Australian/New Zealand Standard

Methods of testing infant products
Method 1: Sleep surfaces—Test for firmness

PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CS-003, Safety Requirements for Children's Furniture. It does not supersede any previous document.

This test method is intended to be referenced by a number of product safety standards. Where no standard exists for a particular product type, the test method can nevertheless be used to identify hazardous softness in a sleep surface, corresponding approximately to a three-fold excess risk of death as compared to firmer sleep surfaces.

FOREWORD

Over a period of many years, good quality research has pointed to an association between infant mortality and overly-soft sleep surfaces*. Such overly-soft surfaces can obstruct an infant's breathing. Infants positioned face up to sleep, as they should be, may nevertheless roll face down and be unable to free themselves from obstructions.

Expert advice to caregivers, nationally and internationally, specifies a 'firm' sleep surface, without quantifying the minimum acceptable firmness or a method for determining it. This document presents a test method for evaluating the firmness of infant furniture items where an infant might be reasonably expected to fall asleep on a mattress or other approximately horizontal surface (e.g. cot, pram, infant cocoon, infant sleep mat, bassinet, cradle, carrycot, etc.).

* In 1993, Ponsonby, et al (*N Engl J Med* 1993; 329) reported that infants in Tasmania who slept face down on soft ti-tree mattresses were at 20 times excess risk of SIDS, while infants that slept face down on firmer surfaces were only at three times excess risk. In 1994 Kemp, et al (*Pediatr Res* 1994; 36) found that two groups of bedding types linked with SIDS were softer than conventional bedding. In 2003, Hauck, et al (*Pediatrics* 2003; 111) published a report on the Chicago Infant Mortality Study, comparing 260 infant deaths with an equal number of matched controls. The authors concluded that an overly-soft sleep surface was an independent risk factor for SIDS. If the sleep surface allowed the infant's head to sink in by one inch (25.4 mm) or more, as estimated by study respondents, there was a 5.1 times excess risk of death. Schlaud et al (*Int J Legal Med* 2010; 124), working in Germany, utilized a purpose-built instrument to assess surface firmness, and suggested a performance criterion by which to identify sleep surfaces with an average three-fold excess risk of death.

STANDARDS Australia
STANDARDS NEW ZEALAND PAEREWA AOTEAROA

METHOD

1 SCOPE

This Standard sets out the method for assessing whether a horizontal or nearly horizontal infant sleep surface exhibits excessive compression when subjected to a constant force applied through a standard load pad. This Standard was designed for products specifically intended for infant use. However, the test method outlined here is not appropriate for infant slings, hammocks and other such funicular devices that support the infant by suspension. While the test method is likewise not appropriate for products that can only hold the infant in an upright sitting position, it may be useful for assessing some baby capsules used in motor vehicles.

2 OBJECTIVE

The objective of the Standard is to provide a test method for use by industry and regulators that will minimize the risk of infant asphyxiation by identifying sleep surfaces that exhibit less than a specified firmness.

3 APPLICATION

The test can be conducted in a laboratory setting, as well as in retail, domestic, factory and other settings. It is applicable to both new and used items.

4 DEFINITIONS

For the purpose of this Standard the definition below applies:

4.1 Sleep surface

The product component, or group of components, providing the horizontal plane, or nearly horizontal plane, intended to support an infant. Examples of sleep surfaces include the mattress used in a cot, the mattress in a folding cot, the mattress in a bassinet, the mattress in a stroller, and any accessory mattress that may be used for an infant to sleep on.

5 PRINCIPLE

A short feeler arm is attached at one end near the centre of the top surface of a rigid disk of specified size that in turn is loaded to a specified total weight. The feeler arm overhangs the edge of the disk by a set amount. If the force of gravity, acting through the disk, indents the sleep surface sufficiently for the feeler arm to make contact with the sleep surface (on the first or any subsequent test), then the product is not sufficiently firm. This method arose from the same discovery process that gave rise to a less formal method (Somers, RL. *Australian and New Zealand Journal of Public Health.* 2012. 36).

6 APPARATUS

The apparatus, shown in Figure 1, consists of a circular bottom disk of specified diameter and thickness, with two flat, parallel faces, a feeler arm clamped tight to the centre of the upper disk face and extending over the edge of the disk by a specified amount, a linear level mounted on a parallel plane and in a parallel direction to the feeler arm, and a handle arrangement which includes a lower collar to clamp the centred end of the feeler arm in place.

The bottom disk shall have a diameter of 203 ±1 mm, and a thickness of 15 ±0.2 mm. The radius of the lower edge of the disk shall not be larger than 1 mm.

AS/NZS 8811.1:2013 Methods of testing infant products - Method 1: Sleep surfaces - Test for firmness