



FACE CONSULTANTS LTD
Global Flooring Consultants

FACE CONSULTANTS LIMITED

Accelerated Abrasion Resistance Surveys

In accordance with

**BS 13892-4:2002 And BS 8204-2: 2003
+ A2: 2011**

Further explanatory information



CoGRI GROUP

Face Consultants Ltd.

Dene House
North Road
Kirkburton
Huddersfield
United Kingdom
HD8 0RW

Offices Worldwide.

VAT Reg No: 567 2890 01. Registered in England No: 2928994.

Tel: +44 (0)1484 600090

Fax: +44 (0)1484 600095

Email: info@face-consultants.com

Website: www.face-consultants.com

What is Abrasion Resistance?

Abrasion resistance is the ability of the surface of a concrete slab to resist wear caused by all kinds of abrasion mechanisms; such as vehicle wheels, foot traffic, scraping and impact. These mechanisms are complex and combinations of them, together with other influencing factors such as dust or water on the surface of the slab, cause wear to the concrete.

Wear is defined as the removal of surface material from the slab by displacement or detachment of particles or fragments of it.

The Face Abrasion Resistance Tester is used to measure the abrasion resistance of a concrete slab. The four different performance classes of BS 8204-2 that the Face Abrasion Resistance Tester can check are outlined overleaf.

The abrasion resistance specification ought to be specified before the slab is poured, following a careful consideration of the slabs' end use. Differentiating between the abrasive effects of the end use may prove difficult, as in most cases the slab will carry a variety of traffic (for example, steel-wheeled trucks may be operating in conjunction with trucks fitted with rubber tyres).

Poor abrasion resistance may be improved by in-surface resin sealers. In more serious cases mechanical removal of the surface and the provision of a coating or screed may be necessary.



The Specification:

The abrasion resistance standard checked for compliance with is BS 8204-2: 2003 + A2: 2011.

The table below details the allowable values of the properties of abrasion resistance for differing performance classes.

Performance Class	Service Conditions	Typical Applications	BS 8204 Test Limits (mm)
AR 0.5 (Special)	Severe abrasion or impact from steel, hard nylon or neoprene wheeled traffic or scoring/scraping by dragging metal objects	Waste transfer stations, foundries, heavy engineering and other very aggressive environments	0.05
AR 1	Very high abrasion; steel, hard nylon or neoprene wheeled traffic and impact. Rubber-tyred traffic in areas subject to spillage of abrasive materials	Production, warehousing and distribution	0.10
AR 2	High abrasion; hard nylon or neoprene wheeled traffic		0.20
AR 4	Moderate abrasion; rubber-tyred traffic	Light duty manufacturing, commercial, sporting and recreational uses	0.40

The BS 8204 test limits operate as follows:

In order for an individual abrasion test to comply with the 'Special' performance class, then the mean amount of wear must not exceed 0.05mm; to comply with the 'AR1' performance class the mean amount of wear must not exceed 0.10mm and so on for the other performance classes.

Test Instruments:

Abrasion resistance is tested using the Face Abrasion Resistance Tester (pictured overleaf).

Accelerated Abrasion Resistance Testing is carried out in accordance with the BS EN 13892-4:2002.

The Face Abrasion Resistance Tester consists of the following components:

An abrasion head carrying three hardened steel wheels tangentially mounted on a circular steel plate at equal radial intervals so that the wheels can freely rotate in a circular path with a mean diameter of 225mm. The wheels are not free to rotate about their vertical axis and are always replaced in complete sets.

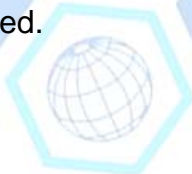
The abrasion head is connected via a drive shaft to an electric motor and gearbox capable of rotating the abrasion head at 180 rpm (± 10 rpm) for 2,850 revolutions (± 10 revolutions).

A circular steel plate to which weights are attached to ensure that the load distributed to the three wheels is 65 kg (± 0.5 kg). The plate is able to move vertically with the wheels.

A steel frame, mounted to which are the motor and abrasion head, which has four stabilising feet bearing onto the floor surface. The frame is restrained from lateral movement during the test by two pins inserted through two holes drilled into the floor coincident with locating holes in the feet of the frame at the base of diagonally opposite legs.

A machined steel template is used to mark the position of the depth gauge feet and the location of the holes to be drilled for the locating pins. The holes in the template are positioned at an equal radial spacing of 45 degrees so that when the depth gauge is placed on the floor with its feet on the marks the gauge slider rests on the centreline of the wheel track.

A digital depth gauge (pictured overleaf) capable of measuring to the nearest 0.01mm is used to measure the depth of the wear. The feet of the depth gauge allow it to straddle the wheel track. The end of the depth gauge slider is rounded.



The Face Abrasion Resistance Tester:



The Digital Depth Gauge:



Survey Method:

The number of tests conducted is dictated by the client (Guidance: One test per 4000 sq. metres, as per TR34 Fourth Edition with a minimum of three tests on any floor), and unless otherwise requested, they are conducted in random locations across the entire slab. The survey method is thus:

The steel template is used to mark the positions that the depth gauge feet will be placed in and to mark the location of the holes to be drilled for the two locating pins.

The depth gauge is used to take eight separate measurements at equally spaced points in the centreline of the wheel track of the Face Abrasion Resistance Tester.

The two holes for the locating pins are drilled, and any dust produced is swept away.

The Face Abrasion Resistance Tester is set in position and the locating pins are inserted to prevent any lateral motion during the test. The Face Abrasion Resistance Tester is switched on and runs at 180rpm until it has completed 2,850 revolutions. When the correct number of revolutions has been completed the Face Abrasion Resistance Tester's on-board computer automatically switches it off.

The locating pins are removed, the Face Abrasion Resistance Tester is moved away from the test area and any dust produced is swept away.

The depth gauge is used to re-take the eight separate measurements. These measurements are then compared with the originals, and the mean amount of wear is calculated to determine compliance with the specification.



Copies of the Concrete Society's Technical Report No.34 (TR34) can be purchased through [Face Consultants Limited](#), or direct from the Concrete Society on:

TEL: (01753) 693 313 FAX: (01753) 692 333