1. SCOPE

a) This specification applies to products applied to various flooring substrates in public buildings (schools, hospitals, aged care facilities etc) for the protection and/or decoration of the substrate.

b) Certain buildings – mostly public buildings such as schools, hospitals and aged care facilities – require the application of coatings to decorate and/or protect the substrate. Where adequate natural ventilation for extended periods of time is not practical or feasible, a decision to only use low surface-emitting coatings may be required in order to minimise any risk of adverse health reactions in the building occupants. This specification enables tender and painting specification writers to call for complying products.

2. BACKGROUND

a) APAS Document D001 should be read to obtain a broad overview of the Australian Paint Approval Scheme (APAS).

b) Manufacturers who wish to participate in APAS should consult APAS documents D177.

c) APAS approval to this specification may be gained by compliance with the requirements detailed in this specification and those in document D192 “The APAS Product Approval System”.

d) In 1994 the Queensland State Government was faced with an OH&S issue that forced the closing of a school following reports of alleged illness among some pupils and staff.

e) The cause was traced to the emission of chemicals from a floor coating that had been applied some weeks earlier during school vacation.

f) This resulted in a Qld State Government ban on the use of seamless flooring products in its buildings until 1998 when an assessment protocol for both the evaluation of supplied products and an accreditation requirement for application contractors (SOA450/EPA450) was developed and implemented by the Queensland Department of Public Works. In September 2010 this pre-qualification arrangement was transferred to APAS (for the paint products) and PCCP (for painting contractors).

g) Hence the purpose of this APAS specification is to document requirements for specialist low surface-emitting coatings for the interiors of public buildings, not only in Queensland but in Australasia generally.

3. DESCRIPTION & GUIDE FOR USERS

3.1 General product description

a) Products approved under this specification are products that produce a seamless protective and/or decorative coating finish for various flooring substrates encountered in interiors of normal buildings.

b) They are formulated with restrictions on the amount of volatile components that will be released from the film during curing.

c) Typically they are mixed on site and applied by squeegee, spike roller, trowel or other means recommended by the manufacturer.

d) Products covered by this specification include but are not necessarily limited to:
  - Surface sealers;
  - Clear and plain colour finishes;
  - Epoxy floor coatings;
  - Decorative systems e.g. fleck flooring; and
  - Multi-layer rebound systems for gymnasiuems and indoor sports arenas.

e) The products may be either single or multi-pack composition.

f) Under Public Works Qld rules, complying products were able to be submitted for certification by one of two possible means;
  i) Direct submission by the product manufacturer with accompanying evidence of compliance to these requirements, or
  ii) Submission by the applicator who independently sourced product and arranged and paid for the testing to demonstrate compliance to these requirements.

g) Under APAS Rules, submissions under 3.1f)i) will only be from fully Recognised Manufacturing Units (RMU) as is the current practice.

h) Submissions under 3.1f)i) represent a departure from the APAS norm but will be permitted for VS-0209 certification applications only.

i) Submissions under 3.1f)i) shall be required to identify the manufacturer and full product name(s). This information will be treated as Commercial-in-Confidence by APAS and its officers but will appear on the Registrant’s Certificate of Compliance.

j) Products certified under 3.1g) above will be listed in the APAS List of Approved Products.
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k) Products certified under 3.1h) above will not be listed in the APAS List of Approved Products. However, a certificate of compliance will be issued to the applicant.

l) Irrespective of the mode of submission, normal APAS rules for re-submissions will apply.

3.2 Technical basis of specification

a) This specification is based on a requirement developed by the Queensland Department of Public Works (SOA450/EPA450).

b) Products approved under this specification do not comply with any PRN of AS/NZS 2311 and 2312.

3.3. Sub-classes

a) This specification is divided into the following sub-classes;
   0209/1 – solvent based or solvent free coating
   0209/2 – water based coating

b) In addition the following suffix is used to differentiate specialist products;
   L – low surface emitting products complying with APAS Technical Document AP-T002 as indicated in Table 1 below.

4. REFERENCED DOCUMENTS

This specification makes reference to the following documents:
- AS/NZS 1580 Paints and related materials – methods of test;
- AS/NZS 4586 Appendix B & HB197 Handbook
- AS ISO 9239.1; Reaction to fire tests for floorings – Part 1 Determination of the burning behaviour using a radiant heat source.

- Australian Uniform Paint Standard (Appendix I of the Standard for the Uniform Scheduling of Drugs & Poisons)

- APAS Document AP-D114 Criteria for recognition as an agency for conformity evaluation
- APAS Document AP-D177 How manufacturers may participate in APAS
- APAS Document AP-D183 Formulation changes
- APAS Document AP-D192 The APAS Product Approval System

6. PRODUCT APPROVAL REQUIREMENTS

6.1 General

a) The product and its application shall comply, during the application process and the life of the approval, with all requirements of APAS Document AP-D192 except for the condition nominated in clause 3.1h) above.

b) Approval will be based on test certification from an APAS Recognised laboratory

c) APAS recognises certain laboratories as having the skills, experience, staff and general technical competence to carry out specific testing for APAS certification.
FLOOR COATINGS FOR BUILDING INTERIORS

d) In decreasing order of preference, such laboratories are;
   i) Current APAS RMUs
   ii) Laboratories with current NATA accreditation and the specific AP-VS0209 test(s) nominated in their Scope of Accreditation
   iii) Laboratories with current NATA accreditation but without the specific AP-VS0209 test(s) nominated in their Scope of Accreditation. However, there are ‘similar’ tests nominated. The degree of ‘similarity’ will need to be approved by APAS.
   iv) Laboratories without RMU status or current NATA accreditation but which have undergone a process of approval by APAS as specified in APAS Document AP-D114

e) At the time of publication of this document, the following testing authorities were recognised by APAS for compliance to ASP-VS0209;

   i) Cetec Pty. Ltd. ABN 44 006 873 687
      2/27 Normanby Rd Notting Hill VIC 3168
      T +61 3 9544 9111
      F +61 3 9544 9211
      E info@cetec-foray.com.au
      1/65 Nicholson St, St Leonards NSW 2065
      T +61 2 9966 9211
      F +61 2 9966 9210
      E sydney@cetec-foray.com.au

   ii) CSIRO Materials Durability & Coatings lab
      ABN 41 687 119 230
      37 Graham Rd Highett VIC 3190
      T +61 3 9252 6362
      F +61 3 9252 6011
      E gerald.eccleston@csiro.au

6.2 Technical

   a) The product shall comply with all requirements detailed in Table 1 below.
   b) Unless specifically nominated, the testing substrate shall be fibre-reinforced cement board.

6.3 Safety & environmental

   a) The product shall comply with all requirements of clause 6.3 & 6.4 of APAS Document D192.

APPENDIX A

DRY CONDITION

A1. Scope and Method

   a) Individual coatings are tested for compliance with maximum drying times as specified in Table 1: Dry Film Properties. Both Surface Dry Condition and Hard Dry Condition are tested in accordance with the methods set out in AS/NZS 1580.401.1: 1999 and AS 1580.401.6: 2002 respectively.
   b) Where a flooring system is comprised of multiple coats, each coat should be applied in succession to the test panel in accordance with the manufacturer’s instructions.
   c) The number of test panels used should be equivalent to twice the number of coats making up the flooring system; so that each test can be conducted on a fresh panel.

APPENDIX B

FIRE TESTING

B1. Principle

   a) The burning behaviour of a floor coating in response to heat and flame, is determined under laboratory conditions in accordance with AS ISO 9239.1:2003.
   b) The results are expressed in terms of critical heat flux (kW/m²) and smoke density development rate (% x min).

B2. Substrate selection

   a) Materials or coatings that are usually applied to a substrate shall be applied to the appropriate substrate.
   b) Where the substrate is unknown, or where the material may be applied to a variety of substrates, the substrate shall be the one that represents the highest reactivity likely end use condition. Refer Table B1 below.
   c) A material tested on any one of the substrates shall apply to any substrate in the same group or a less reactive group.
Reactivity | Substrate material
--- | ---
Most reactive | Standard grade plywood, hardboard, fibre/particleboard (less than 12 mm thick)
Standard grade plywood, hardboard, fibre/particleboard (12 mm or greater thickness)
All paper face gypsum board products
Least reactive | Concrete or masonry, fibre-reinforced cement board, non-paper-faced gypsum boards

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass loss</td>
<td>Abrasion resistance</td>
</tr>
<tr>
<td>&gt; 400mg</td>
<td>Low</td>
</tr>
<tr>
<td>100 – 399mg</td>
<td>Moderate</td>
</tr>
<tr>
<td>&lt; 100mg</td>
<td>High</td>
</tr>
</tbody>
</table>

### B2. Performance requirement

a) Critical Radiant Flux (CRF) expressed in kW/m²; Australian Building Codes Board 2009 Specification C1.10a; Table 1; sets out the minimum CRF for the various BCA building classes.

b) Maximum Smoke Development Rate in buildings not fitted with sprinklers: ≤750%-minutes. (Not applicable in buildings fitted with sprinklers).

c) Source: BCA2009 Specification C1.10a

### APPENDIX C

#### ABRASION RESISTANCE

**C1. Equipment**

Abrasion resistance is determined using a Taber wear testing machine and a calibrated H022 abrasive wheel.

**C2. Method**

The methodology is as described in AS/NZS 2001.2.28:1992 and AS 1580.403.2:2006, with the following variations:

a) Testing is undertaken 72 hours after the final coat of the applied flooring system was applied.

b) A single 100mm square panel is cut from each board. The samples should be taken away from the edges of the board (minimum distance should be 50mm).

c) A calibrated, rubberised H022 abrasive wheel is used. (Previous testing has found that this grade of wheel, when under a 1 kg load, and applied for 1000 revolutions, provides appropriate sensitivity and discrimination over widely diverse applied floor coatings.)

d) The abrasive wheel is pre-conditioned (re-faced) using a standard conditioning disc prior to the test.

e) The samples are weighed to an accuracy of ±1mg before and after testing.

f) Apply the abrasive wheel to the sample for 1,000 revolutions under a 1kg load.

g) The loss in mass is thus used to rate the wear characteristics of the floor.

### C3. Rating

<table>
<thead>
<tr>
<th>Mass loss</th>
<th>Abrasion resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 400mg</td>
<td>Low</td>
</tr>
<tr>
<td>100 – 399mg</td>
<td>Moderate</td>
</tr>
<tr>
<td>&lt; 100mg</td>
<td>High</td>
</tr>
</tbody>
</table>

### APPENDIX D

#### IMPACT RESISTANCE

**D1. Equipment**

The test equipment comprises a 2.0Kg cylindrical mass with a 12.7mm diameter ball indentor contained inside a 1.2m long guide tube as specified in ASTM D2794:1993.

**D2. Method**

The method is as described in AS 1580.406.1:2004 with the following variations:

a) Testing is undertaken 16 days after the final coat of the applied flooring system has been applied i.e. immediately after the last VOC test samples have been taken).

b) A mass is dropped onto the coated surface of the test board at different locations while progressively incrementing the height in 50mm steps until damage is observed. Drops should be made alternatively on the two test boards.

c) Each indentation is inspected for damage using a stereomicroscope at 10X magnification.

d) Repeat the test in different locations under the same conditions, continuing to increase the height in 50mm increments as necessary until four consecutive tests (two on each test board) all achieve the same positive results (i.e. fracture or cracking of the coating).

e) Damage is defined as the point at where fracture or cracking of the coating is observed. Plastic (permanent) deformation of the coating is not regarded as constituting damage unless accompanied by fracture.

f) The impact energy is calculated using the formula:

\[ E = \frac{g \times m \times h}{9.8m/sec^2} \]

Where

- \( E \) = impact energy in J (Joules)
- \( g \) = acceleration (9.8m/sec²)
- \( m \) = mass of drop weight in Kg
- \( h \) = height from which mass dropped in m (metres)
APPENDIX E

DRY SLIP RESISTANCE

E1. Method

a) Friction profiles of the coatings are recorded using a floor friction tester, such as the “Tortus II”, in accordance with the method specified in AS/NZS 4586 Appendix B. The floor friction tester is motor driven and drags a rubber “foot” of standard composition and hardness for a predetermined distance across the surface of the floor under test. The foot is loaded with a known mass (normal force – P) and the lateral force due to frictional restraint (F) is measured as the surface is traversed.

b) The vertical (normal) load shall be 200±20g.

c) The kinetic coefficient of friction (μ) is calculated according to the formula: μ = F/P.

d) Two traverses, each 800±50mm long, are made of the floor in the grain direction.

Note 1: The “grain direction” is specified in 4586:2004 Appendix B as the direction that gives the lowest coefficient of friction reading. Several determinations may be required to ascertain the grain direction.

e) Reface the friction foot before each series of traverses using wet and dry abrasive paper, grade P 400, as specified in AS/NZS 4586:2004. Report the lowest reading obtained for the coefficient of friction (μ) for the surface.

E2. Rating/Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>Floor friction tester mean value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>≥ 0.40</td>
</tr>
<tr>
<td>G</td>
<td>&lt; 0.40</td>
</tr>
</tbody>
</table>

Table E1

a) For Classification F, the mean of the test results shall be equal to, or greater than, 0.4 and each individual test result shall be equal to, or greater than, 0.35.

APPENDIX F

CERTIFICATION TRANSFER PROCESS

F1. Background

a) As reported in clause 2f) above, Queensland Public Works established a protocol for acceptable low surface emitting products and a number of products were ‘certified’ by QPW. With the move to use APAS as the certifying body, a process for transferring the current approved products to the APAS system needs to be documented.

F2. Transference Process –Existing product

a) The APAS managed scheme will become operational on 1 January 2011.

b) Prior to that date, all existing certificants wishing to continue their certification under the APAS scheme will need to supply the following to APAS for each applicant system:

i) A letter requesting participation in APAS and transference of their existing certification to APAS.

ii) A Statement declaring the source and description/name of each element of the applicant system.

iii) Where formulations are known, a Statement declaring whether or not there have been any formulation changes defined as Significant in APAS Document AP-D183 since the most recent test program that lead to QPW certification.

iv) A copy of their existing current certification.

v) A properly completed AP-D139 form (only where the formulation is known).

c) Once APAS is satisfied with the application, the APAS Executive Officer will issue an APAS Certificate of Compliance for each complying product.

d) The expiry date for the Certificate of Compliance shall be 30/06/2012.

e) By 1/07/12, the Registrant shall make a Full Resubmission in accordance with clause 3.7 of AP-D192.

f) Should such a resubmission be successful, a new Certificate of Compliance for the normal 7 year period will be issued.
### TABLE 1 – PERFORMANCE PROPERTIES

<table>
<thead>
<tr>
<th>TEST</th>
<th>METHOD</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 For each Layer of the System (eg primer, topcoat)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WET PAINT PROPERTIES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Preliminary examination of fluid components for testing | AS/NZS 1580.103.1 | Record any defects in the container and any visible leakage. Record any properties of the contents that might impact on the tested performance properties including:  
  - Ullage i.e. the air space above the contents of the container expressed as an approximate percentage of the total capacity of the container;  
  - Surface skinning – its extent, consistency and thickness;  
  - Consistency i.e. has gelling taken place or is the material thixotropic;  
  - Extraneous matter.  
  Do not continue with the test in the event that skinning or gelling has occurred, or if extraneous matter is present. |
| Ease of manual reincorporation | AS/NZS 1580.211.2 | The stirred material should be smooth and uniform and free of sediment or lumps. If this is not the case record as “not readily incorporated”. In this situation, do not continue with the test.  
  Note: While AS/NZS 1580.211.2: 1995 sets out a procedure for assessing the ease of manual reincorporation of paints and related materials in standard 500 ml containers, the same requirements will apply irrespective of the size of container and the method of stirring or mixing employed. |
| Application properties | | Using only the methods appropriate to the product and nominated on the technical data sheet:  
  Shall show satisfactory application properties and the dry film shall be free of defects. |
| **DRY FILM PROPERTIES** | | |
| Surface dry condition | AS/NZS 1580.401.1 | Not more than 6 hrs |
| Hard dry condition (Mechanical thumb test) | AS 1580.401.6 | Not more than 24 hrs |
| Finish – General appearance | AS 1580.603.1 | Shall be free of coarse particles, wrinkling, streakiness, and “orange peel” effects; and have a smooth surface of uniform colour and appearance. |
| **2 For the complete System (substrate, primer, topcoat)** | | |
| TVOC content | AP-T002 | For 0209/1L and 0209/2L products only ≤ 600 µg/m²/hr at 14 days.  
  The TVOC at each test interval (1, 3 & 7 days) shall also be reported. |
| Critical Radiant Flux | AP-VS0209 Appendix B (AS ISO 9239.1) | Report result. Application of product is to be determined by the requirements of BCA2009 Specification C1.10a. |
### FLOOR COATINGS FOR BUILDING INTERIORS

<table>
<thead>
<tr>
<th>TEST</th>
<th>METHOD</th>
<th>REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Smoke Development Rate</td>
<td>AS ISO 9239.1</td>
<td>Report result. Classify product as either <strong>suitable</strong> or <strong>not suitable</strong> for use in buildings not fitted with a sprinkler system complying with BCA Specification E1.5. To be classed as suitable, the Maximum Smoke Development Rate must be ≤ 750%-minutes. Source: BCA2009 Specification C1.10a</td>
</tr>
<tr>
<td>Abrasion resistance</td>
<td>AS 1580.403.2, AS 2001.2.28</td>
<td>Using an H022 abrasive wheel and a 1kg load for 1000 revolutions, determine and report the mass lost and the relevant abrasion resistance rating.</td>
</tr>
<tr>
<td>Impact resistance</td>
<td>AS 1580.406.1, Method B, ASTM D2794</td>
<td>Report the impact energy in Joules at which failure of the coating occurs consistently (four consecutive drops at the same height) and the relevant impact resistance rating.</td>
</tr>
<tr>
<td>Dry slip resistance</td>
<td>AS/NZS 4586, Appendix B</td>
<td>≥0.4 Source Standards Australia HB197</td>
</tr>
</tbody>
</table>

**Note 2:** A minimum curing time of ten days from time of application of the final coat is to elapse prior to commencement of all physical tests with the exception of the Dry Condition tests (see Appendix A above). The physical tests include:
- Fire testing;
- Abrasion resistance;
- Impact resistance; and
- Dry slip resistance.

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