

Raising the Game

Reviewing ASTM F2772 for Indoor Sports Flooring Systems Specification

Today's athletes require sports flooring that can hold up to the rigors of use while also providing optimal ergonomics and safety. The ASTM F2772 is the only material testing method recognized in the United States by the American Society for Testing and Materials (ASTM) for indoor sports flooring. Reviewing this standard for the specification of indoor sports floor systems can help architects, contractors and designers make appropriate specification decisions for their facilities.

ASTM F2772 was designed to certify and classify resilient surfaces made specifically for sports and recreation activities. To ensure that surface materials meet the criteria to be classified in one of the five classes of sports floors (Class I-Class V), the ASTM F2772 test standard measures four characteristics of performance, including Force Reduction, Ball Rebound, Surface Finish Effect, and Vertical Deformation. A floor must meet all four of these criteria to be compliant with the current ASTM F2772 standard for indoor sports and multi-purpose flooring. Diving deeper into each of these criteria reveals how the standard ensures that a flooring solution will offer the appropriate level of shock absorption and safety during both recreational use and intense sports activity.



Force Reduction (ASTM F2569)

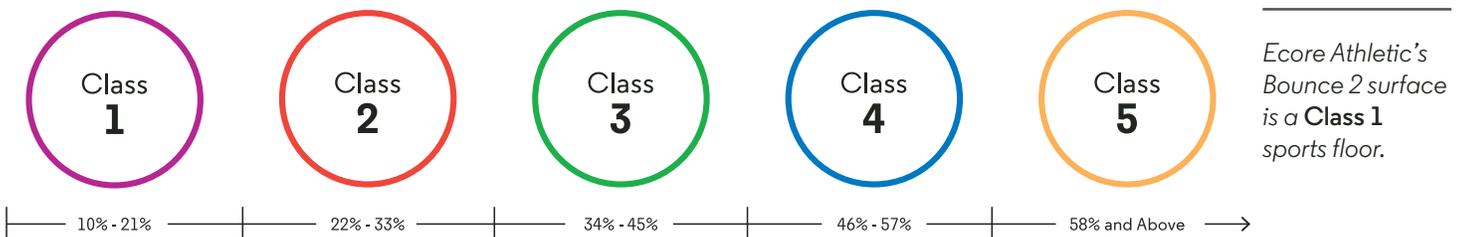
The first factor is force reduction and this portion of the ASTM F2772 standard is tested in accordance with ASTM F2569. A surface's force reduction is measured as a percentage of how much of the total force of an impact is reduced by the surface on which the object in motion, such as a foot, dumbbell, head or other part of the body, falls. Per ASTM F2659, a surface's force reduction may be an "indicator of its

performance, safety, comfort, or suitability of the surface." The more force that a surface reduces, the less chance of injury when an athlete falls on the floor, because a percentage of the impact's shock is being absorbed by the floor.

feels throughout their entire body. The proper balance of Force Reduction and Energy Restitution is what will create an ergonomic and comfortable surface, and the ideal balance is based on the activities performed in the space.

When a floor absorbs the shock of impacts, it can help mitigate the negative stress and strain of impacts that an athlete

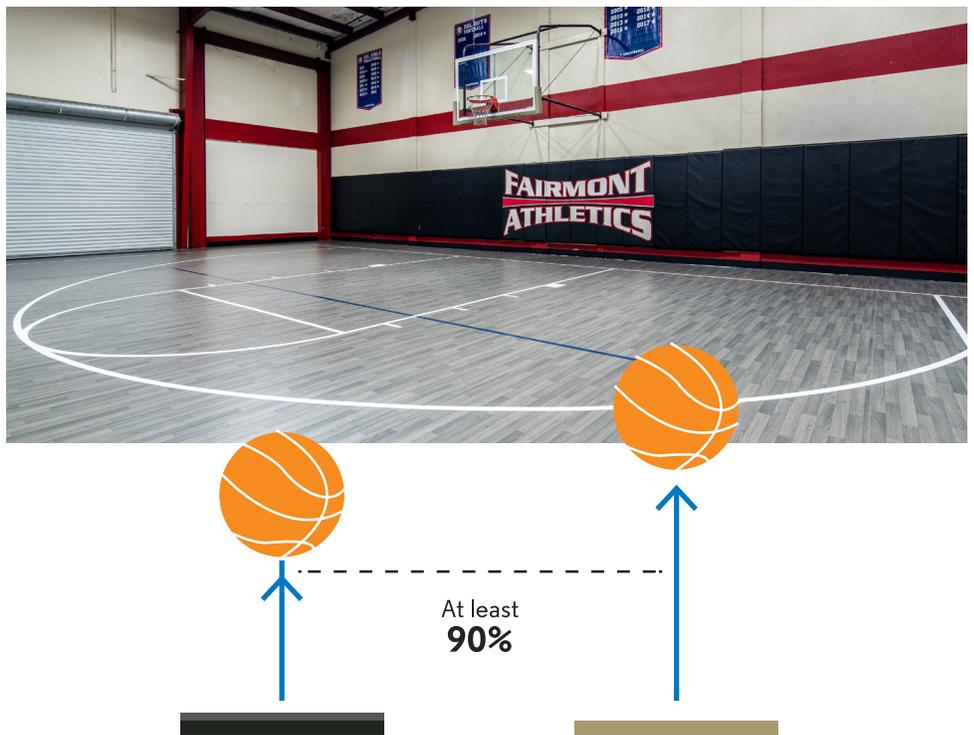
FORCE REDUCTION



Ball Rebound (ASTM F2117)

The way a ball interacts with the playing surface can dramatically affect how a game is played, so it is important the sports floor does not affect a ball's ability to bounce. For example, if a basketball game is being played on a synthetic sports floor, the ball should bounce back similarly to how it would on a hardwood basketball court.

The ball rebound portion of the ASTM F2772 test standard is measured in accordance with ASTM F2117. It is calculated by taking the difference in bounce height, when a ball is bounced on the sports floor, compared to concrete. The average of multiple drop points on the floor must meet or exceed 90% of the rebound height of a ball dropped on concrete. Any one test point cannot differ by more than 3% from the average rebound height. This requirement is to ensure that the sports surface performs uniformly throughout the court.



Ecore Athletic's Bounce 2 surface achieves ASTM 2772 Ball Rebound of 95.5%.

Surface Finish Effect (ASTM E303)

The surface finish effect portion of the ASTM F2772 test standard measures a surface's frictional properties. Also known as "slide effect," this portion of the standard is important to ensure the surface provides the optimal level of traction for an athlete. When athletes are competing, it is important that the floor is not too slippery, so that they can change directions and eliminate the worry of falling. However, it is also equally as important that the floor does not have too much "grab," because this can increase the risk of injuries.

The optimal level of friction can vary depending on the sport that is being performed in the space. To meet the ASTM F2772 test requirements, the surface must provide a value between 80 and 110 in accordance with the ASTM E303 test standard. The surface must also provide uniform (+/- 4 points from the average) results when tested in different locations throughout the space.



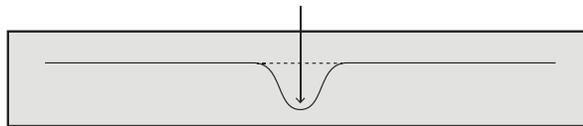
Vertical Deformation (ASTM F2157)

Vertical Deformation measures the elasticity of a surface under an athlete's foot or a heavy load. The amount that a surface deflects or "gives" under an athlete's foot or under a table, chair, or other heavy load can contribute to creating a safer floor that reduces injuries. On the other hand, a surface that gives too much or is too elastic will result in an unstable surface that may contribute to causing injuries.

There are three general flooring types to consider when looking at the vertical deformation of sports surfaces that are measured in accordance with ASTM F2157: point-elastic, area-elastic, and combination-elastic.

Point-Elastic Sports Floors

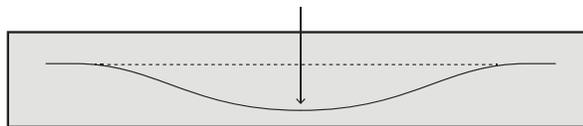
A point-elastic floor (most commonly synthetic sport courts) will have a surface that only deforms in a small area around the load. These surfaces must not deflect more than 3.5mm (0.138"), at any point, to pass.



Deflection < 3.5mm

Area-Elastic Sports Floors

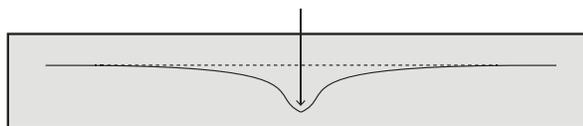
An area-elastic floor (most commonly floors made of wood) will have deflection in a large area under a load. Area-elastic floors are classified as either Class A or Class B. Class A wood sports floors provide a value of vertical deformation between 1.8 and 5mm (0.071" - 0.197"), and Class B wood sports floors provide a value less than 1.8mm (0.071").



Vertical Deformation

Combination-Elastic Sports Floors

A combination-elastic floor (most commonly a synthetic sports floor over a wooden subfloor) will have deflection in both the small area around the load contact point as well as the larger area under the load. The synthetic surface must provide a deformation value between 0.5mm and 2mm (0.020" - 0.079"), and the wooden subfloor must provide a deformation value between 1.8mm and 5mm (0.071" - 0.197").



Bounce 2 Standard Vertical Deformation: 0.72mm (Class B)

For all system types, any individual test point should not deviate more than 0.7mm from the average deformation value.

The Ecore Difference – Providing MORE: ASTM F970

In addition to achieving exceptional test results in the ASTM F2772 test standard, Ecore’s Bounce 2 performance in the ASTM F970 test standard makes it the ideal multi-purpose sports and fitness floor.

The ASTM F970 is the standard test method for measuring recovery properties of floor coverings after static loading. Specifically, it measures the indentation depth on a flooring product after a heavy static load has been removed from its surface. A certain amount of pressure, measured in pounds per square inch (PSI), is applied to the floor for 24 hours. The load is then removed, and the flooring product sits for 24 hours. After 24 hours, the indentation is measured and recorded. The final recorded number is the depth of the indentation that is left in the flooring product after 24 hours.

Ecore’s Bounce 2 flooring also features itsTRU™ technology, which is the fusion bonding of a vulcanized composition rubber (VCR) “muscle” to a 2mm heterogeneous vinyl sheet. This muscle gives Bounce 2 superior energy restitution, which offers next generation results for residual indentation recovery for point and rolling loads in addition to returning energy to the athlete.

Because of its VCR backing, Bounce 2 flooring responds very well to heavy loads. VCR inherently wants to keep and return to its original shape. It does not flatten out and permanently indent over time like most foam-backed products. Conversely, the energy inside VCR allows it to return to its original shape over time.

These properties make Bounce 2 an ideal solution for multi-purpose spaces. Because Bounce 2 is a Class 1 sports floor and it responds well to heavy loads, a variety of activities can take place in the same space without sacrificing floor performance from one activity or sport to the next. With Bounce 2, the same performance surface can be used on the playing court as well as under tables and chairs, if the space also functions as a cafeteria or assembly room, making it a perfect choice for multi-purpose areas.

New technologies have made it possible for sports flooring to enhance athlete performance and safety, while delivering aesthetic appeal and versatility. For most sports applications, vinyl, rubber or synthetic turf wear layers can be fused to a composition rubber backing to provide appealing flooring options that keep athletes at the top of their game.



¹ <https://www.astm.org/Standards/F2569.htm>