Commission Regulation (EC) No 692/2008 of 18 July 2008 implementing and amending Regulation (EC) No 715/2007 of the European Parliament and of the Council on type-approval of motor vehicles with respect to emissions from light passenger and commercial vehicles (Euro 5 and Euro 6) and on access to vehicle repair and maintenance information (Text with EEA relevance)

ANNEX VII

VERIFYING THE DURABILITY OF POLLUTION CONTROL DEVICES (TYPE 5 TEST)

1. INTRODUCTION

1.1. This Annex describes the tests for verifying the durability of pollution control devices. The durability requirements shall be demonstrated using one of the three options set out in points 1.2, 1.3 and 1.4.

1.2. The whole vehicle durability test represents an ageing test of 160 000 kilometres driven on a test track, on the road, or on a chassis dynamometer.

1.3. The manufacturer may choose to use a bench ageing durability test.

1.4. As an alternative to durability testing, a manufacturer may choose to apply the assigned deterioration factors from the following table.

Engine Category	**Assigned deterioration factors**						
	CO	**THC**	**NMHC**	**NO_x**	**HC + NO_x**	**PM**	**P**
Positive-ignition	1,5	1,3	1,3	1,6	—	1,0	1,0
Compression-ignition (Euro 5)	1,5	—	—	1,1	1,1	1,0	1,0
Compression-ignition (Euro 6)[a]							

a Euro 6 deterioration factors to be determined

1.5. At the request of the manufacturer, the technical service may carry out the type 1 test before the whole vehicle or bench ageing durability test has been completed using the assigned deterioration factors in the table above. On completion of the whole vehicle or bench ageing durability test, the technical service may then amend the type-approval results recorded in Appendix 4 to Annex I by replacing the assigned deterioration factors in the above table with those measured in the whole vehicle or bench ageing durability test.

1.6. In the absence of assigned deterioration factors for Euro 6 compression ignition vehicles, manufacturers shall use the whole vehicle or bench ageing durability test procedures to establish deterioration factors.

1.7. Deterioration factors are determined using either the procedures set out in points 1.2 and 1.3 or using the assigned values in the table contained in point 1.4. The deterioration factors are used to establish compliance with the requirements of the appropriate emissions limits set out in Tables 1 and 2 of Annex 1 to Regulation (EC) No 715/2007 during the useful life of the vehicle.

2. TECHNICAL REQUIREMENTS

2.1. The technical requirements and specifications shall be those set out in section 2 to 6 of Annex 9 to UN/ECE Regulation No 83, with the exceptions set out in subsections 2.1.1 to 2.1.4.

2.1.1. As an alternative to the operating cycle described in paragraph 5.1. of Annex 9 of UN/ECE Regulation No 83 for the whole vehicle durability test, the vehicle manufacturer may use Standard Road Cycle (SRC) described in Appendix 3 of this Annex. This test cycle shall be conducted until the vehicle has covered a minimum of 160 000 km.

2.1.2. In paragraph 5.3 and paragraph 6 of Annex 9 of UN/ECE Regulation No 83 the reference to 80 000 km shall be understood as reference to 160 000 km.

2.1.3. The reference to paragraph 5.3.1.4. in the first section of paragraph 6 of Annex 9 of UN/ECE Regulation No 83 shall be understood as reference to Table 1 of Annex I of the Regulation (EC) No 715/2007 for Euro 5 vehicles and Table 2 of Annex I of the Regulation (EC) No 715/2007 for Euro 6 vehicles.

2.1.4. In Section 6 of Annex 9 of UN/ECE Regulation No 83, the sixth subparagraph shall be understood as follows:

A multiplicative exhaust emission deterioration factor shall be calculated for each pollutant as follows:

$$\text{D.E.F.} = \frac{Mi_2}{Mi_1}$$

At the request of a manufacturer, an additive exhaust emission deterioration factor shall be calculated for each pollutant as follows:

$$\text{D.E.F.} = Mi_2 - Mi_1$$

2.2. Bench Ageing Durability Test

2.2.1. In addition to the technical requirements for the bench ageing test set out in section 1.3, the technical requirements set out in this section shall apply.

The fuel to be used during the test shall be the one specified in paragraph 3 of Annex 9 of Regulation 83.

2.3.1. Vehicles with Positive Ignition Engines

2.3.1.1. The following bench ageing procedure shall be applicable for positive-ignition vehicles including hybrid vehicles which use a catalyst as the principle after-treatment emission control device.

The bench ageing procedure requires the installation of the catalyst-plus-oxygen sensor system on a catalyst ageing bench.

Ageing on the bench shall be conducted by following the standard bench cycle (SBC) for the period of time calculated from the bench ageing time (BAT) equation. The BAT equation requires, as input, catalyst time-at-temperature data measured on the Standard Road Cycle (SRC), described in Appendix 3 to this Annex.

2.3.1.2. Standard bench cycle (SBC). Standard catalyst bench ageing shall be conducted following the SBC. The SBC shall be run for the period of time calculated from the BAT equation. The SBC is described in Appendix 1 of this Annex.

2.3.1.3. Catalyst time-at-temperature data. Catalyst temperature shall be measured during at least two full cycles of the SRC cycle as described in Appendix 3 to this Annex.

Catalyst temperature shall be measured at the highest temperature location in the hottest catalyst on the test vehicle. Alternatively, the temperature may be measured at another location providing that it is adjusted to represent the temperature measured at the hottest location using good engineering judgement.

Catalyst temperature shall be measured at a minimum rate of one hertz (one measurement per second).

The measured catalyst temperature results shall be tabulated into a histogram with temperature groups of no larger than 25 °C.

2.3.1.4. Bench-ageing time. Bench ageing time shall be calculated using the bench ageing time (BAT) equation as follows:

te for a temperature bin = th e((R/Tr)–(R/Tv))

Total te = Sum of te over all the temperature groups

Bench-Ageing Time = A (Total te)

Where:

A	=	1,1 This value adjusts the catalyst ageing time to account for deterioration from sources other than thermal ageing of the catalyst.
R	=	Catalyst thermal reactivity = 17 500
th	=	The time (in hours) measured within the prescribed temperature bin of the vehicle's catalyst temperature histogram adjusted to a full useful life basis e.g., if the histogram represented 400 km, and useful life is 160 000 km; all histogram time entries would be multiplied by 400 (160 000/400).
Total te	=	The equivalent time (in hours) to age the catalyst at the temperature of Tr on the catalyst ageing bench using the catalyst ageing cycle to produce the same amount of deterioration experienced by the catalyst due to thermal deactivation over the 160 000 km.
te for a bin	=	The equivalent time (in hours) to age the catalyst at the temperature of Tr on the catalyst ageing bench using the catalyst ageing cycle to produce the same amount of deterioration experienced by the catalyst due to thermal deactivation at the temperature bin of Tv over 160 000 km.
Tr	=	The effective reference temperature (in °K) of the catalyst on the catalyst bench run on the bench ageing cycle. The effective temperature is the constant temperature that would result in the same amount of ageing as the various temperatures experienced during the bench ageing cycle.
Tv	=	The mid-point temperature (in °K) of the temperature bin of the vehicle on-road catalyst temperature histogram.

2.3.1.5. Effective reference temperature on the SBC. The effective reference temperature of the standard bench cycle (SBC) shall be determined for the actual catalyst system design and actual ageing bench which will be used using the following procedures:

(a) Measure time-at-temperature data in the catalyst system on the catalyst ageing bench following the SBC. Catalyst temperature shall be measured at the highest temperature location of the hottest catalyst in the system. Alternatively, the temperature may be measured at another location providing that it is adjusted to represent the temperature measured at the hottest location.

Catalyst temperature shall be measured at a minimum rate of one hertz (one measurement per second) during at least 20 minutes of bench ageing. The measured catalyst temperature results shall be tabulated into a histogram with temperature groups of no larger than 10 °C.

(b) The BAT equation shall be used to calculate the effective reference temperature by iterative changes to the reference temperature (Tr) until the calculated ageing time equals or exceeds the actual time represented in the catalyst temperature histogram. The resulting temperature is the effective reference temperature on the SBC for that catalyst system and ageing bench.

2.3.1.6. Catalyst Ageing Bench. The catalyst ageing bench shall follow the SBC and deliver the appropriate exhaust flow, exhaust constituents, and exhaust temperature at the face of the catalyst.

All bench ageing equipment and procedures shall record appropriate information (such as measured A/F ratios and time-at-temperature in the catalyst) to assure that sufficient ageing has actually occurred.

2.3.1.7. Required Testing. For calculating deterioration factors at least two Type 1 tests before bench ageing of the emission control hardware and at least two Type 1 tests after the bench-aged emission hardware is reinstalled have to be performed on the test vehicle.

Additional testing may be conducted by the manufacturer. Calculation of the deterioration factors has to be done according to the calculation method as specified in Paragraph 6 of Annex 9 to UN/ECE Regulation No 83 as amended by this Regulation.

2.3.2. Vehicles with Compression Ignition Engines

2.3.2.1. The following bench ageing procedure is applicable for compression-ignition vehicles including hybrid vehicles.

The bench ageing procedure requires the installation of the aftertreatment system on a aftertreatment system ageing bench.

Ageing on the bench is conducted by following the standard diesel bench cycle (SDBC) for the number of regenerations/desulphurisations calculated from the bench ageing duration (BAD) equation.

2.3.2.2. Standard Diesel Bench Cycle (SDBC). Standard bench ageing is conducted following the SDBC. The SDBC shall be run for the period of time calculated from the bench ageing duration (BAD) equation. The SDBC is described in Appendix 2 of this Annex.

2.3.2.3. Regeneration data. Regeneration intervals shall be measured during at least 10 full cycles of the SRC cycle as described in Appendix 3. As an alternative the intervals from the Ki determination may be used.

If applicable, desulphurisation intervals shall also be considered based on manufacturer's data

2.3.2.4. Diesel bench-ageing duration. Bench ageing duration is calculated using the BAD equation as follows:

Bench-Ageing Duration = number of regeneration and/or desulphurisation cycles (whichever is the longer) equivalent to 160 000 km of driving

2.3.2.5. Ageing Bench. The ageing bench shall follow the SDBC and deliver appropriate exhaust flow, exhaust constituents, and exhaust temperature to the aftertreatment system inlet.

The manufacturer shall record the number of regenerations/desulphurisations (if applicable) to assure that sufficient ageing has actually occurred.

2.3.2.6. Required Testing. For calculating deterioration factors at least two Type 1 tests before bench ageing of the emission control hardware and at least two Type 1 tests after the bench-aged emission hardware is reinstalled have to be performed. Additional testing may be conducted by the manufacturer. Calculation of the deterioration factors shall be done according to the calculation method set out in Paragraph 6 of Annex 9 to UN/ECE Regulation No 83 and with the additional requirements contained in this Regulation.

Appendix 1

Standard Bench Cycle (SBC)

1. Introduction

The standard ageing durability procedure consists of ageing a catalyst/oxygen sensor system on an ageing bench which follows the standard bench cycle (SBC) described in this Appendix. The SBC requires use of an ageing bench with an engine as the source of feed gas for the catalyst. The SBC is a 60-second cycle which is repeated as necessary on the ageing bench to conduct ageing for the required period of time. The SBC is defined based on the catalyst temperature, engine air/fuel (A/F) ratio, and the amount of secondary air injection which is added in front of the first catalyst.

2. Catalyst Temperature Control

2.1. Catalyst temperature shall be measured in the catalyst bed at the location where the highest temperature occurs in the hottest catalyst. Alternatively, the feed gas temperature may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and ageing bench to be used in the ageing process.

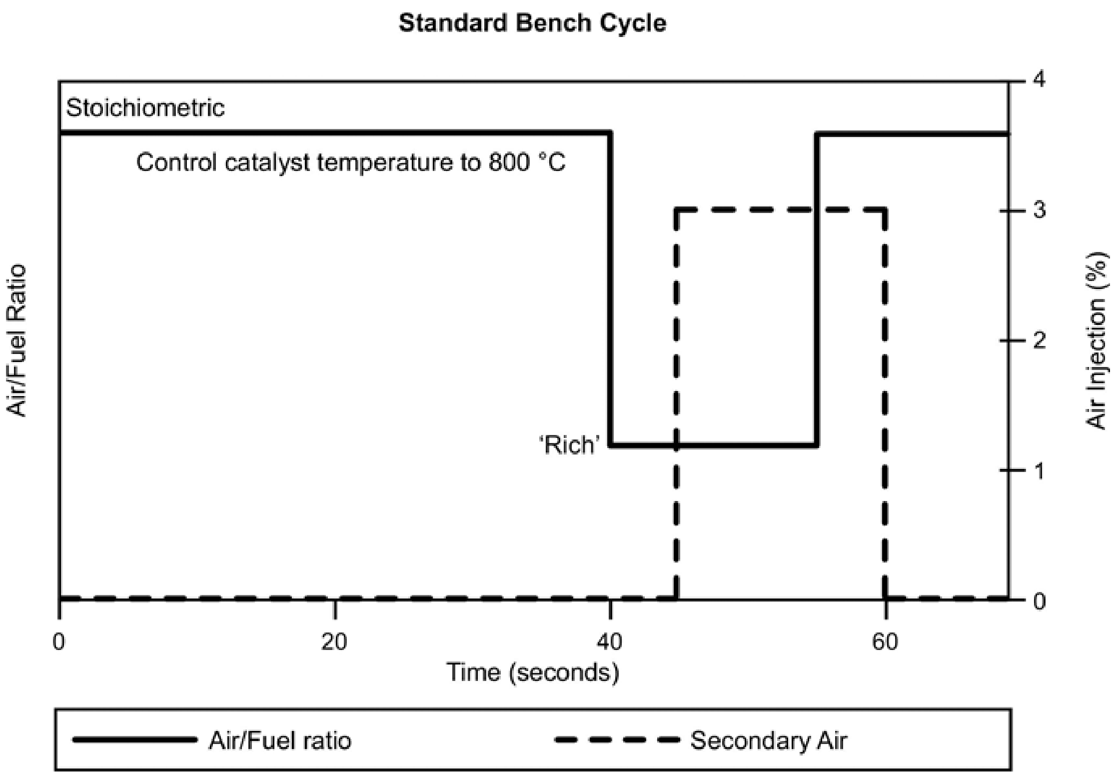
2.2. Control the catalyst temperature at stoichiometric operation (01 to 40 seconds on the cycle) to a minimum of 800 °C (± 10 °C) by selecting the appropriate engine speed, load, and spark timing for the engine. Control the maximum catalyst temperature that occurs during the cycle to 890 °C (± 10 °C) by selecting the appropriate A/F ratio of the engine during the ‘rich’ phase described in the table below.

2.3. If a low control temperature other than 800 °C is utilized, the high control temperature shall be 90 °C higher than the low control temperature.

STANDARD BENCH CYCLE (SBC)

Time(seconds)	Engine Air/Fuel Ratio	Secondary Air Injection
1-40	Stoichiometric with load, spark timing and engine speed controlled to achieve a minimum catalyst temperature of 800 °C	None
41-45	‘Rich’ (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C or 90 °C higher than lower control temperature)	None
46-55	‘Rich’ (A/F ratio selected to achieve a maximum catalyst temperature over the entire cycle of 890 °C or 90 °C higher than lower control temperature)	3 % (± 1 %)

56-60	Stoichiometric with load, spark timing and engine speed controlled to achieve a minimum catalyst temperature of 800 °C	3 % (± 1 %)



3. Ageing Bench Equipment and Procedures

3.1. Ageing Bench Configuration. The ageing bench shall provide the appropriate exhaust flow rate, temperature, air-fuel ratio, exhaust constituents and secondary air injection at the inlet face of the catalyst.

The standard ageing bench consists of an engine, engine controller, and engine dynamometer. Other configurations may be acceptable (e.g. whole vehicle on a dynamometer, or a burner that provides the correct exhaust conditions), as long as the catalyst inlet conditions and control features specified in this Appendix are met.

A single ageing bench may have the exhaust flow split into several streams providing that each exhaust stream meets the requirements of this appendix. If the bench has more than one exhaust stream, multiple catalyst systems may be aged simultaneously.

3.2. Exhaust System Installation. The entire catalyst(s)-plus-oxygen sensor(s) system, together with all exhaust piping which connects these components, will be installed on the bench. For engines with multiple exhaust streams (such as some V6 and V8 engines), each bank of the exhaust system will be installed separately on the bench in parallel.

For exhaust systems that contain multiple in-line catalysts, the entire catalyst system including all catalysts, all oxygen sensors and the associated exhaust piping will be installed as a unit for ageing. Alternatively, each individual catalyst may be separately aged for the appropriate period of time.

3.3. Temperature Measurement. Catalyst temperature shall be measured using a thermocouple placed in the catalyst bed at the location where the highest temperature occurs in the hottest catalyst. Alternatively, the feed gas temperature just before the catalyst inlet face may be measured and converted to catalyst bed temperature using a linear transform calculated from correlation data collected on the catalyst design and ageing bench to be used in the ageing process. The catalyst temperature shall be stored digitally at the speed of 1 hertz (one measurement per second).

3.4. Air/Fuel Measurement. Provisions shall be made for the measurement of the air/fuel (A/F) ratio (such as a wide-range oxygen sensor) as close as possible to the catalyst inlet and outlet flanges. The information from these sensors shall be stored digitally at the speed of 1 hertz (one measurement per second).

3.5. Exhaust Flow Balance. Provisions shall be made to assure that the proper amount of exhaust (measured in grams/second at stoichiometry, with a tolerance of ± 5 grams/second) flows through each catalyst system that is being aged on the bench.

The proper flow rate is determined based upon the exhaust flow that would occur in the original vehicle's engine at the steady state engine speed and load selected for the bench ageing in Paragraph 3.6. of this Appendix.

3.6. Setup. The engine speed, load, and spark timing are selected to achieve a catalyst bed temperature of 800 °C (± 10 °C) at steady-state stoichiometric operation.

The air injection system is set to provide the necessary air flow to produce 3,0 % oxygen (± 0,1 %) in the steady-state stoichiometric exhaust stream just in front of the first catalyst. A typical reading at the upstream A/F measurement point (required in paragraph 5) is lambda 1,16 (which is approximately 3 % oxygen).

With the air injection on, set the 'Rich' A/F ratio to produce a catalyst bed temperature of 890 °C (± 10 °C). A typical A/F value for this step is lambda 0,94 (approximately 2 % CO).

3.7. Ageing Cycle. The standard bench ageing procedures use the standard bench cycle (SBC). The SBC is repeated until the amount of ageing calculated from the bench ageing time equation (BAT) is achieved.

3.8. Quality Assurance. The temperatures and A/F ratio in paragraphs 3.3. and 3.4. of this appendix shall be reviewed periodically (at least every 50 hours) during ageing. Necessary adjustments shall be made to assure that the SBC is being appropriately followed throughout the ageing process.

After the ageing has been completed, the catalyst time-at-temperature collected during the ageing process shall be tabulated into a histogram with temperature groups of no larger than 10 °C. The BAT equation and the calculated effective reference temperature for the ageing cycle according to Paragraph 2.3.1.4 of Annex VII will be used to determine if the appropriate amount of thermal ageing of the catalyst has in fact occurred. Bench ageing will be extended if the thermal effect of the calculated ageing time is not at least 95 % of the target thermal ageing.

3.9. Startup and Shutdown. Care should be taken to assure that the maximum catalyst temperature for rapid deterioration (e.g., 1 050 °C) does not occur during startup or shutdown. Special low temperature startup and shutdown procedures may be used to alleviate this concern.

4. Experimentally Determining the R-Factor for Bench Ageing Durability Procedures

4.1. The R-Factor is the catalyst thermal reactivity coefficient used in the bench ageing time (BAT) equation. Manufacturers may determine the value of R experimentally using the following procedures.

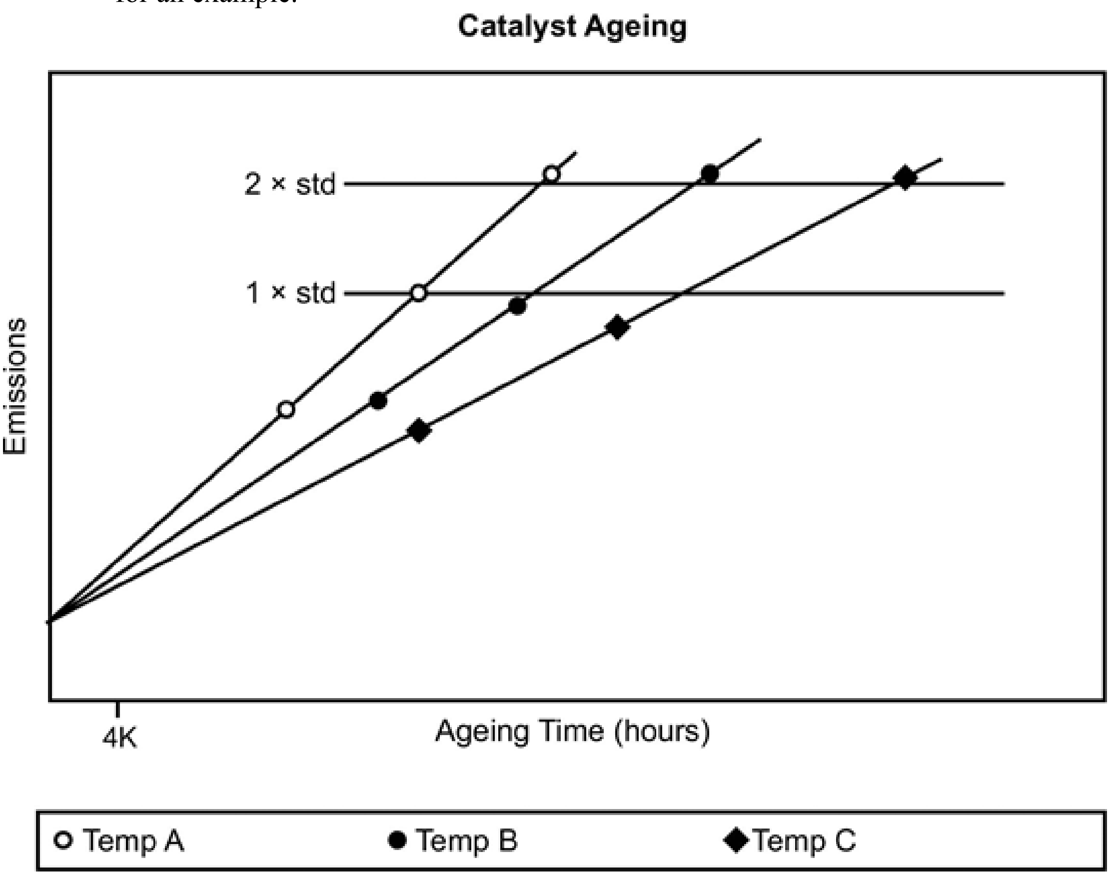
4.1.1. Using the applicable bench cycle and ageing bench hardware, age several catalysts (minimum of 3 of the same catalyst design) at different control temperatures between the normal operating temperature and the damage limit temperature. Measure emissions (or catalyst inefficiency (1-catalyst efficiency)) for each exhaust constituent. Assure that the final testing yields data between one- and two-times the emission standard.

4.1.2. Estimate the value of R and calculate the effective reference temperature (Tr) for the bench ageing cycle for each control temperature according to Paragraph 2.4.4 of Annex VII.

4.1.3. Plot emissions (or catalyst inefficiency) versus ageing time for each catalyst. Calculate the least-squared best-fit line through the data. For the data set to be useful for this purpose the data should have an approximately common intercept between 0 and 6 400 km. See the following graph for an example.

4.1.4. Calculate the slope of the best-fit line for each ageing temperature.

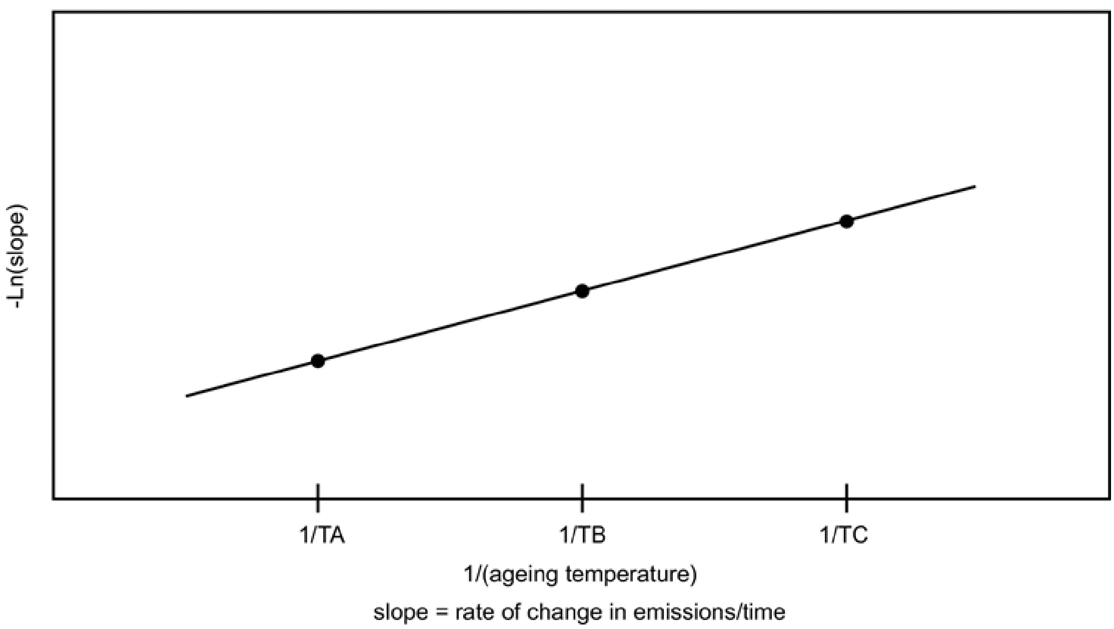
4.1.5. Plot the natural log (ln) of the slope of each best-fit line (determined in step 4.1.4.) along the vertical axis, versus the inverse of ageing temperature (1/(ageing temperature, deg K)) along the horizontal axis, Calculate the least squared best-fit lines through the data. The slope of the line is the R-factor. See the following graph for an example.



4.1.6. Compare the R-factor to the initial value that was used in Step 4.1.2. If the calculated R-factor differs from the initial value by more than 5 %, choose a new R-factor that is between the initial and calculated values, and then repeat Steps 2-6 to derive a new R-factor. Repeat this process until the calculated R-factor is within 5 % of the initially assumed R-factor.

4.1.7. Compare the R-factor determined separately for each exhaust constituent. Use the lowest R-factor (worst case) for the BAT equation.

Determining the R-Factor



Appendix 2

Standard Diesel Bench Cycle (SDBC)

1. Introduction

For particulate filters, the number of regenerations is critical to the ageing process. For systems that require desulphurisation cycles (e.g. NO_x storage catalysts), this process is also significant.

The standard diesel bench ageing durability procedure consists of ageing an aftertreatment system on an ageing bench which follows the standard bench cycle (SDBC) described in this Appendix. The SDBC requires use of an ageing bench with an engine as the source of feed gas for the system.

During the SDBC, the regeneration/desulphurisation strategies of the system shall remain in normal operating condition.

2. The Standard Diesel Bench Cycle reproduces the engine speed and load conditions that are encountered in the SRC cycle as appropriate to the period for which durability is to be determined. In order to accelerate the process of ageing, the engine settings on the test bench may be modified to reduce the system loading times. For example the fuel injection timing or EGR strategy may be modified.

3. Ageing Bench Equipment and Procedures

3.1. The standard ageing bench consists of an engine, engine controller, and engine dynamometer. Other configurations may be acceptable (e.g. whole vehicle on a dynamometer, or a burner that provides the correct exhaust conditions), as long as the aftertreatment system inlet conditions and control features specified in this Appendix are met.

A single ageing bench may have the exhaust flow split into several streams providing that each exhaust stream meets the requirements of this appendix. If the bench has more than one exhaust stream, multiple aftertreatment systems may be aged simultaneously.

3.2. Exhaust System Installation. The entire aftertreatment system, together with all exhaust piping which connects these components, will be installed on the bench. For engines with multiple exhaust streams (such as some V6 and V8 engines), each bank of the exhaust system will be installed separately on the bench.

The entire aftertreatment system will be installed as a unit for ageing. Alternatively, each individual component may be separately aged for the appropriate period of time.

Appendix 3

Standard Road Cycle (SRC)

Introduction

The standard road cycle (SRC) is a kilometre accumulation cycle. The vehicle may be run on a test track or on a kilometre accumulation dynamometer.

The cycle consists of 7 laps of a 6 km course. The length of the lap may be changed to accommodate the length of the mileage accumulation test track.
Standard Road cycle

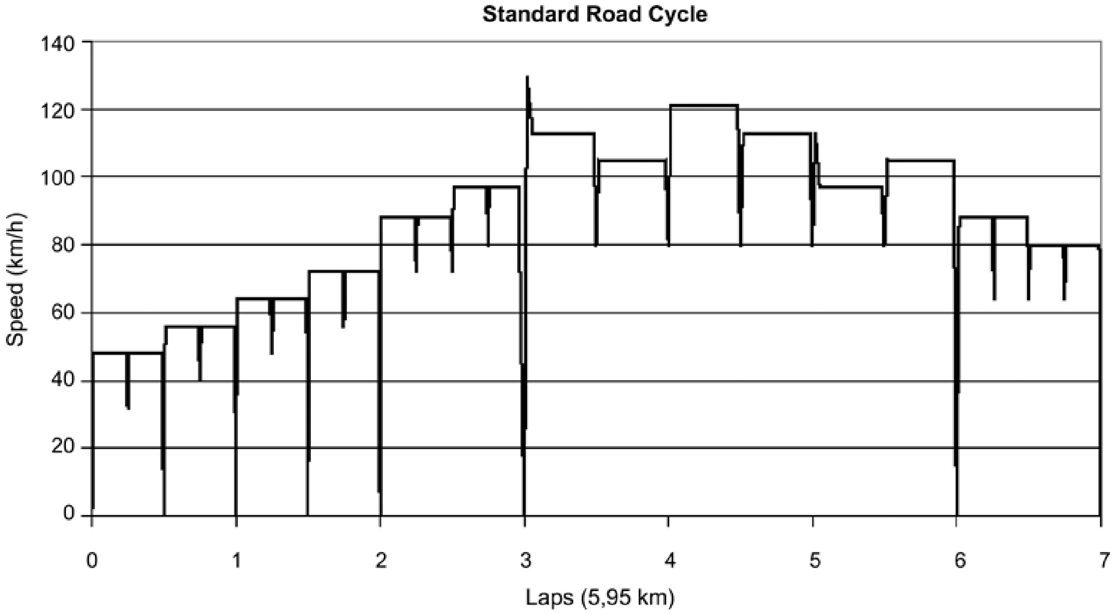
Lap	**Description**	**Typical acceleration rate m/s^2**
1	(start engine) idle 10 seconds	0
1	Moderate acceleration to 48 km/h	1,79
1	Cruise at 48 km/h for 1/4 lap	0
1	Moderate deceleration to 32 km/h	– 2,23
1	Moderate acceleration to 48 km/h	1,79
1	Cruise at 48 km/h for 1/4 lap	0
1	Moderate deceleration to stop	– 2,23
1	Idle 5 seconds	0
1	Moderate acceleration to 56 km/h	1,79
1	Cruise at 56 km/h for 1/4 lap	0
1	Moderate deceleration to 40 km/h	– 2,23
1	Moderate acceleration to 56 km/h	1,79
1	Cruise at 56 km/h for 1/4 lap	0
1	Moderate deceleration to stop	– 2,23
2	idle 10 seconds	0
2	Moderate acceleration to 64 km/h	1,34
2	Cruise at 64 km/h for 1/4 lap	0
2	Moderate deceleration to 48 km/h	– 2,23

2	Moderate acceleration to 64 km/h	1,34
2	Cruise at 64 km/h for 1/4 lap	0
2	Moderate deceleration to stop	– 2,23
2	Idle 5 seconds	0
2	Moderate acceleration to 72 km/h	1,34
2	Cruise at 72 km/h for 1/4 lap	0
2	Moderate deceleration to 56 km/h	– 2,23
2	Moderate acceleration to 72 km/h	1,34
2	Cruise at 72 km/h for 1/4 lap	0
2	Moderate deceleration to stop	– 2,23
3	idle 10 seconds	0
3	Hard acceleration to 88 km/h	1,79
3	Cruise at 88 km/h for 1/4 lap	0
3	Moderate deceleration to 72 km/h	– 2,23
3	Moderate acceleration to 88 km/h	0,89
3	Cruise at 88 km/h for 1/4 lap	0
3	Moderate deceleration to 72 km/h	– 2,23
3	Moderate acceleration to 97 km/h	0,89
3	Cruise at 97 km/h for 1/4 lap	0
3	Moderate deceleration to 80 km/h	– 2,23
3	Moderate acceleration to 97 km/h	0,89
3	Cruise at 97 km/h for 1/4 lap	0
3	Moderate deceleration to stop	– 1,79
4	idle 10 seconds	0
4	Hard acceleration to 129 km/h	1,34
4	Coastdown to 113 km/h	– 0,45

4	Cruise at 113 km/h for 1/2 lap	0
4	Moderate deceleration to 80 km/h	– 1,34
4	Moderate acceleration to 105 km/h	0,89
4	Cruise at 105 km/h for 1/2 lap	0
4	Moderate deceleration to 80 km/h	– 1,34
5	Moderate acceleration to 121 km/h	0,45
5	Cruise at 121 km/h for 1/2 lap	0
5	Moderate deceleration to 80 km/h	– 1,34
5	Light acceleration to 113 km/h	0,45
5	Cruise at 113 km/h for 1/2 lap	0
5	Moderate deceleration to 80 km/h	– 1,34
6	Moderate acceleration to 113 km/h	0,89
6	Coastdown to 97 km/h	– 0,45
6	Cruise at 97 km/h for 1/2 lap	0
6	Moderate deceleration to 80 km/h	– 1,79
6	Moderate acceleration to 104 km/h	0,45
6	Cruise at 104 km/h for 1/2 lap	0
6	Moderate deceleration to stop	– 1,79
7	idle 45 seconds	0
7	Hard acceleration to 88 km/h	1,79
7	Cruise at 88 km/h for 1/4 lap	0
7	Moderate deceleration to 64 km/h	– 2,23
7	Moderate acceleration to 88 km/h	0,89

7	Cruise at 88 km/h for 1/4 lap	0
7	Moderate deceleration to 64 km/h	– 2,23
7	Moderate acceleration to 80 km/h	0,89
7	Cruise at 80 km/h for 1/4 lap	0
7	Moderate deceleration to 64 km/h	– 2,23
7	Moderate acceleration to 80 km/h	0,89
7	Cruise at 80 km/h for 1/4 lap	0
7	Moderate deceleration to stop	– 2,23

The standard road cycle is represented graphically in the following figure:



Changes to legislation:
There are currently no known outstanding effects for the Commission Regulation (EC) No 692/2008, ANNEX VII.