553 | 0,0 |
| 434 | 0,0 | 454 | 37,2 | 474 | 57,0 | 494 | 46,4 | 514 | 10,5 | 534 | 40,2 | 554 | 0,0 |
| 435 | 0,0 | 455 | 42,5 | 475 | 56,6 | 495 | 45,1 | 515 | 13,7 | 535 | 40,2 | 555 | 0,0 |
| 436 | 0,0 | 456 | 44,7 | 476 | 56,6 | 496 | 41,0 | 516 | 15,4 | 536 | 41,2 | 556 | 0,0 |
| 437 | 0,0 | 457 | 46,8 | 477 | 56,6 | 497 | 36,2 | 517 | 16,9 | 537 | 41,5 | 557 | 0,0 |
| 438 | 0,0 | 458 | 50,7 | 478 | 56,6 | 498 | 31,9 | 518 | 19,2 | 538 | 41,8 | 558 | 0,0 |
| 439 | 0,0 | 459 | 53,1 | 479 | 56,6 | 499 | 26,6 | 519 | 22,5 | 539 | 41,2 | 559 | 0,0 |

S = speed (km/h)
t = time (s)

| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 560 | 0,0 | 580 | 28,5 | 600 | 34,8 | 620 | 0,0 | 640 | 0,0 | 660 | 41,2 | 680 | 0,0 |
| 561 | 0,0 | 581 | 28,2 | 601 | 35,4 | 621 | 0,0 | 641 | 0,0 | 661 | 41,8 | 681 | 0,0 |
| 562 | 0,0 | 582 | 27,4 | 602 | 36,0 | 622 | 0,0 | 642 | 0,0 | 662 | 43,9 | 682 | 0,0 |
| 563 | 0,0 | 583 | 27,2 | 603 | 36,2 | 623 | 0,0 | 643 | 0,0 | 663 | 43,1 | 683 | 0,0 |
| 564 | 0,0 | 584 | 26,7 | 604 | 36,2 | 624 | 0,0 | 644 | 0,0 | 664 | 42,3 | 684 | 0,0 |
| 565 | 0,0 | 585 | 27,4 | 605 | 36,2 | 625 | 0,0 | 645 | 0,0 | 665 | 42,5 | 685 | 0,0 |
| 566 | 0,0 | 586 | 27,5 | 606 | 36,5 | 626 | 0,0 | 646 | 3,2 | 666 | 42,6 | 686 | 0,0 |
| 567 | 0,0 | 587 | 27,4 | 607 | 38,1 | 627 | 0,0 | 647 | 7,2 | 667 | 42,6 | 687 | 0,0 |
| 568 | 0,0 | 588 | 26,7 | 608 | 40,4 | 628 | 0,0 | 648 | 12,6 | 668 | 41,8 | 688 | 0,0 |
| 569 | 5,3 | 589 | 26,6 | 609 | 41,8 | 629 | 0,0 | 649 | 16,4 | 669 | 41,0 | 689 | 0,0 |
| 570 | 10,6 | 590 | 26,6 | 610 | 42,6 | 630 | 0,0 | 650 | 20,1 | 670 | 38,0 | 690 | 0,0 |
| 571 | 15,9 | 591 | 26,7 | 611 | 43,5 | 631 | 0,0 | 651 | 22,5 | 671 | 34,4 | 691 | 0,0 |
| 572 | 20,9 | 592 | 27,4 | 612 | 42,0 | 632 | 0,0 | 652 | 24,6 | 672 | 29,8 | 692 | 0,0 |
| 573 | 23,5 | 593 | 28,3 | 613 | 36,7 | 633 | 0,0 | 653 | 28,2 | 673 | 26,4 | 693 | 0,0 |
| 574 | 25,7 | 594 | 29,8 | 614 | 31,4 | 634 | 0,0 | 654 | 31,5 | 674 | 23,3 | 694 | 2,3 |
| 575 | 27,4 | 595 | 30,9 | 615 | 26,1 | 635 | 0,0 | 655 | 33,8 | 675 | 18,7 | 695 | 5,3 |
| 576 | 27,4 | 596 | 32,5 | 616 | 20,8 | 636 | 0,0 | 656 | 35,7 | 676 | 14,0 | 696 | 7,1 |
| 577 | 21,4 | 597 | 33,8 | 617 | 15,4 | 637 | 0,0 | 657 | 37,5 | 677 | 9,3 | 697 | 10,5 |
| 578 | 28,2 | 598 | 34,0 | 618 | 10,1 | 638 | 0,0 | 658 | 39,4 | 678 | 5,6 | 698 | 14,8 |
| 579 | 28,5 | 599 | 34,1 | 619 | 4,8 | 639 | 0,0 | 659 | 40,7 | 679 | 3,2 | 699 | 18,2 |
| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
| 700 | 21,7 | 720 | 24,1 | 740 | 41,0 | 760 | 15,1 | 780 | 44,3 | 800 | 45,1 | 820 | 50,9 |
| 701 | 23,5 | 721 | 19,3 | 741 | 42,6 | 761 | 10,0 | 781 | 45,1 | 801 | 45,9 | 821 | 50,7 |
| 702 | 26,4 | 722 | 14,5 | 742 | 43,6 | 762 | 4,8 | 782 | 45,5 | 802 | 48,3 | 822 | 49,2 |
| 703 | 26,9 | 723 | 10,0 | 743 | 44,4 | 763 | 2,4 | 783 | 46,5 | 803 | 49,9 | 823 | 48,3 |
| 704 | 26,6 | 724 | 7,2 | 744 | 44,9 | 764 | 2,4 | 784 | 46,5 | 804 | 51,5 | 824 | 48,1 |
| 705 | 26,6 | 725 | 4,8 | 745 | 45,5 | 765 | 0,8 | 785 | 46,5 | 805 | 53,1 | 825 | 48,1 |
| 706 | 29,3 | 726 | 3,4 | 746 | 46,0 | 766 | 0,0 | 786 | 46,3 | 806 | 53,1 | 826 | 48,1 |
| 707 | 30,9 | 727 | 0,8 | 747 | 46,0 | 767 | 4,8 | 787 | 45,9 | 807 | 54,1 | 827 | 48,1 |
| 708 | 32,3 | 728 | 0,8 | 748 | 45,5 | 768 | 10,1 | 788 | 45,5 | 808 | 54,7 | 828 | 47,6 |
| 709 | 34,6 | 729 | 5,1 | 749 | 45,4 | 769 | 15,4 | 789 | 45,5 | 809 | 55,2 | 829 | 47,5 |
| 710 | 36,2 | 730 | 10,5 | 750 | 45,1 | 770 | 20,8 | 790 | 45,5 | 810 | 55,0 | 830 | 47,5 |
| 711 | 36,2 | 731 | 15,4 | 751 | 44,3 | 771 | 25,4 | 791 | 45,4 | 811 | 54,7 | 831 | 47,2 |
| 712 | 35,6 | 732 | 20,1 | 752 | 43,1 | 772 | 28,2 | 792 | 44,4 | 812 | 54,7 | 832 | 46,5 |
| 713 | 36,5 | 733 | 22,5 | 753 | 41,0 | 773 | 29,6 | 793 | 44,3 | 813 | 54,6 | 833 | 45,4 |
| 714 | 37,5 | 734 | 25,7 | 754 | 37,8 | 774 | 31,4 | 794 | 44,3 | 814 | 54,1 | 834 | 44,6 |
| 715 | 37,8 | 735 | 29,0 | 755 | 34,6 | 775 | 33,3 | 795 | 44,3 | 815 | 53,3 | 835 | 43,5 |
| 716 | 36,2 | 736 | 31,5 | 756 | 30,6 | 776 | 35,4 | 796 | 44,3 | 816 | 53,1 | 836 | 41,0 |
| 717 | 34,8 | 737 | 34,6 | 757 | 26,6 | 777 | 37,3 | 797 | 44,3 | 817 | 52,3 | 837 | 38,1 |
| 718 | 33,0 | 738 | 37,2 | 758 | 24,0 | 778 | 40,2 | 798 | 44,3 | 818 | 51,5 | 838 | 35,4 |
| 719 | 29,0 | 739 | 39,4 | 759 | 20,1 | 779 | 42,6 | 799 | 44,4 | 819 | 51,3 | 839 | 33,0 |

S = speed (km/h)
t = time (s)

| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 840 | 30,9 | 860 | 46,7 | 880 | 46,8 | 900 | 43,3 | 920 | 36,4 | 940 | 40,2 | 960 | 3,2 |
| 841 | 30,9 | 861 | 46,8 | 881 | 46,7 | 901 | 42,8 | 921 | 37,7 | 941 | 39,6 | 961 | 8,5 |
| 842 | 32,3 | 862 | 46,7 | 882 | 46,5 | 902 | 42,6 | 922 | 38,6 | 942 | 39,6 | 962 | 13,8 |
| 843 | 33,6 | 863 | 45,2 | 883 | 45,9 | 903 | 42,6 | 923 | 38,9 | 943 | 38,8 | 963 | 19,2 |
| 844 | 34,4 | 864 | 44,3 | 884 | 45,2 | 904 | 42,6 | 924 | 39,3 | 944 | 39,4 | 964 | 24,5 |
| 845 | 35,4 | 865 | 43,5 | 885 | 45,1 | 905 | 42,3 | 925 | 40,1 | 945 | 40,4 | 965 | 28,2 |
| 846 | 36,4 | 866 | 41,5 | 886 | 45,1 | 906 | 42,2 | 926 | 40,4 | 946 | 41,2 | 966 | 29,9 |
| 847 | 37,3 | 867 | 40,2 | 887 | 44,4 | 907 | 42,2 | 927 | 40,6 | 947 | 40,4 | 967 | 32,2 |
| 848 | 38,6 | 868 | 39,4 | 888 | 43,8 | 908 | 41,7 | 928 | 40,7 | 948 | 38,6 | 968 | 34,0 |
| 849 | 40,2 | 869 | 39,9 | 889 | 42,8 | 909 | 41,2 | 929 | 41,0 | 949 | 35,4 | 969 | 35,4 |
| 850 | 41,8 | 870 | 40,4 | 890 | 43,5 | 910 | 41,2 | 930 | 40,6 | 950 | 32,3 | 970 | 37,0 |
| 851 | 42,8 | 871 | 41,0 | 891 | 44,3 | 911 | 41,7 | 931 | 40,2 | 951 | 27,2 | 971 | 39,4 |
| 852 | 42,8 | 872 | 41,4 | 892 | 44,7 | 912 | 41,5 | 932 | 40,3 | 952 | 21,9 | 972 | 42,3 |
| 853 | 43,1 | 873 | 42,2 | 893 | 45,1 | 913 | 41,0 | 933 | 40,2 | 953 | 16,6 | 973 | 44,3 |
| 854 | 43,5 | 874 | 43,3 | 894 | 44,7 | 914 | 39,6 | 934 | 39,8 | 954 | 11,3 | 974 | 45,2 |
| 855 | 43,8 | 875 | 44,3 | 895 | 45,1 | 915 | 37,8 | 935 | 39,4 | 955 | 6,0 | 975 | 45,7 |
| 856 | 44,7 | 876 | 44,7 | 896 | 45,1 | 916 | 35,7 | 936 | 39,1 | 956 | 0,6 | 976 | 45,9 |
| 857 | 45,2 | 877 | 45,7 | 897 | 45,1 | 917 | 34,8 | 937 | 39,1 | 957 | 0,0 | 977 | 45,9 |
| 858 | 46,3 | 878 | 46,7 | 898 | 44,6 | 918 | 34,8 | 938 | 39,4 | 958 | 0,0 | 978 | 45,9 |
| 859 | 46,5 | 879 | 47,0 | 899 | 44,1 | 919 | 34,9 | 939 | 40,2 | 959 | 0,0 | 979 | 44,6 |
| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
| 980 | 44,3 | 1000 | 37,8 | 1020 | 12,2 | 1040 | 0,0 | 1060 | 32,2 | 1080 | 29,0 | 1100 | 0,0 |
| 981 | 43,8 | 1001 | 38,6 | 1021 | 6,9 | 1041 | 0,0 | 1061 | 35,1 | 1081 | 24,1 | 1101 | 0,2 |
| 982 | 43,1 | 1002 | 39,6 | 1022 | 1,6 | 1042 | 0,0 | 1062 | 37,0 | 1082 | 19,8 | 1102 | 1,0 |
| 983 | 42,6 | 1003 | 39,9 | 1023 | 0,0 | 1043 | 0,0 | 1063 | 38,6 | 1083 | 17,9 | 1103 | 2,6 |
| 984 | 41,8 | 1004 | 40,4 | 1024 | 0,0 | 1044 | 0,0 | 1064 | 39,9 | 1084 | 17,1 | 1104 | 5,8 |
| 985 | 41,4 | 1005 | 41,0 | 1025 | 0,0 | 1045 | 0,0 | 1065 | 41,2 | 1085 | 16,1 | 1105 | 11,1 |
| 986 | 40,6 | 1006 | 41,2 | 1026 | 0,0 | 1046 | 0,0 | 1066 | 42,6 | 1086 | 15,3 | 1106 | 16,1 |
| 987 | 38,6 | 1007 | 41,0 | 1027 | 0,0 | 1047 | 0,0 | 1067 | 43,1 | 1087 | 14,6 | 1107 | 20,6 |
| 988 | 35,4 | 1008 | 40,2 | 1028 | 0,0 | 1048 | 0,0 | 1068 | 44,1 | 1088 | 14,0 | 1108 | 22,5 |
| 989 | 34,6 | 1009 | 38,8 | 1029 | 0,0 | 1049 | 0,0 | 1069 | 44,9 | 1089 | 13,8 | 1109 | 23,3 |
| 990 | 34,6 | 1010 | 38,1 | 1030 | 0,0 | 1050 | 0,0 | 1070 | 45,5 | 1090 | 14,2 | 1110 | 25,7 |
| 991 | 35,1 | 1011 | 37,3 | 1031 | 0,0 | 1051 | 0,0 | 1071 | 45,1 | 1091 | 14,5 | 1111 | 29,1 |
| 992 | 36,2 | 1012 | 36,9 | 1032 | 0,0 | 1052 | 0,0 | 1072 | 44,3 | 1092 | 14,0 | 1112 | 32,2 |
| 993 | 37,0 | 1013 | 36,2 | 1033 | 0,0 | 1053 | 1,9 | 1073 | 43,5 | 1093 | 13,8 | 1113 | 33,8 |
| 994 | 36,7 | 1014 | 35,4 | 1034 | 0,0 | 1054 | 6,4 | 1074 | 43,5 | 1094 | 12,9 | 1114 | 34,1 |
| 995 | 36,7 | 1015 | 34,8 | 1035 | 0,0 | 1055 | 11,7 | 1075 | 42,3 | 1095 | 11,3 | 1115 | 34,3 |
| 996 | 37,0 | 1016 | 33,0 | 1036 | 0,0 | 1056 | 17,1 | 1076 | 39,4 | 1096 | 8,0 | 1116 | 34,4 |
| 997 | 36,5 | 1017 | 28,2 | 1037 | 0,0 | 1057 | 22,4 | 1077 | 36,2 | 1097 | 6,8 | 1117 | 34,9 |
| 998 | 36,5 | 1018 | 22,9 | 1038 | 0,0 | 1058 | 27,4 | 1078 | 34,6 | 1098 | 4,2 | 1118 | 36,2 |
| 999 | 36,5 | 1019 | 17,5 | 1039 | 0,0 | 1059 | 29,8 | 1079 | 33,2 | 1099 | 1,6 | 1119 | 37,0 |

S = speed (km/h)
t = time (s)

| t | S | t | S | t | S | t | S | t | S | t | S | t | S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1120 | 38,3 | 1140 | 41,8 | 1160 | 0,0 | 1180 | 32,2 | 1200 | 10,5 | 1220 | 34,6 | 1240 | 9,7 |
| 1121 | 39,4 | 1141 | 41,0 | 1161 | 0,0 | 1181 | 26,9 | 1201 | 15,8 | 1221 | 35,1 | 1241 | 6,4 |
| 1122 | 40,2 | 1142 | 39,6 | 1162 | 0,0 | 1182 | 21,6 | 1202 | 19,3 | 1222 | 35,4 | 1242 | 4,0 |
| 1123 | 40,1 | 1143 | 37,8 | 1163 | 0,0 | 1183 | 16,3 | 1203 | 20,8 | 1223 | 35,2 | 1243 | 1,1 |
| 1124 | 39,9 | 1144 | 34,6 | 1164 | 0,0 | 1184 | 10,9 | 1204 | 20,9 | 1224 | 34,9 | 1244 | 0,0 |
| 1125 | 40,2 | 1145 | 32,2 | 1165 | 0,0 | 1185 | 5,6 | 1205 | 20,3 | 1225 | 34,6 | 1245 | 0,0 |
| 1126 | 40,9 | 1146 | 28,2 | 1166 | 0,0 | 1186 | 0,3 | 1206 | 20,6 | 1226 | 34,6 | 1246 | 0,0 |
| 1127 | 41,5 | 1147 | 25,7 | 1167 | 0,0 | 1187 | 0,0 | 1207 | 21,1 | 1227 | 34,4 | 1247 | 0,0 |
| 1128 | 41,8 | 1148 | 22,5 | 1168 | 0,0 | 1188 | 0,0 | 1208 | 21,1 | 1228 | 32,3 | 1248 | 0,0 |
| 1129 | 42,5 | 1149 | 17,2 | 1169 | 3,4 | 1189 | 0,0 | 1209 | 22,5 | 1229 | 31,4 | 1249 | 0,0 |
| 1130 | 42,8 | 1150 | 11,9 | 1170 | 8,7 | 1190 | 0,0 | 1210 | 24,9 | 1230 | 30,9 | 1250 | 0,0 |
| 1131 | 43,3 | 1151 | 6,6 | 1171 | 14,0 | 1191 | 0,0 | 1211 | 27,4 | 1231 | 31,5 | 1251 | 0,0 |
| 1132 | 43,5 | 1152 | 1,3 | 1172 | 19,3 | 1192 | 0,0 | 1212 | 29,9 | 1232 | 31,9 | 1252 | 1,6 |
| 1133 | 43,5 | 1153 | 0,0 | 1173 | 24,6 | 1193 | 0,0 | 1213 | 31,7 | 1233 | 32,2 | 1253 | 1,6 |
| 1134 | 43,5 | 1154 | 0,0 | 1174 | 29,9 | 1194 | 0,0 | 1214 | 33,8 | 1234 | 31,4 | 1254 | 1,6 |
| 1135 | 43,3 | 1155 | 0,0 | 1175 | 34,0 | 1195 | 0,0 | 1215 | 34,6 | 1235 | 28,2 | 1255 | 1,6 |
| 1136 | 43,1 | 1156 | 0,0 | 1176 | 37,0 | 1196 | 0,0 | 1216 | 35,1 | 1236 | 24,9 | 1256 | 1,6 |
| 1137 | 43,1 | 1157 | 0,0 | 1177 | 37,8 | 1197 | 0,3 | 1217 | 35,1 | 1237 | 20,9 | 1257 | 2,6 |
| 1138 | 42,6 | 1158 | 0,0 | 1178 | 37,0 | 1198 | 2,4 | 1218 | 34,6 | 1238 | 16,1 | 1258 | 4,8 |
| 1139 | 42,5 | 1159 | 0,0 | 1179 | 36,2 | 1199 | 5,6 | 1219 | 34,1 | 1239 | 12,9 | 1259 | 6,4 |
| t | S | t | S | t | S | t | S | t | S | t | S | | |
| 1260 | 8,0 | 1280 | 39,4 | 1300 | 45,5 | 1320 | 0,0 | 1340 | 13,0 | 1360 | 26,6 | | |
| 1261 | 10,1 | 1281 | 38,6 | 1301 | 46,7 | 1321 | 0,0 | 1341 | 18,3 | 1361 | 24,9 | | |
| 1262 | 12,9 | 1282 | 37,8 | 1302 | 46,8 | 1322 | 0,0 | 1342 | 21,2 | 1362 | 22,5 | | |
| 1263 | 16,1 | 1283 | 37,8 | 1303 | 46,7 | 1323 | 0,0 | 1343 | 24,3 | 1363 | 17,7 | | |
| 1264 | 16,9 | 1284 | 37,8 | 1304 | 45,1 | 1324 | 0,0 | 1344 | 27,0 | 1364 | 12,9 | | |
| 1265 | 15,3 | 1285 | 37,8 | 1305 | 39,8 | 1325 | 0,0 | 1345 | 29,5 | 1365 | 6,4 | | |
| 1266 | 13,7 | 1286 | 37,8 | 1306 | 34,4 | 1326 | 0,0 | 1346 | 31,4 | 1366 | 4,0 | | |
| 1267 | 12,2 | 1287 | 37,8 | 1307 | 29,1 | 1327 | 0,0 | 1347 | 32,7 | 1367 | 0,0 | | |
| 1268 | 14,2 | 1288 | 38,6 | 1308 | 23,8 | 1328 | 0,0 | 1346 | 34,3 | 1368 | 0,0 | | |
| 1269 | 17,7 | 1289 | 38,8 | 1309 | 18,5 | 1329 | 0,0 | 1349 | 35,2 | 1369 | 0,0 | | |
| 1270 | 22,5 | 1290 | 39,4 | 1310 | 13,2 | 1330 | 0,0 | 1350 | 35,6 | 1370 | 0,0 | | |
| 1271 | 27,4 | 1291 | 39,8 | 1311 | 7,9 | 1331 | 0,0 | 1351 | 36,0 | 1371 | 0,0 | | |
| 1272 | 31,4 | 1292 | 40,2 | 1312 | 2,6 | 1332 | 0,0 | 1352 | 35,4 | | | | |
| 1273 | 33,8 | 1293 | 40,9 | 1313 | 0,0 | 1333 | 0,0 | 1353 | 34,8 | | | | |
| 1274 | 35,1 | 1294 | 41,2 | 1314 | 0,0 | 1334 | 0,0 | 1354 | 34,0 | | | | |
| 1275 | 35,7 | 1295 | 41,4 | 1315 | 0,0 | 1335 | 0,0 | 1355 | 33,0 | | | | |
| 1276 | 37,0 | 1296 | 41,8 | 1316 | 0,0 | 1336 | 0,0 | 1356 | 32,2 | | | | |
| 1277 | 38,0 | 1297 | 42,2 | 1317 | 0,0 | 1337 | 0,0 | 1357 | 31,5 | | | | |
| 1278 | 38,8 | 1298 | 43,5 | 1318 | 0,0 | 1338 | 2,4 | 1358 | 29,8 | | | | |
| 1279 | 39,4 | 1299 | 44,7 | 1319 | 0,0 | 1339 | 7,7 | 1359 | 28,2 | | | | |

S = speed (km/h)
t = time (s)

*APPENDIX 2*

## CHASSIS DYNAMOMETER

1. DEFINITION

1.1. id. 1.1, Appendix 2, Annex III, but replace '10 to 50 km/h' by '10 to 80,5 km/h'.

2. METHOD OF CALIBRATING THE DYNAMOMETER

2.1. id. 2.1, Appendix 2, Annex III.

2.2. Calibrating the power indicator to 80,5 km/h.

2.2.1. The dynamometer shall be calibrated at least once each month or performance verified at least once each week and then calibrate as required. The calibration shall consist of the manufacturer's recommended calibration procedure plus a determination of the dynamometer frictional power absorption at 80,5 km/h. One method for determining dynamometer frictional power absorption at 80,5 km/h is described below, other methods may be used if shown to yield equivalent results. The measured absorbed road power includes the dynamometer friction as well as the power absorbed by the power absorption unit. The dynamometer is driven above the test speed range. The device used to drive the dynamometer is then disengaged from the dynamometer and the roll(s) is (are) allowed to coast down. The kinetic energy of the system is dissipated by the dynamometer. This method neglects the variations in roll bearing friction due to the drive axle weight of the vehicle. The inertia of the free (rear) roll may be neglected in the case of dynamometers with paired rolls.

2.2.1.1. Devise a method to determine the speed of the drive roll if it has not already been measured. A fifth wheel, revolution pickup, or other suitable means may be used.

2.2.1.2. Place a vehicle on the dynamometer or devise another method of driving the dynamometer.

2.2.1.3. Engage the inertial flywheel or other inertial simulation system for the most common vehicle mass category for which the dynamometer is used. In addition other vehicle mass categories may be calibrated, if desired.

2.2.1.4. Drive the dynamometer up to 80,5 km/h.

2.2.1.5. Record indicated road power.

2.2.1.6. Drive the dynamometer up to 96,9 km/h.

2.2.1.7. Disengage the device used to drive the dynamometer.

2.2.1.8. Record the time for the dynamometer drive roll to coast down from 88,5 km/h to 72,4 km/h.

2.2.1.9. Adjust the power absorption unit to a different level.

2.2.1.10. Repeat steps 2.2.1 to 2.2.1.9 above sufficient times to cover the range of road power used.

2.2.1.11. Calculate absorbed road power. See paragraph 2.2.3 of this section.

2.2.1.12. Plot indicated road load power at 80,5 km/h vs. road load power as shown in Figure A.

2.2.2. The performance check consists of conducting a dynamometer coastdown at one or more inertia-horsepower settings and comparing the coastdown time to that recorded during the last calibration. If the coastdown times differ by more than 1 s a new calibration is required.

2.2.3. Calculations. The road load power actually absorbed by the dynamometer is calculated from the following equation:

$$Pa = W \frac{V_1^2 - V_2^2}{2\,000\,t}$$

Pa = Power, kilowatt
W = Equivalent inertia, kg
$V_1$ = Initial velocity (m/s)
$V_2$ = Final velocity (m/s)
t = elapsed time for rolls to coast from 88,5 to 72,4 km/h

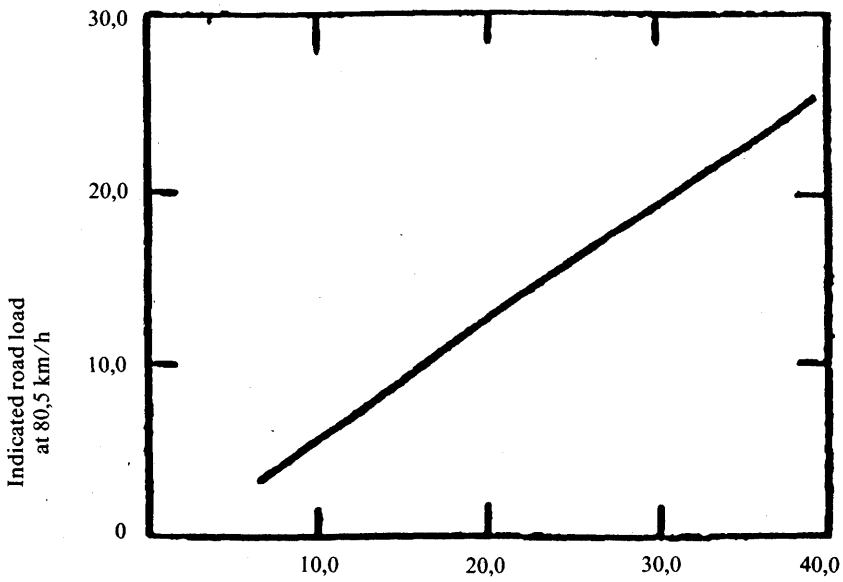



Figure A: *Road load — Actual vs. Indicated*

2.3. id. 2.3, Appendix 2, Annex III.

2.4. Deleted.

3. SETTING OF THE DYNAMOMETER

3.1. **Vacuum method:** id 3.1, Appendix 2, Annex III, but replace 'at the speed of 50 km/h' by 'at the speed of 80,5 km/h'.

3.2. **Other setting method:** id. 3.2, Appendix 2, Annex III, but replace 'at the speed of 50 km/h' by 'at the speed of 80,5 km/h'.

3.3. **Alternative method**

3.3.1. The power absorption unit shall be adjusted to reproduce road load power at 80,5 km/h true speed. The dynamometer power absorption shall take into account the dynamometer friction.

3.3.2. The dynamometer road load setting is determined from the equivalent test weight, the reference frontal area, the body shape, the vehicle protuberances and the fire type by the following equations.

3.3.2.1. For light-duty vehicles to be tested on a twin roll dynamometer.

$$P_A\,(kW) = 0{,}746 \left[ aA + P - \frac{tW}{0{,}454} \right]$$

where: $P_A$ = The dynamometer power absorber setting at 80,5 km/h (horsepower)

A = The vehicle reference frontal area ($m^2$). The vehicle reference frontal area is defined as the area of the orthogonal projection of the vehicle including tyres and suspension components, but excluding vehicle protuberances, on to a plane perpendicular to both the longitudinal plane of the vehicle and the surface upon which the vehicle is positioned. Measurements of this area shall be computed to the nearest hundredth of a square metre using a method approved in advance by the administrator.

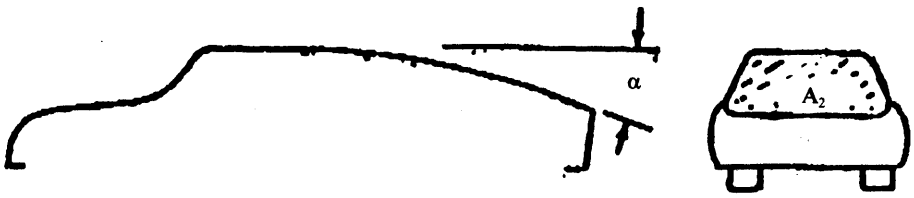
P = the protuberance power correction factor from Table 1 of this paragraph (horsepower)

W = vehicle equivalent test weight (kg)

a = 0,43 for fastback-shaped vehicles; = 0,50 for all other light-duty vehicles

t = 0,0 for vehicles equipped with radical ply tyres = 3 × 10 for all other vehicles

A vehicle is considered to have a fastback shape if the rearward projection of that portion of the rear surface ($A_2$) which slopes at an angle of less than 20° from the horizontal is at least 25 % as large as the vehicle reference frontal area. In addition, this surface must be smooth, continuous, and free from any local transitions greater than 4°. An example of a fastback shape is presented in Figure1.




Side view $\alpha < 20°$ $A_2 > 0,25\ A$ Rear view

*Figure 1*

TABLE 1

**Protuberance power, P, versus total protuberance frontal area, $A_2$**

| A | P (horsepower) |
|---|---|
| A 0,30 | 0,0 |
| 0,30 A 0,60 | ,40 |
| 0,60 A 0,90 | ,70 |
| 0,90 A 1,20 | 1,00 |
| 1,20 A 1,50 | 1,30 |
| 1,50 A 1,80 | 1,50 |
| 1,80 A 2,10 | 1,90 |
| 2,10 A 2,40 | 2,20 |
| 2,40 A 2,70 | 2,50 |
| 2,70 A 3,00 | 2,80 |
| 3,00 A | 3,10 |

The protuberance frontal area, $A_2$, is defined in a manner analogous to the definition of the vehicle reference frontal area, i. e. the total area of the orthogonal projections of the vehicle mirrors, hand ornaments, roof racks, and other protuberance onto a plane(s) perpendicular to both the longitudinal plane of the vehicle and the surface upon which the vehicle is positioned. A protuberance is defined as any fixture attached to the vehicle protruding more than 2,54 cm from the vehicle surface and having a projected area greater than 0,00093 $m^2$ with the area calculated by a method approved in advance by the administrator. Included in the total protuberance frontal area shall be all fixtures which occur as standard equipment. The area of any optional equipment shall also be included if it is expected that more than 33 % of the car line sold will be equipped with this option.

3.3.2.2. The dynamometer power absorber setting for light-duty vehicles shall be rounded to the nearest 0,1 kilowatt.

3.3.2.3. For light-duty vehicles to be tested on a single, large roll dynamometer.

$$P_A\,(kW) = \left[aA + P + (5{,}0 \times 10^{-4} + 0{,}33\,t\,\frac{W}{0{,}454})\right] 0{,}746$$

All symbols in the above equation are defined in paragraph 3.3.2.1 of this section.

*APPENDIX 3*

**RESISTANCE TO PROGRESS OF A VEHICLE — MEASUREMENT METHOD ON THE ROAD SIMULATION ON A CHASSIS DYNAMOMETER**

id. Appendix 3, Annex III

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*APPENDIX 4*

**VERIFICATION OF INERTIAS OTHER THAN MECHANICAL**

id. Appendix 4, Annex III

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*APPENDIX 5*

**DEFINITION OF GAS SAMPLING SYSTEMS**

id. Appendix 5, Annex III, but six bags (instead of two) are necessary on the CVS

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*APPENDIX 6*

**METHOD OF CALIBRATING THE EQUIPMENT**

id. Appendix 6, Annex III

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*APPENDIX 7*

**TOTAL SYSTEM VERIFICATION**

id. Appendix 7, Annex III

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*APPENDIX 8*

**CALCULATION OF THE MASS EMISSIONS OF POLLUTANTS**

The mass emissions of pollutants are calculated by the following equation:

$$M_i = 0{,}43 \frac{M_{icT}\, M_{is}}{S_{cT} + S_s} + 0{,}57 \frac{M_{iHT} + M_{is}}{S_{HT} + S_s}$$

where:

$M_i$ = mass emission of the pollutant i in grams per test

$M_{icT}$ = mass emission of the pollutant i in grams during the first phase (transient cold)

$M_{iHT}$ = mass emission of the pollutant i in grams during the last phase (transient hot)

$M_{is}$ = mass emission of the pollutant i in grams during the second phase (stabilized)

$S_{cT}$ = distance (in km) which has been run during the first phase

$S_{HT}$ = distance (in km) which has been run during the last phase

$S_s$ = distance (in km) which has been run during the second phase

The mass emissions of pollutants are calculated by means of the following:

$$M_i = V_{mix} \times Q_i \times k_H \times C_i \times 10^{-6}$$

where:

$M_i$ = mass emission of the pollutant i in grams per phase

$V_{mix}$ = volume of the diluted exhaust gas expressed in litres per phase and corrected to standard conditions (273,2 K and 101,33 kPa)

$Q_i$ = density of the pollutant i in grams per litres at normal temperature and pressure (273,2 K and 101,33 kPa)

$k_H$ = humidity correction factor used for the calculation of the mass emissions of oxides of nitrogen. There is no humidity correction for HC and CO

$C_i$ = concentration of the pollutant i in the diluted exhaust gas expressed in ppm and corrected by the amount of the pollutant i contained in the dilution air

1. VOLUME DETERMINATION

1.1.

1.2. id 1.1 to 1.3 Appendix 8, Annex III (but replace 'test' by 'phase').

1.3.

2. CALCULATION OF THE CORRECTED CONCENTRATION OF POLLUTANTS IN THE SAMPLING BAG

id 2. Appendix 8, Annex III.

3. DETERMINATION OF THE NO-HUMIDITY CORRECTION FACTOR

id 3 Appendix 8, Annex III.

4. HC MEASUREMENTS WITH DIESEL ENGINES

4.1. id 4.3 Appendix 8, Annex III.

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## Proposal for a Council Directive on the dumping of waste at sea

*COM(85) 373 final*

*(Submitted by the Commission to the Council on 13 August 1985)*

(85/C 245/02)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Articles 100 and 235 thereof,

Having regard to the proposal from the Commission,

Having regard to the opinion of the European Parliament,

Having regard to the opinion of the Economic and Social Committee,

Whereas the Declaration of the Council of the European Communities and of the Representatives of the Governments of the Member States meeting within the Council of 22 November 1973, calls for the implementation of a European Community action programme on the environment (1);

Whereas this action programme was renewed and extended for 1977 to 1981 and 1982 to 1986 by the resolutions of the Council and of the Representatives of the

(1) OJ No C 112, 20. 12. 1973, p. 1.