

Transformed

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION
R 266**

PREFERRED FREQUENCIES FOR ACOUSTICAL MEASUREMENTS

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BRIEF HISTORY

The ISO Recommendation R 266, *Preferred Frequencies for Acoustical Measurements*, was drawn up by the Technical Committee ISO/TC 43, *Acoustics*, the Secretariat of which is held by the British Standards Institution (B.S.I.).

Work on this question by the Technical Committee began in 1957, and led, in 1960, to the adoption of a Draft ISO Recommendation.

In November 1960, this Draft ISO Recommendation (No. 402) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Australia	France	New Zealand
Austria	Germany	Sweden
Belgium	Hungary	Switzerland
Chile	India	United Kingdom
Denmark	Iran	U.S.A.
Finland	Netherlands	U.S.S.R.

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in August 1962, to accept it as an ISO RECOMMENDATION.

PREFERRED FREQUENCIES FOR ACOUSTICAL MEASUREMENTS

1. PURPOSE

- 1.1 The variety of frequencies at present used for acoustical measurements makes comparison of results inconvenient. Some of the difficulties arise from the use of frequencies spaced at different intervals or of series starting from different reference frequencies. The purpose, therefore, of this ISO Recommendation is to refer all frequency-series to a single reference frequency, and to select other frequencies in such a way as to afford a maximum number of common frequencies in the various series. The resulting simplification thus reduces to a minimum the number of frequencies at which acoustical data need to be tabulated; equipment may be specifically constructed for these frequencies; even graph paper may be printed in advance.
- 1.2 Because many kinds of measuring equipment are in current use, it is inevitable that certain equipments will not conform to the present ISO Recommendation; nor is it to be expected that existing equipment will be immediately discarded. This ISO Recommendation, however, provides a guide to future design and construction of apparatus and to the selection of the various frequencies in an orderly fashion.
- 1.3 The frequency of 1000 Hz (c/s) is of great importance in acoustics. For example, it is the reference frequency to the definition of the phon.* 1000 Hz (c/s) frequency has therefore been selected as the basic frequency for all series of preferred frequencies for acoustical measurements.
- 1.4 For certain kinds of acoustical measurements, it is convenient to space the frequencies by fractions of an octave; but for extensions into the infrasonic and ultrasonic ranges, it is convenient to use powers of 10. These two requirements are, strictly, incompatible. However, it has proved possible, without inconvenience, to use the $10^{1/10}$ series for calculating the entries in the table because of the fact that $2^{1/3}$ ($= 1.2599$) is very nearly the same as $10^{1/10}$ ($= 1.2589$), i.e. ten successive intervals in the 1/3 octave series may be accepted as a sufficient approximation to the preferred frequency ratio of 10. Practical considerations may also make some additional rounding desirable: thus 500 Hz (c/s) is listed instead of 501.187, which is the exact frequency determined by the $10^{1/10}$ scale. The maximum individual deviation introduced is 1.22 per cent. All selected numerals comply with ISO Recommendation R 3, *Preferred Numbers. Series of Preferred Numbers*. Where more precision is needed, the frequency may be computed from the formula:

$$10^{n/10}$$

where n is an integer, positive or negative.

2. SCOPE

- 2.1 For certain acoustical measurements, a constant frequency increment is a suitable spacing. More commonly, however, a constant percentage increment is adopted and the test frequencies then form a geometric series. The present ISO Recommendation deals with the geometric series and is not intended to apply to cases where a constant frequency increment, or other particular spacing, would be more suitable, or where there may be good reasons for the adoption or retention of other frequencies.
- 2.2 The present ISO Recommendation does not deal with frequencies for music.

* See ISO Recommendation R 131, *Expression of the Physical and Subjective Magnitudes of Sound or Noise*.