

## **PVC document**

Development of PVC sport flooring over the past few years has required the alteration of components found within vinyl flooring products manufactured in Europe. Since 2007, the REACH (Registration Evaluation, Authorization and Restriction of Chemicals) program has led to the elimination of certain components such as some plasticizers, heavy metals, solvents and other chemicals not in line with sustainable design.

Given these new regulations, formulation of vinyl products has changed. These changes have a direct impact on performance such as **FORCE REDUCTION** because plasticizers are polymer additives that serve to increase the polymer's flexibility, elongation or ease of processing (workability). Early examples of plasticisers include water to soften clay and oils to plasticise pitch to waterproof ancient vessels. In more technical terms, the addition of a plasticizer generally causes a reduction in the cohesive intermolecular forces along the polymer chains. The chains can then move more freely relative to one another, and the stiffness of the polymer is reduced. Nowadays, there is a clear trend in the market to replace these plasticizers by alternatives with a minimum impact on performance. Among the phthalate-based plasticizers, the ortho-phthalates have been restricted in the European Union, and more recently in North America.

Advantage embraces these new regulatory restrictions and promotes products that have been tested using the most current force reduction methods (EN and the New ASTM F2772) and tested after 2007, which corresponds to the date the REACH regulations entered into force and where chemical formulas changed.

### **Force Reduction and Standards clarification**

Force reduction (also known as shock absorption) is a mechanical property used to evaluate a sports surface's ability to reduce impact related forces compared to impacts on concrete. Initially, the DIN pre-standard 18032 Part 2 was designed as an improvement to the previous 1991 version of DIN 18032 Part 2 by the same German standardization body in 2001.

The EN 14904 is the indoor sports flooring standard developed by the European Union's European Standardization Committee. Approved in 2006, **EN 14904 is a replacement of DIN 18032 Part 2** and is used in North America as the test method with the ASTM F2772 classification. Compared to DIN 18032 Part 2, testing requirements for certain EN 14904 properties were designed to promote increased uniformity in the indoor sports system while other properties allowed for a much wider range. On a technical point of view, the EN test Force reduction procedure uses different software adjustments that can affect Force reduction results by up to 5%. It is therefore not surprising to have lower EN force reduction percentage results in comparison to DIN results.

Some sport floor suppliers juggle or hide these new regulations (Force reduction and REACH) to confuse or hide information from the customer or architect.

For an objective and accurate PVC sport flooring evaluation and comparison, Advantage Sport recommends:

- To use only laboratory test reports that use the EN 14904 test procedure and not DIN 18032

### **AND**

- To use only laboratory test reports with tests performed after 2007 that correspond to the full application of the REACH program.



---

Frederic Vachon /Technical director