



## DRILLING INFORMATION

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The Nitro is Ebonite's latest step in the development of the ultimate high performance bowling ball. The Nitro's urethane cover contains two performance additives. At 11.5 pounds, the Nitro has the most urethane of any ball on the market. Ebonite's Dynamic Core allows for a number of drillings that will provide the experienced bowler a variety of ball reactions.

The Nitro utilizes two-piece construction, where the urethane cover stock is poured around the core. Top weight is achieved by the positioning of the core in the upper half of the ball. The higher the core positioning, the more top weight the ball will have, the closer the core is positioned to the center of the ball, the less top weight.

There are two important terms used in describing drilling techniques for the Nitro: the **center of gravity**, referred to as the **CG**, and the **core pin locator**, commonly called the **pin**. The CG is the balance point in the finished bowling ball. Other than for the top weight,

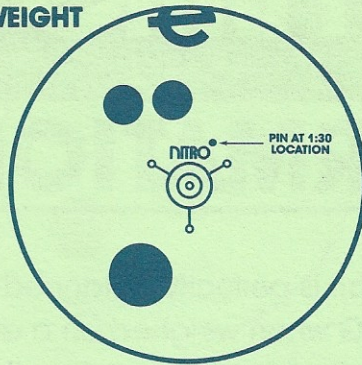
the ball is perfectly balanced around the CG when weighed on a dodo scale. The pin is the spot on the cover that locates the center of the core. The core, if viewed from this spot, is symmetrical. During manufacture, the pin and the CG sometimes become located in different places, which allows for some drilling techniques that are unique to two-piece bowling balls. When a ball is thrown down the lane, both the CG and the core exert forces on the path of the ball. However, because the core has more than four pounds of mass, it exerts the most force on the moving bowling ball. It is important to consider both the location of the CG and the pin when drilling the Nitro ball.

**Note:** The drawings shown are for right-handed bowlers. Left-handed bowlers need to position the center of gravity and the core locator pin in the proper positions in relation to the track of the ball. This requires the ball to be shifted 90 degrees left (counter-clockwise).

## LABEL SHIFT

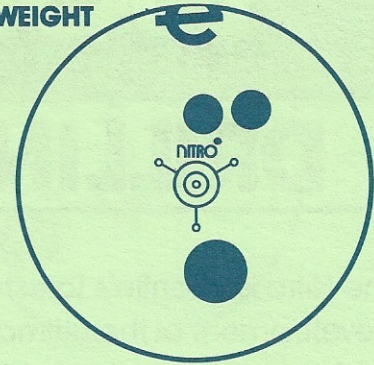
### SHIFTS OFF THE CG

#### POSITIVE WEIGHT



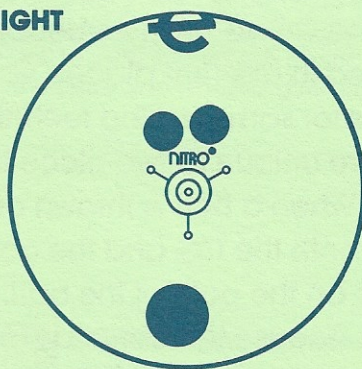
Move the grip to the left of the CG to create an imbalance that causes more hook when the ball enters the pins. (Move grip to the right for left-handers)

#### NEGATIVE WEIGHT



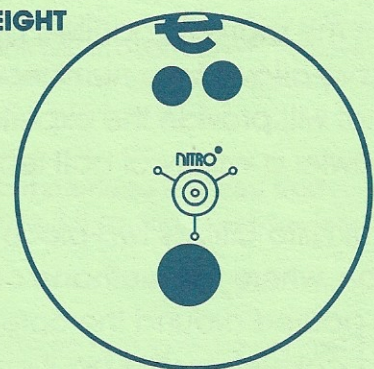
Move the grip to the right of the CG to create an imbalance that causes less hook when the ball enters the pins. (Move grip to the left for left-handers)

#### FINGER WEIGHT



Move the fingers closer to the CG to cause the ball to skid longer.

#### THUMB WEIGHT



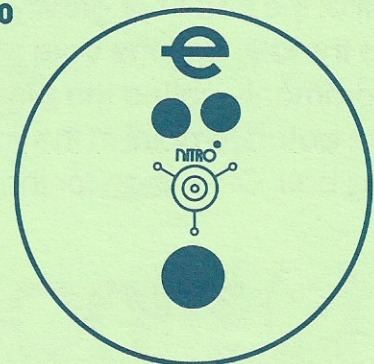
Move the thumb closer to the CG to cause the ball to begin its hook sooner.

**WARNING:** Because of the construction of a two-piece bowling ball, the core location dictates that for left-handed bowlers, the label should be rotated 90 degrees left (counterclockwise) prior to drilling CG label shifts.

## PIN SHIFTS

The core locator pin will be located near the CG, between 12:00 and 2:00 on a clock face. Positioning the pin in different quadrants of the bowling ball will strongly affect the ball reaction. Pin shift can be combined with shifts off the CG to increase or decrease the hooking characteristics. Most often, pin locations are referenced to a clock face. (Example: pin at 3:00 means pin directly right of the CG)

#### PIN AT 1:30

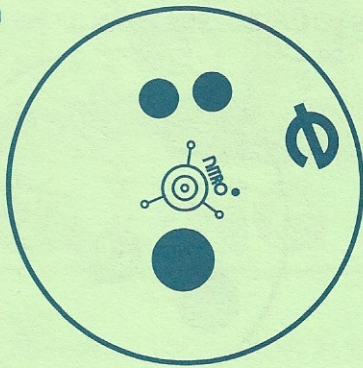


The pin is positioned in the finger-positive quarter of the ball. This causes the ball to skid farther and hook harder at the end.

**WARNING:** For left-handed bowlers, the pin locations are at reversed (10:30, 9:00, and 7:30 respectively).

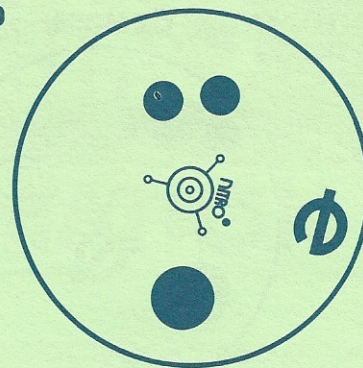
## PIN SHIFTS

### PIN AT 3:00



The pin is positioned directly right of the CG. This causes the ball to arc evenly, giving the ball a smooth path to the pins.

### PIN AT 4:30



The pin is positioned in the thumb-positive quarter. This causes the ball to roll sooner but continue to curve steadily to the pins. This drilling is strongly recommended for bowlers who throw very hard and for full-rollers who are looking to increase the ball's hitting power.

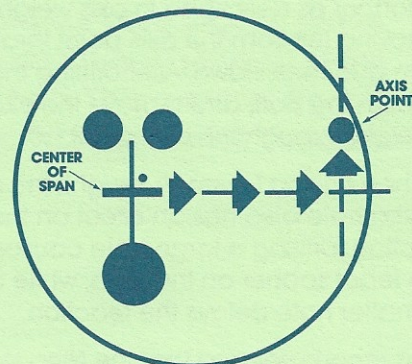
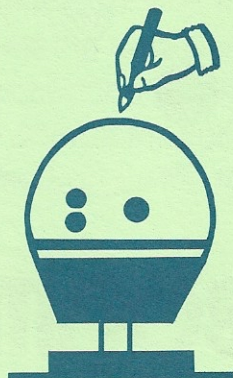
**WARNING:** For left-handed bowlers, the pin locations are at reversed (10:30, 9:00, and 7:30 respectively).

## FINDING THE AXIS POINT

The axis point is easily attainable from the customer's old ball. Trace the track with your marking pencil. Place the ball, track side down, in your ball spinner. Adjust the ball so that the track is parallel to the ball dish. Turn on the spinner. The pencil line should be constant. If it is wobbling, turn off the spinner and readjust. When a stable line is seen, place the pencil at the top of the ball. The center of this pencil mark is your axis. This point should be equidistant to the ball track in all directions.

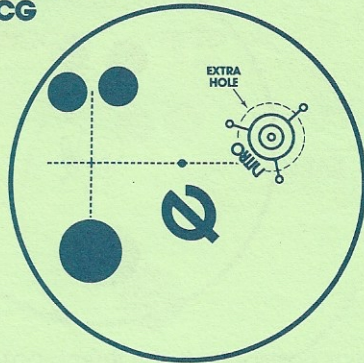
Now we need to get the horizontal and vertical coordinates of the axis point. Draw a line down the center of the finger holes through

the center of the thumb hole. Measure half the distance from the thumb to the fingers and make a mark. This is the center of grip. Take the quarter scale and draw a horizontal line perpendicular to the grip line. Now draw a vertical line from this line through the axis point. Measure the distance from the center of the grip to the intersection of the vertical line. This is the horizontal coordinate. Now measure the length of the vertical line to the axis point. This is the vertical coordinate. Record these coordinates on the customer's spec sheet (for example, 5 inches right, 1 inch up).



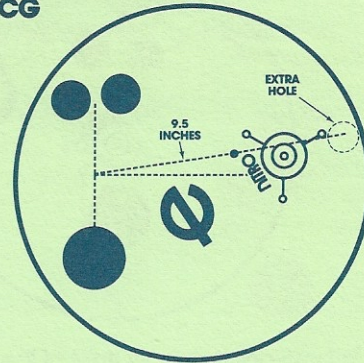
## AXIS WEIGHT

### 1) PIN LOCATED 2" OR MORE FROM THE CG



Place the CG in your axis point. To do this, you need to take the "over" and "up" measurements and reverse the procedure to find the center of span. Draw a line down from the CG and left, through the pin, to locate the center of span on the new ball. After drilling the grip, weigh the ball. Remove the excess side weight through the CG, making sure to reweigh the ball to verify that there is no more than one ounce positive side remaining after the extra hole is drilled.

### 2) PIN LOCATED LESS THAN 2" FROM THE CG



The procedures are the same as described at left, except for the location of the extra hole. (When the pin is near the CG, removing weight through the axis will remove much of the ball's mass, resulting in an undesirable ball reaction.)

After the grip is drilled, reweigh the ball. Draw a line from the center of the grip through the pin. Remove the excess side weight at the spot 9-1/2" from the center of the grip on this line.

**Note:** It is recommended that you start with a Nitro that has 2.5 oz. top weight or less for axis weight.)

**WARNING:** NEVER drill an axis hole through the pin. The concentrated mass will be removed and the results will be extremely undesirable.

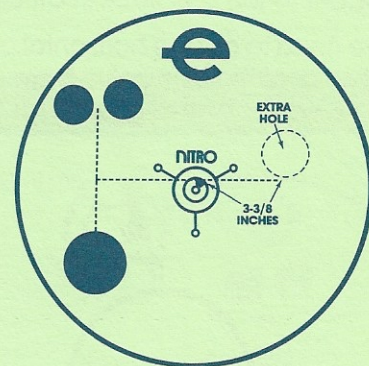
## LEVERAGE WEIGHT

When drilling a Nitro for leverage weight, select a ball which has the pin no more than 3/4" from the CG.

Draw a line right from the pin 3-3/8" to locate the axis point. Once the axis point is located, determine the center of span in the same manner as described in axis weight drillings, moving left from the axis point through the pin and then down. After drilling the grip, reweigh the ball, and remove the excess side weight through the axis point.

When drilling leverage weight, the size of the extra hole also has an effect on the ball's reaction. Drilling a large hole causes the ball to react sooner on the lane, while drilling a smaller hole delays the reaction.

It is recommended that the Nitro start with 3 to 3.5 oz. top weight if the bowler wants a positive side weight leverage ball. For negative leverage, begin with a Nitro with between 2 and 2.5 oz. top weight.



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Ebonite International  
P.O. Box 746  
Hopkinsville, Ky 42241-0746