

Case Former Dimensions

Shell Size	Case Former Diameter	Minimum Length of Former (Nominal shell size x 2 plus 1")
3"	2-1/2"	7"
4"	3-1/2"	9"
5"	4-1/2"	11"
6"	5-1/2"	13"
7"	6-1/4"	14"
8"	7-1/4"	16"
10"	9"	19"
12"	11"	25"

Source: Pyrotechnica IX

Kraft Paper Weights and Thickness

Paper Weight	Paper Thickness (in inches)
30 lb	.003"
40 lb	.004"
50 lb	.005"
60 lb	.006"
70 lb	.007"
90 lb	.009"

Source: Pyrotechnica IX

Kraft Paper Sizes for Cases

Shell Size	Number of turns On former	Paper Length
3"	3	24"
4"	4	48"
5"	5	3 each 24"
6"	6	4 each 24"
7"	7	3 each 48"
8"	8	4 each 48"

Source: Pyrotechnica IX

Amount of paste wraps for single break canister shells

Shell Size	Number of turns On former	Paper Weight	Paper Length
3"	3	30-40 lb.	24"
4"	4	50-70 lb.	48"
5"	5	60-70 lb.	3 each 24"
6"	6	60-70 lb.	4 each 24"
7"	7	60-70 lb.	3 each 48"
8"	8	70 lb.	4 each 48"

Source: Pyrotechnica IX

Canulle Diameter

Shell Size	Canulle Diameter
3"	3/4" – 1"
4"	1" – 1-1/4"
5"	1-1/2" – 1-3/4"
6"	1-3/4" – 2"
7"	2" – 2-1/4"
8"	2-1/4" – 3"

Source: Pyrotechnica IX

Standard Spiking Patterns

Shell Size	Verticals/Strands	Material
3"	12/2	8 Ply Cotton
4"	16/2	8 or 10 Ply Cotton
5"	24/2	8 or 10 Ply Cotton
6"	32/2	8 or 10 Ply Cotton
8"	48/2	8 or 10 Ply Cotton

Source: Pyrotechnica IX

Spolette Information for Single Break Shells

Shell Size	Inside Dia.	Outside Dia.	Length	Powder Charge
3"	5/16"	.55"	2"	1" – 1-1/4"
4"	5/16" – 3/8"	11/16"	3"	1-3/8"
5"	5/16" – 3/8"	11/16"	3"	1-3/8" – 1-1/2"
6"	5/16" – 3/8"	11/16"	3"	1-1/2"
8"	5/16" – 3/8"	11/16"	4"	1-3/4"

Source: Pyrotechnica IX

Time Fuse Delay Times

Shell Size	Delay Time (seconds)
3"	3
4"	3.5
5"	4
6"	5
8"	6

Lift Charge Amounts for Single Break Shells

Shell Size	Description	Weight of 2FA Lift Powder
3"	Color or Salute	1 oz
3"	Color and Inserts	1-1/4- 1-1/2 oz
4"	Color or Salute	2 oz
4"	Color and Inserts	2-1/2 oz
5"	Color or Salute	3 – 3-1/2 oz
5"	Color and Inserts	4 -5 oz
6"	Color or Salute	4-5 oz
6"	Color and Inserts	4-1/2 – 6 oz
8"	Color	8 – 12 oz

Source: Pyrotechnica IX

Notes:

- Powder charges and timings will change because of different powders and construction methods. It is up to the individual to test components to verify that components will work as expected.
- The use of different papers and strings used will also make subtle changes in the shell.
- The amount of string, paper, and liners will also change shell performance.
- It is possible to use recycled paper for the entire shell being built. Problems could arise when pasting. A suggestion to conserve on good virgin kraft paper would be to use recycled paper for the case and virgin kraft for the paste wraps.
- These tables were prepared using the publication "Pyrotechnica IX. The information is compiled from what American fireworks producers would usually do when making shells for displays.
- Part of art work in general is to make it your own. Slight modifications and tinkering with the original design specifications is expected. It should not be considered to be a "Set in stone" rule!