TECHNICAL BULLETIN – TB169.002

AS4992 TILE ADHESIVE CLASSIFICATION SYSTEM

3 JUNE 2010

INTRODUCTION & SCOPE

Adoption of ISO standards have resulted in a system of classifying tile adhesives according to their composition and performance. This classification has been set out in Australian Standard 4992.1 - 2006 with the test methods set out in AS4992.2 - 2006. The following is a summary of the classification system.

CLASSIFICATION

The initial classification is by adhesive type and these categories are:

Cementitious adhesives (C): consisting of a mixture of hydraulic binding agents, aggregates and organic additives. Supplied in powder form, the adhesive is mixed with water and/or liquid admix immediately prior to use.

Dispersion adhesives (D): consisting of a mixture of organic binding agent(s) in the form of an aqueous polymer dispersion, organic additives and mineral fillers. Normally supplied as a premixed paste, the mixture is ready for use.

Reaction adhesives (R): consisting of a mixture of synthetic resin, mineral fillers and organic additives in which setting and curing occurs by chemical reaction. This mixture may consist of two or more components which may include both powders and liquids which must be mixed together immediately prior to use.

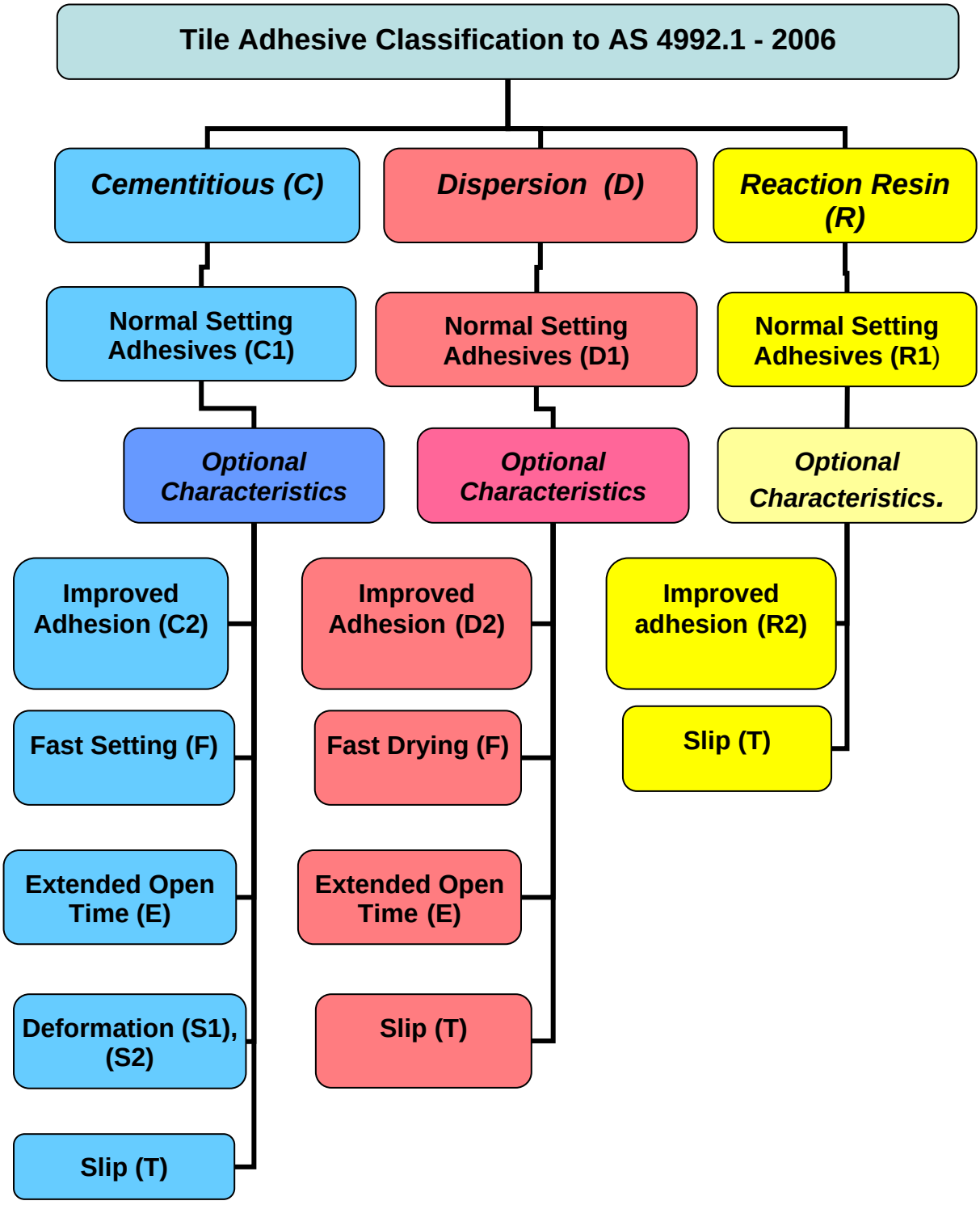
The initial classification is further defined by the performance characteristics of each type of adhesive. These performance characteristics are defined as **fundamental** characteristics or **optional** characteristics.

Fundamental characteristics are those that all adhesives absolutely must have to meet the minimum performance requirements of the standard.

Optional characteristics are where enhanced levels of performance are required for specific service conditions.

Australian Standard 4992 - 2006 sets out the performance requirements for both fundamental and optional characteristics. Fundamental performance generally requires the adhesives to achieve minimum tensile and/or shear bond strengths according to a series of defined tests. Optional characteristics are those where enhanced performance may include increased tensile and/or shear bond strength, resistance to slip under the weight of the tile, transverse deformation (commonly referred to as flexibility), and extended open time.

Thus the classification system begins by defining the adhesive by type **(C), (D), (R)** and then qualifies each type by nominating the highest level achieved in the performance characteristics as a **class 1 normal** adhesive, or **class 2 improved** adhesive, followed by any optional characteristic achieved. These optional characteristics include **fast setting (F), slip resistant (T), extended open time (E) and deformable (S)** (Note: deformable characteristics are applicable to cementitious adhesives only).



Performance characteristics may be different for each classification so it is important to correctly identify the type of adhesive being considered. With the confusion possible by using common descriptive names such as *rubber* adhesive or *organic* adhesive, correct identification ensures the required level of performance is provided.

A brief summary of some of the important differences in the adhesive performance requirements (test method AS4992.2 - 2006) is tabled below.

	Cementitious Adhesives	***Dispersion*** Adhesives	***Reaction Resin*** Adhesives
Fundamental characteristics			
Tensile adhesion strength	$\geq$ 0.5 N/mm^2	n/a	n/a
Shear adhesive strength	n/a	$\geq$ 1.0 N/mm^2	$\geq$ 2.0 N/mm^2
Fast setting (F), Tensile adhesive strength	$\geq$ 0.5 N/mm^2	n/a	n/a
Open time: tensile adhesion strength	$\geq$ 0.5 N/mm^2 after not less than 20 minutes	$\geq$ 0.5 N/mm^2 after not less than 20 minutes	$\geq$ 0.5 N/mm^2 after not less than 20 minutes
Optional characteristics			
Slip (T)	$\leq$ O.5mm	$\leq$ 0.5mm	$\leq$ 5mm
Shear adhesive strength after 21 days dry air cure, 7 days water immersion	n/a	$\geq$ 0.5 N/mm^2	n/a
High tensile adhesion strength after water immersion	$\geq$ 1.0 N/mm^2	n/a	n/a
Deformation (S1)	$\geq$ 2.5 < 5mm	n/a	n/a
Highly Deformation (S2)	$\geq$ 5mm	n/a	n/a
Extended Open Time: tensile adhesion strength	$\geq$ 0.5 N/mm^2 after not less than 30 minutes.	n/a	n/a

For clarity, the table below shows the Designation and Classification for typical adhesives.

Symbol type	Class	Description
		Cementitious Adhesives
C1		Normal cementitious adhesive.
C1	F	Fast setting cementitious adhesive.
C1	T	Normal cementitious adhesive with slip resistance.
C1	FT	Fast setting cementitious adhesive with slip resistance.
C2		Cementitious adhesive with improved characteristics
C2	E	Cementitious adhesive with improved characteristics & extended open time.
C2	F	Fast setting cementitious adhesive with improved characteristics.
C2	T	Cementitious adhesive with improved characteristics & slip resistance.
C2	TE	Cementitious adhesive with improved characteristics, slip resistance and extended open time.
C2	FT	Fast setting cementitious adhesive with improved characteristics and slip resistance
		Dispersion Adhesives
D1		Normal dispersion adhesive.
D1	T	Normal dispersion adhesive with slip resistance.
D2		Dispersion adhesive with improved characteristics.
D2	F	Fast drying dispersion adhesive with improved characteristics.
D2	T	Dispersion adhesive with improved characteristics and slip resistance.
D2	TE	Dispersion adhesive with improved characteristics, slip resistance and extended open time.
		Reaction Resin Adhesives.
R1		Normal reaction resin adhesive.
R1	T	Normal reaction resin adhesive with slip resistance.
R2		Reaction resin adhesive with improved characteristics.
R2	T	Reaction resin adhesive with improved characteristics and slip resistance.

Note: Additional designations may be inserted according to the combination of different symbols of the characteristics. For example, C2ES1 deformable cementitious adhesive with improved characteristics and extended open time.

Products that comply with the requirements of the standard AS4992.1 shall be clearly marked on the packaging and/or the technical data sheets, with the following information:

a) Product name.

b) Manufacturers name and place of origin.

c) Date or code of production, shelf life & storage conditions.

d) Number of the standard and date of issue, i.e. AS4992 - 2006

e) Type of adhesive according to the classification.

f) Instructions for use; e.g. mix proportions, maturing time if applicable, pot life, mode of application, delay time prior to grouting or subjecting to full service conditions.

Ardex tile adhesives have been provided with the above information for many years now and the classification coding is being included on the product data sheets when and wherever possible.

REASON FOR ISSUE
Review and update information

NSW 02 9851 9100, **QLD** 07 3817 6000, **VIC** 03 9308 9255, **SA/NT** 08 8268 2511, **WA** 08 9256 8600
New Zealand (Christchurch) 64 3373 6900

Web: http://www.ardex.com email: techinfo@ardexaustralia.com