

## FIRE HAZARD PROPERTIES OF INSULATION AND PLIABLE MEMBRANES

### INTRODUCTION

This TECHnote addresses fire hazard properties of insulation and sarking materials as dealt with in both the National Construction Code (NCC) and in NATSPEC.

### NCC REQUIREMENTS

The NCC mandates compliance with a number of standards covering fire hazard properties.

**NCC Schedule 1** defines a non-combustible material as one not deemed combustible as determined by AS 1530.1, and non-combustible construction as being constructed wholly of non-combustible materials. **BCA clause C2D11** prohibits the use of paint or fire-retardant coatings on substrates to make them comply with a required Spread-of-Flame, Smoke-Developed or Flammability Index.

**BCA Specification 7** sets out requirements for the fire hazard properties of materials and calls for sarking-type materials to have a Flammability Index of not more than 5 (except in a fire control room or fire isolated exit where the index is 0) as determined by AS 1530.2 and insulation materials to have a Spread-of-Flame Index of not more than 9 and a Smoke-Developed Index of not more than 8 if the Spread-of-Flame Index is more than 5 as determined by AS/NZS 1530.3. Ductwork is required to comply with the fire hazard properties set out in AS 4254.1 and AS 4254.2.

**BCA clause C2D10** allows the use of materials such as plasterboard, fibre-reinforced cement sheeting and some bonded laminated materials where a non-combustible material is required, even though parts of them are combustible.

### WALLS, CEILINGS AND FLOORS

**BCA Specification 7** sets out the requirements for the fire hazard properties of internal wall and ceiling linings, floor linings and floor coverings are determined by **NCC Specification 2**.

Some partition and wall systems marketed by materials manufacturers and tested in accordance with these specifications incorporate insulation that is combustible.

The NCC does not specifically require insulation to be non-combustible, but where the NCC mandates non-combustible construction, that construction must not contain combustible materials. NATSPEC

provides a prompt for *Non-combustible construction required*.

### NATSPEC PROVISIONS

To make the requirements for fire hazard properties of insulation consistent and compliant, NATSPEC requires that insulation and sarking conform to the following:

#### Insulation generally:

- Spread-of-Flame Index: Not more than 9.
- Smoke-Developed Index: Not more than 8 if Spread-of-Flame index is more than 5.

#### Sarking-type material:

- Flammability Index: Not more than 5.

#### Ductwork insulation:

- Spread-of-Flame Index: Not more than 0.
- Smoke-Developed Index: Not more than 3.
- The assembled duct system must pass the UL 181 burning test.

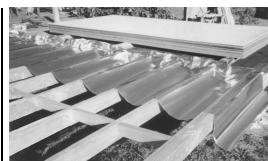
The UL 181 burning test is more severe than the AS/NZS 1530.3 tests. A duct that fails the UL 181 burning test is unlikely to meet the duct standard performance when tested to AS/NZS 1530.3. Anecdotally, testing laboratories may often carry out the UL 181 test first and if that fails then advise the client that it is likely to also fail the AS/NZS 1530.3 test, saving the cost of testing to that standard.

NATSPEC requires submission of evidence (usually test certificates to the relevant standards) showing compliance with the specified fire hazard properties. Submissions should be checked against the respective specified values.

### ADDITIONAL PROVISIONS

For more stringent fire performance, specifiers could consider the following:

- Include only insulation materials and facings deemed non-combustible as determined by AS 1530.1.
- Specify ceiling, wall and floor insulation with *ignitability, spread-of-flame, heat evolved* and *smoke-developed* indices of zero, when tested to AS/NZS 1530.3.
- Exclude materials that only achieve the required performance using facings. Install non-combustible products under ridge capping.



Floor foil insulation.



Roof foil insulation.



Ductwork insulation.

#### Relevant standards

AS 1530 *Methods for fire tests on building materials, components and structures*.

Part 1 *Combustibility test for materials*.

Part 2 *Test for flammability of materials*.

Part 3 *Simultaneous determination of ignitability, flame propagation, heat release and smoke release*.

AS 4254 *Ductwork for air-handling systems in buildings*

Part 1 *Flexible duct*.

Part 2 *Rigid duct*.

UL 181 *Factory-made air ducts and air connectors*.

#### Relevant worksections

- 0171 *General requirements*
- 0471 *Thermal insulation and pliable membranes*
- 0472 *Acoustic insulation*
- 0702 *Mechanical design and install*
- 0715 *Chillers – combined*
- 0724 *Air handling plant – combined*
- 0741 *Ductwork*
- 0744 *Ductwork insulation*
- 0745 *Attenuators and acoustic louvres*
- 0752 *Mechanical piping insulation*
- 0761 *Refrigeration*
- 0802 *Hydraulic design and install*
- 0823 *Cold and heated water*