UN Regulation No.83-05

◆ Type II test
(Carbon monoxide emission test at idling speed)
◆ Type III test
(Verifying emissions of crankcase gases)

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JAPAN AUTOMOBILE STANDARDS INTERNATIONALIZATION CENTER

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Regulation 5: Specifications and tests

5.3. Description of tests

5.3.2. Type II test (Carbon monoxide emission test at idling speed)

5.3.2.1. This test is carried out on all vehicles powered by positive ignition engines, as follows:

5.3.2.1.1. Vehicles that can be fuelled either with petrol or with LPG or NG/biomethane shall be tested in the Type II test on both fuels.

5.3.2.1.2. Notwithstanding the requirement of paragraph 5.3.2.1.1., vehicles that can be fuelled with either petrol or a gaseous fuel, but where the petrol system is fitted for emergency purposes or starting only and which the petrol tank cannot contain more than 15 litres of petrol will be regarded for the Type II test as vehicles that can only run on a gaseous fuel.

5.3.2.2. For the Type II test set out in Annex 5 to this Regulation, at normal engine idling speed, the maximum permissible carbon monoxide content in the exhaust gases shall be that stated by the vehicle manufacturer. However, the maximum carbon monoxide content shall not exceed 0.3 per cent vol.

At high idle speed, the carbon monoxide content by volume of the exhaust gases shall not exceed 0.2 per cent, with the engine speed being at least 2,000 min-1 and Lambda being 1 ± 0.03 or in accordance with the specifications of the manufacturer.

Explanation of the UNR83-05

Annex 5

TYPE II TEST

(Carbon monoxide emission test at idling speed)

1. **Introduction**

This annex describes the procedure for the Type II test defined in paragraph 5.3.2. of this Regulation.

2. **Conditions of measurement**

2.1. The fuel shall be the reference fuel, specifications for which are given in Annexes 10 and 10a to this Regulation.

2.2. During the test, the environmental temperature shall be between 293 and 303 K (20 and 30 ° C). The engine shall be warmed up until all temperatures of cooling and lubrication means and the pressure of lubrication means have reached equilibrium.

2.2.1. Vehicles that are fuelled either with petrol or with LPG or NG/biomethane shall be tested with the reference fuel(s) used for the Type I test.

2.3. In the case of vehicles with manually-operated or semi-automatic-shift gearboxes, the test shall be carried out with the gear lever in the "neutral" position and with the clutch engaged.

2.4. In the case of vehicles with automatic-shift gearboxes, the test shall be carried out with the gear selector in either the "neutral" or the "parking" position.

2.5. Components for adjusting the idling speed

2.5.1.	Definition
	For the purposes of this Regulation, "components for adjusting the idling speed" means controls for changing the idling conditions of the engine which may be easily operated by a mechanic using only the tools described in paragraph 2.5.1.1. of this annex. In particular, devices for calibrating fuel and air flows are not considered as adjustment components if their setting requires the removal of the set-stops, an operation which cannot normally be performed except by a professional mechanic.
2.5.1.1.	Tools which may be used to control components for adjusting the idling speed: screwdrivers (ordinary or cross-headed), spanners (ring, open-end or adjustable), pliers, Allen keys.
2.5.2.	Determination of measurement points
2.5.2.1.	A measurement at the setting in accordance with the conditions fixed by the manufacturer is performed first;
2.5.2.2.	For each adjustment component with a continuous variation, a sufficient number of characteristic positions shall be determined.
2.5.2.3.	The measurement of the carbon-monoxide content of exhaust gases shall be carried out for all the possible positions of the adjustment components, but for components with a continuous variation only the positions defined in paragraph 2.5.2.2. of this annex shall be adopted.

2.5.2.4.	The Type II test shall be considered satisfactory if one or both of the two following conditions is met:
2.5.2.4.1.	None of the values measured in accordance with paragraph 2.5.2.3. of this annex exceed the limit values;
2.5.2.4.2.	The maximum content obtained by continuously varying one of the adjustment components while the other components are kept stable does not exceed the limit value, this condition being met for the various combinations of adjustment components other than the one which was varied continuously.
2.5.2.5.	The possible positions of the adjustment components shall be limited:
2.5.2.5.1.	On the one hand, by the larger of the following two values: the lowest idling speed which the engine can reach; the speed recommended by the manufacturer, minus 100 revolutions per minute;
2.5.2.5.2.	On the other hand, by the smallest of the following three values:
	The highest speed the engine can attain by activation of the idling speed components;
	The speed recommended by the manufacturer, plus 250 revolutions per minute;
	The cut-in speed of automatic clutches.
2.5.2.6.	In addition, settings incompatible with correct running of the engine shall not be adopted as measurement settings. In particular, when the engine is equipped with several carburettors all the carburettors shall have the same setting.

3. **Sampling of gases**

3.1. The sampling probe shall be inserted into the exhaust pipe to a depth of at least 300 mm into the pipe connecting the exhaust with the sampling bag and as close as possible to the exhaust.

3.2. The concentration in CO (CCO) and CO2 (CCO2) shall be determined from the measuring instrument readings or recordings, by use of appropriate calibration curves.

3.3. The corrected concentration for carbon monoxide regarding four-stroke engines is:

$$C_{CO\,corr} = C_{CO} \frac{15}{C_{CO} + C_{CO2}} \text{ (per cent vol.)}$$

3.4. The concentration in CCO (see paragraph 3.2. of this annex) measured according to the formulae contained in paragraph 3.3. of this annex need not be corrected if the total of the concentrations measured (CCO + CCO2) is for four-stroke engines at least:

(a)	For petrol	15 per cent
(b)	For LPG	13.5 per cent
(c)	For NG/biomethane	11.5 per cent

Regulation 5: Specifications and tests

5.3. Description of tests

5.3.3. Type III test (Verifying emissions of crankcase gases)

5.3.3.1. This test shall be carried out on all vehicles referred to in paragraph 1. except those having compression-ignition engines.

5.3.3.1.1. Vehicles that can be fuelled either with petrol or with LPG or NG should be tested in the Type III test on petrol only.

5.3.3.1.2. Notwithstanding the requirement of paragraph 5.3.3.1.1., vehicles that can be fuelled with either petrol or a gaseous fuel, but where the petrol system is fitted for emergency purposes or starting only and which the petrol tank cannot contain more than 15 litres of petrol will be regarded for the Type III test as vehicles that can only run on a gaseous fuel.

5.3.3.2. When tested in accordance with Annex 6 to this Regulation, the engine's crankcase ventilation system shall not permit the emission of any of the crankcase gases into the atmosphere.

Explanation of the UNR83-05

Annex 6

TYPE III TEST

(verifying emissions of crankcase gases)

1. **Introduction**

This annex describes the procedure for the Type III Test defined in paragraph 5.3.3. of this Regulation.

2. **General provisions**

2.1. The Type III test shall be carried out on a vehicle with positive- ignition engine, which has been, subjected to the Type I and the Type II test, as applicable.

2.2. The engines tested shall include leak-proof engines other than those so designed that even a slight leak may cause unacceptable operating faults (such as flat-twin engines).

3. **Test conditions**

3.1. Idling shall be regulated in conformity with the manufacturer's recommendations.

3.2. The measurement shall be performed in the following three sets of conditions of engine operation:

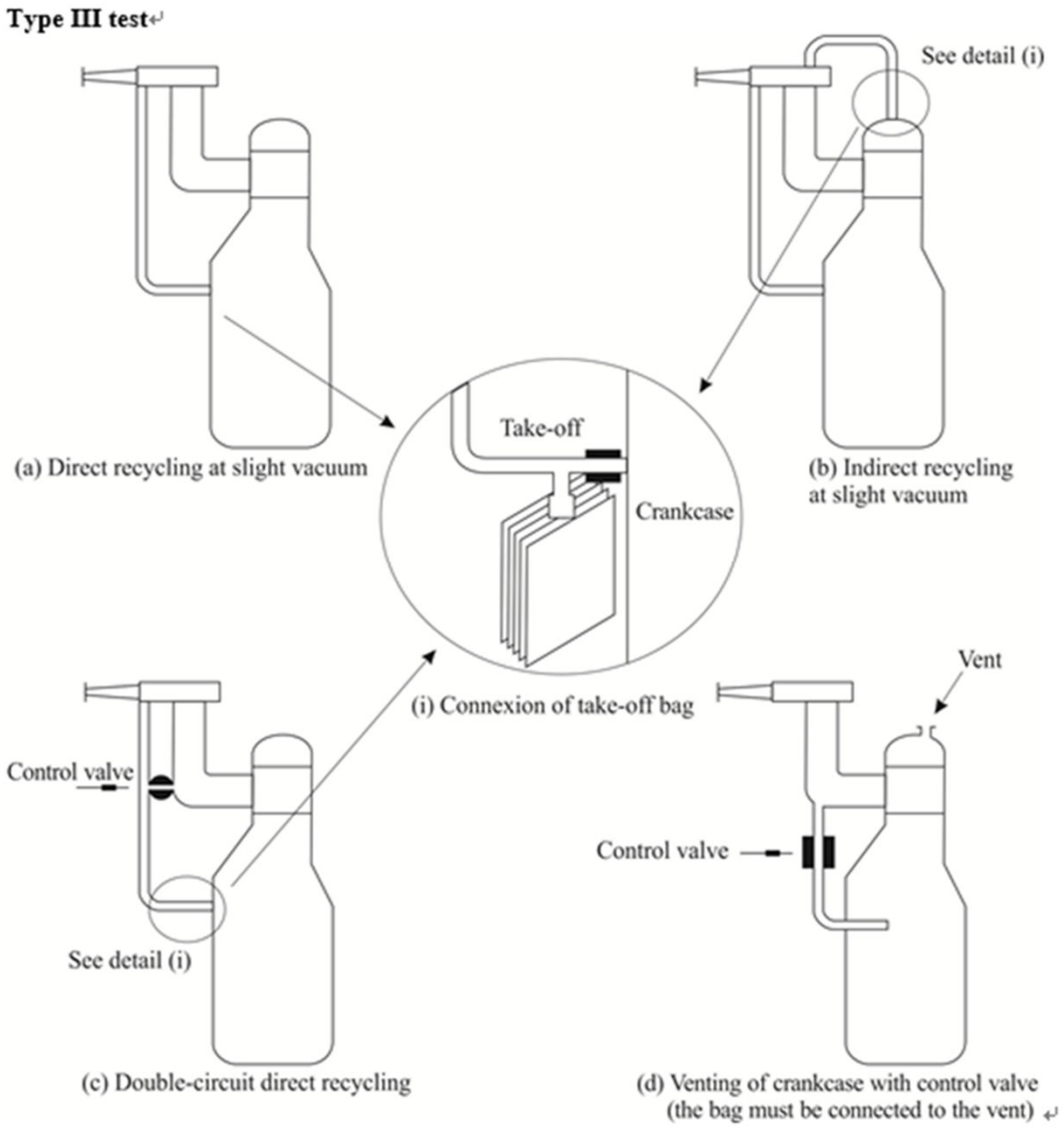
Condition number	*Vehicle speed (km/h)*
1	Idling
2	50 ±2 (in 3rd gear or "drive")
3	50 ±2 (in 3rd gear or "drive")

Condition number	*Power absorbed by the brake*
1	Nil
2	That corresponding to the setting for Type I test at 50 km/h
3	That for conditions No. 2, multiplied by a factor of 1.7

4.	**Test method**
4.1.	For the operation conditions as listed in paragraph 3.2. of this annex, reliable function of the crankcase ventilation system shall be checked.
5.	**Method of verification of the crankcase ventilation system**
5.1.	The engine's apertures shall be left as found.
5.2.	The pressure in the crankcase shall be measured at an appropriate location. It shall be measured at the dip-stick hole with an inclined-tube manometer.
5.3.	The vehicle shall be deemed satisfactory if, in every condition of measurement defined in paragraph 3.2. of this annex, the pressure measured in the crankcase does not exceed the atmospheric pressure prevailing at the time of measurement.
5.4.	For the test by the method described above, the pressure in the intake manifold shall be measured to within ±1 kPa.
5.5.	The vehicle speed as indicated at the dynamometer shall be measured to within ±2 km/h.
5.6.	The pressure measured in the crankcase shall be measured to within ± 0.01 kPa.
5.7.	If in one of the conditions of measurement defined in paragraph 3.2. of this annex, the pressure measured in the crankcase exceeds the atmospheric pressure, an additional test as defined in paragraph 6. of this annex shall be performed if so requested by the manufacturer.

6.	**Additional test method**
6.1.	The engine's apertures shall be left as found.
6.2.	A flexible bag impervious to crankcase gases and having a capacity of approximately five litres shall be connected to the dipstick hole. The bag shall be empty before each measurement.
6.3.	The bag shall be closed before each measurement. It shall be opened to the crankcase for five minutes for each condition of measurement prescribed in paragraph 3.2. of this annex.
6.4.	The vehicle shall be deemed satisfactory if, in every condition of measurement defined in paragraph 3.2. of this annex , no visible inflation of the bag occurs.
6.5.	**Remark**
6.5.1.	If the structural layout of the engine is such that the test cannot be performed by the methods described in paragraphs 6.1. to 6.4. of this annex, the measurements shall be effected by that method modified as follows:
6.5.2.	Before the test, all apertures other than that required for the recovery of the gases shall be closed;
6.5.3.	The bag shall be placed on a suitable take-off which does not introduce any additional loss of pressure and is installed on the recycling circuit of the device directly at the engine-connection aperture (see diagram below).

Explanation of the UNR83-05 Annex 6 Type III Test



Thank you!