#	A	B	C	D	E	F	G	H	I	J
1	**I. Bocal**		Original bocal; CroneIA2 no							Crone1
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: CroneIA2 yes; but could be from wear							
14	choke bore dia.	9.7	logic 1; bore diameter of choke; logic 0; either diameter bocal bottom or beginning of bore at bottom or receiver							9.1
15	receiver length (1, 0) (formally choke length)	42	logic 1; length of choke from top of wing joint; logic 0; length of receiver (same as string length)							29.1
16	wing joint length	522	CroneIA2 vrfd; total wing joint length, including tenon and socket							514
17	tenon length	43.2	tenon length							38.9
18										
19	wj f2	235	dist top of wing to where tone hole enters bore [not at the center of the tone hole]							234
20	wj e	294								293
21	wj d	336	CroneIA2 D tone hole has been plugged and redrilled							342
22										
23	Bore dia. Bottom of wing joint	16.4								15.6
24	Bore dia. top of boot joint small side	16.4	CroneIA2 OOR 16.1 x 16.7							16.1
25	Bore dia. top of boot joint large side	22.8	CroneIA2 OOR 22.5 x 23.1; vrfd small							25.3
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	90	dist from top of boot to where topmost tone hole enter bore [not at center of tone hole]							85
30	bj b	155	CroneIA2 vrfd							145
31	bj a	201								191
32										
33	bjstotal [Needed for both boot logics]	433	total length of boot, include socket, along the small bore side, CroneIA2 mea. With boot cap removed							423
34	bjltotal [Needed for both boot logics]	433	total length of boot, include socket, along large bore side							423
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]	383	hook length along s bore => bjs-septum length = boot - septum <= calc the septum							380
39	bootl [Needed for both boot logics]	383	hook length along l bore => bjl-septum length = boot - septum <= calc the septum							380
40										
41	boots bottom [Needed for both boot logics]	31	use hook, dist of bore [dist on stick plus 7mm, diff between hook and bot of stick] 24 + 7=31							24
42	bootl bottom [Needed for both boot logics]	31	use hook, dist of bore [same as boots except tenon depth will be different]							24
43			CroneIA2 Two round plug design							
44	extreme bore [Needed for logic 1 only]	44.7	Outside dia of plug [measured] = small bore dia + large bore dia + the septum width							43.2
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]							
47	septum length calc - do not imput value	50	dist. From very bottom of boot to septum [bjl - bootl]	do not imput value						43
48	septum length - do not imput value	50	if bj logic = 0 => septum = septum exp; if bj logic = 1 => septum = septum c	do not imput value						43
49										
50	sbore dia sep* [Needed for both boot logics]	18.2	septum small bore dia [assume = lbore dia sep]							18.1
51	lbore dia sep* [Needed for both boot logics]	19.3	septum large bore dia [assume = sbore dia sep] [mesure if cork can be removed; for Logic 0]							18.5
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	7.2	septum width; calc. => extreme bore - sbore - lbore	do not imput value						6.6
54	sep width - do not imput value	7.2	if bj logic = 0 => sep width = sep width exp; if bj logic = 1 => sep width = sep	do not imput value						6.6
55										
56	bj g	345	CroneIA2 vrfd long; dist from top of boot (socket) to where G hole enters bore [not at cent of tone hole]							324
57	bj f1	137	CroneIA2 vrfd long; dist from top of boot (socket) to where F1 hole enters bore [not at cent of tone hole]							123
58										
59										
60										
61										
62										
63	**IV. Tone Hole Diameters**									
64	f2	6								5.4
65	e	5.7								5.7
66	d	4.8	CroneIA2 D tone hole has been plugged and redrilled							5.4
67										
68	c	6.8								8
69	b	6.4								6.9
70	a	6.3								5.8
71	g	10	CroneIA2 vrfd large							8.5
72	f1	11.2	CroneIA2 vrfd large							9.9
73										
74	e1	13.2	CroneIA2 12.9 x 13.5 slightly oblong; e1 tone hole dia, on long joint [need to average]							10.3
75	d1	11.7	d1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]							11.2
76	c1	11.4	c1 tone hole dia, on long joint [need to average NS and EW dias, NS usually greater]							11.3
77										
78										
79										
80										
81										
82	**V. Tone Hole Depths**									
83	f2	22.1	CroneIA2 Tone holes drilled at fairly extreme angles							20.7
84	e	19								21.2
85	d	22.7								22.7
86										
87	c	28.4								24.6
88	b	25								24.9
89	a	26.2								30.1
90	g	14	meas along bot tone hole wall [north wall, toward reed,tone hole usually at angle]							15.4
91	f1	18	meas along east side tone hole wall [north wall, toward reed,t hole usually at angle]							18.9
92			CroneIA2 There is a table along long joint							
93	e1	7.6	e1 tone hole depth;meas east/west with deapth gauge [at center, or shortest dist]							9.3
94	d1	8.7	d1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]							8.7
95	c1	7	c1 tone hole depth; meas east/west with deapth gauge [at center, or shortest dist]							9.5
96			CroneIA2 Tone hole lengths on long joint are short; E and C tone holes are flattened							
97										
98										
99										
100										
101	**VI. Long Joint**									
102	lg_length	588	total length of long joint							600
103	lg_tenon_bot	48.2	length bottom tenon on long joint [tenon going into boot joint]							42.6
104	lj_bot_bore	20.8	long joint bottom tenon bore diameter [tenon going into boot joint]							23.8
105	lj_top_bore	32.4	CroneIA2 OOR 30.5 x 31.5 vrfd small; long joint top tenon bore diameter [tenon going into bell]							32.4
106	lg_tenon_top	31.2	length top tenon on long joint [tenon going into bell]							33.5

#	A	B	C	D	E	F	G	H	I	J
107	e1 distance	66	dist long joint tenon to e1 [from bot of tenon to where tone hole enters bore]							60
108	d1 distance	252	dist long joint tenon to d1 [from bot of tenon to where tone hole enters bore]							261
109	c1 distance	476	CroneIA2 vrfd short; dist long joint tenon to c1 [from bot of tenon to where tone hole enters bore]							512
110										
111										
112										
113										
114										
115	**VII. Bore diameters at Tone Holes**									
116	f2	12.2								11.6
117	e	13								12.7
118	d	13.7								13.5
119										
120	c	17.3								16.3
121	b	17.5								16.7
122	a	17.6								17.1
123	g	20								19.8
124	f1	21.3	CroneIA2 OOR							23
125										
126	e1	22.5	e1 tone hole bore diameter on long joint							24.6
127	d1	25.8	d1 tone hole bore diameter on long joint							27.4
128	c1	29.4	CroneIA2 OOR; c1 tone hole bore diameter on long joint							31.1
129										
130										
131										
132										
133										
134	**VIII. Bell**		CroneIA2, There is not a tone hole on 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							0
136	bell_length (0, 1, 2)	286	total length of bell [lines 141 + 144 = line 136]							295
137	bell_bot_bore (0, 1, 2)	29.8	dia bore at the bottom of bell [end with socket]							32.5
138	bell_top_bore 0, (1, 0, 2)	25.5	dia bore at the top of bell [where low Bb exits]							33.3
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)	32.3	bell socket length							40
144	bell_expansion_length (only for logic 2)		distance of maxium expansion to top of bell [where Bb exits]							
145	belflg	34.7	Usually about 10mm more than line 138							49.5
146										
147										
148	**IX. PITCH**									
149	pitch	430	input the historical pitch of the bassoon, must input value, best guess							430
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: CroneIA2-O-Kiefer-Wg1-WOB-DNM							
156										
157			Notes on long joint bore: CroneIA2 OOR in places							
158			Notes on boot joint bore: CroneIA2 normal							
159	**XI. Bore Diameter Locations**		Notes on wing join boret: CroneIA2 good							
160		19	Number of diameters							23
161	**Bell Bore;** CroneIA2 very OOR	9.7	Initial bore diameter							9.1
162	29.8mm diameter at socket	380	dist1; measured from the bottom of the wing joint- 10mm				1			385
163	29mm rod 160mm from socket	338	dist2; measured from the bottom of the wing joint- 11mm				1			322
164	28mm rod 195mm from socket	297	dist3; measured from the bottom of the wing joint- 12mm				1			258
165	27mm rod 230mm from socket	230	dist4; measured from the bottom of the wing joint- 13mm				1			212
166	26mm rod 275mm from socket	145	CroneIA2 vrfd gap; dist5; measured from the bottom of the wing joint- 14mm				1			94
167	25.5mm diameter at bell end	50	dist6; measured from the bottom of the wing joint- 15mm	Bottom wing jt	16.4		1			18
168		0	dist7; measured from the top of the bootjoint - small bore side- 16mm	top boot small	16.4		1			60
169		83	dist8; measured from the top of the bootjoint - small bore side- 17mm	top boot large	22.8		2			170
170		330	CroneIA2 vrfd gap; dist9; measured from the top of the bootjoint - small bore side- 18mm				2			340
171		0	dist10; measured from the top of the bootjoint - large bore side- 19mm	sbore dia sep	18.2		3			370
172		345	dist11; measured from the top of the bootjoint - large bore side- 20mm	lbore dia sep	19.3		3			313
173		565	dist12; measured from the top of the bootjoint - large bore side- 21mm				4			265
174		530	dist13; measured from the top of the bootjoint - large bore side- 22mm				4			180
175		495	dist14; measured from the top of the bootjoint - large bore side- 23mm				4			126
176		435	dist15; measured from the top of the long joint- 24mm	lj_bot_bore	20.8		4			565
177		380	dist16; measured from the top of the long joint- 25mm				4			506
178		310	dist17; measured from the top of the long joint- 26mm				4			430
179		268	dist18; measured from the top of the long joint- 27mm				4			370
180		196	dist19; measured from the top of the long joint- 28mm				4			322
181		155	dist20; measured from the top of the long joint- 29mm				4			245
182		75	dist21; measured from the top of the long joint- 30mm				4			219
183		0	dist22; measured from the top of the long joint- 31mm				4			125
184		0	dist23; measured from the top of the long joint- 32mm	lj_top_bore	32.4		4			8