

**Tonal analysis report for: ex-Woodlesford, All Saints**

Keltek Trust Ref.: 19011

Partial frequencies in Hz

Partial	Bell	Tenor	5th	4th	3rd	2nd	Treble
Nominal		854	959	1076	1140	1282	1434
Quint		655	740	825	872	976	1059
Tierce		513	575	642	682	766	846
Prime		406	446	472	532	581	626
Hum		226	255	286	298	336	364

Tenor keynote: Ab+48 cents International Pitch

Estimated accuracy for frequency analysis: +/- 0.5%

Partial ratios

Partial	Bell	Tenor	5th	4th	3rd	2nd	Treble
Nominal		DATUM	1.1230	1.2600	1.3349	1.5012	1.6792
Quint		0.7670	0.7716	0.7667	0.7649	0.7613	0.7385
Tierce		0.6007	0.5996	0.5967	0.5982	0.5975	0.5900
Prime		0.4754	0.4651	0.4387	0.4667	0.4532	0.4365
Hum		0.2646	0.2659	0.2658	0.2614	0.2621	0.2538

For a perfect *True Harmonic* tuned bell the Hum is 0.25, Prime 0.5, Tierce 0.6, Quint 0.75 with reference to the Nominal

Equal Tempered Scale: Errors in cents compared to true-harmonic tuned bells

Partial	Bell	Tenor	5th	4th	3rd	2nd	Treble
Nominal		DATUM	1	0	0	3	-3
Quint		39	49	38	34	26	-27
Tierce		2	-1	-10	-5	-7	-29
Prime		-87	-125	-227	-119	-170	-235
Hum		99	107	106	77	82	26

Errors in cents (100 cents = 1 semitone)

Just Intonation Scale: Errors in cents compared to true-harmonic tuned bells

Partial	Bell	Tenor	5th	4th	3rd	2nd	Treble
Nominal		DATUM	-3	14	2	1	13
Quint		39	49	38	34	26	-27
Tierce		2	-1	-10	-5	-7	-29
Prime		-87	-125	-227	-119	-170	-235
Hum		99	107	106	77	82	26

Errors in cents (100 cents = 1 semitone)

Comparison with tuning scales - errors in cents

Scale	Tenor	5th	4th	3rd	2nd	Treble
Equal Tempered	DATUM	1	0	0	3	-3
Just Intonation	DATUM	-3	14	2	1	13

Rings of bells can be tuned to many different scales. Two of the most common are Equal Tempered and Just Intonation.

Details of weights, diameters, notes, founders and dates of casting

	Tenor	5th	4th	3rd	2nd	Treble
Weight (cwt)	8-2-0	6-3-0	5-2-15	4-3-6	4-0-24	3-2-20
Weight (kg)	432	343	286	244	214	187
After tuning (cwt)						
Diameter (in.)	36.9	33.9	31.9	29.9	28	25
Diameter (mm)	937	861	810	759	711	635
Note	Ab+48	Bb+49	C+48	Db+48	E -49	F+45
Founder	Mears & Stainbank	Mears & Stainbank	Mears & Stainbank	Mears & Stainbank	Mears & Stainbank	Mears & Stainbank
Date	1870	1870	1870	1870	1870	1870

Scale	Tenor	5th	4th	3rd	2nd	Treble
Equal Tempered						
Just Intonation						

Detailed information about the sound of bells including the description of partials, tuning scales and true-harmonic tuning may be found on our web site.