

Measurements of North American Bassoon Reeds

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The diverse topography of North America presents challenges to bassoon reed makers. Not only does one need to address season variations in humidity and temperature, but the differences in altitude between the Rocky Mountains and coastal cities will result in marked changes to the way one scrapes a reed. The reeds presented in this paper demonstrate several reed makers solutions to these challenges. Three of the reeds measured in this article come from high altitudes (#36, #43, and #44) and two from altitudes close to sea level (#35 and #45). All the reeds were tested in Towson, Maryland that has an altitude close to sea level.

The authors gratefully acknowledge support from the Faculty Development and Research Committee of Towson University that made possible this article and companion articles "The John Miller Bassoon Reed Collection" and "Measurements of International Bassoon Reeds." Ms. Williams, a graduate bassoon student at Towson University, undertook that arduous task of all of the reed measurements and also included comments on the perceived pitch of the crow of each reed.

Procedures employed for measurements in this article are detailed in a previous article: Terry B. Ewell and Todd Goranson, "Double Reed Measurements Part 1: Bassoon Reeds," *Scrapes International* 2 (December 1999): 56-64. This article was reprinted in *The Double Reed* 23/4 (2000): 57-66 and is also available on IDRS WWW at http://www.idrs.org/publications/dr/dr23.4.pdf/double_reed_measurements.pdf. The tools for this article were Porter&Cable brand drill bits, a General brand 6" dial caliper, and a Forrester brand dial

indicator (H-22 BA).

In order to save printed space the measurements of blade thickness and apertures are presented in the form of a table rather than with a graphic representation as in past articles. Figure 1 gives a graphic representation of the upper (first wire up) blade measurements of Reed #31. A careful comparison of this figure with the table for the upper blade of Reed #31 will clarify the new format. Please note that the measurements are in millimeters unless otherwise indicated. Photographs of the bassoon reeds by Terry Ewell are available on the IDRS WWW site at <http://www.idrs.org/reed/Reeds.html>. The reeds were soaked in water before the pictures were taken. Also on the same web site are audio files of the "crows" from each of the bassoon reeds that were recorded by Terry Ewell and Karen Williams. The authors thank John Spivey, recording technician at Towson University, for preparing these sound files.

Comments by Terry Ewell on the performance characteristics of each reed are also included in this article. The rating of the timbre of each reed is on a scale of 1-5, with 1 indicating the lowest resonance and 5 the highest in each category. A rating of 5 in the Low category indicates a reed with perceived maximum resonance of the fundamental tones. A rating of 5 in the Middle category indicates a reed with perceived maximum resonance in mid-range harmonics above the fundamental; a 5 in the High category designates a reed with perceived maximum high overtones. Terry Ewell normally plays on reeds he would rate Low 4, Middle 4, High 2. He tested the reeds with Heckel bassoon #12859 and a Heckel C 0 nickel/silver alloy bocal.

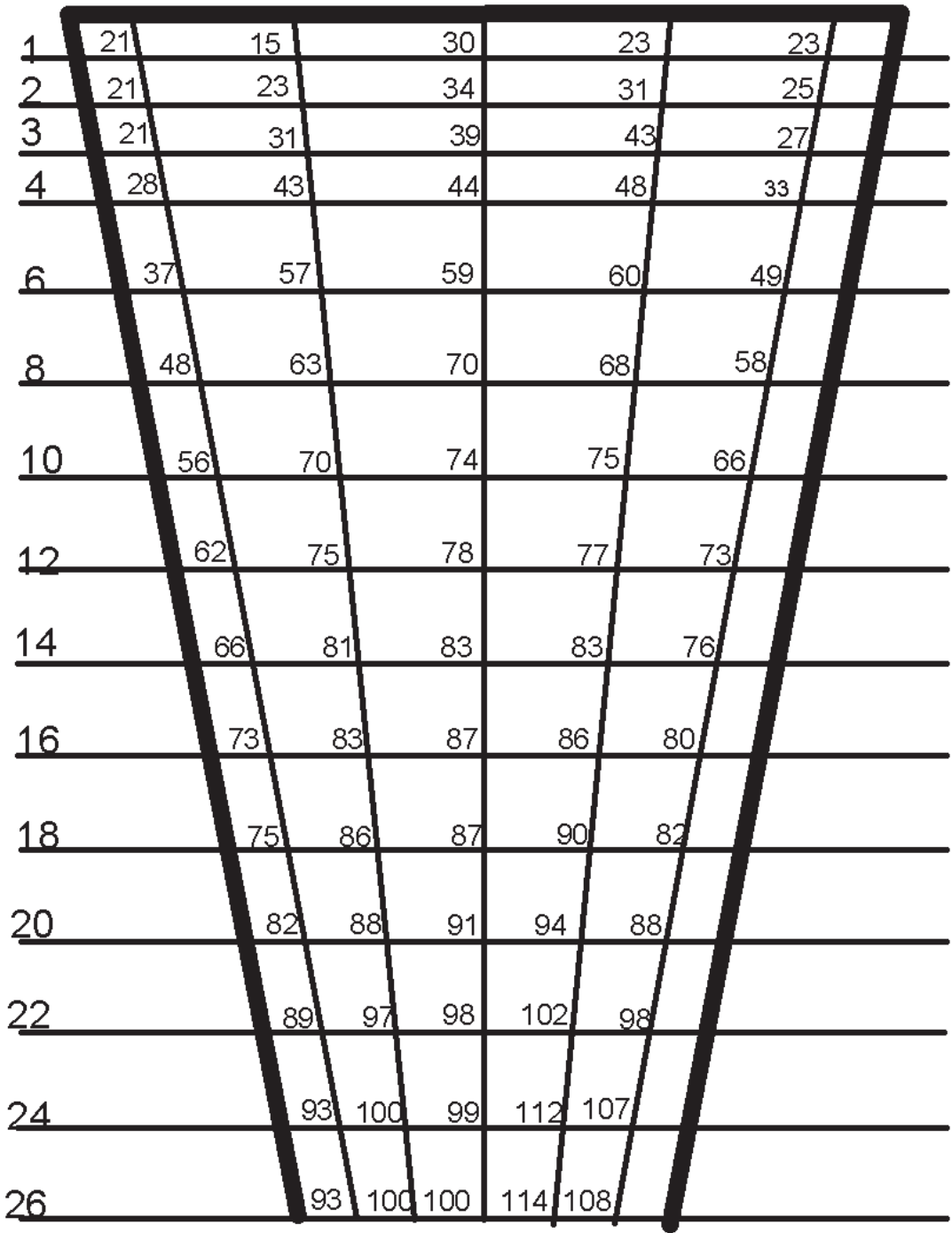


Figure 1. Graphic Presentation of the Upper Blade of Reed #31.

REED #31. Lee Goodhew, Ithaca, New York, USA. Notes from Goodhew, "Reed used for a recital at Ithaca College on 21 Oct. 99." The reed was 2.21 in (56.13 mm) in length. The blade was 1.12 in (28.45 mm) in length. The width of the reed at the tip was 0.62 in (15.75 mm). The width of the reed at the collar was 0.33 in (8.38 mm). The reed had a gold cotton string wrap sealed with glue. On the bark of the bottom blade, the numbers 37 were written in black marker. There were three brass wires at 0.17 in (4.32 mm), 0.69 in (17.53 mm), and 1.02 in (25.91 mm). The reed crowded an Eb.

Comments by Ewell. Low 3, Middle 4, High 4. Tip more closed than the prior reeds. Vibrant especially in the middle and high partials. Slurs to E5 (high E). The reed keeps this same timbre throughout the whole dynamic range, even pianissimo. Quick articulation without resistance.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	0	3	9	14	21	27	34	41	46

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.06	0.08	0.09	0.1	0.11	0.13	0.14	0.14	0.15	0.16	0.17	0.18
mm	1.52	2.03	2.29	2.54	2.79	3.3	3.56	3.56	3.81	4.06	4.32	4.57

mm	22	24	26	28
in	0.19	0.2	0.2	-
mm	4.83	5.08	5.08	-

Blade Thickness Measurements

	Upper					Lower					
1	21	15	30	23	23	1	13	13	20	19	23
2	21	23	34	31	25	2	16	17	25	25	23
3	21	31	39	43	27	3	25	23	39	30	23
4	28	43	44	48	33	4	25	45	46	46	32
6	37	57	59	60	49	6	37	52	57	54	45
8	48	63	70	68	58	8	46	62	68	59	53
10	56	70	74	75	66	10	52	69	72	70	58
12	62	75	78	77	73	12	58	74	76	75	62
14	66	81	83	83	76	14	63	77	82	80	71
16	73	83	87	86	80	16	71	80	84	84	77
18	75	86	87	90	82	18	71	83	85	84	78
20	82	88	91	94	88	20	77	85	88	88	86
22	89	97	98	102	98	22	77	88	94	96	94
24	93	100	99	112	107	24	88	97	103	108	106
26	93	100	100	114	108	26	95	98	102	109	106

REED #32. Lee Goodhew, Ithaca, New York, USA. Notes from Goodhew, "Back up reed for recital at Ithaca College on 21 Oct. 99." The reed was 2.15 in (54.61 mm) in length. The blade was 1.04 in (26.42 mm) in length. The width of the reed at the tip was 0.62 in (15.75 mm). The width of the reed at the collar was 0.33 in (8.38 mm). The reed had a gold string wrap sealed with glue. There were three brass wires at 0.16 in (4.06 mm), 0.68 in (17.27 mm). The reed was marked 37 with pencil. The reed crowded an E.

Comments by Ewell. Low 2, Middle 4, High 4. More popping, explosive attacks than #31. Slurs to E5. Crows F#.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	1	5	10	15	22	30	37	41	43

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.07	0.08	0.09	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.18	0.18
mm	1.78	2.03	2.29	2.54	2.79	3.05	3.3	3.56	3.81	4.06	4.57	4.57

mm	22	24	26	28
in	0.18	0.18	0.18	-
mm	4.57	4.57	4.57	-

Blade Thickness Measurements

Upper						Lower					
1	5	15	24	14	20	1	15	18	25	16	16
2	14	23	27	19	20	2	18	19	28	20	18
3	18	28	44	27	21	3	20	26	42	27	22
4	25	38	52	39	28	4	25	38	50	37	25
6	33	50	60	55	43	6	39	50	57	52	39
8	46	57	70	61	55	8	49	60	68	61	51
10	52	64	73	68	61	10	50	65	71	68	58
12	58	68	75	73	66	12	58	69	75	72	61
14	60	69	76	77	70	14	62	71	78	75	63
16	63	70	78	79	72	16	64	72	80	77	65
18	68	72	80	83	75	18	64	72	80	77	65
20	72	74	83	85	78	20	70	71	76	77	67
22	76	75	83	84	80	22	76	68	68	75	72
24	82	76	82	83	84	24	82	63	61	72	74
26	85	77	80	80	86	26	82	60	53	70	76

REED #35. Michel Bettez, Canada. Given to Ewell in Buenos Aires, Argentina in August 2000. The reed was 2.1 in (53.34 mm) in length. The blade was 0.98 in (24.89 mm) in length. The width of the reed at the tip was 0.66 in (16.76 mm). The width of the reed at the collar was 0.37 in (9.4 mm). The reed did not have a wrap but was sealed with a glue similar to Duco cement. The reed had three brass wires at 0.25 in (6.35 mm), 0.73 in (18.54 mm), and 1.0 in (25.4 mm). The reed crowed an E.

Comments by Ewell. Low 5, Middle 4, High 1. C#3 (C# below open F) and E3 sag. Open tip. Very little high partials with this reed. Attacks tend to pop. Slurs to E5. Full pianissimo sound with resistance. Crows F.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	3	9	15	17	20	39	44	48	-

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.1	0.11	0.11	0.12	0.13	0.14	0.15	0.15	0.17	0.18	0.18	0.19
mm	2.54	2.79	2.79	3.05	3.3	3.56	3.81	3.81	4.32	4.57	4.57	4.83

mm	22	24	26	28
in	0.2	0.21	-	-
mm	5.08	5.33	-	-

Blade Thickness Measurements

Upper						Lower					
1	15	18	21	11	7	1	12	17	13	15	7
2	15	23	31	18	13	2	13	23	29	22	12
3	17	27	35	24	16	3	14	29	36	27	14
4	17	31	43	30	18	4	18	33	42	34	19
6	25	37	53	39	23	6	27	41	53	43	29
8	31	41	60	46	29	8	33	47	64	51	36
10	37	47	68	51	35	10	41	50	67	52	41
12	41	49	68	50	41	12	48	52	67	52	44
14	49	50	66	51	47	14	54	55	66	53	50
16	55	54	64	54	52	16	59	57	64	53	53
18	59	56	60	57	60	18	61	60	64	57	58
20	66	59	60	64	69	20	64	62	64	61	64
22	71	62	68	70	77	22	68	68	67	65	70
24	77	71	80	77	88	24	76	71	73	68	78

REED #36. Yoshi Ishikawa, Boulder, Colorado, USA. Notes from Ishikawa: "Reed made 08 Oct. 99. Quality 4 stars out of 5. Sound: medium dark. Gouge .58." The reed was 2.28 in (57.91 mm) in length. The blade was 1.09 in (27.69 mm) in length. The width of the reed at the tip was 0.64 in (16.26 mm). The width of the reed at the collar was 0.34 in (8.64 mm). The reed had an orange nylon string wrap sealed with glue. The reed had one green string that created a stripe in the orange string. The top blade was marked .28, and the bottom blade was marked 10.8. 1111 MD was marked on the wrap. The reed had three brass wires at 0.31 in (7.87 mm), 0.82 in (20.83 mm), and 1.1 in (27.94 mm). The reed crowed a C#.

Comments by Ewell. Low 3, Middle 4, High 4. C#3 and E3 sag a lot. E5 difficult to slur to. Rapid articulation and quite vibrant. Crows D.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	0	5	13	17	22	39	44	47	-

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.08	0.09	0.1	0.1	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18
mm	2.03	2.29	2.54	2.54	2.79	3.05	3.3	3.56	3.81	4.06	4.32	4.57

mm	22	24	26	28
in	0.19	0.19	0.19	0.19
mm	4.83	4.83	4.83	4.83

Blade Thickness Measurements

Upper						Lower					
1	6	9	20	21	17	1	15	18	25	22	14
2	7	14	24	21	17	2	16	19	28	22	13
3	10	19	31	23	18	3	16	23	32	24	13
4	14	26	38	30	23	4	18	30	40	29	13
6	24	37	52	37	30	6	28	38	52	44	31
8	30	49	59	55	41	8	36	53	62	54	40
10	39	61	67	60	48	10	41	59	68	61	41
12	45	64	68	65	50	12	47	64	71	65	54
14	52	64	69	65	53	14	51	64	71	65	55
16	58	64	69	64	54	16	56	64	71	64	57
18	59	62	69	63	57	18	60	64	71	64	56
20	59	62	69	63	58	20	60	67	71	64	56
22	59	62	69	63	58	22	59	67	71	64	57
24	59	62	70	63	58	24	59	65	71	65	56
26	60	63	70	64	60	26	61	68	72	66	57

REED #43. Cynthia Estill, given to Ewell at the Aspen Music Festival, Aspen, Colorado, USA, 1977. The reed was 2.23 in (56.64 mm) in length. The blade was 1.03 in (26.16 mm) in length. The width of the reed at the tip was 0.65 in (16.51 mm). The width of the reed at the collar was 0.35 in (8.89 mm). The reed was wrapped with black rubber shrinkable tubing. Under the wrap, the reed was sealed with glue. The top wire was marked "6" between the first and second wires. The reed had three brass wires at 0.22 in (5.59 mm), 0.79 in (20.07 mm), and 1.08 in (27.43 mm). The reed crowed a C#.

Comments by Ewell. Low 2, Middle 4, High 4. E3 and C#3 don't drop in pitch, don't sag. Very responsive reed. The blade feels flat-- without much topography--in your mouth. Little core to the sound at pianissimo.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	3	11	15	19	24	27	31	41	45

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.08	0.09	0.1	0.1	0.12	0.12	0.13	0.14	0.15	0.15	0.15	0.16
mm	2.03	2.29	2.54	2.54	3.05	3.05	3.3	3.56	3.81	3.81	3.81	4.06

mm	22	24	26	28
in	0.16	0.17	0.18	-
mm	4.08	4.32	4.57	-

Blade Thickness Measurements

Upper						Lower					
1	17	15	26	20	17	1	15	15	22	18	11
2	17	19	31	27	18	2	17	20	25	23	16
3	22	23	38	32	21	3	20	26	35	29	20
4	25	30	46	38	24	4	24	32	40	35	23
6	28	41	57	45	29	6	31	47	54	46	30
8	35	50	59	57	40	8	39	58	62	59	37
10	39	56	62	62	47	10	44	61	66	61	43
12	48	61	65	67	52	12	48	64	71	67	49
14	51	64	69	70	60	14	53	66	73	70	53
16	55	67	69	73	64	16	58	66	72	70	56
18	62	71	70	73	65	18	63	67	73	73	59
20	72	76	71	74	67	20	68	69	75	78	60
22	79	84	75	74	74	22	76	73	78	82	69
24	79	85	81	79	83	24	83	78	81	84	81
26	89	96	98	88	91	26	90	85	86	90	97

REED #44. Leonard Sharrow, given to Ewell at the Aspen Music Festival Aspen, Colorado, USA, 1977. The reed was 2.14 in (54.36 mm) in length. The blade was 0.98 in (24.89 mm) in length. The width of the reed at the tip was 0.57 in (14.48 mm). The width of the reed at the collar was 0.35 in (8.89 mm). The reed had a red cotton string wrap that was painted yellow. "5LC" was written on the bottom blade. The reed had three brass wires at 0.27 in (6.86 mm), 0.71 in (18.03 mm), and 1.04 in (26.42 mm). The reed crowed a D.

Comments by Ewell. Low 2, Middle 4, High 4. E3 and C#3 flat. Blows freely, perhaps the lightest feeling reed of all those tested (Reed # 24-46). Keeps the core to the sound at all dynamics. Well balanced. Wonderful pianissimo control. E5 difficult to produce even when slurred.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	0	5	11	17	23	38	43	46	48

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.08	0.08	0.09	0.11	0.12	0.13	0.14	0.15	0.15	0.16	0.16	0.17
mm	2.03	2.03	2.29	2.79	3.05	3.3	3.56	3.81	3.81	4.06	4.06	4.32

mm	22	24	26	28
in	0.17	0.17	-	-
mm	4.32	4.32	-	-

Blade Thickness Measurements

Upper						Lower					
1	19	16	27	19	17	1	15	16	26	20	24
2	19	21	30	20	17	2	15	19	29	28	24
3	22	27	35	28	18	3	15	22	32	32	25
4	25	31	38	33	21	4	18	30	39	38	27
6	29	37	44	40	26	6	26	40	46	45	36
8	33	42	48	47	36	8	31	44	48	47	38
10	37	47	50	52	45	10	38	47	51	51	42
12	42	48	44	52	49	12	42	49	51	54	45
14	45	47	41	48	49	14	50	51	52	54	47
16	45	45	37	47	47	16	56	51	54	55	47
18	45	45	37	47	47	18	59	52	55	54	47
20	46	47	37	50	50	20	60	54	57	55	46

22	54	49	37	49	55	22	60	55	56	55	49
24	63	54	42	52	64	24	62	57	56	62	60

REED #45. Sidney Rosenberg, given to Ewell in Seattle, Washington, USA, 1977-1978. The reed was 2.13 in (54.1 mm) in length. The blade was 1.02 in (25.91 mm) in length. The width of the reed at the tip was 0.62 in (15.75 mm). The width of the reed at the collar was 0.31 in (7.87 mm). The reed had a white cotton string wrap sealed with glue. The reed had three brass wires at 0.23 in (5.84 mm), 0.63 in (16.0 mm), and 0.95 in (24.13 mm). The reed crowed a D.

Comments by Ewell. Low 4, Middle 4, High 2. Very comfortable reed for Ewell—just the right balance of vibration, airflow, and intonation. Slurs to E5. A bit “gravelly” (rough sounding) at pianissimo but very well focused at forte.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	0	3	8	13	25	39	42	46	47

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.09	0.09	0.1	0.12	0.12	0.13	0.13	0.15	0.16	0.17	0.18	0.19
mm	2.29	2.29	2.54	3.05	3.05	3.3	3.3	3.81	4.06	4.32	4.57	4.83

mm	22	24	26	28
in	0.19	0.2	0.2	-
mm	4.83	5.08	5.08	-

Blade Thickness Measurements

Upper						Lower					
1	7	14	27	14	11	1	10	12	18	14	6
2	8	21	30	23	14	2	13	17	23	16	7
3	15	26	38	33	17	3	16	21	31	23	10
4	23	33	41	38	23	4	18	27	38	33	16
6	29	42	49	47	29	6	24	35	49	47	28
8	33	47	54	52	40	8	33	44	54	52	36
10	36	50	56	53	44	10	39	49	58	57	46
12	42	54	58	54	49	12	46	54	63	60	53
14	45	57	61	58	51	14	50	57	67	63	56
16	52	60	63	58	57	16	56	59	69	65	59
18	58	63	64	61	60	18	63	61	70	70	66
20	66	67	68	64	63	20	66	66	72	73	72
22	70	68	68	65	68	22	72	70	74	75	80
24	70	69	71	66	70	24	81	73	76	78	83
26	74	68	70	68	77	26	85	78	82	82	90

REED #46. Arthur Weisberg, given to Ewell in Norfolk, Virginia, USA, summer 1979. The reed was 2.2 in (55.88mm) in length. The blade was 1.03 in (26.16 mm) in length. The width of the reed at the tip was 0.66 in (16.76 mm). The width of the reed at the collar was 0.34 in (8.64 mm). The reed had an orange and white nylon string wrap sealed with glue. The reed had three brass wires at 0.15 in (3.81 mm), 0.73 in (18.54 mm), and 1.12 in (28.45 mm). The reed crowed a C#.

Comments by Ewell. Low 3, Middle 3, High 3. Flat E3 and C#3. Emphasizes control in the softer dynamics. Slurs to E5. Well-balanced with thin corners. Crows under Eb.

Drill Bit	13/64	3/16	11/64	5/32	9/64	1/8	7/64	3/32	5/64
length mm	3	7	11	16	29	40	44	48	-

Blade Aperture Measurements

mm	1	2	3	4	6	8	10	12	14	16	18	20
in	0.08	0.09	0.09	0.1	0.11	0.12	0.14	0.15	0.16	0.18	0.18	0.18
mm	2.03	2.29	2.29	2.54	2.79	3.05	3.56	3.81	4.06	4.57	4.57	4.57

mm	22	24	26	28
in	0.19	0.19	0.19	-
mm	4.83	4.83	4.83	-

Blade Thickness Measurements

Upper						Lower					
1	8	7	8	11	5	1	6	6	13	11	10
2	10	14	20	18	13	2	7	16	23	17	15
3	14	21	28	27	16	3	14	25	31	23	19
4	17	26	37	32	19	4	17	31	40	31	22
6	21	36	46	41	25	6	21	40	51	42	31
8	24	43	51	47	32	8	24	49	56	51	35
10	27	49	52	53	42	10	31	56	62	58	42
12	31	53	57	58	52	12	35	60	64	61	44
14	43	57	59	64	55	14	41	63	66	63	47
16	44	59	60	68	56	16	49	65	66	65	53
18	47	61	61	69	57	18	56	70	66	65	54
20	51	61	61	70	64	20	58	73	66	67	56
22	52	61	62	69	67	22	59	73	66	67	64
24	57	61	62	67	67	24	58	71	68	71	68
26	60	56	62	66	77	26	60	71	73	75	69