STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

AS 2983.16

METHODS OF TEST FOR SYNTHETIC SPORTING SURFACES

METHOD 16: DETERMINATION OF OZONE RESISTANCE*

1 SCOPE. This Standard sets out a method for determining ozone resistance of a synthetic sporting surface.

Warning note on toxicity: Attention is drawn to the highly toxic nature of ozone. The recommended threshold limit values (TLV) for ozone (in the workroom environment) are 0.1 ppm (parts ozone per million parts air by volume), i.e. 0.1 ppm is the maximum average concentration that workers may safely be exposed to during a normal working week. However, it is essential that efforts be made to minimize exposure at all times, and 0.1 ppm should be regarded as an absolute maximum concentration. The maximum average concentration should be appreciably lower.

2 PRINCIPLE. Test specimens are wrapped around a mandrel and placed in a test chamber maintained at 40°C and with an ozone concentration of 50 parts per hundred million. Specimens are held in this environment for 70 h and subsequently examined for development of cracking.

3 APPARATUS. The following apparatus is required:

(a) *Test chamber* consisting of a closed, non-illuminated chamber, thermostatically controlled to 40 ±2°C, lined with, or constructed of, a material (for example aluminium) that does not readily decompose ozone. Dimensions shall be such that the requirements of Clause 3(e) are met. The chamber may be provided with a window through which the surface of the test specimens can be observed.

(b) *Source of ozonized air.* Either of the following apparatus may be used:

(i) An ultra-violet lamp.

(ii) A silent discharge tube.

Oxygen is necessary when using the discharge tube in order to avoid the formation of nitrogen oxides. The ozonized oxygen or air may be diluted with air to attain the required ozone concentration. Air used for generation of ozone or dilution shall first be purified by passing it over activated charcoal and shall be free from any contaminants likely to affect the ozone concentration, cracking or estimation of ozone.

The ozonized air shall be fed from the source into the chamber via a heat exchanger to adjust its temperature to that required for the test and shall be brought to the specified relative humidity (Clause 6.3).

(c) *Means for adjusting the concentration of ozone.* This may be, but does not have to be, automatic. When an ultra-violet light source is used the amount of ozone produced can be controlled by adjusting the voltage applied to the tube or the gas flow rates, or by shielding part of the tube exposed to the gas flow. When a silent discharge tube is used, the amount of ozone produced can be controlled by adjusting voltage applied to generator, dimensions of electrodes, oxygen flow rate, or diluent air flow rate. A two-stage dilution of the ozonized air can also be used. Adjustments shall be such that they will maintain the concentration within the tolerances given in Clause 5.1. In addition, after each occasion that the test chamber is opened for insertion or inspection of test specimens, the ozone concentration shall return to the test concentration within 30 min. Concentration of ozone entering the chamber shall at no time exceed the concentration specified for the test.

(d) *Means of determining ozone concentration.* A means of sampling the ozonized air from the vicinity of the test specimens in the chamber and means of estimating its ozone content shall be provided.

Glass pipelines should be used to convey the ozonized air to the measuring device. Plastics are to be avoided except as short connecting pieces for joining glass tubing. The entire sampling line shall be purged prior to its use for ozone estimation by passing a high concentration of ozone through it for sufficient time to oxidize any contaminants.

(e) *Means of adjusting gas flow.* This shall be capable of adjusting the average velocity of flow of ozonized air in the test chamber to a value of not less than 8 mm/s and preferably to a value between 12 and 16 mm/s, calculated from the measured gas flow rate in the chamber divided by the effective cross-sectional area of the chamber normal to the gas flow. In tests intended to be comparable, velocity shall not vary by more

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* This method is based on BS 903, Methods of Testing Vulcanized Rubber—Part A 23 Determination of Resistance to Ozone Cracking under Static Conditions.

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