	A	B	C	D	E	F	G	H
1	**I. Bocal**		Original bocal; Winckler2 No					
2	dia reed end		inside diameter of reed end of bocal					
3	bocal string length (0, 1)		length of bocal inserted into receiver					
4	metal bocal length top (0, 1)		meas. along top of bocal					
5	metal bocal length bot (0, 1)		meas. along bottom of bocal					
6	dia wj end		inside diameter of bocal					
7								
8	bocal logic	2	if bocal logic = 0 => bocal is choke; if bocal logic = 1 =>choke in wing joint calc; if bocal logic = 2 => no bocal					
9								
10								
11								
12								
13	**II. Wing Joint Lengths**		bocal receiver: Winckler2 no; the upper part of the wing has been repaired					
14	choke bore dia.	10.5	logic 1; bore diameter of choke; logic 0; either diameter bocal bottom or beginning of bore at bottom or receiver					
15	receiver length (1, 0) (formally choke length)	50	logic 1; length of choke from top of wing joint; logic 0; length of receiver (same as string length)					
16	wing joint length	506	total wing joint length, including tenon and socket					
17	tenon length	47.1	tenon length					
18								
19	wj f2	231	dist top of wing to where tone hole enters bore [not at the center of the tone hole]					
20	wj e	276						
21	wj d	317	Winckler2 tone hole not drill totally into center of bore					
22								
23	Bore dia. Bottom of wing joint	15.2	Need to Average, usally oval; Winckler2 no					
24	Bore dia. top of boot joint small side	16.2						
25	Bore dia. top of boot joint large side	24.1	Winckler2 slighty oval					
26								
27	**III. Boot Lengths**							
28	bj logic	1	logic=> if bj logic = 0 => plug removed; if bj logic = 1 => plug cannot be removed					
29	bj c	98	dist from top of boot to where topmost tone hole enter bore [not at center of tone hole]					
30	bj b	145						
31	bj a	193						
32								
33	bjstotal [Needed for both boot logics]	438	total length of boot, include socket, along the small bore side, meas. With boot cap removed					
34	bjltotal [Needed for both boot logics]	438	total length of boot, include socket, along large bore side					
35	plug small [Need for logic 0 only]	0	plug thickness, large bore side					
36	plug large [Need for logic 0 only]	0	plug thickness, small bore side					
37								
38	boots [Needed for both boot logics]	396	hook length along s bore => bjs-septum length = boot - septum <= calc the septum					
39	bootl [Needed for both boot logics]	396	hook length along l bore => bjl-septum length = boot - septum <= calc the septum					
40								
41	boots bottom [Needed for both boot logics]	21	use hook, dist of bore [dist on stick plus 7mm, diff between hook and bot of stick]	14 + 7 = 21				
42	bootl bottom [Needed for both boot logics]	21	use hook, dist of bore [same as boots bot except tenon depth will be different]					
43			Winckler2 Looks like a 2 plug design, could not remove boot cap, see bire photos					
44	extreme bore [Needed for logic 1 only]	50	Outside dia of plug [measured] = small bore dia + large bore dia + the septum width;					
45			Winckler2 Extreme bore is an estimate, could not remove boot cap; larger than Winckler1					
46	septum length exp [Need for logic 0 only]	0	dist. from very bottom of boot to septum [point between the large and small bore]					
47	septum length calc - do not imput value	42	dist. From very bottom of boot to spetum [bjl - bootl]	do not imput value				
48	septum length - do not imput value	42	if bj logic = 0 => septum = septum exp; if bj logic = 1 => septum = septum calc	do not imput value				
49								
50	sbore dia sep* [Needed for both boot logics]	19.3	septum small bore dia [assume = lbore dia sep]					
51	lbore dia sep* [Needed for both boot logics]	19.5	septum large bore dia [assume = sbore dia sep] [mesure if cork can be removed; for Logic 0]					
52	sep width exp [Need for logic 0 only]	0	septum width; direct measurement if remove plug					
53	sep width calc - do not imput value	11.2	septum width; calc. => extreme bore - sbore - lbore	do not imput value				
54	sep width - do not imput value	11.2	if bj logic = 0 => sep width = sep width exp; if bj logic = 1 => sep width = sep v	do not imput value				
55								
56	bj g	338	dist from top of boot (socket) to where G hole enters bore [not at cent of tone hole]					
57	bj f1	138	dist from top of boot (socket) to where F1 hole enters bore [not at cent of tone hole]					
58								
59								
60								
61								
62								
63	**IV. Tone Hole Diameters**							
64	f2	6.2						
65	e	6.1						
66	d	5.9						
67								
68	c	7.3						
69	b	6.6						
70	a	6.1						
71	g	8.7						
72	f1	10.7						
73								
74	e1	11.3	Winckler2 oblong 10.8 x 11.7; e1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]					
75	d1	10.6	Winckler2 oblong 10.0 x 11.1; d1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]					
76	c1	12.9	Winckler2 oblong 11.3 x 14.5; c1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]					
77								
78								
79								
80								
81								
82	**V. Tone Hole Depths**							
83	f2	29.5						
84	e	29						
85	d	29.5						
86								
87	c	24						
88	b	24						
89	a	25.3						
90	g	16.5	meas along bot tone hole wall [north wall, toward reed,tone hole usually at angle]					
91	f1	21.7	meas along east side tone hole wall [north wall, toward reed,t hole usually at angle]					
92								
93	e1	5.2	e1 tone hole depth;meas east/west with deapth gauge [at center, or shortest dist]					
94	d1	6.1	d1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]					
95	c1	5.5	c1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]					
96								

	A	B	C	D	E	F	G	H
97								
98								
99								
100								
101	**VI. Long Joint**		Winckler2 no table along long joint					
102	lg_length	593	total length of long joint					
103	lg_tenon_bot	44.5	length bottom tenon on long joint [tenon going into boot joint]					
104	lj_bot_bore	23.5	Winckler2 23.2 x 23.8; long joint bottom tenon bore diameter [tenon going into boot joint]					
105	lj_top_bore	29	long joint top tenon bore diameter [tenon going into bell]					
106	lg_tenon_top	38.1	length top tenon on long joint [tenon going into bell]					
107	e1 distance	62	dist long joint tenon to e1 [from bot of tenon to where tone hole enters bore]					
108	d1 distance	255	dist long joint tenon to d1 [from bot of tenon to where tone hole enters bore]					
109	c1 distance	492	Winckler2 vrfd long dist long joint tenon to c1 [from bot of tenon to where tone hole enters bore]					
110								
111								
112								
113								
114								
115	**VII. Bore diameters at Tone Holes**							
116	f2	12.1						
117	e	12.4						
118	d	13.1						
119								
120	c	16.4						
121	b	16.6						
122	a	17.2						
123	g	20.1						
124	f1	22.2						
125								
126	e1	21.5	e1 tone hole bore diameter on long joint					
127	d1	23.3	d1 tone hole bore diameter on long joint					
128	c1	27.3	c1 tone hole bore diameter on long joint					
129								
130								
131								
132								
133								
134	**VIII. Bell**		Winckler2 no tone hole in the bell					
135	bell logic	1	If bell_logic = 0 => normal conical bore; if bell_logic = 1 => inverted concial bore; if bell_logic = 2 => bell expansion					
136	bell_length (0, 1, 2)	285	total length of bell [lines 141 + 144 = line 136]					
137	bell_bot_bore (0, 1, 2)	29.5	dia bore at the bottom of bell [end with socket]					
138	bell_top_bore 0, (1, 0, 2)	26.6	dia bore at the top of bell [where low Bb exits]					
139	bell_center_bore (only for logic 2)		dia bore at max center of expansion					
140	bell_wall (only for logic 2)		bell wall thickness, Just for David					
141	bell_bot_bore_expansion (only for logic 2)		dist of bottom to maxium of expansion [including bell socket length,if bell logic=0 =>100]					
142	Outside diameter of wood at expansion		Just for David					
143	bell_tenon (0, 1, 0, 2)	37.5	bell socket length					
144	bell_expansion_length (only for logic 2)		distance of maxium expansion to top of bell [where Bb exits]					
145	belflg	39.5	Usually about 10mm more than line 138; MEAS. 16 June 2013					
146								
147								
148	**IX. PITCH**							
149	pitch	415	input the historical pitch of the bassoon, must input value, best guess					
150	freq_init	380	Initial frequency range variable					
151	Delta frequency	2	frequency increment parameter					
152	Number of frequencies	60	number of frequencies to scan for min chi sq					
153	Frequency adjust	1.05	frequency adjustment parameter					
154	**X. Title**							
155	title		Bassoon Calculation: Winckler2-O-ParisE187-Wg1-WOB-DNM					
156								
157			Notes on long joint bore: Winckler2 very OOR small, different taper than of boot					
158			Notes on boot joint bore: Winckler2 normal					
159	**XI. Bore Diameter Locations**		Notes on wing join boret: Winckler2 good shape					
160		17	Number of diameters					
161	**Bell Bore**	10.5	Initial bore diameter					
162	29.5mm diameter at socket	0	dist1; measured from the bottom of the wing joint- 10mm				1	
163	29mm rod 65mm from socket	370	dist2; measured from the bottom of the wing joint- 11mm				1	
164	28mm rod 105mm from socket	280	dist3; measured from the bottom of the wing joint- 12mm				1	
165	27mm rod 145mm from socket	192	dist4; measured from the bottom of the wing joint- 13mm				1	
166	26mm rod 200mm from socket	123	dist5; measured from the bottom of the wing joint- 14mm				1	
167	26mm rod 35mm from bell top OOR	65	dist6; measured from the top of the bootjoint - small bore side- 15mm	Bottom wing	15.2		1	
168	26.6mm diameter at bell end	0	dist7; measured from the top of the bootjoint - small bore side- 16mm	top boot sma	16.2		2	
169		175	dist8; measured from the top of the bootjoint - small bore side- 17mm	top boot larg	24.1		2	
170		263	Winckler2 OOR; dist9; measured from the top of the bootjoint - small bore side- 18mm				2	
171		370	dist10; measured from the top of the bootjoint - large bore side- 19mm	sbore dia sep	19.3		2	
172		355	dist11; measured from the top of the bootjoint - large bore side- 20mm	lbore dia sep	19.5		3	
173		235	dist12; measured from the top of the bootjoint - large bore side- 21mm				3	
174		170	dist13; measured from the top of the bootjoint - large bore side- 22mm				3	
175		95	dist14; measured from the top of the bootjoint - large bore side- 23mm				3	
176		65	dist15; measured from the top of the long joint- 24mm	lj_bot_bore	23.5		3	
177		190	dist16; measured from the top of the long joint- 25mm	;			4	
178		155	dist17; measured from the top of the long joint- 26mm				4	
179		110	dist18; measured from the top of the long joint- 27mm				4	
180		55	dist19; measured from the top of the long joint- 28mm				4	
181		0	dist20; measured from the top of the long joint- 29mm				4	
182		0	dist21; measured from the top of the long joint- 30mm				4	
183		0	dist22; measured from the top of the long joint- 31mm				4	
184		0	dist23; measured from the top of the long joint- 32mm	lj_top_bore	29		4	