



Drilling Angles shown are for 5" PAP – Adjust for other PAPs

Outer Limits Black Hole Drilling Chart							
	Layout	Layout Specs	Low RG	Int Diff	Total Diff	Performance Differential	RG PAP
	Undrilled	-	2.499	0.014	0.051	0.053	
A	Maximum Flip	Pin Over 70° x 3-1/2" x 20°		0.026	0.059	0.065	2.520
B	Most Versatile	Pin Over 45° x 4" x 35°		0.018	0.050	0.053	2.528
C	Smoother Motion	Pin Over 20° x 4-1/2" x 40°		0.012	0.045	0.047	2.538
D	Midlane Hook	Pin Under 40° x 4-1/4" x 75°		0.013	0.040	0.042	2.532
E	Smaller Hook	Pin Besides 90° x 2 1/4" x 45°		0.009	0.039	0.040	2.509

This chart uses a 5" horizontal axis co-ordinate. Adjust the drilling angle for other horizontal co-ordinates. Always use the pin to PAP distance and VAL angle to get the desire ball motion.

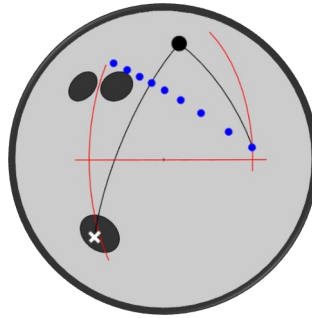
*"Performance Differential" is a term used to accurately describe the track flare of a ball. The TRUE amount of track flare of a drilled ball is related to both the intermediate and total differential of the drilled ball. The "Performance Differential" of the drilled ball measures the relationship between the intermediate and total differential to give an accurate measure of the amount of track flare in the drilled ball.*

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## Suggested Layouts for Asymmetric Cores

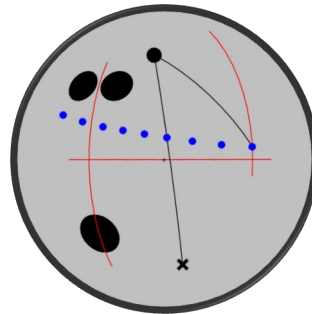
### A – Maximum Flip

**Pin Over**  
**70° x 3½" x 20°**



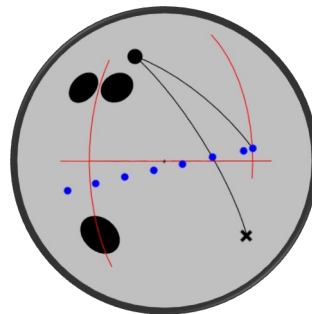
### B – Most Versatile

**Pin Over**  
**45 x 4" x 35°**



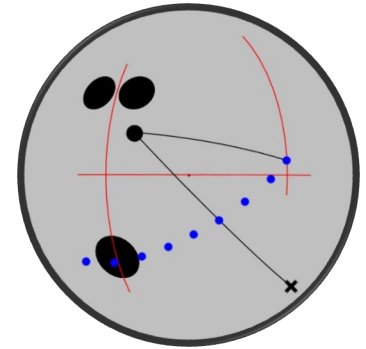
### C – Smoother Motion

**Pin Over**  
**20° x 4-1/2" x 40°**



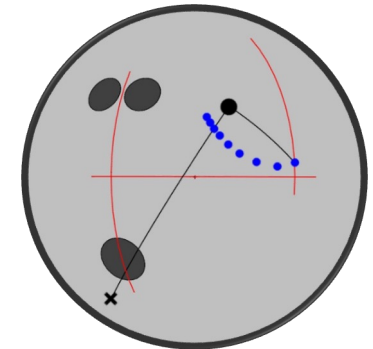
### D-Midlane Hook

**Pin Under**  
**40° x 4 ¼" x 75°**



### E –Smaller Hook

**Pin Under**  
**90° x 2 ¼" x 45°**



The "X" on the diagrams indicates the Preferred Spin Axis (PSA / Mass Bias) of the drilled ball, and the line that connects the PSA and PIN after drilling is referred to as the "Pin to Spin Line". The important feature of the "Pin to Spin Line" is that the ball revs up when the migrating axis crosses this line so the sooner the migrating axis crosses the "Pin to Spin Line", the sooner the ball revs up.