

# THE SCIENCE BEHIND THE SURFACE

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SPORTS TURF

## WHAT IS VERTICAL BALL REBOUND?

Vertical ball rebound is a measure of how high a soccer ball will bounce after impacting the synthetic turf surface. The soccer ball should rebound in a similar fashion to a bounce on natural grass.

## MEASURING VERTICAL BALL REBOUND

The test is conducted with an electromagnetic or vacuum release mechanism which releases a soccer ball from a height of 2 meters. From that the height of the rebound is measured by recording the sound of the first and second bounce. The time between the first and second bounce is measured. We know how the force of gravity acts on the bouncing ball, so we can calculate how high the ball traveled during that time period. That distance is recorded as the ball rebound height.

The test is conducted five times in each testing location and the average results are calculated. Six locations are tested across the playing surface and each test must fall within the acceptable range for the surface to meet the requirements of this test. The Synthetic Turf Council (STC) and FIFA recommend that a soccer ball rebounds to a height between 60 to 100 centimeters on a community field, and 60 to 85 centimeters on a stadium field. These ranges are based on a comprehensive study done on natural turf fields.

## WHAT DOES THIS MEAN FOR MY FIELD?

Soccer players anticipate the position of a volleyed ball so they can continue play after the ball after the ball bounces. If the ball rebound is too high, it can bounce over the head of the player or land farther away from expected landing point. Athletes should not have to change their playing style when going from natural grass fields to synthetic turf fields.

### Calculation and expression of results

For each test calculate the rebound height using the formula:

$$H = 1.23 (T - \Delta t)^2 \times 100$$

Where:

**H** = rebound height in cm

**T** = the time between the first and second impact in seconds

**$\Delta t$**  = 0.025s

