STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

AS 2983.5

METHODS OF TEST FOR SYNTHETIC SPORTING SURFACES

METHOD 5: DETERMINATION OF STIFFNESS

1 SCOPE. This Standard sets out two methods to measure certain shock-absorbing characteristics, the impact force-time relationships, and the rebound properties of playing surface systems. This method is applicable to natural and artificial playing surface systems and to components thereof.

NOTES:

1. This procedure may also be used to measure the shock-attenuation properties of materials used as protective padding, such as the padding on trampoline frames, football goal posts, gymnasium walls, shoulder pads, body padding, etc. It should not be used, without some modifications, to test the finished products.
2. This test method is similar to ASTM 355-86, Standard test method for shock-absorbing properties of playing surface systems and materials.

2 PRINCIPLE.

2.1 General. A test specimen is impacted at a specified velocity with a missile of given mass and geometry. A transducer mounted in the missile monitors the acceleration-time history of the impact which is recorded with the aid of an oscilloscope or other recording device. Optionally, with the use of penetration measuring devices, the displacement history of the impact may also be recorded.

2.2 Method A. This method uses a cylindrical missile with a circular, flat, metal impacting surface with specified mass, geometry, and impact velocity appropriate for the intended end use.

2.3 Method B. This method uses a missile with a hemispherical, metal impacting surface of specified mass, radius, and impact velocity appropriate for the intended end use.

3 DEFINITIONS.

3.1 Playing surface system—composite that includes the contact surface, energy-absorbing materials, if any, and base layers.

3.2 Base line—starting reference plane of the playing surface system from which the total penetration is determined. It is taken as the top plane of the playing surface system, when subjected to a static compression of 1 kPa (0.14 psi) for Method A or the weight of missile for Method B, unless otherwise specified.

3.3 Acceleration—instantaneous time rate of change of velocity which may be positive or negative.

3.4 ***G***—ratio of the magnitude of missile acceleration during impact, to the acceleration of gravity.

3.5 G_{max}—maximum value of G encountered during impact.

3.6 Severity index—An arbitrary parameter equal to the integral of $G^{2.5}$ dt over the total duration of impact.

3.7 Impact velocity—velocity of the missile as it crosses the base line on impact.

3.8 Rebound velocity—velocity of the missile as it crosses the base line on rebound.

3.9 Time to G_{max}—difference between the time the missile crosses the base line on impact and the time G_{max} is reached.

3.10 Dynamic hardness—stress on a material due to rapid indentation by a moving missile with the geometry described in Method A.

3.11 Time to maximum penetration—difference between the time the missile crosses the base line on impact and the time maximum penetration is reached.

4 APPARATUS.

4.1 Testing machine. Any type of dynamic testing apparatus, that impacts the test material on a massive, rigid anvil with a missile at a prescribed impact velocity and monitors and records the acceleration-time history, is acceptable. The anvil mass should be at least 100 times that of the missile. The test apparatus may optionally be designed to test a playing surface in-place. In either case, the test specimen shall have dimensions larger than the impact area of the missile as specified in Clause 5.1. The test machine and missile shall have sufficient rigidity to eliminate undesirable vibrations in the apparatus which might be recorded on the acceleration-time curve.

ISBN 0 7262 4973 4