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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 23146-2008

**Calculation of the frequencies and cents of twelve-tone equal
temperament**

十二平均律的频率与音分的计算

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Foreword

Appendix A of this standard is a normative appendix. The standard proposed by China National Light Industry Council. This standard by the National Standardization Technical Committee instrument. This standard by Ningbosenlong Instrument Co., Ltd., Beijing Institute of Musical Instruments, National Instrument Standardization Center, Shanghai super limited dial piano Company drafted. The main drafters of this standard. Luo Jianfeng, Zhang Zhenqi, Wang Wei, Sun Zhaoping, and high. Tempered frequency and cents calculations

1 Scope

China's national standard for calculating the frequencies of the twelve-tone equal tempered scale and the cent values derived from them. It specifies the terms, the frequencies and the method of calculating them in cents, and it may be used in instrument design, manufacture and tuning. Equal temperament is the compromise on which almost all Western and most modern Chinese instrument making rests. The intervals that sound consonant are simple frequency ratios - an octave is exactly two to one, a fifth very nearly three to two - but those ratios do not close: stacking twelve perfect fifths does not return to the starting note, it overshoots by a small and audible amount. An instrument tuned in pure intervals is therefore in tune in one key and out of tune in others, which is tolerable for a violinist who adjusts as they play and impossible for a piano, an organ or a fretted instrument, where the pitches are fixed when the instrument is built. Equal temperament resolves it by dividing the octave into twelve exactly equal ratios, each the twelfth root of two: no interval except the octave is pure, every interval is equally slightly impure, and every key is equally usable. The cent divides each of those semitones into a hundred parts, giving a logarithmic unit in which a deviation of pitch is a number rather than a ratio, which is how tuning accuracy is specified and measured. The standard fixes the reference pitch, the resulting frequency for every note, the formulae relating frequency to cents, and a normative annex of the values - so that a fret position, a pipe length, a string scaling or a tuning specification is computed

from one agreed table. Issued on 30 December 2008 and in force since 1 September 2009.

This standard specifies the frequency and method of calculation and cents terms of the tempered. This standard can be used to instrument design, manufacture and tuning musical instruments.

2 Normative references

The following documents contain provisions which, through reference in this standard and become the standard terms. For dated references, subsequent Amendments (not including errata content) or revisions do not apply to this standard, however, encourage the parties to the agreement are based on research Whether the latest versions of these documents. For undated reference documents, the latest versions apply to this standard.

GB/T 3451 standard tuning frequency

3 Requirements

3.1 is a tempered octave is divided into 12 sound level that is twice the frequency between each two adjacent sound level frequency ratio.

12 Sang 2, (approximately equal to 1.059463); every two adjacent sound level difference of 100 cents.

3.2 In the small print of a set of a standard pronunciation, should meet the requirements of GB/T 3451 regulations.

3.3 tone equal temperament column order shown in Table 1. Table 1, column tempered tone sequence table Group

1 Group 2 characters characters characters group set small print small print small print Group

3.4 Conversion tone row corresponding to each letter name frequency

3.4.1 calculation by the frequency corresponding to the note name, see (1) Like -1 12 (1) Where.

--- Sounds like the position in the sound column. Bit integer for the musical alphabet corresponding to the sequence number of decimal places for the sound score. Its tone is the first decimal place

4 Group

5 Group Musical alphabet letter name sequence number sequence number sequence number sequence number of the musical alphabet letter name note name sequence number sequence number sequence number of the musical alphabet letter name sequence

number sequence number musical alphabet letter name - - 4 C1 16 C 28 c 40 c1 52 c2 64
c3 76 c4 88 c5 - - 5 # C1 17 #C 29 #c 41 # c1 53 # c2 65 # c3 77 # c4 - - - - 6 D1 18 D 30 d
42 d1 54 d2 66 d3 78 d4 - - - - 7 # D1 19 #D 31 #d 43 # d1 55 # d2 67 # d3 79 # d4 - - - - 8
E1 20 E 32 e 44 e1 56 e2 68 e3 80 e4 - - - - 9 F1 21 F 33 f 45 f1 57 f2 69 f3 81 f4 - - - - 10
F1 22 #F 34 #f 46 # f1 58 # f2 70 # f3 82 # f4 - - - - 11 G1 23 G 35 g 47 g1 59 g2 71 g3
83 g4 - - - - 12 # G1 24 #G 36 #g 48 # g1 60 # g2 72 # g3 84 # g4 - - 1 A2 13 A1 25 A 37 a
49 a1 61 a2 73 a3 85 a4 - - 2 # A2 14 # A1 26 #A 38 #a 50 # a1 62 # a2 74 # a3 86 # a4 - -
3 B2 15 B1 27 B 39 b 51 b1 63 b2 75 b3 87 b4 - -