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REVISION OF ISO 140/II
STATEMENT OF PRECISION REQUIREMENTS

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The recently published standard BS 2750: Part 2:1980 is identical to ISO 140/II and therefore there is good reason to monitor the changes presently being discussed for the revision of ISO 140/II. Briefly, the second draft revision of ISO 140/II presents new (lower) repeatability figures to encourage more precise measurement techniques within laboratories, together with a different method of checking repeatability. Also, detailed procedures for conducting repreducibility checks between laboratories and tentative reproducibility figures are now proposed for inclusion in the standard.

The value of some of the changes is examined with reference to sound insulation measurements carried out in the Acoustic Laboratories at British Gypsum. Summarising, it is found that both the repeatability check methods have shortcomings and are not directly effective at promoting accurate testing. However, the accepted present state of sound insulation testing militates against any serious attempt to obtain more precise measurements on cost grounds (this is especially true in field measurements) and therefore the standard should perhaps acknowledge this and consider repeatability figures in line with current practice. For example, from measurements of the sound field properties in a pair of 100 m^3 reverberent rooms used for measuring sound reduction index, it is found that eight random microphone positions with a reverberation time determination at each position is needed to meet the repeatability figures. In conditions more typical of field measurements, twelve random microphones with six reverberation time measurements may be necessary to achieve sufficient precision of measurement.

In spite of the testing difficulties some organisations are keen to make more precise measurements than the standard suggests, for product marketing and development reasons. For example, airborne sound insulation repeatability figures from British Gypsum and the French owned CEBTP and CSTB laboratories are compared in Fig. 1 where it is evident that all three laboratories achieve somewhat lower repeatability compared to the proposed figures except that the French laboratories have slight problems at 630 and 800 Hz. The attainment of given reproducibility figures when comparing different testing organisations obviously depends on the individual accurate test methods but also on laboratory design aspects. One important factor is the positioning of the test specimen in the aperture. ISO 140/III advises that the specimen be placed in the centre of the aperture yet it is well known that repeatability suffers considerably and also systematic differences between the two directions of test occur - both points hardly conducive to good reproducibility. For example, in Fig. 2, the effect of placing a specially constructed demountable partition at several points in the test aperture in terms of the measured sound reduction index is shown. The lowest values of R at the lower frequencies are obtained with the partition centrally located and the highest values when mounted flush with one face of the dividing wall containing the test aperture. Overall, the spectrum slope is seen to vary with partition

location.

It is concluded, therefore, that the trend towards obtaining accurate testing is encouraged by the standards but little practical effort is made to tackle the roots of the problem.

FIG.1 MEASURED REPEATABILITY r

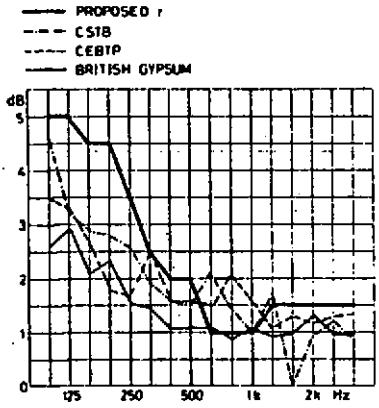

FIG. 2 POSITION IN APERTURE - EFFECT ON R