

How to: Standards, specs & testing

Petar Davcev – Portfolio Leader – Materials Performance & Testing

The background of the slide is a semi-transparent blue-green gradient. In the lower half, there is a faint, stylized illustration of a port and airport. It shows a large cargo ship docked at a pier with several cranes, a yellow forklift in the foreground, and a white truck. In the background, there are silhouettes of airport buildings and an airplane in flight.

Overview

What are standards and specifications

Performance based vs prescriptive based specifications

Which specifications apply to you

Not all specifications are the same

Important terminology you shall know

The key to it all – Testing, Validation and Compliance

Common issues, barriers and roadblocks

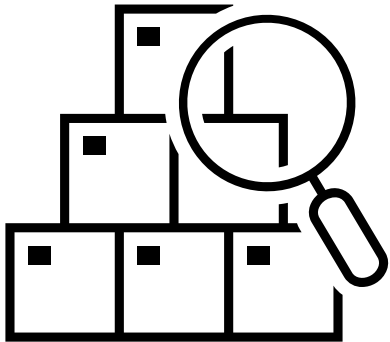


What are Standards and Specifications



Governing Framework

- **Standards** - Standards are the governing documents that are recognised as the most practical and appropriate current solution, that is agreed upon by a recognised authority. For example
 - Standard for Bitumen – *AS2008 -2013*



Product Specific

- **Specifications** - Specifications ensure the detailed outcomes in terms of quality or performance expected in the finished product
 - Specification in *AS2008 – 2013* can be for a C170 Bitumen
 - Viscosity, Penetration, Flash Point, etc.

Performance vs Prescriptive

Test	Effect on road performance
Road performance tests	
Viscosity at 60 °C	Pavement rutting and binder bleeding
Penetration at 25 °C	Pavement cracking
% Viscosity increase after RTFO	Asphalt cracking, compaction
Construction performance tests	
Viscosity at 135 °C	Pumping, compaction and aggregate coating
Flash point	Flammability
Toluene insolubles	Presence of coke or inorganic material (which can affect pumping ability)

Origins of Standards and Specifications are Prescriptive

- AS2008 – 2013 Example
- AST3110 – Based on common imported polymers in the early days, SBS, EVA, SBR, CR, PBD
- Assisted with industry performance uniformity
- Equipment commonality
- Safety

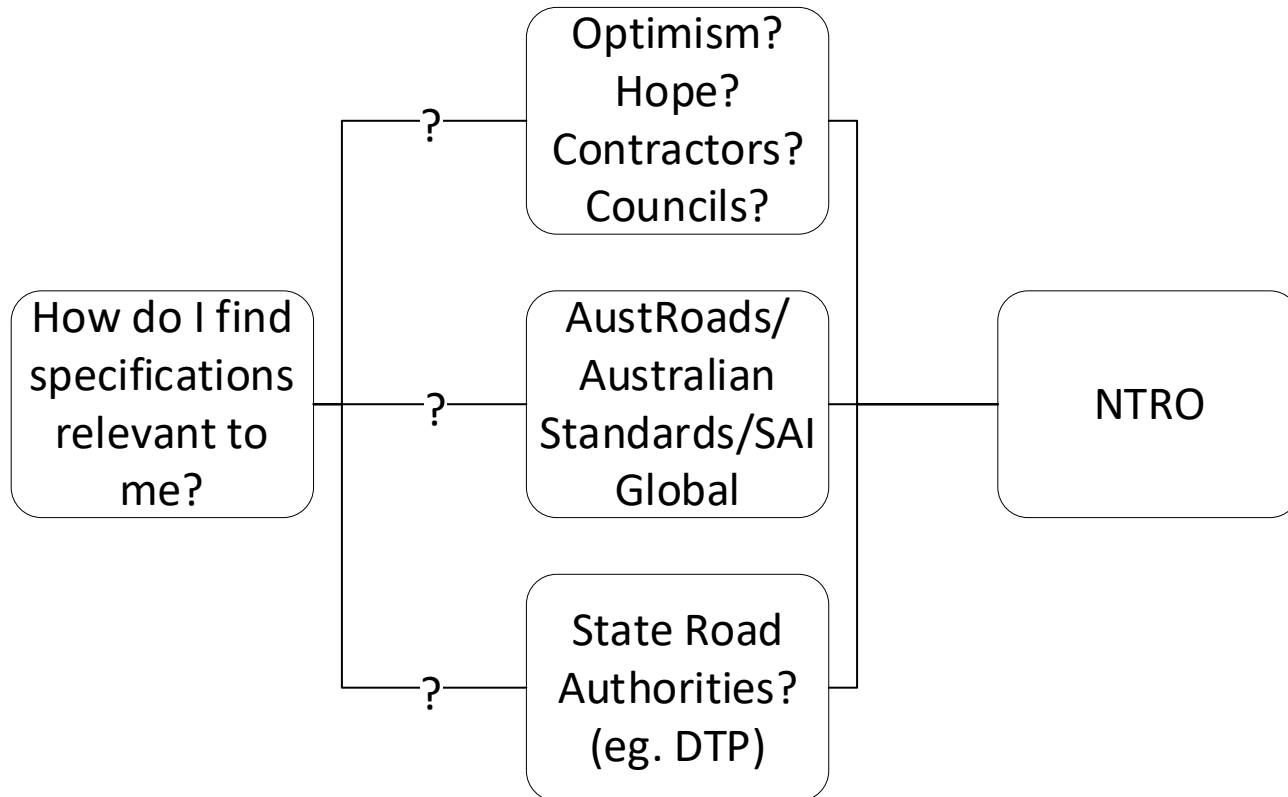
Performance vs Prescriptive continued

rCB Specification				
Test	Test Method	Unit	Result Range	Test Frequency
Ash Content	ASTM D 1506	%	10 - 20	6 weeks
Water Content (max)	AS 4489.8.1	%	3	6 weeks
PSD (Sieve Size)			%passing by mass	
1.18	AS1141.11.1, AS 4489.2.1	mm	100	6 weeks
0.600			80 - 100	
0.300			70 - 90	
0.150			50 - 70	
0.075			30 - 40	
pH	ASTM D1512	- log[H +]	TBR	6 weeks
Loss on Heating	AS 4489.7.1	%	TBR	6 weeks
Filler Density	AS/NZS 1141.7	t/m ³	TBR	6 weeks

Standards and Specifications that are *Performance* based:

- New and recycled products call for performance-based specifications
- Meet standards, unique specification
- Collaboration with Road Authorities, Industry and Independent Laboratories (NTRO)
- NTRO work closely with industry to innovate, develop and guide products to meet standards and create unique specifications
 - Recovered Carbon Black Specification example

Which specifications apply to you?



- How can you identify which standards and specs apply to you, and where to find them?
 - Austroads/ Australian Standards
 - Speaking Directly with Contractors/Asset Owners/State Road Authorities/Councils
 - Collaboration with NTRO – We can walk you through the right process for you, sometimes new product specifications are created, products are validated, and mix designs reformulated

Not all specifications are the same

Specification requirement		TMR	TfNSW	DTP
Filler type		Hydrated lime	Hydrated lime	Hydrated Lime, many more*
Proportion of added filler		Not less than 1.0 %	Not less than 1.5 %	Minimum 8.0 %
Fibre additive percentage by total mass of mix		Note less than 0.3 %	Note less than 0.3 %	0.3 %
Compaction	Marshall	50 blows	-	50 blows
	Gyratory	-	120 cycles 350 cycles	- -
Compaction Temperature	Marshall	160 °C ± 3 °C	160 °C ± 3 °C	160 °C ± 3 °C
	Gyratory			
Air voids of compacted specimens	Marshall (50 blows)	2.0 – 5.0	-	3.5 – 5.0
	Gyratory (120 cycles)	-	≥ 3.0 % and ≤ 6.0 %	-
	Gyratory (350 cycles)	-	≥ 2.0 %	-
Drain off	Temperature ¹	185 °C	-	185 °C
		-	175 °C	-
	Duration ¹	1 hour	1 hour	1 hour
	Drain off	≤ 0.3%	less than 0.3%	not exceed 0.3%

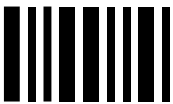
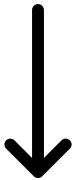
- A Standard may allow something such as *Filler*.
 - A product and/or performance specification, may vary depending on which state, council and even road project.
- The table on the left outlines the specifications for fillers in 3 states.
- The changes can be dramatic, and one product success in Victoria for example, may not translate across other states.
- It is **critical** to understand the products performance, end use market and specification.
- Unless you have a clear pathway, it can be an arduous road ahead to tick the right boxes for your product/material.

Important terminology you *shall* know

- Standards and Specifications will have precise wording around requirements. These can sometimes be confusing and difficult to clarify. Below is a summary of key terms to look out for and what they mean.
- Key Terms
 - **“Shall”** means you must, denotes an absolute requirement in order to conform to the specification
 - **“Should”** denotes a recommendation or that which is advised but not required in order to conform to the specification
 - **“Can/May”** means you are able to, but don’t have to



The key to it all – Testing, Validation, Compliance



New Material Chemical and Physical Classification

Feasibility Trials, Environmental Assessment, OHS Assessment

Engineering Performance Trials

Product Specifications, Guidelines and Technical Reports

Commercialisation

- New products must demonstrate they are safe, meet performance requirements, are infinitely recyclable and cost competitive.
 - Testing can be complex and there are many claims in industry today.
 - The **only** way to be sure of a claim is to have an independent, NATA accredited laboratory validate a product to standards and specifications and compared to a control.
- NTRO houses Australia's leading independent, NATA accredited laboratory. Our commercialisation methodology has validated over 70 recycled materials in use across our road network today.
 - Indicative timeline to complete methodology
 - 6 - 12 months – Testing Program and Trial

The key to it all – Testing, Validation, Compliance continued

- Below is a list of some of the recycled materials that NTRO has tested, validated and collaboratively developed for use in our road network today:
 - Truck Tyres
 - Passenger Tyres
 - Agricultural Tyres
 - Conveyor Belts
 - Crushed Glass
 - Slag
 - Silica Manganese
 - Carbon Char
 - Bottom Ash
 - Fly Ash
 - Organics
 - Iron Oxide
 - Bauxite Clay
 - Silicon Carbide
 - Recycled Asphalt Pavement
 - C&D waste
 - Blended Soil
 - Reclaimed Paint
 - Textile Fibre
 - Waste pulp and fibre
 - Plastic Grocery Bags
 - Plastic Containers
 - Comingled Plastic
 - Additive Manufacturing Plastic
 - Failed Currency Notes
 - 3D print polymer
 - Engine Oil
 - Lubricant Oil
 - Bio Oil



Common issues, barriers and roadblocks

- Having validated over 40 recycled products in the NTRO laboratories, here are some key learning to share:
 - **Meeting DTP and other state road agency expectations** – There is no exact pathway. It is critical you work together with suppliers, contractors, state road authorities, councils, MRPV, ecologiQ on their specific needs and products to find a way forward. Alternatively, you can also seek to partner with organisations like NTRO who can manage that entire process and create a unique pathway for you.
 - **Failing to meet all relevant requirements** – This can range from performance specifications, environmental requirements and approvals and OHS standards. Working closely with the right organisation will ensure you have a clear path to get to real outcomes, industry acceptance and commercialisation.
 - **Limitations to funding testing, validation and compliance** – Testing can be costly, so it imperative you do your due diligence and partner with an organisation that will require you to fund one research program. It is unfortunately very common for product owners to fund multiple incomplete, unrelated testing programs which are costly, time inefficient and will not satisfy the road authorities

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Visit our Website - [NTRO](https://www.ntro.org.au)

Email: petar.davcev@ntro.org.au

