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BALL CONSTRUCTION

Both the Purple Rhino Pro (PRP) and Black Rhino Pro (BRP) are conventional two piece balls. Each contains a shaped core as one piece and a urethane cover stock as the second piece. The core shape is the same in both the PRP and BRP while the cover stocks of the two balls are different.

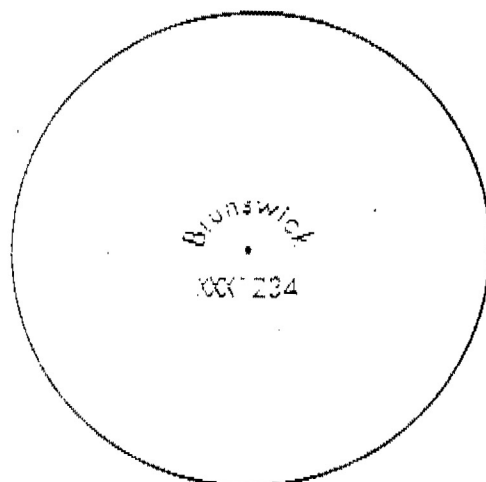
As can be seen in the diagrams to the right, the core shape can be described as a sphere with a cylinder extending from the top and a shorter cylinder extending from the bottom. The green riser pin that can be seen on the surface of the ball in the label area shows the center line along the long axis of the core. As can be seen from the top view diagram, the core is symmetric around the pin, making the Rhino Pro a conventional two piece design.

BLACK RHINO PRO COVER STOCK

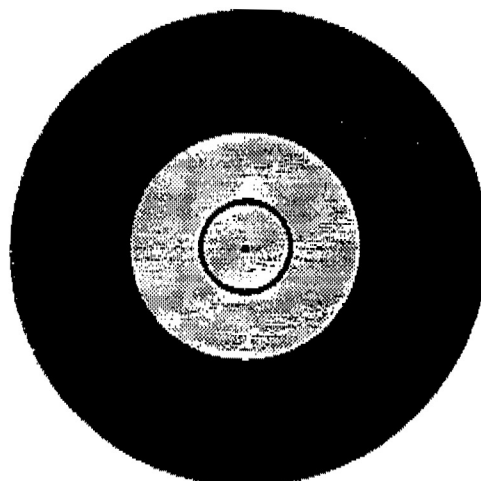
The shell of the BRP is a conventional type of urethane that has been specifically formulated to perform well on medium to heavy oil patterns. The BRP comes factory sanded with a 320 grit finish. If the ball reacts too soon on the lane the surface can be easily smoothed or shined for less reaction. Wet sanding with 400 then 600 grit paper before shining is recommended. Highly polishing the BRP surface will make it more usable on moderately dry conditions.

PURPLE RHINO PRO COVER STOCK

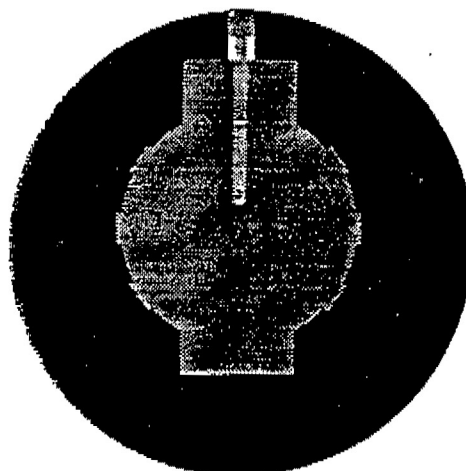
The shell of the PRP, which is quickly becoming known as a *highly responsive* material, is made from a new type of urethane formulation that is significantly different from those used in other Brunswick Urethane balls to date.



RHINO PRO LABEL VIEW



RHINO PRO TOP VIEW



RHINO PRO SIDE VIEW



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The unique characteristic of the PRP cover stock is that it responds more strongly to the lane surface than a conventional urethane does. Thus the PRP reacts more strongly on dry lane surfaces, but reacts less strongly on medium and heavily oiled lane surfaces than traditional urethane cover stocks. On most lane conditions, the Purple Rhino Pro has the potential to react less in the heads but react more on the back ends than other urethane bowling balls.

Bowlers have come to expect the surface of the PRP to have a "tacky" feel. The degree to which the surface feels tacky is dependent on how much the ball has been polished. The greater the polish, the tackier the feel. Polishing your PRP in a Lustre King™ or Lustre Kleen™ increases the tacky feeling of the cover stock.

Because of the unique characteristics of this type of urethane, sanding and polishing the ball can cause different changes in the ball's reaction than might be expected.

Polishing the PRP will tend to make the ball react less in the heads and react stronger on the back ends if they are dry. If the PRP is reacting too strongly on a lane that has dry back ends, polishing can cause an even stronger back end reaction and thus may not provide the desired change in reaction.

Sanding the PRP will cause the ball to react more in the heads but will limit the change in direction in the back ends. This will give the ball a more even reaction that is closer to that of a conventional urethane cover stock. If a PRP is reacting too strongly on a lane that has dry back ends, sanding the surface will cause the ball to roll sooner. This can even out the trajectory and make the ball more usable on this condition. If a PRP is reacting too weakly on an oily lane, sanding the surface will cause the ball to roll sooner, giving a reaction that is closer to conventional urethanes. On heavily oiled lanes no amount of sanding will make a PRP go long and hook hard like a shiny PRP on a lane with dry back ends.

Comparing reactions between the PRP and BRP, both sanded and shined, is difficult because the total reaction the bowler will see depends on the combination of the ball, the lane condition and the bowler's technique. For medium to heavily oiled lanes, conventional urethanes such as the Black Rhino Pro may provide a more usable reaction. On very oily lanes with lots of carry down the BRP may tend to react more than a PRP. On more medium amounts of oil, crowned or blocked conditions, the PRP may tend to react more than the BRP.

DRILLING TRENDS

Drilling trends on the PBA tour for the PRP have tended toward Medium to Minimum reaction layouts. The PRP typically gives the bowler a very large back end reaction. Maximum reaction layouts tend to be too reactive for the bowlers on tour. Label shifts, both positive and negative have been popular. Leverage weight and other strong reacting layouts are not used by the majority of bowlers. Positioning



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the pin on the bowlers axis, with a balance hole approximately 9 inches out to the right (for right handers) from the grip center has also been popular (use a ball with top weight of 2.5 oz. or less or a pin-out with the heavy spot positioned between the grip center and the axis). This layout tends to produce an even reaction with moderate back ends. Most tour players use the PRP highly polished to maximize the back end reaction of the ball. The first thing most bowlers on tour do is put the PRP in a Lustre King for 10 minutes to achieve an extremely high polish.

Drilling trends on the PBA tour for the BRP have been to use Medium to Maximum reaction layouts. Positive side weight or Leverage weight are the most common layouts used.

FINGER GRIPS AND THUMB SLUGS

The durability of the PRP coverstock falls in between conventional polyester and urethane formulations. Any ball has the potential to crack or chip around the finger and thumb holes, especially when finger or thumb inserts are used. The *highly responsive* urethane formulation of the PRP is slightly more susceptible to cracking than a conventional urethane.

Here are a few tips to minimize problems with any ball, including the PRP:

- *Use a minimum bridge width of 1/4". Bridges that are narrower than 1/4" are much weaker and are not covered by warranty should they break out.*
- *Thumb slugs that have to be hammered into the hole can cause cracking around the thumb hole. If the slug is extremely tight in the hole either shave down the slug or open the thumb hole before installation to avoid stress on the ball.*
- *Use a slow drill bit feed rate to minimize stress on the coverstock.*
- *Keep your drill bits sharp; especially the 31/32" bit used for installing finger inserts.*
- *Drill 1/4" to 1/2" at a time and then pull back and allow the cover stock and drill bits to cool to minimize stress to the cover stock.*

Exposure to high temperatures can also increase the possibility of cracking. Brunswick recommends that any type of *highly responsive* material not be stored at high temperatures for an extended period of time.

RESURFACING

The cover stock formulation of the Purple Rhino Pro tends to track out a little faster than our conventional urethane formulations.



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There have been some rumors that the Purple Rhino Pro cannot be resurfaced. This is not true. Normal resurfacing techniques will work fine on the Purple Rhino Pro. For example:

220 grit paper to remove surface scratches

320 grit paper

400 grit paper

Approximately 5 minutes in a Lustre King or Lustre Kleen ball polisher to reproduce the factory finish.

LIGHT WEIGHT RHINO PROS

The 12, 13 and 14 pound Rhino Pros have been designed to have the same dynamic characteristics as the 15 and 16 pound balls. To accomplish this Brunswick has used a compound core design that features a high density inner core and a low density outer core surrounded by a half inch cover stock. This creates a lightweight three-piece ball that has the weight distribution and dynamics of a heavier two-piece ball.

This feature is unique to Brunswick and guarantees that the layout techniques that are used on 15 and 16 pound Rhino Pros will work equally well on the 12, 13 and 14 pound weights.

Note: The shell, outer and inner core of the 12, 13 and 14 pound Rhino Pros are made of materials of different densities and hardness. Drilling the holes too quickly can cause the drill bit to wander as it hits the different materials, creating holes that are not round. Keeping the drill bits sharp and drilling the holes at a medium to slow feed rate will help prevent this problem.

Note: The outer core material of the 12, 13 and 14 pound Rhino Pros is a light weight material and sands away rapidly with the disc sander. Too much time or pressure with the disc sander will cause a lip between the shell and the outer core.

The light weight Rhino Pro's use the same cover stocks as the 15 and 16 pound Pros. The 10 and 11 pound Rhino Pros use a spherical core offset to provide top weight.

FULL ROLLER LAYOUTS

Brunswick would like to recommend a new method for manipulating ball reaction for full rollers.

Semi-roller techniques such as moving the pin to the positive side of the ball to increase reaction cause the track to flare in a clock wise direction, toward the fingers and away from the thumb for a semi-roller. For the full-roller this type of pin placement causes the track to flare toward the fingers and the thumb, often resulting in the track moving over some or all of the holes.

For the full-roller we need to make the track flare in the opposite direction. To do this we need to move the pin in a direction that most pro shop operators are not comfortable with.

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Moving the pin to the negative side of the ball (more than 6-3/4" away from the bowler's positive axis) will cause the track to flare in the opposite direction and increase ball reaction. Move the pin in the 7:30 direction or perpendicular to the track. Maximum reaction is obtained when the pin is 3-3/8" from the track. Minimum reaction is obtained with the pin on the bowler's grip center.

If the pin is to be placed further than 1" from the grip center, Brunswick recommends using a pin-out ball to avoid the need for an extra hole. Place the pin in the desired location then position the ball so the heavy spot is placed back toward the grip center.

If you have any questions about this information, or additional ball drilling techniques for Brunswick Balls, call Bill Wasserberger or Ray Edwards at 1-800-YES-BOWL (1-800-937-2695).

Good Luck and Good Bowling,
Brunswick R. & D Staff