

# TECHNICAL DETAILS

## Die Wohltemperirte Gitarre / Thidell Formula 1

Die Wohltemperirte Gitarre is adapted for the guitar from Dr. Bradley Lehman's brilliant reconstruction of the keyboard temperament used by J.S. Bach for Das Wohltemperirte Clavier. Thidell Formula 1 is designed exclusively for the guitar.

Listening to the Wohltemperirte major thirds, we notice that the keys of F, C, and to an extent G, are the most favoured, which gives a tonal balance well adapted to keyboards where major keys are concerned (F major is a barre shape on the guitar, but uses only white keys on the keyboard). We have modified this a little to fit in better with its application on the guitar. Major keys which are more consonant than in equal temperament are F, G, Bb, C, D. Minor keys which are more consonant than in equal temperament are E, F#, Ab, A, B, D.

Formula 1 does not take F as most favoured major key, but keeps the third to A equal tempered. However the F - C fifth interval is Just. The tonal balance here favours the major keys of E, F#, G, A, B, C, D. Minor keys which are more consonant than in equal temperament are E, F#, G#, A, B, Eb.

One thing which is very similar about these temperaments is the open string offsets. (Specified in cents offset from equal temperament.)

### Die Wohltemperirte Gitarre

E	A	D	G	B	E
-2	0	+2	+3,9	0	-2

### Thidell Formula 1

E	A	D	G	B	E
-2	0	+2	+4	-1	-1

We see that an octave stretch is built into Formula 1 for the note E. One of the reasons for this is to make a better fifth interval to A.

The general open fourth increase serves to subtly push up the pitch for D and G so that the major third intervals from D - F# and G - B are larger and the minor third interval to E is smaller. This makes for thirds which are closer to Just.

### Chromatic analysis: Die Wohltemperirte Gitarre

E	F	F#	G	Ab	A	Bb	B	C	C#	D	Eb
-2	+7,8	-1,4 (+2)	+3,9 (+3,9)	+0,2 (+3,9)	0	+3,9	0	+5,9 (+3,9)	+1,4 (+3,9)	+2	+0,6 (+3,9)

Figures in brackets are the original Bach/Lehman figures, the upper row is the Lehman temperament as modified for the guitar. F# is lowered to give a good D major. G# is lowered to make E major more consonant. C# is lowered for a better A major. Eb is lowered for a better B major. These are all common guitar keys.

### Chromatic analysis: Thidell Formula 1

E	F	F#	G	Ab	A	Bb	B	C	C#	D	Eb
-2	0	-4	+4	-4	0	-4	-1	+2	-4	+2	-4

Study of this chromatic scale reveals that it has 7 fifth intervals which are purer than their equal tempered equivalents. If we add together the number of major and minor highlights we get 20. The equivalent number of highlights in Wohltemperirte is 15.

The remaining key signatures in both Wohltemperirte and Formula 1 all sound harmonically acceptable to the ear, with varying degrees of tonal colour.