Comprehensive Drilling Suggestions

These are suggested drilling techniques to help you achieve the ball reaction desired from your RADICAL BOWLING TECHNOLOGIES bowling ball. Please feel free to use your favorite layout on any RADICAL BOWLING TECHNOLOGIES ball. You may also use the Dual Angle Layout of your choice with confidence. One of the benefits of balls designed for RADICAL BOWLING TECHNOLOGIES is their drilling versatility. Choosing the correct drilling technique for your desired ball reaction combined with the correct coverstock surface will strongly enhance your enjoyment of your RADICAL BOWLING TECHNOLOGIES ball. These drilling suggestions are separated into two categories, suggested symmetrical and suggested asymmetrical drilling techniques. We recommend you try the factory surface when you first try your new RADICAL BOWLING TECHNOLOGIES ball, but don’t hesitate to alter the surface to achieve the amount of hook you desire, or the breakpoint distance you’re looking for. The surface of your RADICAL BOWLING TECHNOLOGIES ball is easily adjusted to achieve your desired final ball reaction.

RADICAL BOWLING TECHNOLOGIES Ball Surface Chart
(Listed from earliest traction to latest traction)
- 240 grit Siaair micro pad
- 360 grit Siaair micro pad
- 500 grit Siaair micro pad
- 800 grit Siaair micro pad
- 1000 grit Siaair micro pad
- 1500 grit Siaair micro pad
- 2000 grit Siaair micro pad
- 4000 grit Siaair micro pad
- 2000 grit Siaair micro pad with Brunswick Royal Compound
- 2000 grit Siaair micro pad with Brunswick Royal Shine
Suggested Asymmetrical Layouts for High Track Bowlers
Bowlers with Less Than 12 Degrees of Initial Axis Tilt

**Sharper Breakpoint**
- layout =
  - 70° Drilling Angle
  - 3 3/8" Pin to PAP
  - 30° VAL Angle
- Recommended Pin Distance 2-5.5"

**More Angular Breakpoint**
- Use for most players on most patterns

**Midlane**
- layout =
  - 45° Drilling Angle
  - 4" Pin to PAP
  - 35° VAL Angle
- Recommended Pin Distance 2-5.5"

**Heavy Forward Roll**
- Use for Speed Dominant Players and/or heavier oil volumes

**Control**
- layout =
  - 85° Drilling Angle
  - 4 1/2" Pin to PAP
  - 45° VAL Angle
- Recommended Pin Distance 2-4"

**Smooth Continuous Hook**
- Use for Rev Dominant Players and/or lighter oil volumes

*Note - Sample Diagrams use a PAP of 5 1/2" over by 0 0 Actual Layout may appear different depending upon the bowler’s PAP*
Suggested Asymmetrical Layouts for Medium Track Bowlers

Bowlers with 12 to 18 Degrees of Initial Axis Tilt

**Sharper Breakpoint**

layout =

\[
\begin{align*}
55^\circ & \times 3 \frac{3}{4}^\circ & \times 30^\circ \\
\text{Drilling Angle} & \times \text{Pin to PAP} & \times \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 2-5.5”

**More Angular Breakpoint**

Use for most players on most patterns

**Midlane**

layout =

\[
\begin{align*}
35^\circ & \times 4 \frac{1}{4}^\circ & \times 30^\circ \\
\text{Drilling Angle} & \times \text{Pin to PAP} & \times \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 2-5.5”

**Heavy Forward Roll**

Use for Speed Dominant Players and/or heavier oil volumes

**Control**

layout =

\[
\begin{align*}
65^\circ & \times 5^\circ & \times 40^\circ \\
\text{Drilling Angle} & \times \text{Pin to PAP} & \times \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 2-4”

**Smooth Continuous Hook**

Use for Rev Dominant Players and/or lighter oil volumes

*Note - Sample Diagrams use a PAP of 4 3/4” over by 0. Actual Layout may appear different depending upon the bowler’s PAP*
Suggested Asymmetrical Layouts for Low Track Bowlers

Bowlers with More Than 18 Degrees of Initial Axis Tilt

**Sharper Breakpoint**

layout =

\[
\begin{align*}
45^\circ & \quad \text{Drilling Angle} \\
4 1/4'' & \quad \text{Pin to PAP} \\
25^\circ & \quad \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 3-5.5”

**More Angular Breakpoint**

Use for most players on most patterns

**Midlane**

layout =

\[
\begin{align*}
20^\circ & \quad \text{Drilling Angle} \\
4 3/4'' & \quad \text{Pin to PAP} \\
30^\circ & \quad \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 3-5.5”

**Heavy Forward Roll**

Use for Speed Dominant Players and/or heavier oil volumes

**Control**

layout =

\[
\begin{align*}
30^\circ & \quad \text{Drilling Angle} \\
5 1/4'' & \quad \text{Pin to PAP} \\
60^\circ & \quad \text{VAL Angle}
\end{align*}
\]

Recommended Pin Distance 1-4”

**Smooth Continuous Hook**

Use for Rev Dominant Players and/or lighter oil volumes

*Note - Sample Diagrams use a PAP of 4” over by 0 ‡ Actual Layout may appear different depending upon the bowler’s PAP*
Determining the Bowler’s Initial Axis Tilt: Initial Axis Tilt is best determined by measuring the distance across the bowler’s initial ball track on the surface of the ball. A measurement of > 11 1/4” (< 12 degrees) indicates a high track bowler. A measurement of 10 1/4” to 11 1/4” (12 to 18 degrees) indicates a medium track bowler. A measurement of < 10 1/4” (> 18 degrees) indicates a low track bowler.

Ball Surface & Cleaning: RADICAL bowling balls are manufactured with a predetermined surface preparation. With the assistance of a qualified pro shop, sanding, scuffing, or smoothing the surface texture may be needed to optimize performance for different styles of players on different lane conditions. We cannot overemphasize the importance of regularly cleaning your RADICAL ball with a quality bowling ball cleaner IMMEDIATELY AFTER each use. Doing so will insure a more consistent reaction and maximize the life of your RADICAL bowling ball.

Balance Holes for Asymmetrical Layouts: If, and when, a balance hole is needed, we recommend using the “Gradient Line Balance Hole System”. The Gradient Line extends from the PSA to P1 passing through the PAP.

### Balance Hole Locations on the Gradient Line

<table>
<thead>
<tr>
<th>Balance hole Position</th>
<th>Location</th>
<th>Change in Ball Reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>6 ¾” from the PSA on the VAL</td>
<td>Weakens ball reaction</td>
</tr>
<tr>
<td>P2</td>
<td>1/3 of the distance from the P1 to the PSA</td>
<td>Maintains ball reaction</td>
</tr>
<tr>
<td>P3</td>
<td>2/3 of the distance from the P1 to the PSA</td>
<td>Strengthens ball reaction</td>
</tr>
<tr>
<td>P4</td>
<td>PSA</td>
<td>Maximizes ball reaction</td>
</tr>
</tbody>
</table>

Legend for the Asymmetrical Layout Pictures:

- **Pin** = The spot marking the top center of the core of the ball
- **MB** = The locator pin marking the position of the Mass Bias
- **PAP** = The positive end of the bowler’s axis of rotation at release
- **VAL** = A Vertical line drawn through the bowler’s PAP
- **Midline** = A horizontal line drawn midway between the thumb and finger holes
Suggested Symmetrical Layouts

**Pin Under – No Balance Hole** - Ultimate Control Layout

Place pin 3” to 5” from PAP for desired flare.

**Pin Over – No Balance Hole** - Later, Sharper Breakpoint with Control

Place pin 3” to 5” from PAP for desired flare.
**Pin Beside with Balance Hole** - Medium Revving with Continuation

Place pin 3” to 5” from PAP for desired flare.

Place Balance Hole on the VAL, 1 ½” below the midline.

---

**Pin Above with Double Thumb Balance Hole** - Fastest Revving Layout

Place pin 4” from PAP - 30 degree VAL angle. Place Center of Balance Hole 1 ¾” from edge of thumb assembly **Pitched** 1 ¼” away from the thumb. Drill balance hole 2 ¾” deep.
**NEW Drilling Layout - MOTion Hole Drilling** - Strongest back end reaction

**For PAPs 5” over or more:**

Draw a line on the ball from the center of the thumb hole through the pin. Extend the line 10” past the pin to the bottom of the ball and mark that spot that is 10” from the pin. That is the intended location for the balance hole. Place a piece of white tape on that spot. Bowl with the ball to make sure the ball doesn’t flare over the tape. If the ball flares over the tape, move the tape sideways to miss the track flare. Drill the balance hole 4” deep. Start with a ¾” diameter hole. Increase the diameter of the hole to as much as 1 ¼” to increase the back end reaction, if desired.

**For PAPs less than 5” over:**