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NOISE LABELLING IN DENMARK

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INTRODUCTION

Noise labelling of plastic processing machines and woodworking machines is at present being introduced on a voluntary basis in Denmark. The programme receives financial backing from the Danish Working Environment Fund. It is intended that the voluntary programme may later be expanded to include other types of industrial machines of limited size and which are produced/sold in large numbers.

The fact that the noise labelling is on a voluntary basis implies that the buyers of the machines and not the authorities make demands regarding noise labelling information. Thus the programme does not include maximum limits for noise emission stipulated by the authorities.

THE AIM OF NOISE LABELLING

The primary aim of noise labelling is to make it possible to compare the noise emission from various models/products of a similar machine type, so that the buyers of machines may choose the less noisy model. Secondly the purpose is to make it possible to predict the noise level in new workshops and to select new machines according to the existing noise environment.

Buyers' demand for less noisy machines is hoped to motivate manufacturers and suppliers to produce and market low noise machines. Such a development will in the long run result in reduced total expenditure in respect of noise control.

LABELLING CONDITIONS

In order to be able to compare machines it is necessary that the conditions for noise measurements are standardized, as far as both acoustics and operation conditions are concerned.

Standards for acoustic. The acoustic measurements are performed according to ISO 3746, which is a survey method used to determine the sound

power level. It is not practicable to move machine tools to special rooms for measurement, and it has therefore been impossible to choose a measurement method with engineering accuracy. Apart from the sound power level the sound pressure level is measured at the operator's position, or if the machine is automatic, at a fixed measuring point. This measurement is performed according to ISO/DP 7960 part 1, which makes it possible to make an environmental correction of the measured sound pressure level.

Standards for operating conditions. The acoustic standards are used for all types of machines. However, a standard for operating conditions is needed for each type of machine. The operating conditions for both woodworking and plastic machines have been chosen in order to subject the machine to a heavy, normal load. In this way the result of the noise labelling may also be used to form the basis for prediction of the noise levels in workshops.

The labelling program includes in respect of woodworking machines the eight most common types of machines, such as circular saws, planing machines, thickness planing machines and moulding machines. Operating conditions for these are described in ISO/DP 7960 part 3.

The following plastic processing machines are included: Granulators and injection moulding machines. The operating conditions for these machines have been drawn up by dealers and buyers in co-operation and the conditions chosen are in accordance with the German DIN norm 45 635 Teil 31 and 37.

Paper work. Each measurement is thoroughly documented in two tables, one concerning acoustics and one concerning operating conditions. These tables are kept by the measuring institution and one copy is handed to the machine dealer. For use on exhibitions and for the use of buyers a number of certificates are produced. The certificate shows the measurement results and identifies the machine, but only documents the measurements in broad outlines.

LABELLING VALUE

Since the participation in the program is on a voluntary basis, it is not economically feasible to measure more than one machine of each type. The results of the labelling are therefore subject to some uncertainty, partly measurement uncertainty, partly due to the variation in sound emission from individual machines of the same type.

This may be acceptable as long as the main purpose is to compare machines of similar size and noise characteristics. However the supplier will have to take this into account if he wishes to use the labelling results as a guarantee. It is the supplier's responsibility to secure that the machines he sells are in accordance with the machine tested. Measurements performed by foreign institutions are accepted in Denmark provided the relevant standards for operation have been used, and that the acoustic standard gives an accuracy better than or equal to ISO 3746.

USER'S GUIDANCE

Noise labelling is intended to assist both buyers and dealers in connection with machine deliveries, and a user's guidance has been prepared which makes clear the use of the data. The guidance approaches users at many levels, for instance machine producers and suppliers, buyers, supervisors, safety representatives, and the noise declaration program should therefore be of use also to persons who do not possess knowledge of noise problems.

The sound power level is used in the program in order to obtain an unambiguous description of the noise emission. The concept of sound power is not however readily understood everywhere, and the user's guidance therefore contains a simple explanation of sound power level and sound pressure level.

INTRODUCTION OF THE PROGRAM

The program aims to introduce a more expansive arrangement, in order that noise labelling may eventually become a natural part of all machine deliveries. The program includes: information, measurements and publication of the measurement results.

Information. With the user's guidance information has been forwarded to the suppliers, organisations and individual firms.

Measurements. Backing from the Danish Working Environment Fund has made it possible to perform noise labelling measurements for specific types of machines at a favourable price. Thickness planing machines and plastic granulators are labelled free of charge, while the other machines included in the program are labelled at approx. half price. The purpose of this is that financial reasons should not prevent any supplier from having the machine noise labelled.

Catalogue. All measurement results will be published in a catalogue/noise data bank.

TECHNICAL BACKGROUND FOR OPERATING CONDITIONS

The following requirements should be fulfilled by the machinetypes, included in the program:

- a) it should be of a size that makes it appropriate to measure the sound power level
- b) the noise from the machine should be emitted by parts normally delivered with the machine
- c) it is desirable, that the noise emission at different operating conditions is so uniform that the labelling results may be used to predict noise levels in the factories.

Plastic processing machines. As there were no standards available, which were applicable, a working group with representatives for suppliers and buyers of plastic machines was elected, in order to work out operating conditions.

Blow moulding machines, injection moulding machines and granulators were examined:

- a) was fulfilled
- b) the noise from a blow moulding machine greatly depends on the shape of the mould. The mould is delivered separately, and is often produced by the user. The blow moulding machine was therefore excluded for the time being.
- c) a study was made to clarify this and work out the basis for choice of operating conditions:

At the plast injection moulding machine the sound power level was only to a limited extent dependent on the load of the machine. Furthermore the machine will, when working, be loaded near its maximum, - more or less similar to the labelling operating conditions - in order to ensure high productivity. In respect of plastic granulators relatively limited variations of sound power level were found while granulating a number of different materials - but polycarbonate (rarely used) was exceptionally noisy.

Injection moulding machines and granulators were therefore chosen for the program.

Woodworking machines. When the Danish work was started, Swedish and German national standards already existed for a number of machine types, and there were also proposals from EUMABOIS - The European Association of Manufacturers of Wood Working Machines. After consultations with manufacturers and importers of machines it was decided, that Denmark should use internationally acknowledged standards. At the same time it was desirable to combine the contents of the existing standards. This demand is met by ISO DP 7960, Part 3, which describes the operating conditions for the eight machine types included in the Danish program.

The eight chosen machine types all meet the general requirements a, b and c.