



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 10.12.1997
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Proposal for a

EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE

**amending Council Directive 92/23/EEC relating to tyres for motor vehicles and
their trailers and to their fitting**

(presented by the Commission)

EXPLANATORY MEMORANDUM

1. Aim

The aim of the proposed measures is to limit the noise generated by the contact between tyres in motion and road surfaces which, together with the action already taken in order to curtail the noise emissions from the mechanical parts of vehicles, will have positive effects on the fight against noise caused by road traffic without thereby diminishing road safety and without excessive disruption of the tyre market.

2. Background

The proposed action is a follow up to the provisions of Article 4(2) of Directive 92/97/EEC¹ - amending Directive 70/157/EEC on the permissible sound level and exhaust system of motor vehicles² - which lay down that decisions concerning subsequent action, intended in particular to reconcile the safety requirements with the need to limit the noise generated by contact between tyres and road surfaces will be adopted on the basis of a proposal from the Commission which will take account of the studies and research to be conducted on that source of noise.

The Commission first of all made its ad hoc "ERGA-Noise" group responsible for developing a realistic, reproducible method enabling the noise arising from contact between tyres in motion and road surfaces to be measured.

Once this method of measurement had been defined the Commission prompted a study intended to produce a numerical value for the sound level of the tyre-road noise generated by different types of tyre fitted to different types of motor vehicle.

3. General aspects of the limit values proposed

As regards the limit values for tyre-road noise, the Commission's proposal has adopted values deriving from the nominal rim size for tyres intended to be fitted to passenger cars (limit values spread between 72 and 76 decibels) and from the use category for commercial-vehicle tyres (limit values between 75 and 79 decibels).

These limit values were submitted to the working party on "Motor Vehicles" and the opinions expressed by the Member-State experts were divided. Indeed, although the experts from certain Member States fully supported the limit values put forward by the Commission, those from other Member States and those from the tyre industry nevertheless felt that those values would be too stringent and that an increase by two decibels would be fairer. However, the Commission feels that the limit values put forward constitute a fair balance between the interests of the market and those of

¹ OJ No L 371, 19.12.1992, p. 1

² OJ No L 42, 23.2.1970, p. 16

environmental protection. It should be pointed out in this connection that a raising of the limit values by even a single decibel would be likely to reduce the impact of the action in such a way that only about 8% of the tyres offered for sale would have to be altered in order to become less noisy and thus to meet the new requirements, as compared with roughly 25% that would have to be adjusted to the new requirements if they were to remain below the limit values put forward by the Commission.

4. Specific factors

Article 1 provides, in particular, that the requirements of the new Annex V concerning tyre-road noise shall not apply to road tyres intended to be fitted to vehicles registered for the first time before 1 October 1980. Indeed, if such tyres, which have dimensions and characteristics that are specific to the vehicles of the period (for example Aston Martin, Ferrari Dino, etc...), are not expected to meet the requirements concerning tyre-road noise, their impact on the environment would nevertheless be very low owing to their very restricted numbers, which are decreasing with time.

Article 2 provides for a date (1 October 2001) starting from which the requirements of the Directive will apply to both M1 vehicles and their tyres and vehicles in categories other than M1 and their tyres, by presenting the two scenarios involved: where the requirements of the directive will be applicable (a) within a total harmonised system and (b) within an optional harmonisation system (national type approvals still possible).

In addition Article 2 provides for a date (1 October 2005) from which any replacement tyres already having been approved before the date of entry into force of the new directive will have to meet the requirements of the latter.

5. Future activities

The Commission would like to point out that the requirements intended to reduce the noise arising from contact between tyres in motion and road surfaces constitute an initial thrust in the fight against this source of noise and that they must subsequently be reviewed in the light of their effect on the market and the environment.

Proposal for a
European Parliament and Council Directive
amending Council Directive 92/23/EEC relating to tyres for motor vehicles and
their trailers and to their fitting

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

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

Having regard to the proposal from the Commission¹,

Having regard to the opinion of the Economic and Social Committee²,

acting in accordance with the procedure referred to in Article 189b of the Treaty,

- (1) Whereas the internal market comprises an entity without internal frontiers within which the free movement of goods, persons, services and capital shall be guaranteed; whereas measures should be adopted for that purpose;

- (2) Whereas Council Directive 92/23/EEC relating to tyres for motor vehicles and their trailers, and to their fitting³ is one of the separate directives under the Community approval procedure introduced by Council Directive 70/156/EEC on

¹ OJ No C

² OJ No C

³ OJ No L 129, 24.5.1992, p. 95

the type approval of motor vehicles and their trailers⁴, as last amended by European Parliament and Council Directive 97/27/EC⁵; whereas the provisions of Directive 70/156/EEC concerning systems, components and separate technical units for motor vehicles shall thus apply to this directive;

- (3) Whereas in particular in implementing Articles 3, paragraph 4, and 4, paragraph 3, of Directive 70/156/EEC, each separate directive shall contain, in an annex thereto, an information document and an approval document drawn up in accordance with Annex VI to said directive for the purpose of computerising approval; whereas the approval document set out in Directive 92/23/EEC must therefore be amended;
- (4) Whereas Article 4, paragraph 2, of Council Directive 92/97/EEC⁶ amending Council Directive 70/157/EEC relating to the permissible noise level and exhaust system of motor vehicles⁷, as last amended by Commission Directive 96/20/EEC⁸, states that any subsequent action intended, in particular, to reconcile the safety requirements with the need to limit the noise arising from contact between tyres and road surfaces will be adopted on the basis of a proposal from the Commission which will take account of the studies and research to be conducted in connection with that source of noise;
- (5) Whereas a realistic, reproducible method enabling the noise arising from contact between tyres and road surfaces has been developed; whereas on the basis of that new method of measurement a study has been carried out in order to produce a

⁴ OJ No L 42, 23.2.1970, p. 1

⁵ OJ No L 233, 25.8.1997, p. 1

⁶ OJ No L 371, 19.12.1992, p. 1

⁷ OJ No L 42, 23.2.1970, p. 16

⁸ OJ No L 92, 13.4.1996, p. 23

numerical value for the sound level representing the tyre-road noise generated by various types of tyres fitted to various types of motor vehicle;

HAVE ADOPTED THIS DIRECTIVE:

Article 1

Directive 92/23/EEC shall be amended as follows:

1. "EEC component type approval" and "EEC approval" shall be replaced in every instance by the term "EC approval".
2. The definition of "tyre" in Article 1, first indent, shall read "any new pneumatic tyre, in the form of original equipment or of a replacement, intended to be fitted to vehicles to which Directive 70/156/EEC applies".

The following shall be added to the end of Article 1:

"The requirement set out in Annex V shall not apply to:

- tyres whose speed rating is less than 80 km/h,
- tyres whose nominal rim diameter does not exceed 254 mm (or code 10),
- spare tyres intended for temporary use,
- tyres intended to be fitted to vehicles registered for the first time before 1 October 1980."

3. Paragraphs 1 and 2 in Article 2 shall be replaced by the three following paragraphs:

"1. Member States shall grant EC approval, under the conditions laid down in Annex I, to all types of tyre manufactured in accordance with the requirements of Annex II, and shall allocate to these an approval number as specified in Annex I.

2. Member States shall grant EC approval, under the conditions laid down in Annex I, to all types of tyres manufactured in accordance with the requirements of Annex V and shall allocate to these an approval number as specified in Annex I.
3. Member States shall grant EC approval to all vehicles in respect of their tyres under the conditions laid down in Annex III, where those tyres (including spare tyres, where appropriate) meet the requirements of Annex II and the requirements concerning vehicles laid down in Annex IV, and shall allocate to any such vehicle an approval number as specified in Annex III”.
4. ANNEX V - Tyre-road noise emission” shall be added to the end of the list of annexes.
5. The annexes shall be amended in accordance with the annex to this directive.

Article 2

1. From 1.10.2001 Member States may no longer grant EC approval for category-M1 vehicles in accordance with Article 4, paragraph 1, of Directive 70/156/EEC to a type of vehicle for reasons relating to its tyres and their fitting, or to a type of tyre in accordance with Article 4, paragraph 2, of Directive 70/156/EEC intended for such vehicles if the requirements of Directive 92/23/EEC, as amended by this directive, are not met.
2. From 1.10.2001 Member States may no longer grant the following for vehicles within categories other than M1:
 - EC approval in accordance with Article 4, paragraph 1, of Directive 70/156/EEC,or
 - national approval, unless the provisions of Article 8, paragraphs 2, of Directive 70/156/EEC are invoked,

to a type of vehicle for reasons relating to its tyres and their fitting, or to a type of tyre intended for such vehicles, if they do not comply with Directive 92/23/EEC as amended by this directive.

3. From 1.10.2001 Member States shall

- consider the certificates of conformity accompanying new vehicles in accordance with the provisions of Directive 70/156/EEC as being no longer valid for the purposes of Article 7, paragraph 1, of said directive

and

- prohibit the registration, sale, or placing in service of new vehicles that are not accompanied by a certificate of conformity in accordance with Directive 70/156/EEC unless the provisions of Article 8, paragraph 2, of Directive 70/156/EEC are invoked,

for reasons relating to the tyres, and their fitting to these new vehicles, if the requirements of Directive 92/23/EEC, as amended by this directive, are not met.

4. From 1.10.2005 Member States shall

- consider certificates of conformity accompanying new tyres in accordance with the provisions of Directive 70/156/EEC, to be no longer to be valid for the purposes of Article 7, paragraph 2, of said directive

and

- prohibit the sale of new tyres that are not accompanied by a certificate of conformity in accordance with Directive 70/156/EEC, unless the provisions of Article 8, paragraph 2, of Directive 70/156/EEC are invoked,

for reasons relating to the new tyres, if the requirements of Directive 92/23/EEC, as amended by this directive, are not met.

Article 3

1. Member States shall adopt the laws, regulations and administrative provisions needed in order to comply with this directive before 1.10.2001 and shall forthwith inform the Commission thereof.

They shall apply these measures from 1.10.2001.

2. When the Member States adopt these measures they shall contain a reference to this directive or shall be accompanied by such a reference on the occasion of their official publication. The methods of making such a reference shall be laid down by the Member States.
3. Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this directive.

Article 4

This directive shall take effect from the date of its publication in the Official Journal of the European Communities.

Article 5

This directive is addressed to the Member States.

Done at Brussels,

*For the European Parliament
The President*

*For the Council
The President*

ANNEX

1. Annex I to Directive 92/23/EEC shall be replaced with the following Annex I:

“Annex I

ADMINISTRATIVE PROVISIONS FOR THE EC TYPE- APPROVAL OF TYRES

1. APPLICATION FOR THE EC TYPE-APPROVAL OF A TYPE OF TYRE
 - 1.1. The application for EC type-approval for a type of tyre pursuant to Article 3(4) of Directive 70/156/EEC is to be submitted by the tyre manufacturer.
 - 1.1.1. The application for EC type-approval pursuant to Annex II is to be accompanied, in triplicate, by a description of the tyre type as described in the information document in Appendix 1A.
 - 1.1.1.1. The application must be accompanied (all in triplicate) by a sketch, or a representative photograph, which identifies the tyre tread pattern and a sketch of the envelope of the inflated tyre mounted on the measuring rim showing the relevant dimensions (see sections 6.1.1. and 6.1.2. of Annex II) of the type submitted for approval.
 - 1.1.1.2. It must also be accompanied either by the test report issued by the Testing Body which has carried out the tests or, at the discretion of the competent authority, by one or two samples of the tyre type to be tested.
 - 1.1.2. The application for EC type-approval pursuant to Annex V is to be accompanied, in triplicate, by a description of the tyre type as described in the information document in Appendix 1B.
 - 1.1.2.1. The application must be accompanied (all in triplicate) by sketches, drawings or photographs of the tread pattern(s) that is/are representative of the type of tyres.
 - 1.1.2.2. It must also be accompanied either by the test report issued by the Testing Body that has carried out the tests or, at the discretion of the competent authority, by four samples of the size that is representative of the type to be tested.
 - 1.2. The manufacturer may apply for the EC type-approval to be extended

- 1.2.1. to include modified tyre types for type-approvals pursuant to Annex II and/or
- 1.2.2. to include additional tyre size designations and/or amended manufacturer's trade descriptions and/or tread patterns for type-approvals pursuant to Annex V.
- 1.3. The approval authority may accept the laboratories of the tyre manufacturer as approved test laboratories pursuant to Article 14(1) of Directive 70/156/EEC.

2. INSCRIPTIONS

- 2.1. Specimens of a type of tyre submitted for EC type-approval must bear the applicant's clearly visible and indelible trade mark or name and must allow sufficient space for the inscription of the EC type-approval mark.

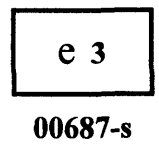
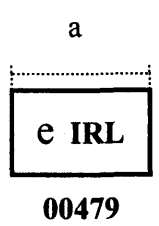
3. EC TYPE-APPROVALS

- 3.1. EC type-approval pursuant to Article 4(3) of Directive 70/156/EEC is to be granted and a type-approval number is to be issued in respect of any tyre type, submitted in accordance with 1.1.1. above, which satisfies the requirements of Annex II.
 - 3.1.1. Notice of approval or of the extension or refusal of approval of a tyre type pursuant to Annex II must be communicated to the Member States by means of a form conforming to the model in Appendix 2A.
- 3.2. EC type-approval pursuant to Article 4(3) of Directive 70/156/EEC is to be granted and a type-approval number is to be issued in respect of any tyre type, submitted in accordance with 1.1.2. above, which satisfies the requirements of Annex V.
 - 3.2.1. Notice of approval or of extension or of refusal of approval of a tyre type pursuant to Annex V must be communicated to the Member States by means of a form conforming to the model in Appendix 2B.
- 3.3. An approval number is to be assigned to each tyre type-approved. The same Member State must not assign the same number to another tyre type. In particular, approval numbers assigned pursuant to Annex II and approval numbers assigned pursuant to Annex V must be different.

4. EC TYPE-APPROVAL MARKING

- 4.1. Any tyre conforming to a type in respect of which type-approval has been granted pursuant to this Directive must bear the relevant EC type-approval mark.
- 4.2. The EC type-approval mark will consist of a rectangle surrounding the lower case letter 'e' followed by the distinguishing letter(s) or number of the Member State which has granted the type-approval as per Annex VII to Directive 70/156/EEC. The EC type-approval number will consist of the type-approval number shown on the certificate completed for the type, preceded by two figures : '00' for commercial vehicle tyres, '02' for passenger car tyres.
 - 4.2.1. The rectangle forming the EC mark must have a minimum length of 12 mm and a minimum height of 8 mm. Letters and number(s) must be at least 4 mm in height.
- 4.3. The EC type-approval marks and numbers, and any additional marks required in Annex II, section 3., the latter for the type-approval pursuant to the requirements of Annex II, must be affixed as prescribed in that section.
- 4.4. Approval numbers assigned pursuant to Annex V must be followed by the suffix 's'.
- 4.5. An example of the EC mark is given below:

a = 12 mm minimum



The tyre bearing the EC mark shown above is a commercial vehicle tyre (00) satisfying the EC requirements (e), for which the EC mark has been granted in Ireland (IRL) under the number 479 pursuant to

Annex II and in Italy (3) under the number 687 pursuant to Annex V (s).

Note : The numbers '479' and '687' (EC-mark type-approval numbers) and the letters 'IRL' and the digit '3' (letters and number of the Member States which granted the EC mark) are for guidance only.

The approval numbers must be placed close to the rectangle and either above or below or to the left or the right. The digits of the approval number must all be on the same side of the 'e' and face in the same direction.

5. MODIFICATION OF A TYRE TYPE

- 5.1. If a tyre type-approved pursuant to Annex II or pursuant to Annex V has been modified, the provisions of Article 5 of Directive 70/156/EEC shall apply.
- 5.2. If the tread pattern of a tyre has been modified in the case of type-approvals pursuant to Annex II no repetition of the tests prescribed in Annex II is considered necessary.
- 5.3. Where tyre-size designations, trade marks and tread-pattern descriptions have been added to a range of tyres in the case of type-approvals pursuant to Annex V no repetition of the tests prescribed in Annex V is considered necessary.
- 5.4. If there has been a modification of the tyre tread pattern(s) in the case of type-approvals pursuant to Annex V no repetition of the tests prescribed in Annex V is considered necessary if these modifications do not adversely affect the tyre/road noise emissions.

6. CONFORMITY OF PRODUCTION

- 6.1. As a general rule, measures to ensure the conformity of production shall be taken in accordance with the provisions laid down in Article 10 of Directive 70/156/EEC.
- 6.2. If, when checks are carried out in accordance with Appendix 1 to Annex V in order to check the conformity of production, the noise level of the tyre tested does not exceed the limit values set out in section 4.2. of Annex V by more than 1 dB(A), the production shall be deemed to conform to the requirements of section 4. of the above-mentioned Annex V.

2. Appendix 1 to Annex I shall be renumbered 'Appendix 1A' and the title shall read as follows:

“Appendix 1A

INFORMATION DOCUMENT No..... RELATING TO EC TYPE-
APPROVAL FOR A TYRE

(Annex II of Directive 92/23/EEC)”.

3. Appendix 2 to Annex I shall be renumbered 'Appendix 2A' and the title shall read as follows: “

“Appendix 2A

MODEL

(maximum format: A4 (210 x 297 mm)

EC TYPE-APPROVAL CERTIFICATE”

4. The following new Appendices 1B and 2B shall be added after Appendix 2A:

“Appendix 1B

INFORMATION DOCUMENT No..... RELATING TO EC TYPE-
APPROVAL FOR A TYRE RELATING TO TYRE/ROAD NOISE
EMISSION

(Annex V of Directive 92/23/EEC)

The following information, if applicable, must be supplied in triplicate and include a list of contents. Drawings, if any, must be supplied to an appropriate scale and in sufficient detail on size A4 or folded to that size. Relevant performance-related information must be supplied in the case of microprocessor controlled functions.

1. GENERAL

- 1.1. Manufacturer's name:
- 1.2. Name and address of applicant:
- 1.3. Address(es) of manufacturing plant(s):
- 1.4. Means of identification of the type: (trade mark(s) and trade description(s)):

2. TYRES

2.1. Tyre classification: (class C1, class C2 or class C3)

2.2. Category of use: (normal, snow or special)

2.3. List of tread-pattern designations:

(specify for each trade mark and trade description the list of tyre designations as per section 2.17. of Annex II to Directive 92/23/EEC adding, in the case of class C1 tyres, the mark 'Reinforced' or 'Extra Load', if applicable).

Appendix 2B

Model

(maximum format: A4 (210 x 297 mm))

EC TYPE-APPROVAL CERTIFICATE

(tyre/road noise emission)

STAMP OF ADMINISTRATION

Communication concerning the:

- type-approval ⁽¹⁾
- extension of type-approval ⁽¹⁾
- refusal of type-approval ⁽¹⁾
- withdrawal of type-approval ⁽¹⁾

of a type of tyre with regard to Annex V to Directive 92/23/EEC, as last amended by Directive .../.../EC, relating to tyre/road noise emission.

EC type-approval No:

Extension No:

SECTION I

0. GENERAL

0.1. Manufacturer's name:

0.2. Name and address of applicant:

0.3. Address(es) of manufacturing plant(s):

SECTION II

1. ADDITIONAL INFORMATION

1.1. Trade name(s) and trade description(s):

1.2. Tyre classification: (class C1, class C2 or class C3) ⁽¹⁾

1.3. Category of use: (Normal/Snow/Special) ⁽¹⁾

2. Testing Body responsible for carrying out tests:

3. Date of test report:

4. Number of test report:

5. Grounds for extending type-approval (where appropriate):

6. Comments (if any):

7. Date and place:

8. Signature:

9. A list of documents making up the type-approval file is lodged with the authority that has granted the approval and which may be obtained on request, is attached.

⁽¹⁾ Delete as appropriate.”

5. In Annex IV, section 3.1.1. shall be amended to read as follows:

“3.1.1. Subject to the provisions of section 3.7.4., every tyre fitted to a vehicle, including any spare, must bear the EC type-approval mark as specified in section 4. of Annex I or the type-approval mark indicating compliance with ECE Regulations Nos. 30 or 54 as referred to in the recitals of this Directive. ECE type-approval marks are considered to be equivalent only to the EC type-approval marks granted pursuant to Annex II.”

6. The following new annex V and the pertaining Appendix 1 shall be added after annex IV :

"ANNEX V

TYRE/ROAD NOISE EMISSION

1. SCOPE

This annex applies to the EC type-approval of tyres, as components, in respect of tyre/road noise emissions.

2. DEFINITIONS

For the purposes of this Annex, the definitions of Annex II shall apply, except for the definition under section 2.1., which shall read as follows:

2.1. "Type of tyres"

means, in relation to type-approval pursuant to this Annex (tyre/road noise emission), a range of tyres consisting of a list of tyre size designations (see section 2.17. in Annex II), trade marks and trade descriptions which do not differ in such essential characteristics as:

- the manufacturer's name
- the tyre classification (see section 2.4. of this Annex)
- the tyre structure (see section 2.1.4. of Annex II)
- the category of use (see section 2.1.3. of Annex II)
- the tyre/road noise emission.

In addition, the following definitions shall also apply:

2.2. "Trade description"

means the identification of the tread pattern design as provided by the tyre manufacturer. It may coincide with the trade mark.

2.3. "Tyre/road noise emission"

means the noise arising from the contact between tyres in motion and the road surface.

2.4. For the purpose of this Annex, the following classification shall apply:

class C1 tyres passenger car tyres (see section 2.32. of Annex II);

class C2 tyres commercial vehicle tyres (see section 2.33. of Annex II) with load capacity index in single formation ≤ 121 and speed category symbol \geq "N" (see section 2.29.3. of Annex II);

class C3 tyres commercial vehicle tyres (see section 2.33. of Annex II) with load capacity index in single formation ≤ 121 and speed category symbol \leq "M" (see section 2.29.3. of Annex II) or commercial vehicle tyres (see section 2.33. of Annex II) with load capacity index in single formation ≥ 122 .

3. MARKING REQUIREMENTS

3.1. The tyres must bear:

3.1.1. the manufacturer's name or trade mark;

3.1.2. the trade description, as defined in section 2.2. However, the trade description is not required when it coincides with the trade mark;

3.1.3. the tyre size designation, as defined in section 2.17. of Annex II;

3.1.4. the inscription 'REINFORCED' (or alternatively 'EXTRA LOAD') if the tyre is classified as reinforced (see section 2.3.4. of Annex II);

3.1.5. the inscription 'M+S' (or alternatively 'M.S' or 'M&S') if the tyre is a snow tyre.

4. TYRE/ROAD NOISE EMISSION REQUIREMENTS

4.1. General requirements

A set of four tyres bearing to the same tyre size designation and trade description that is representative of the range of tyres, shall be submitted to a tyre/road noise emission level test to be carried out as specified in Appendix 1.

4.2. The noise levels determined in accordance with Appendix 1 shall not exceed the following limits :

- 4.2.1. Class C1 tyres, with reference to the nominal section width (see Annex II, section 2.17.1.1.) of the tyre that has been tested:

Nominal section width	Limit value expressed in dB(A)
145 and lower	72
155 and 165	73
175 and 185	74
195 to 215	75
225 and larger	76

- 4.2.1.1. For reinforced tyres (see Annex II, section 3.1.8.), the limit values in section 4.2.1. shall be increased by 1 dB(A).
- 4.2.1.2. For tyres classified in category of use "Special" (see Annex II, section 2.1.3.), the limit values in section 4.2.1. shall be increased by 2 dB(A).
- 4.2.2. Class C2 tyres, with reference to the category of use (see Annex II, section 2.1.3.) of the range of tyres:

Category of use	Limit value expressed in dB(A)
Normal	75
Snow	77
Special	78

- 4.2.3. Class C3 tyres, with reference to the category of use (see Annex II, section 2.1.3.) of the range of tyres:

Category of use	Limit value expressed in dB(A)
Normal	76
Snow	78
Special	79

Appendix 1

Measurement procedure for tyre/road noise levels emitted by tyres at high speed

0. Introduction

The present procedure contains specifications for measuring instruments, measurement conditions and the measurement method, in order to obtain the noise level of a set of tyres mounted on a test vehicle and rolling at high speed on a specified road surface. The maximum sound pressure level is to be recorded when the test vehicle is coasting, by remote-field microphones; the final result for a reference speed is obtained from a linear regression analysis.

1. Measuring instruments

1.1. Acoustic measurement

- 1.1.1. The apparatus used for measuring the sound level must be a type-1 sound-level meter as described in IEC Publication 651 "sound level meters" (1979) by the International Electrotechnical Commission. Measurements must be carried out using the F ("fast response") characteristic of the sound-level-meter time weighting and the A characteristic of frequency weighting which are also described in the above-mentioned publication.

At the beginning and end of each set of measurements, the sound level meter must be calibrated in accordance with the manufacturer's instructions by means of an appropriate sound source (e.g. a pistonphone). The calibration device must meet the requirements of class 1 in IEC 942 "sound calibrators". The test must be considered invalid if the sound level meter errors registered during this calibration exceed 0.5 dB.

1.1.2. Positioning of the microphone.

The microphone must be located at a distance of 7.5 ± 0.2 m from track reference line CC' (figure 1) and 1.2 ± 0.1 m above the ground. Its axis of maximum sensitivity must be horizontal and perpendicular to the path of the vehicle (line CC').

1.2. Speed measurements

The vehicle speed on the test section will be determined when the front end of the vehicle has reached line PP' to an accuracy of ± 1 km/h (see figure 1).

1.3. Temperature measurements

Ambient : the device must be capable of measuring the ambient temperature to within $\pm 1^\circ\text{C}$. The ambient temperature is to be measured at a height of 1.2 m above ground. Ambient temperature must not be measured in direct sun-light.

Surface : the device must be capable of measuring the test surface temperature to within $\pm 1^\circ\text{C}$. The surface temperature is to be measured on the surface itself.

1.4. Wind measurements

The device must be capable of measuring the wind speed to within ± 1 m/s at a height of 1.2 m above ground. The wind direction must be recorded.

2. Conditions of measurement

2.1. Test site

The test site must consist of a central section surrounded by a substantially flat test area. The measuring section must be level; the test surface must be dry and clean for all measurements.

The test track must be such that the conditions of a free sound field between the sound source and the microphone are attained to within 1 dB. These conditions shall be deemed to be met if there are no large sound reflecting objects such as fences, rocks, bridges or buildings within 50 m of the centre of the measuring section.

The surface of the test track and the dimensions of the test site must be in accordance with Annex VI to Directive 92/97/EEC.

A central part of at least 10 m radius must be free of powdery snow, tall grass, loose soil or cinders.

There must be no obstacle which could affect the sound field within the vicinity of the microphone and no person is to stand between the microphone and the sound source. The operator carrying out the measurements and any observers attending the measurements must

position themselves so as not to affect the readings of the measuring instruments.

2.2. Meteorological conditions

No measurements must be made under poor atmospheric conditions. It must be ensured that the results are not affected by gusts of wind.

No tests are to be performed if the wind speed at microphone height exceeds 5 m/s.

The measurements shall not be made if either the ambient or test track surface temperature is below 5 °C.

2.3. Ambient noise

The background noise level (including any wind noise) must be at least 10 dB less than the tyre/road noise measured. A suitable shield may be fitted to the microphone provided that account is taken of its effect on the sensitivity and directional characteristics of the microphone.

Any measurement affected by a sound peak which appears to be unrelated to the characteristics of the general noise level of the tyres, is to be ignored.

2.4. Test vehicle requirements

2.4.1. The test vehicle will be a motor vehicle and be fitted with four single tyres on just two axles.

2.4.2. The vehicle must be loaded such as to comply with the test tyre loads as specified in section 2.5.3.

2.4.3. The wheelbase between the two axles fitted with the test tyres must be less than 3 m in case of class C1 tyres and 5 m in case of class C2 and C3 tyres (see section 2.4. of Annex V).

2.4.4. To ensure that tyre noise is not significantly affected by vehicle design features any spray suppression equipment fitted, must be removed and no vehicles should be used whose bodywork, in the vicinity of the tyres, could affect the noise generated by the tyres.

For example, it is not permitted to add or to retain any components in the immediate vicinity of the rims and tyres which may screen and absorb the noise emitted by the tyres.

However, it is permissible to remove or modify any components of the vehicle that may contribute to the background noise of the vehicle.

In addition, the vehicle's track width may be altered in order to enable the tyres to extend either partially or totally beyond the outline vehicle. Such changes may be required, for example, to ensure adequate steerability when wide tyres are being tested.

2.5. Tyres

2.5.1. Four tyres of the same type and range must be fitted to the test vehicle.

Tyres with special fitting requirements must be tested in accordance with these requirements (e.g. direction of rotation, ...).

The tyres must have full tread depth before being run in.

2.5.2. Tyres are to be tested on rims permitted by the tyre manufacturer.

2.5.3. For each tyre on the test vehicle, the test load Q_t must be 70 % to 90 % of reference load Q_r . For all tyres, reference load Q_r corresponds to the maximum mass associated with the load capacity index of the tyre (see Annex II - Appendix 2). Where the load capacity index consists of two numbers (see Annex II - section 2.28.), reference should be made to the first number. In the case of some ZR tyres where the load capacity index is omitted (see Annex II - section 3.1.6.1.), reference should be made to the maximum load distinctly marked on the tyre sidewall.

2.5.4. Each tyre fitted to the test vehicle must have a test pressure P_t not higher than reference pressure P_r and lying within:

$$P_r (Q_t/Q_r)^{1.25} \leq P_t \leq 1.2 P_r (Q_t/Q_r)^{1.25}$$

where :

- the reference pressure P_r for "standard" class C1 tyres is 2.5 bars,
- the reference pressure P_r for "reinforced" class C1 tyres is 3.0 bars", and
- the reference pressure P_r for class C2 and class C3 tyres is the pressure corresponding to the pressure index marked on the sidewall (see Annex II - section 3.1.11.).

- 2.5.5. The tyres should be "run-in" prior to testing in order to remove compound nodules or other tread-pattern characteristics resulting from the moulding process. This will normally require the equivalent of about 100 km of normal use on the road.

The tyres fitted to the test vehicle must rotate in the same direction as when they were run in.

- 2.5.6. Tyres must be warmed up prior to testing.

3. Method of testing

3.1. General conditions

For all measurements, the vehicle must be driven in a straight line over the measuring section (AA' to BB') in such a way that the median longitudinal plane of the vehicle is as close as possible to line CC'.

When the front end of the test vehicle has reached line AA', the vehicle's driver must have put the gear selector in its neutral position and switched off the engine. If abnormal noise (e.g. cooling fan, "pre-ignition") is emitted by the test vehicle during the measurement the test must be repeated.

3.2. Nature and number of measurements

The maximum sound level expressed in A-weighted decibels [dB(A)] will be measured as the vehicle is coasting between lines AA' and BB' (figure 1 - Front end of the vehicle on line AA'; rear end of the vehicle on line BB'). This value will constitute the result of the measurement.

At least four measurements will be made on each side of the test vehicle at a test speed higher than the reference speed, and at least four measurements at a test speed lower than the reference speed. The speeds will be more or less equally spaced over the speed range specified in section 3.3.

3.3 Test speed

The test vehicle speed will be within the range :

- from 70 to 90 km/h for class C1 and class C2 tyres,
- from 60 to 80 km/h for class C3 tyres.

4. Interpretation of results

The measurement will be invalid if an abnormal discrepancy between the maximum value and the general noise level is recorded.

4.1. Determination of test result

Reference speed V_{ref} used to determine the final result will be :

-80 km/h for class C1 and class C2 tyres,

-70 km/h for class C3 tyres.

4.2. Regression analysis of noise measurements

The (not temperature compensated) tyre/road noise level L_R in dB(A) is determined by a regression analysis according to:

$$L_R = \bar{L} - a\bar{v}$$

where :

\bar{L} is the mean value of the noise levels, measured in dB(A) :

$$\bar{L} = \frac{1}{n} \sum_{i=1}^{i=n} L_i$$

n is the measurement number ($n \geq 16$).

\bar{v} is the mean value of the logarithmic speeds :

$$\bar{v} = \frac{1}{n} \sum_{i=1}^{i=n} v_i \quad \text{with} \quad v_i = \lg(V_i / V_{ref})$$

a is the slope of the regression line in dB(A)

$$a = \frac{\sum_{i=1}^{i=n} (v_i - \bar{v})(L_i - \bar{L})}{\sum_{i=1}^{i=n} (v_i - \bar{v})^2}$$

4.3. Temperature compensation

L_R determined according to section 4.2. will be corrected by applying a temperature compensation to a road surface reference temperature Θ_{ref} , in accordance with the following :

$$L_R(\Theta_{ref}) = L_R(\Theta) + K(\Theta - \Theta_{ref})$$

where: Θ is the road-surface temperature measured,

$$\Theta_{ref} = 20^{\circ}\text{C},$$

$$\text{and } K = 0.03 \text{ dB(A)/}^{\circ}\text{C if } \Theta > \Theta_{ref}$$

$$0.06 \text{ dB(A)/}^{\circ}\text{C if } \Theta < \Theta_{ref}$$

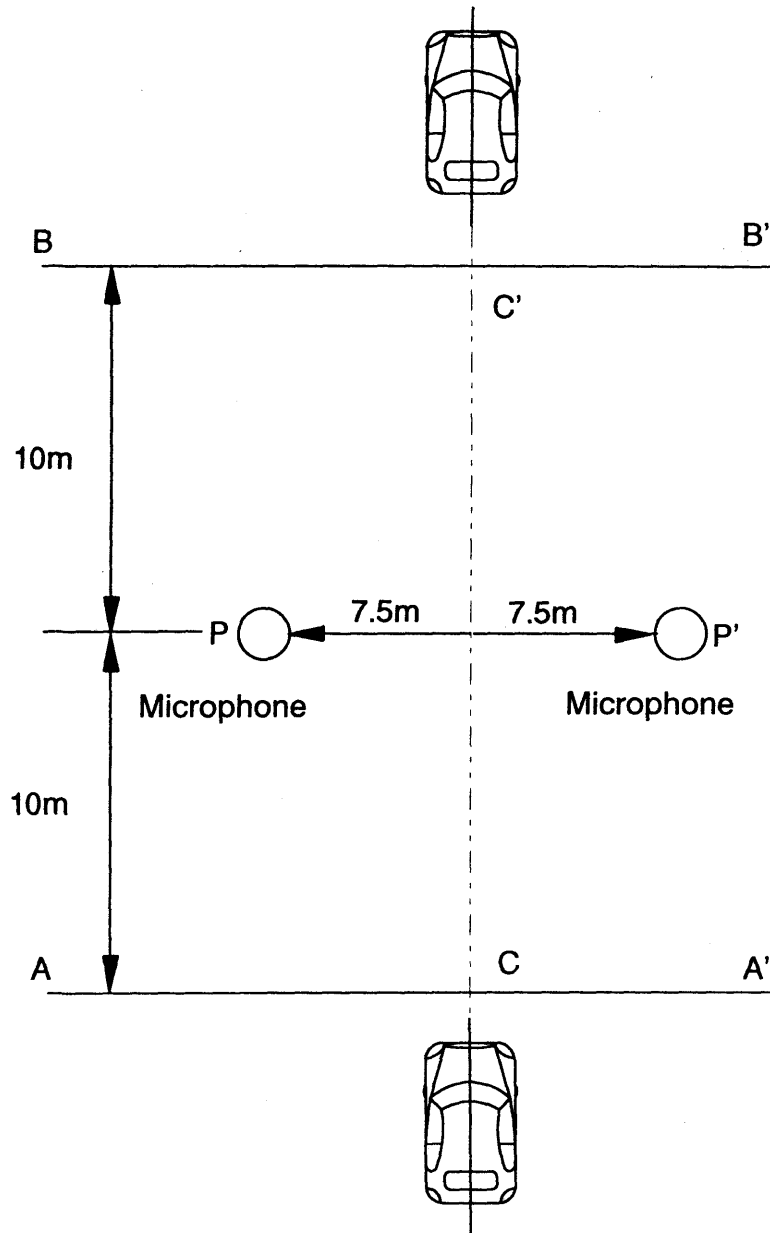
There will be no temperature compensation for class C3 tyres.

- 4.4. In order to take account of any measuring-instrument inaccuracies the results determined as per section 4.3. above are to be reduced by 1 dB(A).
 - 4.5. The final result, the temperature compensated tyre/road noise level $L_R (\Theta_{ref})$ in dB(A), will be rounded down to the nearest lower integer value.
5. Test report

The test report drawn up for the purpose of issuing the certificate referred to in appendix 2 must provide all relevant data. In particular details of the ambient conditions: namely test track, air temperature, wind (direction and speed) and ambient noise, must also be recorded in the test report.

Figure 1

Microphone positions for the measurement



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