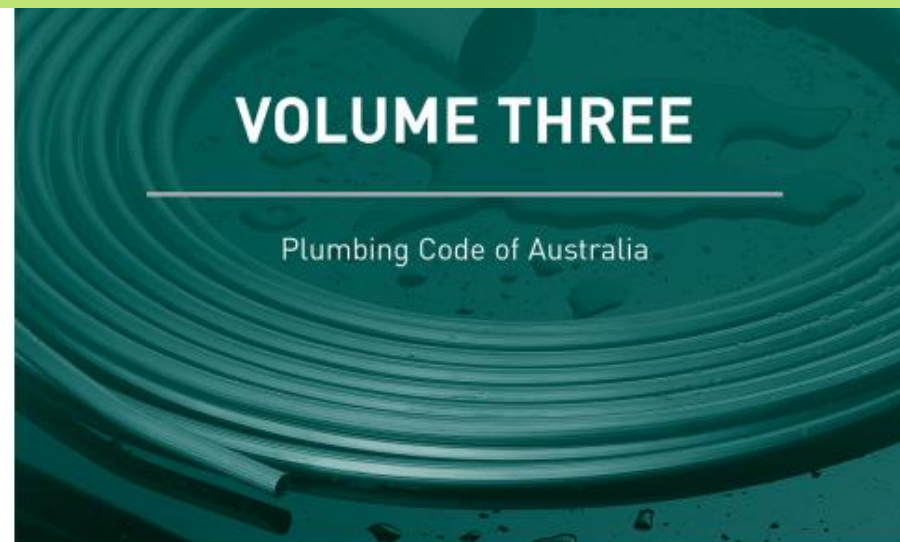




**Performance Solution (Alternative Solution) means a method of complying with the *Performance Requirements* other than by a *Deemed-to-Satisfy Solution*.**



Presenters  
Mr Bradley Hodgkinson  
Mr Stephen Jennison

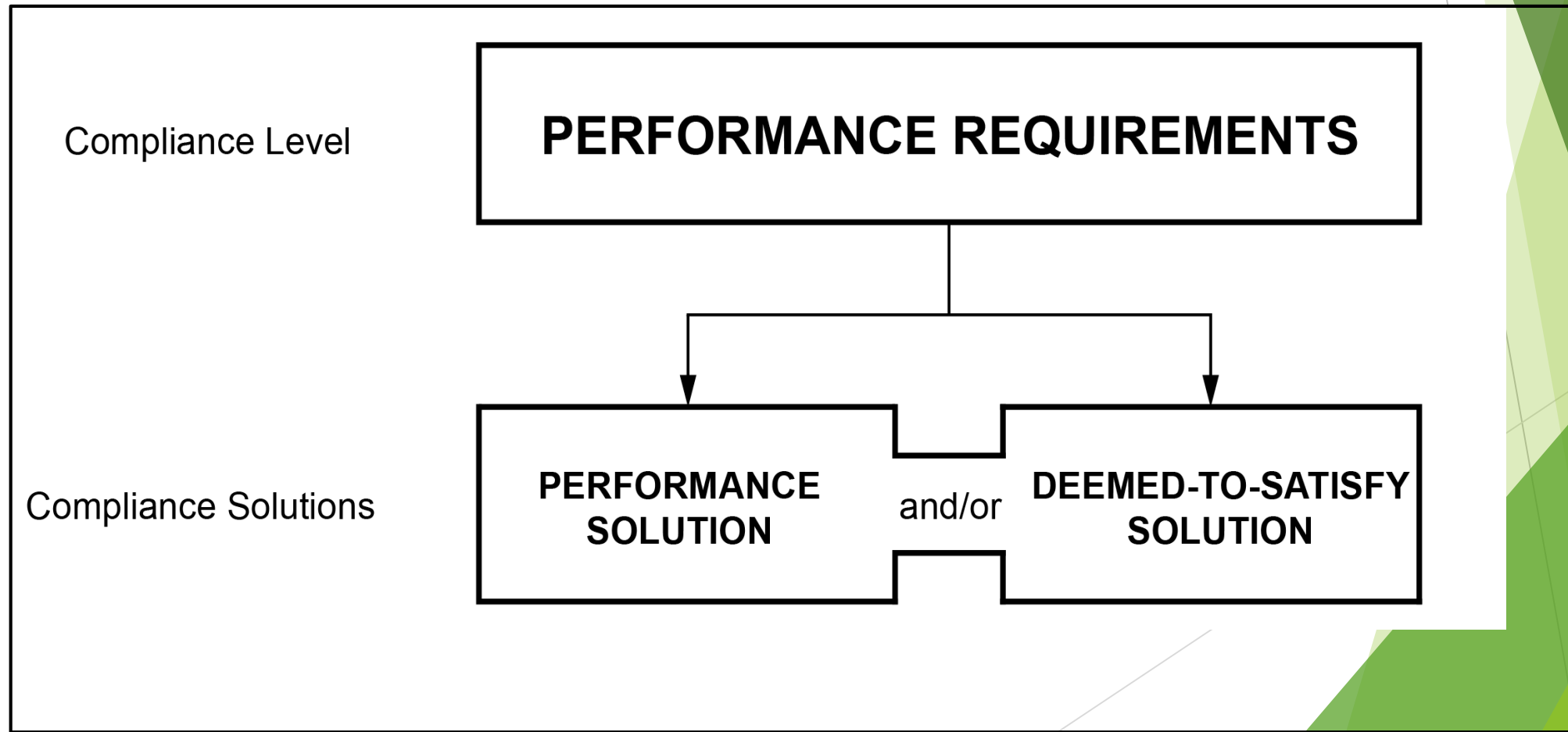
The NCC is drafted in a performance format allowing a choice of *Deemed-to-Satisfy Solutions* or flexibility to develop *Performance Solutions* based on existing or new innovative buildings, *plumbing and drainage products*, systems and designs.

When complying with the *Deemed-to-Satisfy Provisions*, or when developing *Performance Solutions* in order to comply with the NCC, consideration may need to be given to whether the solution impacts on compliance with other Parts of the NCC. (Plumbing Code of Australia)

# Meeting the Performance Requirements

The *Performance Requirements* can only be satisfied by a—

- (a) *Performance Solution*; or
- (b) *Deemed-to-Satisfy Solution*; or
- (c) combination of (a) and (b).



“NOT THIS”



OR







## **Assessment Methods**

- a) Evidence to support that the use of a material or *product*, the design or the form of construction meets a *Performance Requirement* or *Deemed-to Satisfy Provision*.**
- b) *Verification Methods* such as—**
  - (i) the *Verification Methods* in the NCC; or**
  - (ii) such other *Verification Methods* as the authority having jurisdiction accepts for determining compliance with the *Performance Requirements*.**
- c) Expert Judgment, could be;**
  - i) Person with the appropriate qualifications; or
  - ii) a person who is a expert in a technique in which **judgment** is made based upon a specific set of criteria and/or expertise that has been acquired in relation to the subject.
- d) Comparison with the *Deemed-to-Satisfy Provisions*.**

The assessment methods described above are applicable only to assessment of a **Plumbing or Drainage Solution** to determine that it complies with the relevant Performance Requirements.

The term **Plumbing and Drainage Solution** refers to the use of a material or product (i.e. its installation) but not the certification of a material or product.





**Non-certified  
product**

Fire service



### **36 Installing backflow prevention devices**

- (1) An appropriate backflow prevention device must be installed on premises if pollution of the water supply on the premises or the water service provider's water service to the premises has been, or could be, caused by the plumbing on the premises.

### **38 Testable backflow prevention devices**

- (2) The local government, or an entity authorised by the local government, must keep a register of the testable backflow prevention devices.
- (3) An owner of an installed testable backflow prevention device must—
  - (a) register the device with the local government or entity; and
  - (b) at least once each year, have the device inspected or tested by a person who is licensed to do the work.

## RE: CPVC Sprinkler Pipe – The Example

The attached alternative solution statement has been commissioned by the QBSA. This document forms a part of the sprinkler system approval documentation for the use of the PVC-C pipe with testable double check valve registered as non-testable. In this system the sprinklers are fed from the common domestic supply to the residential units.

The two main items contained within the solution are:

An A2.2 *Evidence of Suitability* opinion (as permitted by the PCA) certifying that the proposed use of PVC-C pipe in the sprinkler system satisfies the PCA provisions for use of a material and design in this instance, and

An A0.9 (b) assessment method of verification to determine the suitability of non-registered testable double check valves (DCV) on the system.

The opinion relating to the use of the PVC-C has been formulated to satisfy the PCA table A2.1 that requires all materials in contact with drinking water to be compliant to AS/NZS4020 with a minimum of level 1 certification.

The use of the testable DCV as a non-registered component exceeds the requirements for backflow prevention given the outcome of the first assessment. The system is designed to provide a cost effective solution whereby significantly large numbers of non-testable dual check devices would have to be replaced 5-7 years.

## **5. Non-Registered Testable Double Check Valves**

As a result of the opinion described in section 4 the minimum requirements for backflow prevention is the use of a dual check valve only (non-testable).

However, a further assessment is now provided to specify the installation of a testable DCV nominated for use for specific reasons, thus increasing the serviceability and ongoing maintenance of the systems above the minimum required.

The testable DCV will be installed with a nominated reduced and specified testing regime (not annually) thus requiring the devices to be registered as non-testable.

The testable DCV will be introduced into the design with a nominated batch-testing regime only, as described below. This will be nominated as a 5 yearly batch test of 15% of devices every 5 years. The details of which are covered in another section of this report.



## **Performance Solutions Proposal – Solar Water Heater Installations**

### **Collector Orientation over 45° and up to 90° from True North**

Currently the Australian New Zealand Standard AS/NZS 3500.4:2015 does not allow for solar collector orientation to be greater than 45° from true north. This is having an impact on consumers who wish to install a solar water heater and do not have a suitable roof within an arc of 45° from true north. A solar water heater installed with its collectors orientated between 45° and 90° from true north can still provide significant levels of energy savings and reductions in annual operating costs.

#### **Compliance with Performance Requirement Clause *BP2.8* and Verification Method Clause *BV2.2***

The GHG intensity would be calculated from the results of the TRNSYS modelling. If the annual greenhouse gas intensity of the solar water heater with an azimuth of 90° from true north exceeds 100 g CO<sub>2</sub>e/MJ of thermal energy load, then modelling will be performed to determine the maximum orientation from true north where the annual greenhouse gas intensity does not exceed 100 g CO<sub>2</sub>e/MJ for the solar water heater.

## Performance and Deemed-to-Satisfy Solutions – Southern Queensland

Brisbane weather file, Zone 3 requirements, medium load from AS/NZS 4234:2008

### Performance Modelling

The Plumbing Code of Australia allows for performance modelling of a heated water service using the Australian New Zealand Standard AS/NZS 4234:2008 Heated water systems – Calculation of energy consumption, as an Assessment and Verification method in determining a Performance or Deemed-to-Satisfy Solution. The performance data is calculated from the performance modelling results of this water heater obtained using AS/NZS 4234:2008. Refer also to “Calculation Methodology Details” on page 3.

### Performance Data

The following performance data of a [redacted] model [redacted] thermosiphon solar water heater is derived from TRNSYS computer simulation modelling using AS/NZS 4234:2008, Brisbane weather file, Zone 3 requirements and a medium load.

System	Orientation / Inclination		Load Size (kWh per annum)	Purchased Energy Used (kWh)	Energy Savings (kWh per annum)	Energy Savings (%)	GHG Factor (kg CO2- e/kWh)	GHG Intensity (g CO2-e/MJ)
Reference Electric WH			3483	4194			0.94	314
model 302L	90	20	3483	1324	2870	68.4	0.94	99

## Performance Solutions – Summary

A Performance Solution and two Deemed-to-Satisfy Solutions are summarised, for a [REDACTED] installed with an orientation of 90° from true north in the region of Southern Queensland, which demonstrate compliance with the Plumbing Code of Australia.

The Performance Solution is using a Verification Method [refer Clauses A0.4 (a) (i), A0.6 (b) (i) & (ii) of the PCA], whilst the two Deemed-to-Satisfy Solutions are using a Comparison Method [refer Clauses A0.4 (a) (ii), A0.6 (d) of the PCA] to show equivalency to the Deemed-to-Satisfy Provisions. These are:

### *Performance Solution – Clause BP2.8 (b) (i) and Verification Method BV2.2 modelling using AS/NZS 4234:2008*

- BP2.8 (b) (i) requires the greenhouse gas (GHG) intensity of a heated water service not to exceed 100 g CO<sub>2</sub>-e/MJ.
- Using BV2.2 (modelling using AS/NZS 4234:2008), a GHG intensity of 99 g CO<sub>2</sub>-e/MJ is achieved (column 8, row 3 of table on page 1).

### *Deemed-to-Satisfy Solution 1 – Clause B2.4 (b) (ii) (A), modelling using AS/NZS 4234:2008*

- B2.4 (b) (ii) (A) requires a solar water heater to have for a building of 3 or 4 bedrooms at least 22 Small-scale Technology Certificates (STCs) for the zone where it is being installed.

An STC is equivalent to the 1 MWh of electricity displaced over a 10 year period. Therefore this subclause is requiring at least 22 MWh be displaced over this period.

- Calculations from the results of modelling using AS/NZS 4234:2008 realises 28 MWh of electricity to be displaced over a ten year period (column 5, row 3 of table on page 1 = 2.870 MWh/a x 10 years).

Note: [REDACTED] may be eligible for 28 STCs to be created for its installation in Zone 3.

### *Deemed-to-Satisfy Solution 2 – Clause B2.4 (b) (ii) (B), modelling using AS/NZS 4234:2008*

- B2.4 (b) (ii) (B) requires a solar water heater to have for a building of 3 or 4 bedrooms an energy saving of not less than 60% in accordance with AS/NZS 4234 for a “medium” load system.
- Calculations from the results of modelling using AS/NZS 4234:2008 realises an energy saving of 68.4% (column 6, row 3 of table on page 1).