

Läsåret 07/08

SG1108 Tillämpad fysik, mekanik, 7,5 hp

Projekt: Studsande bordtennisboll

From http://www.sizes.com/sports/table_tennis.htm (ITTF = International Table Tennis Federation):

Balls for international play must be from a list of approved manufacturers and models maintained by the ITTF.

- Color: white or orange, with a matte finish.
- Mass: 2.7 grams ideally, but 2.67 to 2.77 grams is acceptable. In qualifying manufacturers, the ITTF tests a set of 24 balls, and no more than one can be outside this range.
- Diameter: Since October 2000, 40 millimeters, with a minimum diameter of 39.5 mm and a maximum of 40.50 mm.

The ITTF has an interesting way of testing for a property they call "veer," which reflects both the ball's sphericity and the distribution of mass, which might be non-uniform due to variations in the thickness of the wall or in the density of the material. A ball is rolled 100 millimeters down a plane inclined 14° to the horizontal, onto a level surface. The ball is expected to continue to travel along a straight line perpendicular to the line where the planes join. If within 100 centimeters the ball rolls more than 175 mm away from the line, it fails. Each ball is tested twice, once rolling on the seam, and two times in any other position. If more than 1 out of 24 balls fails this test, the brand is not approved.

- Bounce: when dropped from a height of 305 mm onto a steel block, must bounce at least 230 mm but not more than 250 mm.
- Stamp: no larger than 280 square millimeters, in one or two colors. It must include:
 - a trademark or brand name
 - the ITTF approval, which may be simply "ITTF"
 - "40" or "40 mm"
 - the name of the country where the manufacturer is headquartered.
- Seam: only one is allowed, and that as inconspicuous as possible.
- Packaging: must include a date or datecode.

The ball has always been made of celluloid, but this is not a requirement. In fact, the ITTF is encouraging manufacturers to find a better material.

On 1 October 2000, the diameter of the ball was increased to 40 mm from 38 mm. The ITTF estimated that the increase would decrease the speed of the ball by 4 to 8%, and the spin by 10 to 13%. The purpose of the change was to produce longer rallies and to make the ball more visible on television, in the belief that this would make the game more interesting to spectators.

An important aspect is the ball bouncing above: when dropped from a height of 305 mm onto a steel block, must bounce at least 230 mm but not more than 250 mm.

For simplicity presume that a ball bounces 250 mm when it is dropped. How long time will it take before it comes to rest?