	A	B	C	D	E	F	G	H
1	**I. Bocal**		Original bocal, Winckler3, No					Winckler1
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					2
9								
10								
11								
12								
13	**II. Wing Joint Lengths**		bocal receiver: Winckler3, no a choke; the upper part of the wing has been repaired, in bad shape					
14	choke bore dia.	10.8	logic 1; bore diameter of choke; logic 0; either diameter bocal bottom or beginning of bore at bottom or receiver					7.1
15	receiver length (1, 0) (formally choke length)	60	logic 1; length of choke from top of wing joint; logic 0; length of receiver (same as string length)					68
16	wing joint length	507	total wing joint length, including tenon and socket					500
17	tenon length	38.7	tenon length					39
18								
19	wj f2	230	dist top of wing to where tone hole enters bore [not at the center of the tone hole]					232
20	wj e	275						276
21	wj d	317						317
22								
23	Bore dia. Bottom of wing joint	15.5	Need to Average, usally oval; Winckler3 no					14.8
24	Bore dia. top of boot joint small side	14.6						14.3
25	Bore dia. top of boot joint large side	23.9						23.4
26								
27	**III. Boot Lengths**							
28	bj logic	1	logic=> if bj logic = 0 => plug removed; if bj logic = 1 => plug cannot be removed					1
29	bj c	99	dist from top of boot to where topmost tone hole enter bore [not at center of tone hole]					100
30	bj b	146						146
31	bj a	196						193
32								
33	bjstotal [Needed for both boot logics]	436	total length of boot, include socket, along the small bore side					436
34	bjltotal [Needed for both boot logics]	436	total length of boot, include socket, along large bore side					436
35	plug small [Need for logic 0 only]	0	plug thickness, large bore side					0
36	plug large [Need for logic 0 only]	0	plug thickness, small bore side					0
37								
38	boots [Needed for both boot logics]	391	hook length along s bore => bjs-septum length = boot - septum <= calc the septum					396
39	bootl [Needed for both boot logics]	391	hook length along l bore => bjl-septum length = boot - septum <= calc the septum					396
40								
41	boots bottom [Needed for both boot logics]	22	use hook, dist of bore [dist on stick plus 7mm, diff between hook and bot of stick]					20
42	bootl bottom [Needed for both boot logics]	22	use hook, dist of bore [same as boots bot except tenon depth will be different]					20
43								
44	extreme bore [Needed for logic 1 only]	46.5	Outside dia of plug [measured] = small bore dia + large bore dia + the septum width					44
45								
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]					0
47	septum length calc - do not imput value	45	dist. From very bottom of boot to spetum [bjl - bootl]	do not imput value				40
48	septum length - do not imput value	45	if bj logic = 0 => septum = septum exp; if bj logic = 1 => septum = septum calc	do not imput value				40
49								
50	sbore dia sep* [Needed for both boot logics]	18.2	septum small bore dia [assume = lbore dia sep];					18.2
51	lbore dia sep* [Needed for both boot logics]	18.9	septum large bore dia [assume = sbore dia sep] [mesure if cork can be removed; for Logic 0]					18.2
52	sep width exp [Need for logic 0 only]	0	septum width; direct measurement if remove plug					0
53	sep width calc - do not imput value	9.4	septum width; calc. => extreme bore - sbore - lbore	do not imput value				7.6
54	sep width - do not imput value	9.4	if bj logic = 0 => sep width = sep width exp; if bj logic = 1 => sep width = sep width calc	do not imput value				7.6
55								
56	bj g	CM	dist from top of boot (socket) to where G hole enters bore [not at cent of tone hole]					340
57	bj f1	138	dist from top of boot (socket) to where F1 hole enters bore [not at cent of tone hole]					138
58								
59								
60								
61								
62								
63	**IV. Tone Hole Diameters**							
64	f2	6.1						5.9
65	e	5.8						5.6
66	d	5.8						5.7
67								
68	c	7.9						6.9
69	b	7						6.9
70	a	6.7						6.2
71	g	9.2						8.4
72	f1	11.1						10.9
73								
74	e1	12.2	Winckler3 11.4 x 13mm; e1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]					12
75	d1	11	d1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]					9.8
76	c1	CM	[Winckler1 oblong 14.0 x 14.8] c1 tone hole dia, on long joint [need to average NS and EW dias]					12.6
77								
78								
79								
80								
81								
82	**V. Tone Hole Depths**							
83	f2	27.2						27.3
84	e	28						26.6
85	d	26.3						27.4
86								
87	c	23.3						24.7
88	b	23.7						25.5
89	a	22.5						25
90	g	21.5	meas along bot tone hole wall [north wall, toward reed,tone hole usually at angle]					19
91	f1	19.8	meas along east side tone hole wall [north wall, toward reed,t hole usually at angle]					21.3
92								
93	e1	9.5	e1 tone hole depth;meas east/west with deapth gauge [at center, or shortest dist]					5.7
94	d1	9.7	d1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]					5.7
95	c1	CM	c1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]					5.4
96								
97								
98								
99								
100								
101	**VI. Long Joint**		Winckler3 a table along long joint					
102	lg_length	594	total length of long joint					586
103	lg_tenon_bot	45.5	length bottom tenon on long joint [tenon going into boot joint]					42.4
104	lj_bot_bore	21.9	Winckler3 OOR 21.3 x 22.4; long joint bottom tenon bore diameter [tenon going into boot joint]					23.9

	A	B	C	D	E	F	G	H
105	lj_top_bore	28.8	Winckler3 vrfd small; long joint top tenon bore diameter [tenon going into bell]					32.5
106	lg_tenon_top	36.5	length top tenon on long joint [tenon going into bell]					33.1
107	e1_distance	60	dist long joint tenon to e1 [from bot of tenon to where tone hole enters bore]					60
108	d1 distance	257	dist long joint tenon to d1 [from bot of tenon to where tone hole enters bore]					266
109	c1 distance	496	Winckler3 vrfd long; dist long joint tenon to c1 [from bot of tenon to where tone hole enters bore]					474
110								
111								
112								
113								
114								
115	**VII. Bore diameters at Tone Holes**							
116	f2	12						11.4
117	e	12.2						11.6
118	d	12.6						12.2
119								
120	c	14.7						14.8
121	b	15.4						15.2
122	a	15.8						15.5
123	g	19.3						19.3
124	f1	21.1						21
125								
126	e1	22.2	e1 tone hole bore diameter on long joint					23.9
127	d1	24	d1 tone hole bore diameter on long joint					27.1
128	c1	CM	c1 tone hole bore diameter on long joint					29.8
129								
130								
131								
132								
133								
134	**VIII. Bell**		Winckler3 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					1
136	bell_length (0, 1, 2)	285	Winckler3 vrfd; total length of bell [lines 141 + 144 = line 136]					300
137	bell_bot_bore (0, 1, 2)	28.7	dia bore at the bottom of bell [end with socket]					31
138	bell_top_bore 0, (1, 0, 2)	25.2	dia bore at the top of bell [where low Bb exits]					27.5
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)	37.6	Winckler3, in bad shape; bell socket length					33.1
144	bell_expansion_length (only for logic 2)		distance of maxium expansion to top of bell [where Bb exits]					
145	belflg	53.7	Usually about 10mm more than line 138; MEAS. 16 June 2013					44
146								
147								
148	**IX. PITCH**							
149	pitch	415	input the historical pitch of the bassoon, must input value, best guess					415
150	freq_init	380	Initial frequency range variable					380
151	Delta frequency	2	frequency increment parameter					2
152	Number of frequencies	60	number of frequencies to scan for min chi sq					60
153	Frequency adjust	1.05	frequency adjustment parameter					1.05
154	**X. Title**							
155	title		Bassoon Calculation: Winckler3-O-Veriam-Wg1-WOB-DNM					
156								
157			Notes on long joint bore: Winckler3 very OOR in places					
158			Notes on boot joint bore: Winckler3 small side very out of round					
159	**XI. Bore Diameter Locations**		Notes on wing joint boret: Winckler3 normal					
160		17	Number of diameters					21
161	**Bell Bore**	10.8	Initial bore diameter					7.1
162	28.7mm diameter at socket	0	dist1; measured from the bottom of the wing joint- 10mm				1	373
163	28mm rod 105mm from socket	345	dist2; measured from the bottom of the wing joint- 11mm				1	295
164	27mm rod 200mm from socket	275	dist3; measured from the bottom of the wing joint- 12mm				1	197
165	26mm rod 245mm from socket	163	dist4; measured from the bottom of the wing joint- 13mm				1	118
166	25.2mm diameter at bell end	92	Winckler1 OOR; dist5; measured from the bottom of the wing joint- 14mm				1	29
167		72	dist6; measured from the top of the bootjoint - small bore side- 15mm	Bottom wing	15.5		2	145
168		175	dist7; measured from the top of the bootjoint - small bore side- 16mm	top boot sma	14.6		2	117
169		360	dist8; measured from the top of the bootjoint - small bore side- 17mm	top boot larg	23.9		2	0
170		335	dist9; measured from the top of the bootjoint - small bore side- 18mm				2	0
171		375	dist10; measured from the top of the bootjoint - large bore side- 19mm	sbore dia sep	18.2		3	360
172		265	Winckler3 very OOR; dist11; measured from the top of the bootjoint - large bore side- 20mm; 20	lbore dia sep	18.9		3	222
173		555	dist12; measured from the top of the bootjoint - large bore side- 21mm	Hook Length	391		4	140
174		540	dist13; measured from the top of the bootjoint - large bore side- 22mm				4	102
175		445	dist14; measured from the top of the bootjoint - large bore side- 23mm				4	69
176		363	dist15; measured from the top of the long joint- 24mm	lj_bot_bore	21.9		4	512
177		290	dist16; measured from the top of the long joint- 25mm				4	455
178		210	Winckler3 OOR; dist17; measured from the top of the long joint- 26mm				4	385
179		160	dist18; measured from the top of the long joint- 27mm				4	315
180		0	dist19; measured from the top of the long joint- 28mm				4	222
181		0	dist20; measured from the top of the long joint- 29mm				4	158
182		0	dist21; measured from the top of the long joint- 30mm				4	97
183		0	dist22; measured from the top of the long joint- 31mm				4	60
184		0	dist23; measured from the top of the long joint- 32mm	lj_top_bore	28.8		4	15
185								10
186								11
187								12
188								13
189								14
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206								31
207								32