METTAWA, ILLINOIS

KICKAPOO BAMBOO

EST. 2018

The Trifecta Series Fly Rods

An experiment in E.C. Powell rod action

Three 2 piece rods with Powell A,B, & C tapers can create 9 different rods
(IF the ferrules are the same size and fit together)

Powell Taper design & nomenclature

“Three methods of applying power - leverage, spring and momentum”

“Unity of action”

3 variables in rod design

Slope (fast to slow rate)
Increment (A or C)
Starting tip dimension (line weight)

A type rods: Tip action, Butt resistant “Spring”

“…fast, keen, sensitive and least fool proof”

C type rods: Tip resistant, Butt action “Momentum”

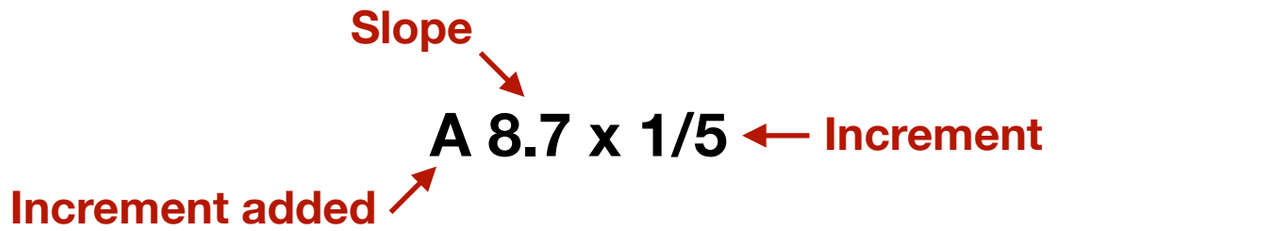
“…slow and awkward in their action but most fool proof”

B type rods: Uniform taper

“…an all-around rod for the average angler”

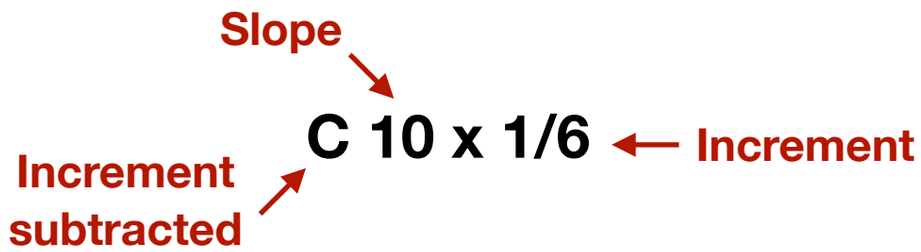
Powell Tapers-nomenclature and math

Examples:



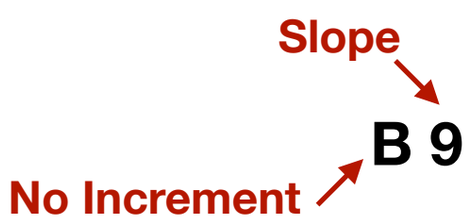
Each strip increases by .0087” every 6”

Accumulated increment of each strip increases by .0002”



Each strip increases by .010” every 6”

Accumulated increment of each strip decreases by 0.00017”



Each strip increases by .009” every 6”

(.0075 per 5” station)

Powell Tapers-math

Of Powell Tapers and Parabolics

by

Mike McGuire

In conics I can floor peculiarities parabolous
(from the modern Major General's song)

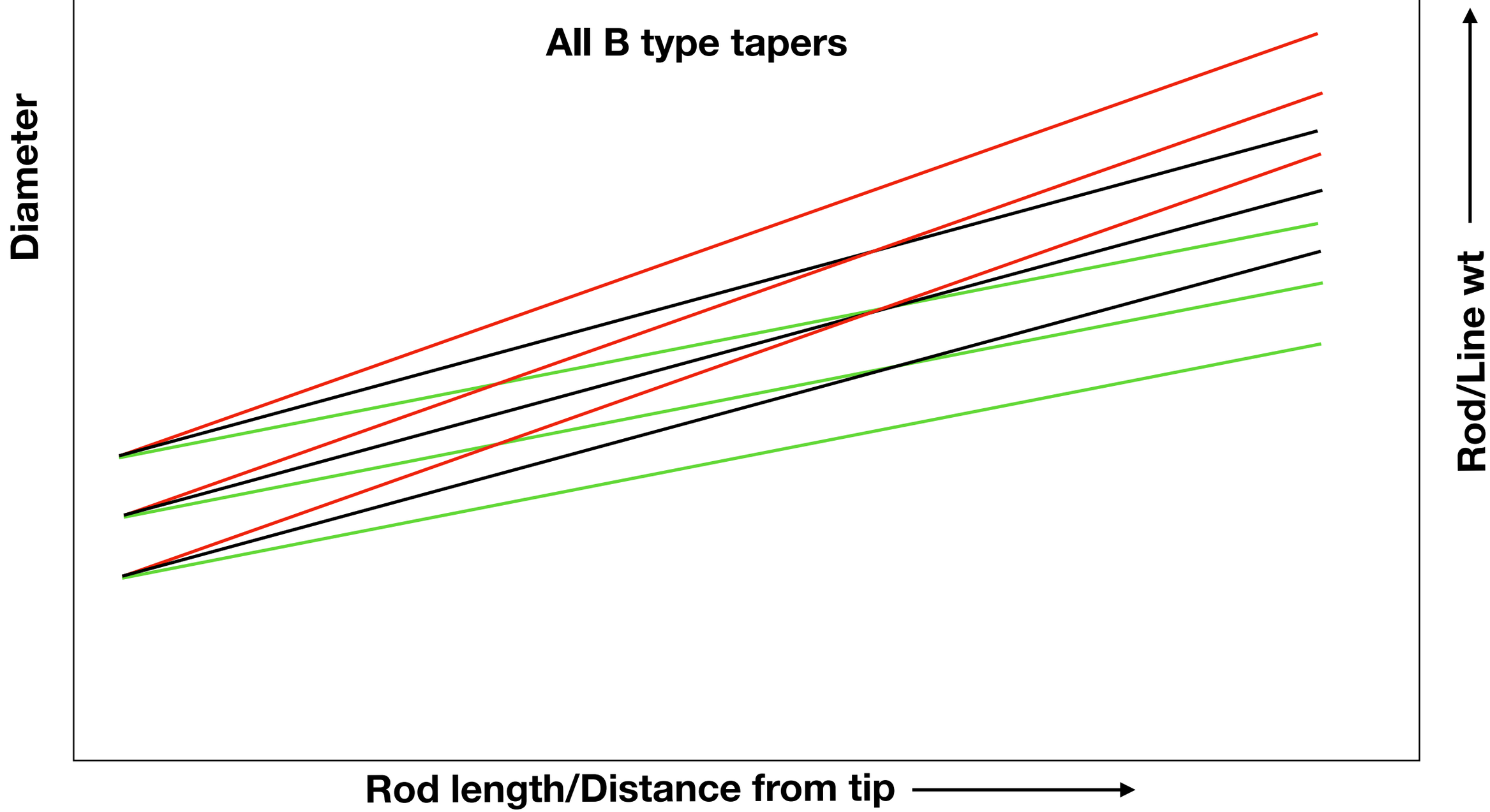
E. C. Powell had a unique algorithmic approach to designing rod tapers. There were three types, the A taper, the B, and the C. The B taper was the simplest, just a straight line of constant slope. He set a tip dimension and the increase in dimension for every six inches. A typical increase he used was 8.7 thousandths for the six inches for the dimension of the strip. This is of course half the flat-to-flat dimension for a hex rod. In mathematical terms with a tip dimension $\mathbf{y_0}$, and the increase in dimension per 6 inches, **P**, the dimension **y** at a point **x** along the rod is

$$\mathbf{y = (P/6)x + y_0}. \qquad (1)$$

http://mmcgr.users.sonic.net/index.html

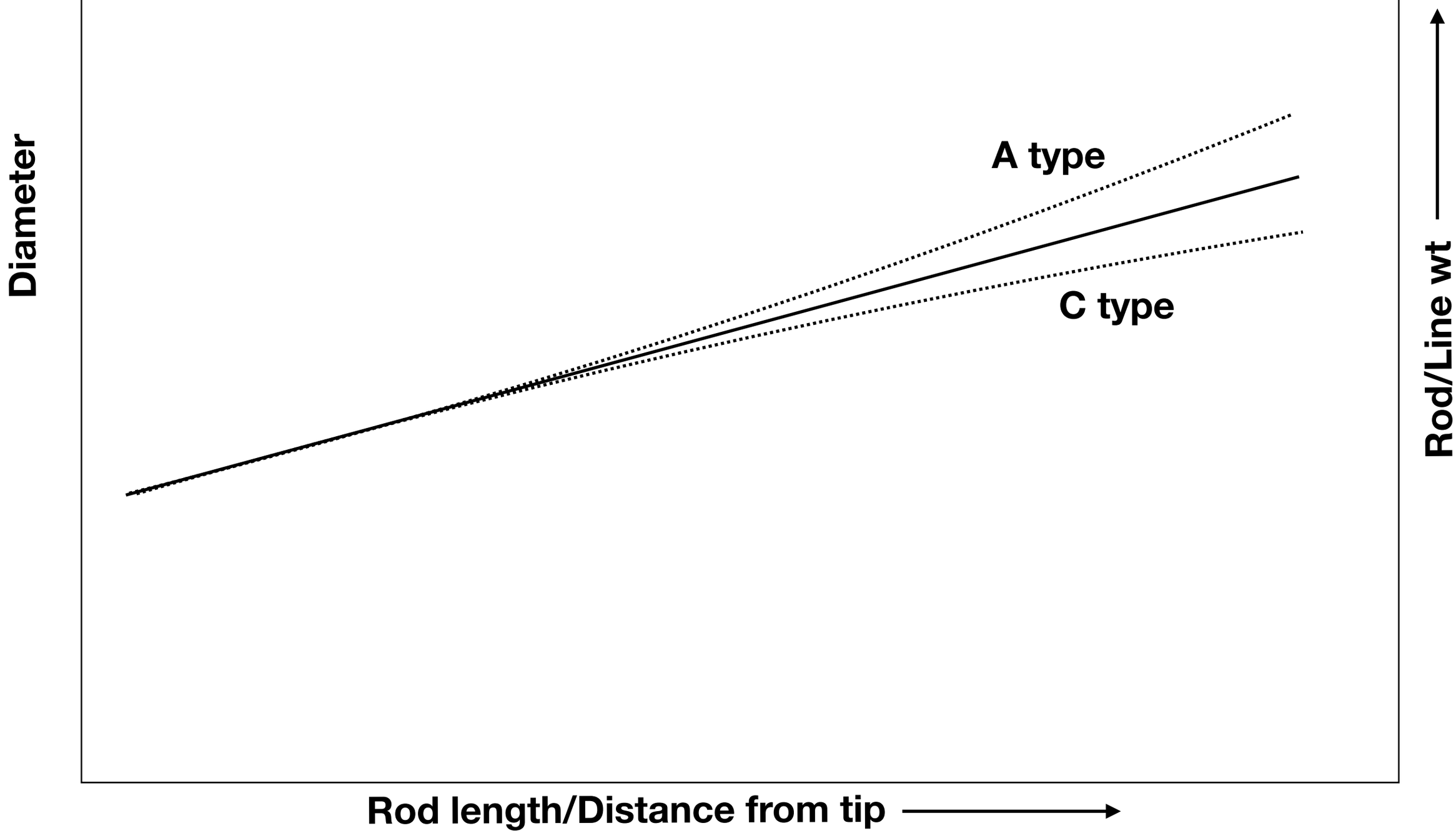
Starting tip size and Slope variation

Linear rods
(y=ax+b)



Increment variation

Quadratic rods
($y=ax^2+bx+c$)



3 tip sizes (e.g. .060, .065, .070)

3 taper slopes (e.g. 8, 9, 10)

3 taper increments (A,B,C)

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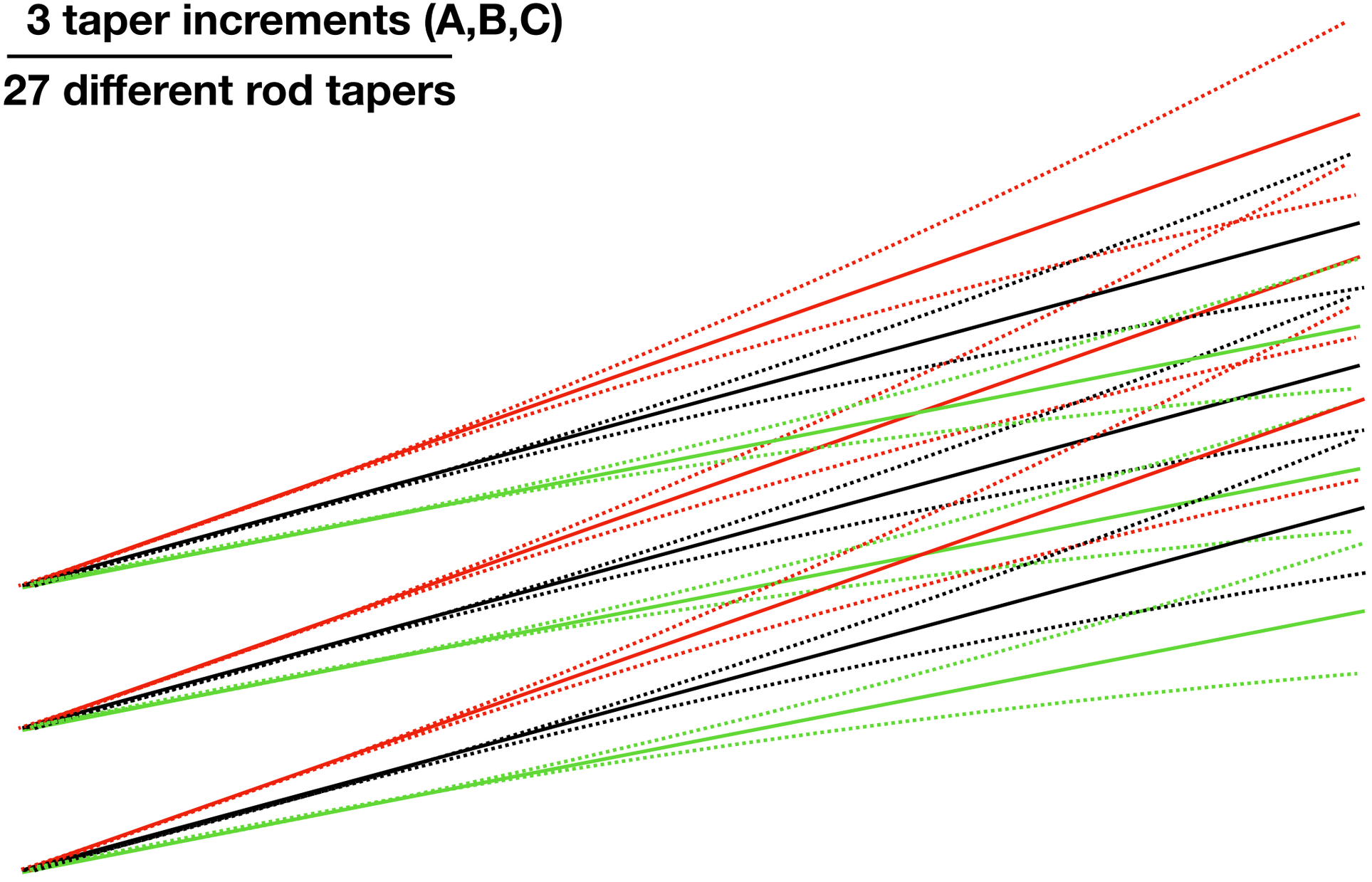
27 different rod tapers



With 3 different rod lengths (e.g. 8', 8'6", 9') would be 81 rods

Diameter

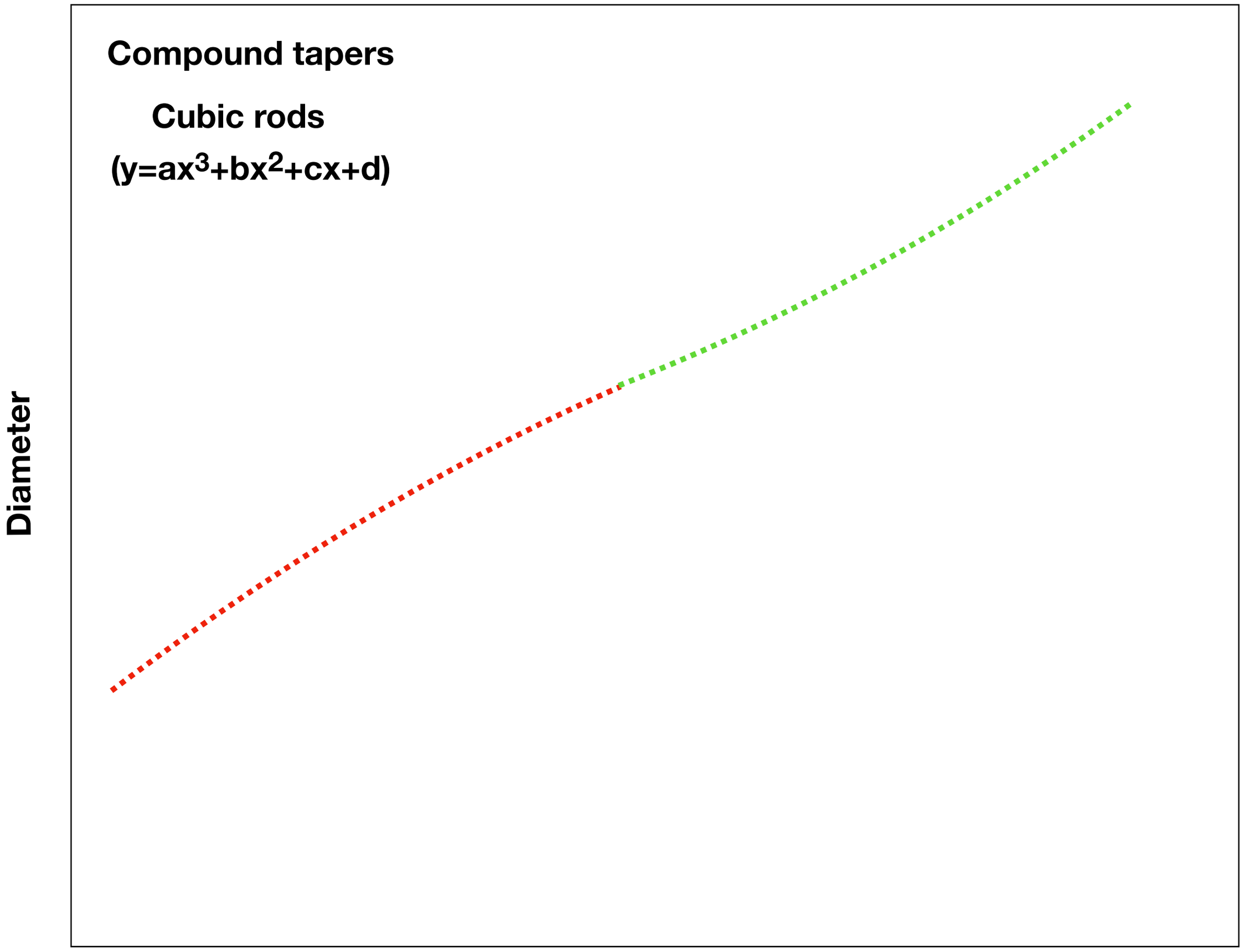
Rod/Line wt

Rod length/Distance from tip

Compound tapers

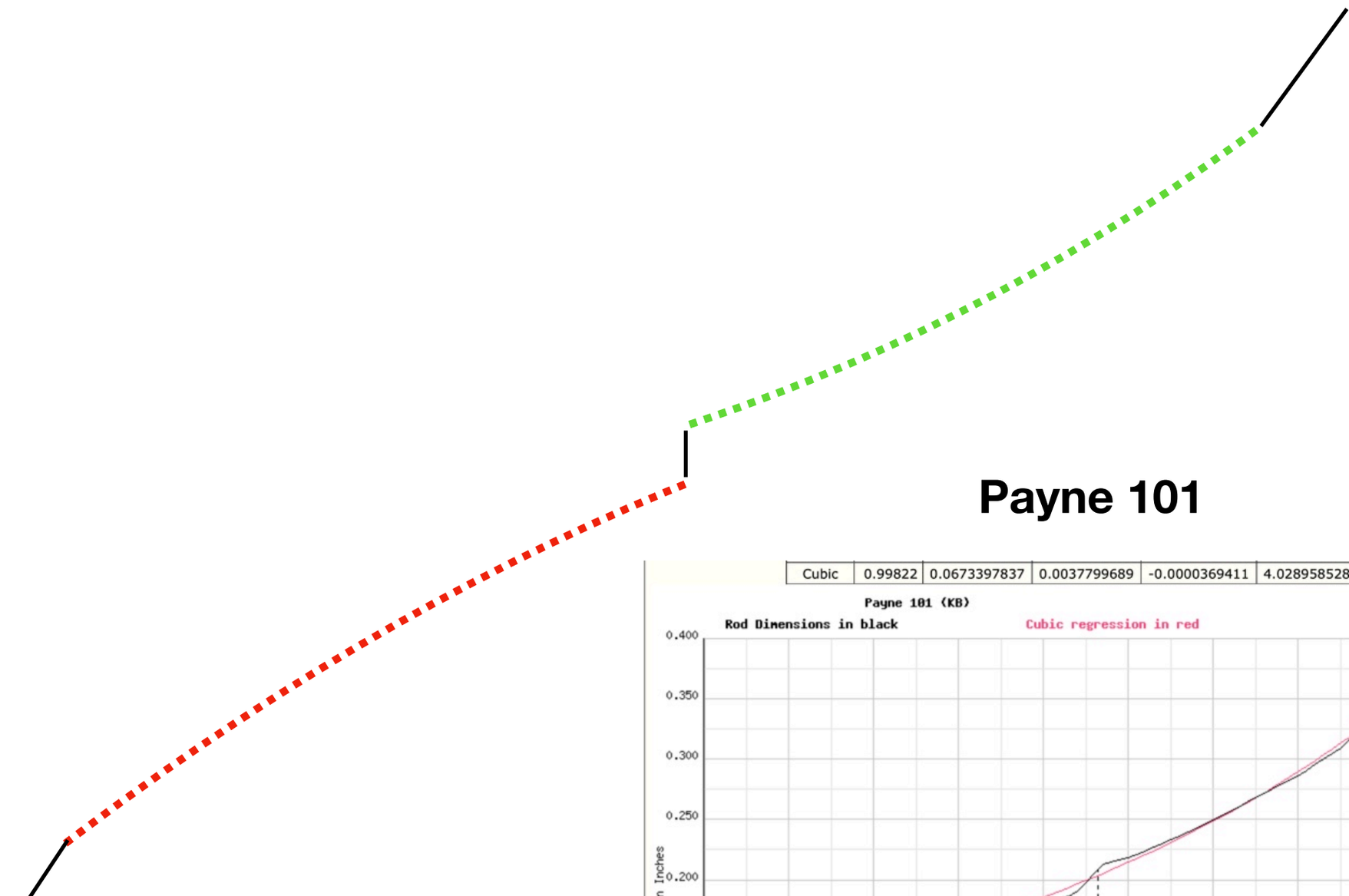
Cubic rods

($y=ax^3+bx^2+cx+d$)



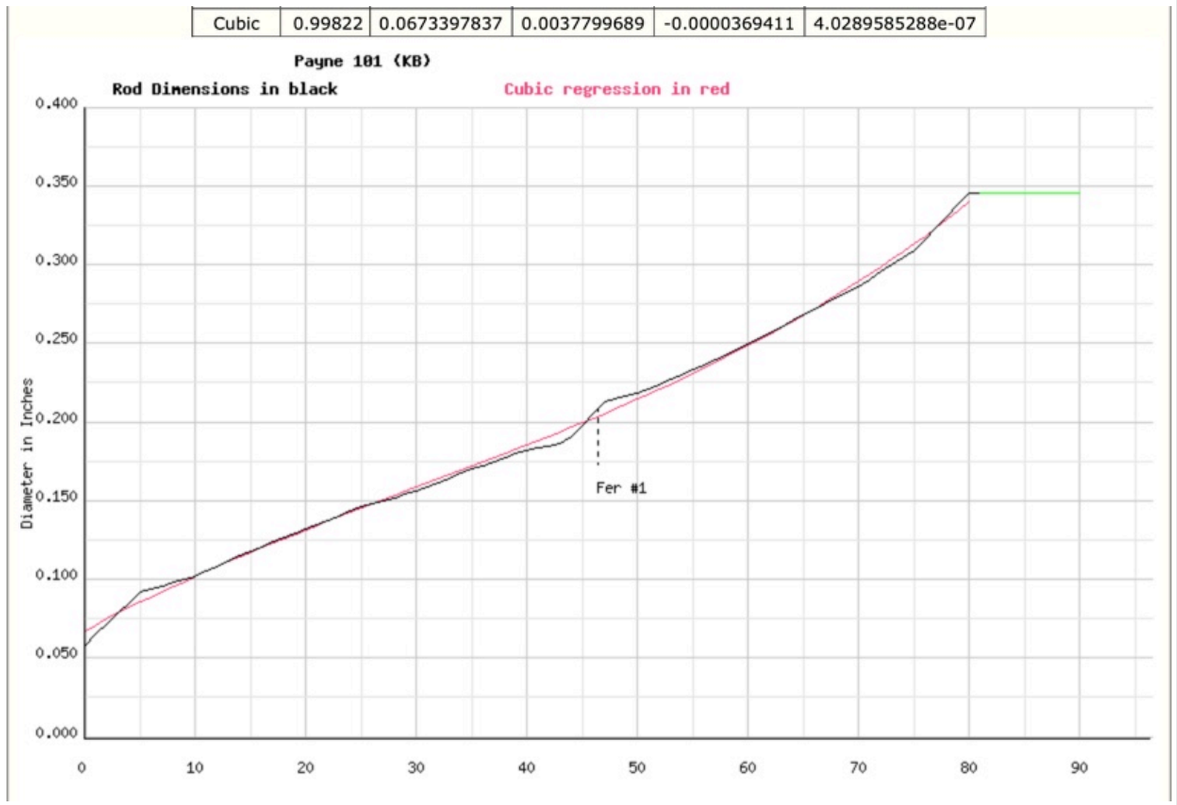
Cubic fit rod with swelled butt, step down ferrules, drop at tip

Diameter



Payne 101

Cubic	0.99822	0.0673397837	0.0037799689	-0.0000369411	4.0289585288e-07



Rod length/Distance from tip ⟶

Hexrod Powell taper function

A

Tip size:	0.070	Inch
Linear strip taper:	8	Thousanths of inch per 6 inches
"A" taper factor:	1/4	Fraction of thousanths to add per 6 inches
"C" taper factor:		Fraction of thousanths to substract per 6 inches
Show taper every:	5 inches	

Calculate

B

Tip size:	0.070	Inch
Linear strip taper:	9	Thousanths of inch per 6 inches
"A" taper factor:		Fraction of thousanths to add per 6 inches
"C" taper factor:		Fraction of thousanths to substract per 6 inches
Show taper every:	5 inches	

Calculate

C

Tip size:	0.070	Inch
Linear strip taper:	10	Thousanths of inch per 6 inches
"A" taper factor:		Fraction of thousanths to add per 6 inches
"C" taper factor:	1/4	Fraction of thousanths to substract per 6 inches
Show taper every:	5 inches	

Calculate

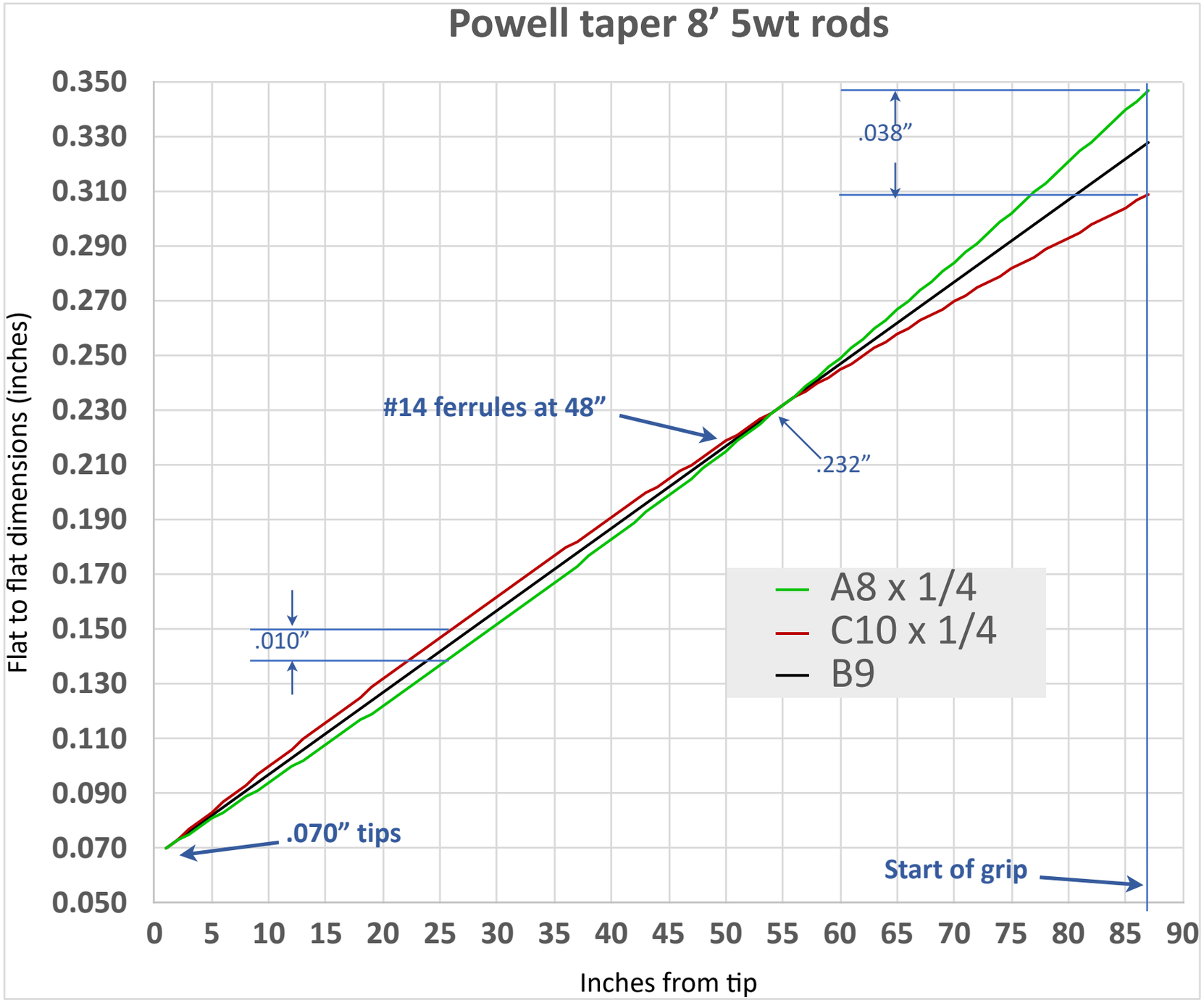
Tip dimensions

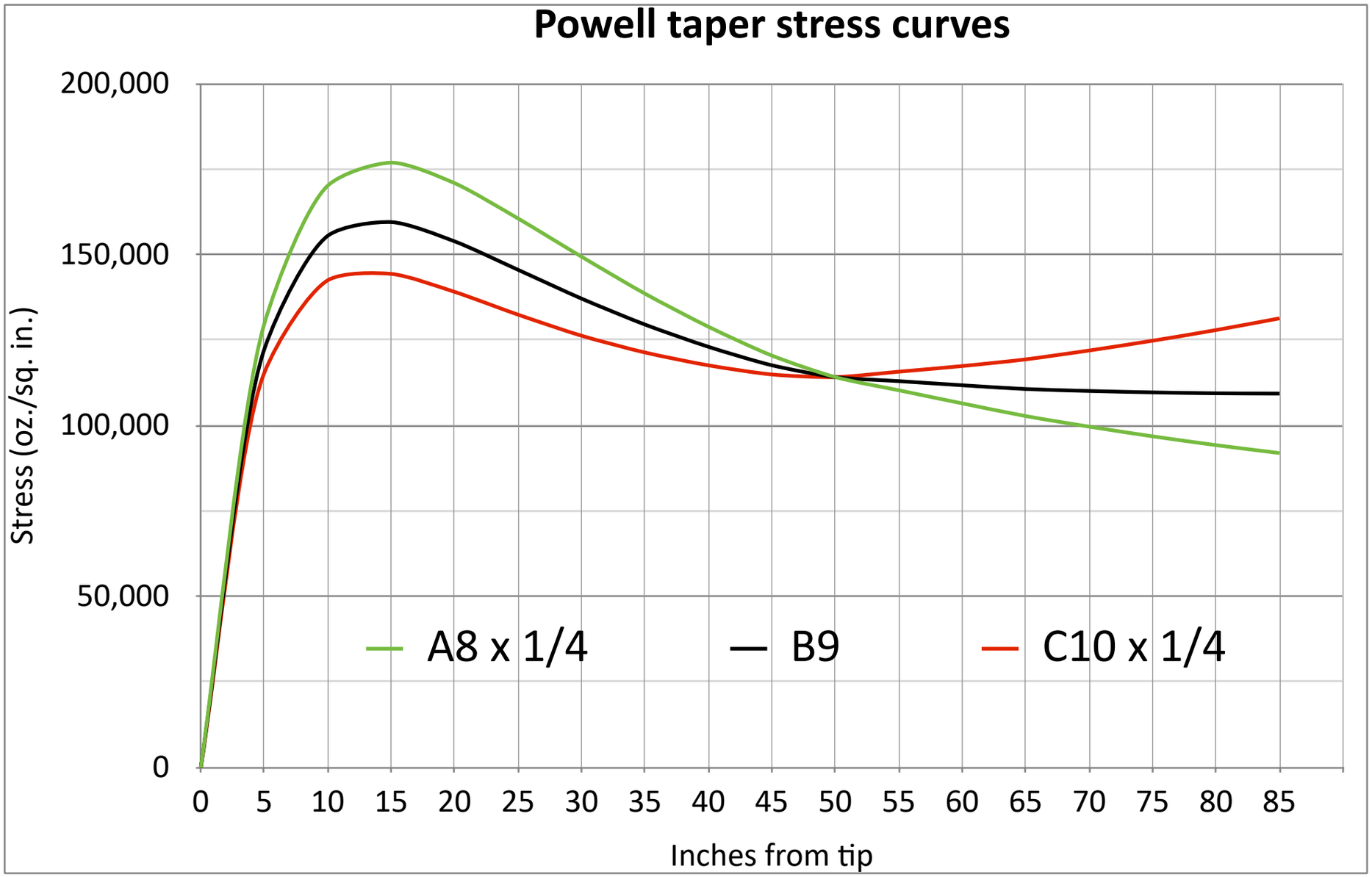
	Initial slope	2.67/inch	3.00/inch	3.33/inch
	Inches	A8 x 1/4	B9	C10 x 1/4
	0	0.070	0.070	0.070
	1	0.073	0.073	0.073
	2	0.075	0.076	0.077
	3	0.078	0.079	0.080
	4	0.081	0.082	0.083
	5	0.083	0.085	0.087
	6	0.086	0.088	0.090
	7	0.089	0.091	0.093
	8	0.091	0.094	0.097
	9	0.094	0.097	0.100
	10	0.097	0.100	0.103
	11	0.100	0.103	0.106
	12	0.102	0.106	0.110
	13	0.105	0.109	0.113
	14	0.108	0.112	0.116
	15	0.111	0.115	0.119
	16	0.114	0.118	0.122
	17	0.117	0.121	0.125
	18	0.119	0.124	0.129
	19	0.122	0.127	0.132
	20	0.125	0.130	0.135
	21	0.128	0.133	0.138
	22	0.131	0.136	0.141
	23	0.134	0.139	0.144
	24	0.137	0.142	0.147
	25	0.140	0.145	0.150
0.005” diff.	26	0.143	0.148	0.153
	27	0.146	0.151	0.156
	28	0.149	0.154	0.159
	29	0.152	0.157	0.162
	30	0.155	0.160	0.165
	31	0.158	0.163	0.168
	32	0.161	0.166	0.171
	33	0.164	0.169	0.174
	34	0.167	0.172	0.177
	35	0.170	0.175	0.180
	36	0.173	0.178	0.182
	37	0.177	0.181	0.185
	38	0.180	0.184	0.188
	39	0.183	0.187	0.191
	40	0.186	0.190	0.194
	41	0.189	0.193	0.197
	42	0.193	0.196	0.200
	43	0.196	0.199	0.202
	44	0.199	0.202	0.205
	45	0.202	0.205	0.208
	46	0.205	0.208	0.210
	47	0.209	0.211	0.213
#14 Ferrule	48	0.212	0.214	0.216

Butt dimensions

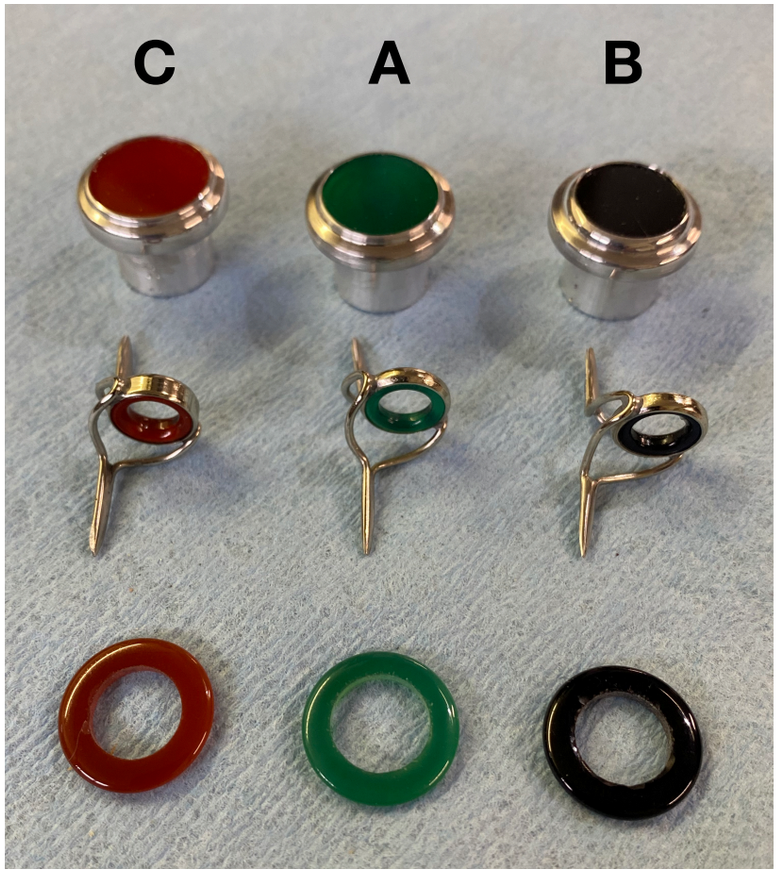
#14 Ferrule	48	0.212	0.214	0.216
	49	0.215	0.217	0.219
	50	0.219	0.220	0.221
	51	0.222	0.223	0.224
	52	0.225	0.226	0.227
	53	0.229	0.229	0.229
0” diff.	54	0.232	0.232	0.232
	55	0.235	0.235	0.235
	56	0.239	0.238	0.237
	57	0.242	0.241	0.240
	58	0.246	0.244	0.242
	59	0.249	0.247	0.245
	60	0.253	0.250	0.247
	61	0.256	0.253	0.250
	62	0.260	0.256	0.253
	63	0.263	0.259	0.255
	64	0.267	0.262	0.258
	65	0.270	0.265	0.260
	66	0.274	0.268	0.263
	67	0.277	0.271	0.265
	68	0.281	0.274	0.267
	69	0.284	0.277	0.270
	70	0.288	0.280	0.272
	71	0.291	0.283	0.275
	72	0.295	0.286	0.277
	73	0.299	0.289	0.279
	74	0.302	0.292	0.282
	75	0.306	0.295	0.284
	76	0.310	0.298	0.286
	77	0.313	0.301	0.289
	78	0.317	0.304	0.291
	79	0.321	0.307	0.293
	80	0.325	0.310	0.295
	81	0.328	0.313	0.298
	82	0.332	0.316	0.300
	83	0.336	0.319	0.302
	84	0.340	0.322	0.304
	85	0.343	0.325	0.307
0.019” diff.	86	0.347	0.328	0.309

Start of grip


Powell taper 8’ 5wt rods
Flat to flat dimensions (inches)
0.350
0.330
0.310
0.290
0.270
0.250
0.230
0.210
0.190
0.170
0.150
0.130
0.110
0.090
0.070
0.050
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
Inches from tip
.038”
#14 ferrules at 48”
.232”
.010”
.070” tips
Start of grip
A8 x 1/4
C10 x 1/4
B9

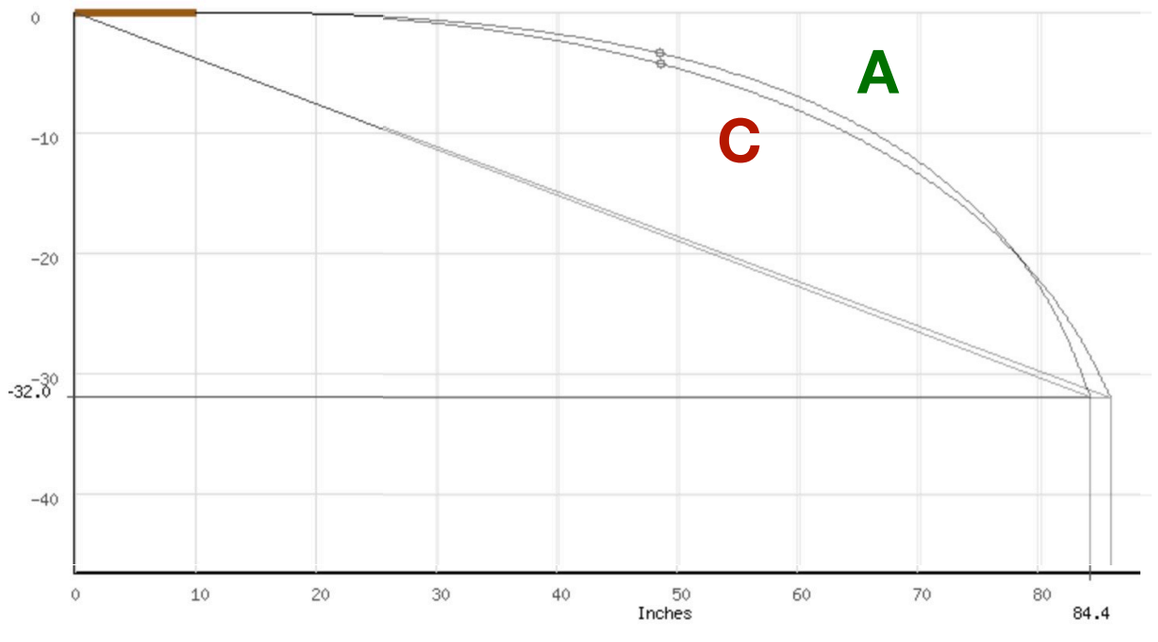

Powell taper stress curves
200,000
150,000
100,000
50,000
0
Stress (oz./sq. in.)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
Inches from tip
A8 x 1/4
B9
C10 x 1/4

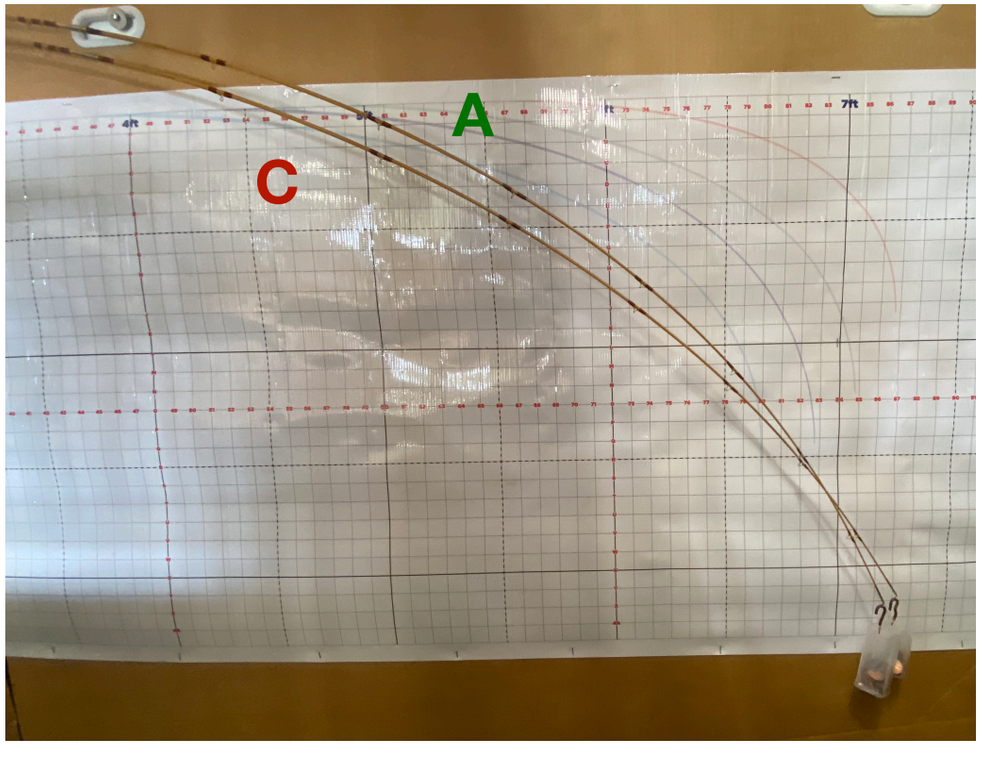
- 8 foot 2 piece rods are as identical as possible
- A single culm was used for all three rods
- Strips were matched to position on the culm
- Same node positions with 3x3 stagger
- Hollow fluted from 0.060” to 0.040” wall thickness
- Guides in same position on each rod
- Ferrules are interchangeable
- Same grips and reel seats
- Butts and tips are labeled & color coded
- Same weight Medalist 1494 reels & 406 DT5 lines



Static deflection measurements at 1/3 rod length (32”)

Predicted (HexRod)				Actual		
A	B	C		A	B	C
68	66	63	Tip angle°	66	62	58
2.83	2.79	2.73	Ounces to deflect	3.10	3.07	3.00





Final rod weights (ounces)

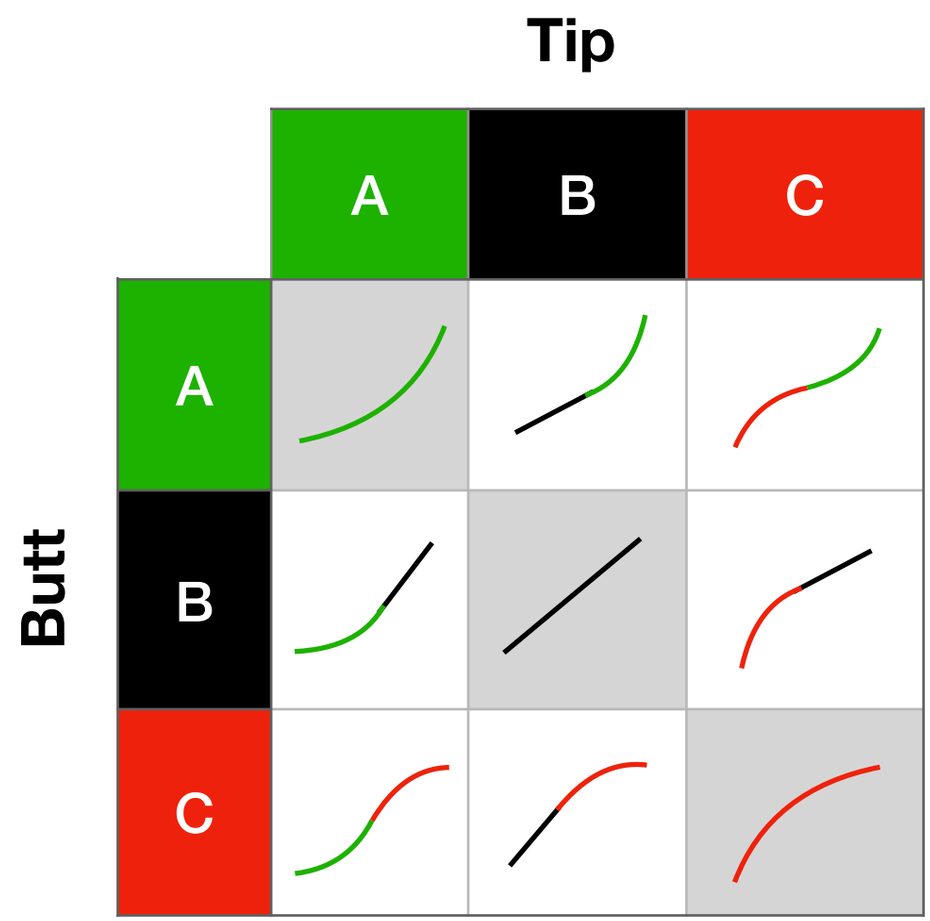
	A	B	C
Tip	0.70	0.71	0.76
Butt	3.31	3.29	3.30
Total	4.01	4.00	4.06

Photos by Yaz

METTAWA, ILLINOIS

KICKAPOO BAMBOO

EST. 2018



Which combination do you prefer?

Feedback is welcome

KICKAPOO BREW

METTAWA, ILLINOIS

FF

Frank's Finest

CREAM ALE

Guaranteed to put a smile on your face

6.3% ABV **23 IBU**