Read through each of the five categories below. These are the important topics to consider when choosing the proper surface friction for your hand condition. Simply circle the choice in each category that fits you. At the end of your evaluation, add up the five numbers and compare this sum to the bottom of the page. This chart is only a guide. You may have to tune the final surface texture, but this will provide you with a starting place. Having a trained pro shop technician assist you will pin-point the proper selection.

### VARIABLE POINTS

#### Lane Condition
- Heavy Oil: 3
- Medium Oil: 2
- Light Oil: 1

#### Bowler’s Ball Speed
- Faster: 3
- Average: 2
- Slower: 1

#### Bowler’s Revolutions
- Striker (under 13): 3
- Twerker (13 to 17): 2
- Power (18+): 1

#### Bowler’s Axis Rotation
- Rotation at hand position at release: 3
- 45° (3:00 hand release): 2
- 90° (4:30 hand release): 1

Total Points and Recommended Surface Friction

<table>
<thead>
<tr>
<th>Points</th>
<th>Recommended Surface Friction</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>360-grit Abralon pad</td>
</tr>
<tr>
<td>14</td>
<td>Powerhouse Sandblaster Polish</td>
</tr>
<tr>
<td>13</td>
<td>500-grit Abralon Pad or 3M Burgundy Scuff Pad</td>
</tr>
<tr>
<td>12</td>
<td>3M Grey Scuff Pad</td>
</tr>
<tr>
<td>11</td>
<td>800-grit wet sandpaper</td>
</tr>
<tr>
<td>10</td>
<td>1000-grit Abralon pad or Powerhouse Matte Polish</td>
</tr>
<tr>
<td>9</td>
<td>500-grit Abralon pad, followed by 2000-grit Abralon Pad</td>
</tr>
<tr>
<td>8</td>
<td>1000-grit Abralon pad, followed by 2000-grit Abralon Pad</td>
</tr>
<tr>
<td>7</td>
<td>1000-grit Abralon pad, followed by 2000-grit Abralon Pad</td>
</tr>
<tr>
<td>6</td>
<td>1000-grit, then 2000-grit Abralon Pads, followed by Ebonite Powerhouse Polish</td>
</tr>
<tr>
<td>5</td>
<td>1000-grit, then 2000-grit Abralon Pads, followed by Ebonite Powerhouse Polish</td>
</tr>
</tbody>
</table>

--- TRUE GRIT ---

The most important decision for proper ball reaction.

Having the proper amount of surface friction on the bowling ball’s surface is the most important factor in obtaining a favorable ball reaction. Having too much surface friction allows the ball to skid too far, and having too little (the ball is too smooth) will severely hinder your ball reaction. While it is very important to consider the proper RG (early rev versus late rev) and Differential (flares and hook potential) when picking out a new ball, have the proper relationship of friction between the ball’s surface and the lane surface is paramount in maximizing ball reaction. It does not matter what type of engine a car has if it does not provide the proper contact with the road. One can vary the breakpoint quickly with sandpaper and polishing compounds than with drilling techniques using different pin placements.

On the other side of this page is a general guide for choosing the proper surface friction. I’d like to address two of the five categories: axis rotation and axis tilt.

Axis rotation is dictated by the bowler’s hand position at the point of release. When the hand exits the ball between 5:30 and 6:00, the ball has an end-over-end roll. This release creates 15° to 18° axis rotation and has the least amount of side roll. The ball has very little side roll, (figure 1). When the hand exits the ball in the 6:30 area, the ball has a medium amount of side roll. This release creates 45° axis rotation, medium length, and is the most adaptable to many lane conditions (figure 2). Releasing the ball at a 70° hand position imparts maximum side roll. The ball rolls at a 90° angle, has maximum skid, and a violent break point (figure 3).

The second subject is axis tilt. This is the vertical angle that the bowler’s axis spins on. This is also determined by the release. By turning the hand too quickly, the thumbs exits the thumb hole. This causes the bowler to top the ball. The more the bowler tips the ball, the smaller his/her track circumference will be. The small the track, the most vertical axis tilt. The more the tilt present, the longer the ball will slide down the lane and the less hooking power it will have. More definition will occur when the hands enter the pocket. Before, in figures 4, 5 and 6, it is the method used to determine the track circumference. First, trace the bowler’s track with a marking pencil. Using your quanter scale, draw a line (at a 90° angle) across the track from one side of the track to the other. Measure the half-way point and mark it with your pencil. Draw another line 90° to this line connecting both sides of the track. Measure the half-way point on this line. The point of intersection on this line is the bowler’s positive axis point. If the bowler’s PAP is not visible, use a pencil and make a point on the side of the track (not on the pin) at 1:30.

The following ratings were used:
- Length: scale 1 to 10 with 1 being the earliest roll and 10 being the most length.
- Backend: scale 1 to 10 with 1 being the least and 10 being the most.
- Overall: scale 1 to 10 with 1 being the least and 10 being the most.

These drilling patterns are adaptations of the ball’s dynamic fingerprints. The length, backend, and overall ratings are relative to the ball’s potential. Drilling a low RG ball (safe RG placement near the thumb) will create a low hook and create as much length as you would receive from choosing a high RG ball. A drilling high RG ball to get into an earlier roll will not be as effective in heavier oil as a choosing a lower RG ball. A higher RG ball will require more surface friction to react well in heavier oil. A lower RG ball will require less surface friction to navigate medium to lighter oils (figures 1 through 6). When the ball has been polished by the rain condition the different layouts will be more pronounced. When drilling a ball that has a lower RG differential (ball potential) the differences between length, backend, and overall ratings can be seen. The drills should be made to the drills should be made to the ball’s surface condition.

BOWLER’S AXIS ROTATION (Orientate the ball in the drilling instructions. The center of the ball is identified by the PAP. The PAP in the layout is in the bowler’s positive axis point. If the bowler’s PAP is not visible, use a pencil and make a point on the side of the track (not on the pin) at 1:30.)

- Length: scale 1 to 10 with 1 being the earliest roll and 10 being the most length.
- Backend: scale 1 to 10 with 1 being the least and 10 being the most.
- Overall: scale 1 to 10 with 1 being the least and 10 being the most.

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--- SYMMETRIC CORE DYNAMIC LAYOUTS ---

These layouts are for right-hand drilling. Reverse the layout procedure to mirror image for left-handed layouts.
DRILLING #1 LABEL LEVERAGE

Reaction: Length…5     Backend…7     Overall Hook…8

Ball Choice: pin out 1" to 4", all top weights

Balance Hole: 6" from the grip center on a line through the CG, drill back to 1/2 positive.

CG Placement: 3" to 4" from PAP in the thumb positive quadrant (location depends on the pin out distance).

Pin Placement: No hole needed.

Lane Condition: Medium to heavy oil with carrydown, good for players with faster speed, medium to maximum axis rotation, and above average ball speed.

Hook Style: Maximum hook, sharp backend

In review:

Balance holes in the REV-LEVERAGE area cause earlier and stronger roll-off. Place the hole on the Positive Axis Point to 1/2 oz. positive side.

Balance holes past the PAP increase the flare potential of the ball. This will increase the amount of hooked track and change the track to be more flared. Pin placements in the positive side weight will reduce the REV-LEVERAGE flare and balance holes on the PAP will balance out the REV-LEVERAGE area and reduce balance hole potential. Choosing a larger pin negatively side weight will reduce the REV-LEVERAGE flare and balance holes past the PAP will balance out the REV-LEVERAGE area and reduce balance hole potential.

Placement of a balance hole along the vertical axis line will cause increased balance hole potential along the track line. This is the balance hole area that creates the REV-LEVERAGE. As you move away from the PAP along the vertical axis line the balance hole potential decreases. The REV-LEVERAGE flare potential is caused by the combination of balance holes and the location of the hole along the track line. Balance holes in the REV-LEVERAGE area cause earlier and stronger roll-off. Balance holes past the PAP increase the flare potential of the ball.

Balance hole placements can utilize the REV-LEVERAGE balance hole. Simply choose a larger pin and apply the CG in the thumb positive quadrant along the REV-LEVERAGE area. Balance holes in the REV-LEVERAGE area can cause earlier and stronger roll-off, increased flares, and correspondingly faster speed and medium to maximum axis rotation.

Balance holes in the REV-LEVERAGE area can cause earlier and stronger roll-off, increased flares, and correspondingly faster speed and medium to maximum axis rotation.