

# COMMISSION OF THE EUROPEAN COMMUNITIES

COM (80) 468 final

Brussels, 21st November 1980

**PROPOSAL FOR A COUNCIL DIRECTIVE  
ON THE LIMITATION OF NOISE EMITTED BY HYDRAULIC AND  
ROPE-OPERATED EXCAVATORS AND BY DOZERS AND LOADERS**

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(presented by the Commission to the Council)

COM(80) 468 final

## I. INTRODUCTION

This proposal for a directive forms part of the European Communities' action programme on the Environment (1). This programme demonstrates the urgent nature of action on noise emission. The approximation of the laws in the construction plant and equipment sector is also mentioned in the supplement of 21 May 1973 (2) which the Council, on a proposal from the Commission included in the general programme of 28 May 1969 aimed at the removal of technical barriers to trade in industrial products.

The purpose of this proposal for a directive is to reduce sound emission from new hydraulic and rope-operated excavators, dozers and loaders, under a uniform set of regulations for the entire European Community. This proposal for a directive refers to a proposal for a directive in the process of adoption by the Council, and is based on the most recent activities of the Group on Economic Questions, i.e. document R/7128/79 (ENT 66) of 11.6.1979 as regards the outline directive.

The method of measurement is based on Council Directive 79/113/EEC of 19 December 1978, modified on ..... (4).

## 2. GENERAL

Owing to their numbers and method of operation, hydraulic and rope-operated excavators, dozers and loaders, hereinafter called "earth moving machines", contribute significantly to the ambient noise level.

As stated in the introduction, this proposal for a directive is aimed at limiting sound emission from earth moving machines. It classifies these according to their net installed power and divides them up into four classes based on their operating characteristics and on sound insulation techniques while taking account of each one's economic aspects. For the purpose of limiting the noise at operators' position, limit values are specified.

The Commission proposes "total" harmonization. This offers more complete protection of the environment than the "optional" method. It has, moreover, received wide support within the panel of national experts assembled by the Commission to help in drawing up this directive. Once adopted, therefore, this proposal is intended to replace the legal and administrative provisions in force in the Member States.

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- (1) O.J. C 112 of 20.12.1973 and C 139 of 13.6.1977
  - (2) O.J. C 38 of 05.6.1973
  - (3) O.J. C 76 of 16.6.1969
  - (4) O.J. L 33 of 08.2.1979 and O.J. C 300 of 01.12.1979

In order to meet specific requirements in addition to the provisions of the directive this proposal also allows Member States to impose restrictions on use via their national regulations, provided that they are not discriminatory. These restrictions should therefore also apply to earth moving machines already in use since, as stated elsewhere, this directive is only concerned with those placed on the market after its entry into force. For checking conformity to type, the choice of approval procedure is based on the outline directive (1) specifying the various procedures for the type approval of construction plant and equipment under discussion within the Council.

EEC type verification as defined in the outline directive (1) is proposed.

### 3. LEGAL SITUATION IN THE MEMBER STATES

#### Belgium

The outline law of 18 July 1973 empowers the central authorities to publish implementing orders aimed at limiting sound emission by and regulating the use of equipment. There are currently no specific regulations governing earth moving machines.

#### Federal Republic of Germany

Article 48 of the Federal Law for Protection against Nuisances empowers the federal government to draw up regulations laying down emission limit values. In addition, the regulation of 19 August 1970 on perceived noise provides for noise limits for various zones of activity during both day and night time.

More particularly administrative regulations (of 16.8.1972, of 04.5.1973, of 14.5.1973 and 17.12.1973) provide for emission limits for these machines used on public sites.

#### France

Decree no. 69-380 of 18 April 1969 stipulated that equipment used on sites must be sound-insulated so as not to cause an excessive nuisance.

The order of 11 April 1972 on the limitation of the airborne sound emission level of internal combustion engines in certain items of construction equipment lays down emission limits for the engines of these machines and provides for their type approval.

#### Netherlands

The 1952 General Law on Nuisances empowers the authorities to publish regulations aimed at limiting emission by noisy products. The frame law of 16.2.1979 is more precise on this point and envisages the setting of noise emission levels for noisy products.

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(1) R/7128/79 (ENIT 66 of 11.6.1979)

### United Kingdom

The Control of Pollution Act, Section III of 1 January 1976 confers upon local authorities the power to regulate site noise by prescribing :

- the method of carrying out the work;
- the installations or machinery to be used;
- working periods;
- sound emission limits

In the remaining Member States the situation is covered by general legislation.

In view of the differences between the legal provisions in the Member States, which are likely to cause an imbalance in conditions of competition, and so have a direct effect on the operation of the Common Market, Article 100 of the Treaty should be invoked.

#### 4. LIMIT VALUES FOR SOUND EMISSION TO THE ENVIRONMENT

4.1. The sound emission limits for earth moving machines are to be reduced in two stages. This offers a distinct advantage to the manufacturers, who will be able to see which way future requirements will be leading. It clearly spells out for users the firm resolve to achieve a considerable long-term reduction in sound emission from building sites.

In order to take maximum account of the various types, the Commission proposes four categories, each having a different permissible sound emission level.

The levels put forward take account of the proposals made by the national experts and the results of measurements carried out on different types.

The five-year period granted for implementing stage two is needed to take account of the time needed to adapt production lines for new models.

It should be noted that the prime effort is required for low-capacity earth moving machines, since they are generally used in an urban environment. Because of their performance the other categories are mainly used in industrial or uninhabited areas.

Two methods of measurement have been examined by the panel of national experts :

- a "static" method limited to measuring the noise from the main engine of the earth moving machines;
- a "dynamic" method enabling the noise emitted by both the main engine and the working features of the earth moving machine to be measured during a conventional work cycle.

Although a large majority of experts thought that the dynamic method approached nearest to the actual work of the engine under consideration, there were doubts as to whether this method gave sufficient reproductability of the measurements. This could become a problem during the trading of these products. For this reason it was decided, together with the national experts group, that the static method would be retained initially.

The group proposed that studies should be undertaken, through the Committee for adaptation to technical progress, to establish a reproducible method which includes not only the main motor but also the working accessories of the earth moving machines during their normal working conditions.

#### 4.2. NOISE GENERATED BY MACHINES AT OPERATORS POSITION

After consultation with the experts the Commission is of the opinion that an essential prerequisite for granting the advantages of free circulation should be a noise limit for the operator's position, intended to ensure that machines are designed and constructed to a good modern standard and are as quiet at the operator's normal working position as is technically and economically reasonable.

The limit proposed for the first stage is a value that can be met by most machines now on the market without modification, but will have the effect that machines with no sound-reducing measures are either improved or removed from the market. The second stage limits will require a substantial number of machines to be improved, but the technology needed is well known and the value proposed is one that is already attained in the most modern designs. Given the time allowed for phasing-in of the second stage limits, the economic burden imposed by the proposal should not be excessive.

Work on general principles of protection of workers from the harmful effects of noise is in preparation within the Commission.

The present directive is not concerned with measurement and limitation of the noise dose received by the operator. These aspects will be dealt with as part of the general worker protection programme of the Commission.

#### 5. ECONOMIC ASSESSMENT OF THE PROPOSAL

5.1. The Commission has paid close attention to the economic impact of the proposed regulation. In consulting industry it tried to obtain precise figures on the true cost of the sound insulation asked for.

5.2. Taken as a whole, the highly important Community market in construction plant covers 10% of the mechanical engineering sector (\*). The bulk of the construction plant sector is made of : loaders, excavators and dozers, i.e. the categories considered in these directives.

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(\*) Not including means of transport

In 1978 the EEC's annual production amounted to some 60 000 construction plant units, representing a value of the order of 3 000 million EUA. Today Community production accounts for almost a quarter of the world total, with the Community in second place after the United States and followed immediately by Japan. Some 85 manufacturers in 130 factories are currently building this type of construction plant in the Community.

According to the trade associations, 52 000 persons are directly employed in the sector.

In 1978 about 40% of the EEC's annual production was used in the country of manufacture, while a little over a third of the remainder, i.e. nearly a quarter of the total production, stayed in the Community. The main customers for exports to non-Community countries were the OPEC and EFTA countries.

5.3. It should be noted with regard to the direct cost of the proposal that the information received is still very fragmentary. According to the manufacturers the increase in the price of earth moving machines due to the stage-one specifications is 1 - 2%. It has not been possible to provide a valid estimate for stage two. If one refers to an EPA study on the cost of sound-insulating tractors that are comparable with earth moving machines one can estimate that, in view of the timescale for implementing stage two, its cost will be 3-4% of the cost per unit. It should be noted that the cost of maintaining such sound-insulated machines will rise where there are rules governing their use. In view of the service provided by the equipment the impact of this increase of overall site costs will be slight and will in no way affect the rate of inflation.

5.4. In practice, the manufacture of equipment complying with these specifications means incorporating insulating materials in the engine and improving or modifying certain components such as the exhaust silencer and the cooling fan. Setting uniform limits throughout the Community will expand the manufacture of these insulating materials.

One can assume that the resultant economies of scale will reduce the cost of these products, which at the moment are required on the French and German markets only.

Furthermore, since these insulating materials are manufactured mainly by medium-sized firms, greater demand will very likely help strengthen the small and medium-sized sector of industry.

One can conclude, therefore, that, although the proposal will slightly increase the cost of the equipment, its overall socio-economic effects will be favourable.

## 6. CONSULTATION OF INTERESTED PARTIES

In drawing up this proposal the Commission widely consulted the interested parties, in this case the CECE (Committee for European Construction Equipment).

## 7. COOPERATION AT INTERNATIONAL LEVEL

During the preparation of this proposal for a directive the Commission took part in the standardization activities of ad-hoc WP ISO/TC43, which was responsible for drawing up standards on airborne noise emitted by earth moving machines.

The Commission's participation in this work demonstrates its willingness to reach a uniform solution which, while guaranteeing the protection and improvement of the environment, would greatly facilitate international trade in earth moving machines.

The Commission has also conducted exchanges of information in this area with the US EPA and contemplates their further expansion.

8. CONSULTATION OF THE EUROPEAN PARLIAMENT AND THE ECONOMIC AND SOCIAL COMMITTEE

Under the terms of Article 100 (2) of the Treaty the opinion of these two bodies is required, since implementation of the provisions of the directive means that the legal provisions in all of the Member States will have to be amended.

PROPOSAL FOR A COUNCIL DIRECTIVE ON  
THE LIMITATION OF NOISE EMITTED BY  
HYDRAULIC AND ROPE-OPERATED EXCAVATORS  
AND BY DOZERS AND LOADERS

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 1973<sup>(1)</sup> and 1977<sup>(2)</sup> action programmes of the European Communities on the environment reflect the importance of the problem of noise nuisance and in particular the need for action to regulate the worst noise sources;

Whereas during the Council meeting of 18 - 19 December 1978 the Ministers for the Environment declared that the technical requirements relating to the measurement of noise at the operator's position would have to be included in the Annexes to the special directives on each type of equipment under consideration;

Whereas the disparity between the provisions already applicable in the various Member States concerning the limitation of the sound emission level of hydraulic and rope-operated excavators and of dozers and loaders directly affects the functioning of the common market; whereas it is therefore appropriate to carry out in this field the approximation of laws for which Article 100 of the Treaty provides;

Whereas, in the Member States, provisions aimed at limiting noise at the operator's position and methods of measuring the noise differ from one Member State to another and when applied to construction plant and equipment, constitute barriers to trade in such equipment; whereas those provisions must therefore be approximated;

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(1) O.J. No. C 112, 20.12.1973

(2) O.J. No. C 139, 13. 6.1977.



Whereas Council Directive . . . . . of . . . . .  
on the approximation of the laws of the Member States relating to common  
provisions for construction plant and equipment <sup>(3)</sup> laid down inter alia the  
procedures for EEC type-approval and EEC verification;  
whereas it is necessary, pursuant to that Directive, to prescribe the  
harmonized requirements which each category of equipment must satisfy;

Whereas Council Directive 79/113/EEC of 19 December 1978 on the approxima-  
tion of the laws of the Member States relating to the determination of the  
noise emission of construction plant and equipment <sup>(4)</sup>, as amended by Direc-  
tive <sup>(5)</sup>, laid down the method which should be used for establishing the  
acoustic criteria for hydraulic and rope operated excavators and for  
dozers and loaders;

Whereas owing to the effect of the noise emitted by hydraulic and rope-  
operated excavators and by dozers and loaders on the environment and, more  
particularly, on human well-being and health, it is necessary to bring  
about a progressive and appreciable reduction in the permissible sound  
emission level of hydraulic and rope operated excavators and of dozers  
and loaders;

Whereas it is appropriate to set a sound emission level applicable when  
this Directive comes into force and that five years later more stringent  
restrictions should come into force;

Whereas the measures in this Directive relate only to noise emitted by  
hydraulic and rope-operated excavators and to dozers and loaders, and  
whereas any provisions relating to exposure of operators to sound  
pressure are not concerned by this Directive;

Whereas technical provisions must be adapted rapidly to technical advances;  
whereas it is necessary to this end to provide for the application of the  
procedure set out in Article 21 of Directive . . . . .

HAS ADOPTED THIS DIRECTIVE

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(3) O.J. No. L 33, 8. 2.1979, p. 15

(2) O.J. No. L . . . . .

(5) O.J. No. L . . . . .

Article 1

1. This Directive applies to the permissible sound power level of hydraulic and rope-operated excavators and of dozers and loaders, hereinafter called "earth-moving machines", used to perform work on civil engineering and building sites.
2. This is a special Directive within the meaning of Article 3 (2) of Directive . . . . . , hereinafter called the "outline Directive".

Article 2

For the purposes of this Directive :

- 2.1. Hydraulic or rope-operated excavators are machines combining a self-propelled undercarriage with an upper structure which can swivel through more than 360°. The machine excavates, lifts, carries and dumps material by moving either a boom, an arm and bucket (as is the case with a face shovel or a backhoe) or a bucket controlled by the winding-gear (as is the case with a drag-line or a clamshell), the undercarriage remaining stationary during the machine's working cycle.
- 2.2. Dozers are self-propelled wheeled or crawler machines fitted in front with a blade which serves primarily to displace or spread materials.
- 2.3. Loaders are self-propelled wheeled or crawler machines fitted in front with a bucket. The machine loads, raises, transports and dumps material by combining its own movements and those of the bucket.

Article 3

1. The approved bodies shall issue an EEC type-verification certificate for every type of earth moving machine for which :
  - the airborne noise, measured under the conditions set out in the Annex to Directive 79/113/EEC as supplemented by Annex I

to this Directive, does not exceed the permissible sound power level specified with reference to the net power and dates in the following table :

Net installed power ISO 1585 of 1.10.74	Permissible sound power level in dB(A)/1 pW as from	
	the entry into force of the Directive	5 years after the entry in- to force of the Directive
≤ 150 kW	107	104
150 < ≤ 250 kW	110	107
250 < ≤ 375 kW	112	110
> 375 kW	115	112

- the sound pressure levels of airborne noise in dB(A) measured under the conditions of Annex II of Directive 79/113/EEC, as supplemented by this Directive, shall not exceed the permissible levels as indicated in the following table :

Permissible sound pressure level in dB(A)/ 20µpA at the operator's position	
on entry into force of the Directive	5 years after the entry in- to force of the Directive
89	86

2. All applications for an EEC type-verification certificate in respect of the permissible sound power level of earth moving machines shall be accompanied by an information document conforming to the model shown in Annex III.
3. For each type of earth moving machine it certifies, the approved body shall complete all the sections of the EEC type-verification certificate conforming to the model given in Annex III to the outline Directive.
4. The period of validity of EEC type-verification certificates shall be limited to five years. This may be extended by five years provided application is made during the 12 months preceding the expiry of the first five-year period.
5. By way of derogation from Article 19<sup>(1)</sup> of the outline Directive, the advantages provided for in this Article shall, after a period of 4 years from the entry into force of the Directive, no longer be available for earth moving machines supplied with certificates of conformity drawn up on the basis of an EEC type-verification certificate for the figures in the first period; the period of validity must accordingly be shown on the certificates of conformity concerned.
6. For every earth moving machine built in conformity with the type certified by EEC type-verification, the manufacturer shall complete a certificate of conformity conforming to the model given in Annex IV to the outline Directive.
7. Each earth moving machine built in accordance with the type certified by EEC type-verification shall bear a clear and permanent mark

indicating the sound power level in dB(A) referenced to 1pW, guaranteed by the manufacturer and determined as laid down in Annex I to Directive 79/113/EEC, as supplemented by Annex I to this Directive, together with the symbol  $\epsilon$  (epsilon). The model for this mark is given in Annex IV to this Directive.

#### Article 4

Member States may taken measures to regulate the use of earth-moving machines in areas which they consider sensitive.

#### Article 5

Checking of the conformity of production models with the type examined, as provided for in Article 12 of the outline Directive, shall be carried out using the technical procedure laid down in Annex V.

#### Article 6

The amendments necessary to adapt the requirements of the Annexes to technical progress shall be adopted in accordance with the procedure laid down in Article 4 of Directive 79/113/EEC.

#### Article 7

Member States shall take all necessary measures to ensure that earth-moving machines as defined in Article 2 cannot be placed on the market unless they satisfy the provisions of this Directive and of the outline Directive.

#### Article 8

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive on 1 October 1982 and shall forthwith inform the Commission thereof.

2. Member States shall communicate to the Commission the texts of the main provisions of national law which they adopt in the field governed by this Directive.

Article 9

This Directive is addressed to the Member States.

A N N E X I

Method of determining airborne noise emitted by hydraulic  
and rope-operated excavators, dozers and loaders

Scope

This method of measurement is applicable to hydraulic and rope-operated excavators, dozers and loaders, hereinafter called earth moving machines. It lays down the test procedures for determining the sound power level of such construction plant with a view to EEC type-approval, EEC verification and checking for conformity.

These technical procedures comply with the requirements laid down in the Annex I to Directive 79/113/EEC<sup>(1)</sup>, and the provisions of that Annex are applicable to earth-moving machines subject to the following additions :

4. Criteria to be used for expressing results

4.1. Acoustic criterion for the environment

The acoustic criterion for the environment of an earth moving machine shall be expressed by the sound power level  $L_{WA}$ .

6.2. Operation during measurements

The noise emitted shall be measured with the earth moving machine stationary and its engine idling (free of load).

For these measurements, the engine and hydraulic system of the earth moving machine must be warmed up in accordance with the manufacturer's instructions; safety requirements must be observed.

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(1) O.J. L 33 of 8.2.1979

Measurements of the noise emitted at the operator's position shall be carried out under the same conditions and in accordance with the requirement laid down in Annex II to Directive 79/113/EEC.

6.2.1. Static testing of the sound source free of load

The test shall be carried out with the earth moving machine and the engine running at its rated speed (1), without operating the working equipment or travelling mechanism.

The rated speed shall be set by the manufacturer. The bucket of the excavator or the loader, respectively the blade of the dozer, shall be positioned at a height of  $300 \text{ mm} \pm 50 \text{ mm}$  above the ground or at its maximum height if the former height cannot be attained. The plane formed by the edges of the bucket (excluding the teeth) or the blade must be more or less parallel to the ground (transport position).

6.3. Measuring site

The measuring site must be flat. This site, including the microphone positions, shall be of concrete or non-porous asphalt.

6.4. Measuring surface, measuring distance, location and number of measuring points

6.4.1. Measuring surface, measuring distance

The measuring surface to be used for the test shall be a hemisphere. The radius of the hemisphere shall be determined by the basic length (1, see fig. 1).

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(1) corresponding to the net installed power determined in accordance with ISO 1585, First edition, 01.10.1974.



The radius shall be :

- 4 m when the basic length of the earth moving machine to be tested is not greater than 1.5 m;
- 10 m when the basic length of the earth moving machine to be tested is greater than 1.5 m but not greater than 4 m;
- 16 m when the basic length of the earth moving machine to be tested is greater than 4 m.

For the earth moving machine, the geometrical centre of the basic machine shall be positioned vertically above the centre of the hemisphere and the front of the machine shall face measuring point  $x_1^0$ .

#### 6.4.2. Location and number of measuring points

##### 6.4.2.1. General

For measurements there shall be six measuring points, i.e. points 2,4,6,8,10 and 12 arranged as defined in section 6.4.2.2. of the Annex I to Directive 79/113/EEC.

The front of the earth moving machine shall face measuring point  $x_1^0$ .

##### 7.1.1. Extraneous noise

The level of parasitic noise shall not be taken into consideration (7.1.1.(b)).

##### 7.1.5. Presence of obstacles

A visual check in a circular zone having a radius three times that of the measuring hemisphere and the same centre is adequate to ensure that the provisions of section 6.3. paragraph 3 of Annex I to Directive 79/113/EEC have been complied with.

8.5. Calculation of the sound power level  $L_{WA}$

Correcting factor  $K_2$  shall be zero.

A N N E X II

Method of measuring airborne noise generated by  
hydraulic and rope-operated excavator's, dozers and loaders  
at the operator's position

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Scope

This method of measurement applies to hydraulic and rope-operated excavators, dozers and loaders, hereinafter called earth moving machines. It lays down the test procedures for determining the equivalent continuous sound pressure level at the operator's position.

These technical procedures comply with the requirements laid down in Annex II to the Directive 79/113/EEC, and the provisions of that Annex apply to earth moving machines subject to the following additions :

6. Operators

An operator shall occupy the operator's position.

6.2.1. Standing operator

This point shall not be taken into consideration.

7.1. General

The microphone shall be located as specified in section 7.3.

9.1. General

The conditions for installing and operating the machine are those laid down in point 6.2. of Annex I.

9.2. Operation of machines with adjustable features

Adjustable features, excepted those mentioned in point 9.2.2., shall not be taken into consideration.

10.2.2. Using the A-weighted sound pressure levels  $L_{pA}$

If a sound level meter is used,  $\Delta t$  shall be five seconds.

A N N E X III

Model Information Document for a Type of  
Earth Moving Machine

1. General

- 1.1. Name and address of manufacturer or authorized representative .....
- 1.2. Make (name of undertaking) .....
- 1.3. Commercial description .....
- 1.4. Type .....

2. Dimensions of the earth moving machine

- 2.1. Length - l (see figure 1)
- 2.2. Mass operational ..... kg
- 2.3. Unit lay-out of the earth moving machine

3. Operating conditions

- 3.1. Operation of the drive motor
  - 3.1.1. Make and type .....
  - 3.1.2. Energy used : petrol, diesel, electric\*
- 3.2. Installed net power, .....kW\*\*
- 3.3. Nominal engine speed ..... rev/min

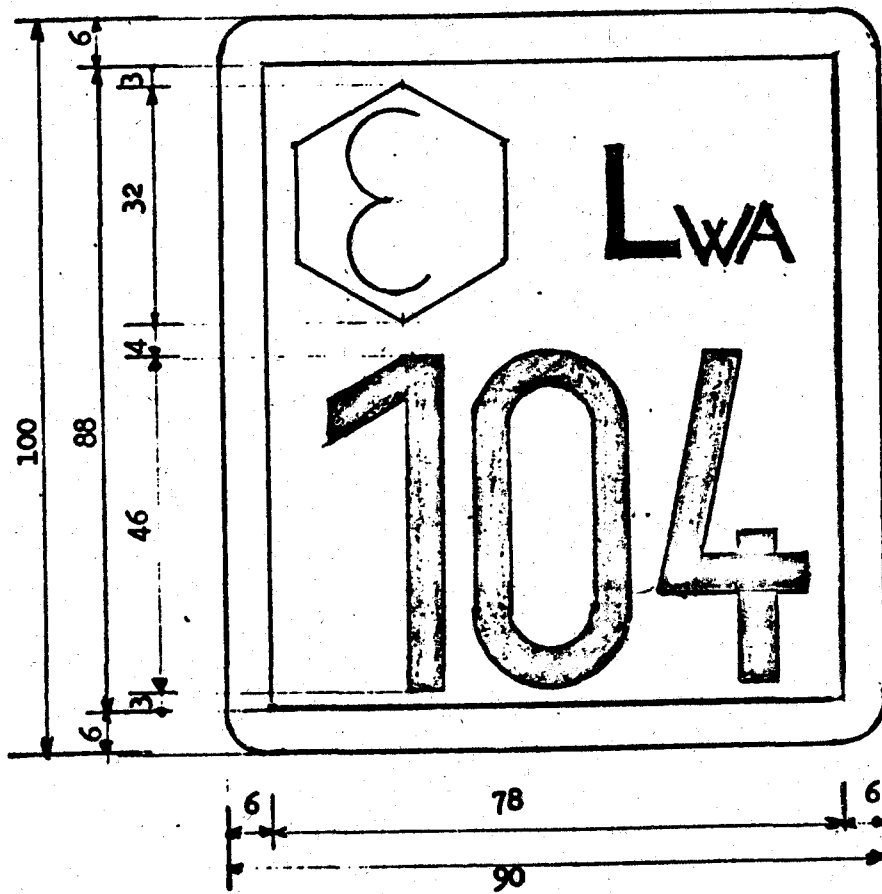
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\*) delete as appropriate

\*\*\*) ISO 1585, First edition, 01.10.1974

ANNEXE IV

Model of plate stating the sound power level



ANNEX V

Technical procedure for checking the conformity  
of production models with the type examined

The conformity of production models with the type examined shall,  
if possible, be verified by spot checks.

BASIC LENGTH OF EARTH MOVING MACHINE

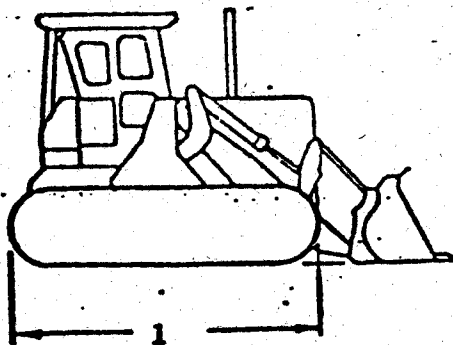
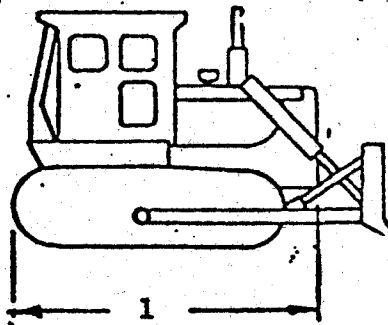
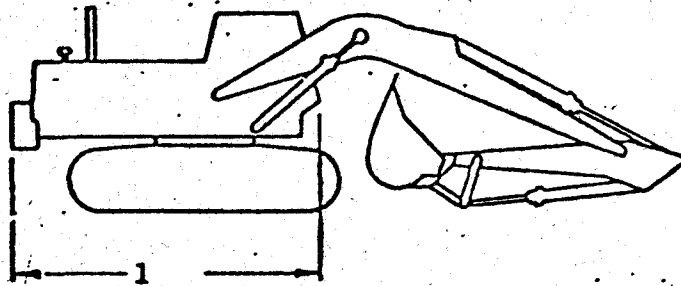


fig.1