

Build something great™

BORAL MATERIALS TECHNICAL SERVICES

BORAL

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As one of Australia's largest construction materials companies, Boral is passionate about providing customers with superior quality products and reliable service. We are committed to remaining at the forefront of our industry by continually improving and refining existing products and developing new products to meet market needs.

The Boral Materials Technical Services (BMTS) Laboratory in Sydney is key to achieving our quality objectives. Not only are we the only Australian construction materials company to maintain a full-service construction materials laboratory in Australia, BMTS is also the largest facility of its kind in the country, providing special and standard testing and product development services to Boral and our customers.

About us

Boral Materials Technical Services (BMTS) has its origins in two iconic Australian companies, Readymixed Concrete Industries Ltd. and Blue Metal Industries Ltd. The Readymix Central Research Laboratory focused on concrete technology and had a strong research and development culture. The Blue Metal Industries Laboratory commenced operation in 1958 at Prospect Quarry, and developed testing capabilities in quarry products, asphalt and masonry. By 1982, both companies had been acquired by Boral and the two laboratories were merged to become BMTS.

The BMTS facility at Baulkham Hills in Sydney specialises in compliance testing of construction materials and offers quality control testing, R&D expertise and specialised technologies associated with:

- Concrete
- Admixtures
- Curing compounds
- Cement and supplementary cementitious materials (fly ash, slag, silica fume)
- Mortar and grout
- Asphalt and bitumen
- Building materials (bricks, pavers, dimension stone, masonry units, roof tiles)
- Road construction materials (natural and recycled)
- Aggregates and rock

In addition, BMTS provides comprehensive environmental services such as dust monitoring of ambient air and chemical analysis of water effluents from manufacturing sites. A key objective for all Boral manufacturing businesses is to maintain superior technical standards and supply high-grade construction materials for commercial application. It is the role of BMTS to support this objective and to ensure that Boral remains at the forefront of national and international technological standing.



BORAL MATERIALS TECHNICAL SERVICES

Accreditation and Certification

Boral Materials Technical Services is accredited by the National Association of Testing Authorities (NATA) to comply with ISO/IEC 17025:2017, and operates under Accreditation Numbers 547 and 9968 for Construction Materials Testing and Chemical Testing respectively. This double accreditation covers almost 280 regional, national and international endorsed test methods for standard service work.

The full schedule of BMTS accreditation can be viewed at the NATA website.
www.nata.com.au

In addition to this endorsed test-work, BMTS has developed a variety of specialised in-house test procedures and conducts numerous other tests for defined project requirements and R&D investigations. Furthermore, BMTS is certified by BSI under the international ISO 9001:2015 Quality Management Standard (Cert. Number FS 603749) to:

- Conduct construction materials and chemical testing
- Develop product designs
- Provide technical and environmental services

The BMTS Laboratory was recognised by NATA as a world-class testing facility:

“It truly is a pleasure to assess organisations with a solid commitment to undertaking both world best practice and continuous improvement.”



Our Capabilities

Boral Materials Technical Services is uniquely qualified to provide:

- Construction materials compliance testing.
- Assessment and large scale testing of construction materials for specific applications.
- Consulting services encompassing compliance, performance and durability of construction materials.
- Guidance on how existing construction materials can be adapted for specific applications, with appropriate technical support and field investigations.
- Construction material forensic investigations and related issues.
- Expert technical assistance in litigation cases involving construction material compliance, performance, durability, diagnostics and related issues.
- Preparation of construction materials specifications.
- Assessment of project tender documents.
- Environmental site assessment and monitoring.
- Conceptual concrete and asphalt mix designs.
- Feasibility studies.

BMTS is considered to be the largest full-service construction materials testing facility in the southern hemisphere and our services extend to international clients. Some examples include:

- Singapore – assessment of steel fibre re-enforcement in concrete.
- Jamaica – concrete trial mixes for the construction of an aluminium smelter.
- Dubai – specialised creep testing of the high strength concrete used in the Burj Khalifa – the tallest reinforced concrete building in the world.

BMTS technical capability is underpinned by more than 50 professional full-time staff and the facility consists of six distinct in-house laboratories:

- Chemistry
- Aggregates
- Soils
- Cement
- Concrete
- Asphalt and bitumen

BORAL MATERIALS TECHNICAL SERVICES

Chemistry and Cement Laboratories

The Chemistry and Cement laboratories are separate, but closely associated and staffed by some of our highest qualified and experienced personnel. The Chemistry Laboratory carries out chemical testing and analyses of construction materials, as well as environmental monitoring of quarries, asphalt plants, concrete plants, recycling depots and transport depots with regard to dust emissions and wastewater effluents.

The laboratory has extensive analytical capabilities covering classical, ISE (ion-selective electrode) and advanced techniques that include:

- ICP-AES (inductively coupled plasma atomic emission spectroscopy)
- XRF (X-ray fluorescence)
- UV/Vis (ultraviolet – visible spectroscopy)
- IR (infrared spectroscopy)

In addition to standard analyses, the following specialised testing is routinely undertaken:

- Heavy metal analysis of natural and recycled materials
- Chemical analysis of cement
- Cement compliance testing
- Evaluation of curing compounds
- Hardened concrete analysis
- Chloride diffusion in concrete



Aggregates Laboratory

Boral is a major supplier of quarry products and aggregates testing is a core service available from Boral Materials Technical Services. The Aggregates Laboratory offers the full suite of compliance aggregates testing for all applications including concrete, asphalt, rail ballast, filter material and gabion rock.

Specialised capabilities in aggregates strength, abrasion, soundness, adhesion and PAFV testing (Polished Aggregate Friction Value) have been developed over the past 25 years. We also assist in investigating new quarry resources, enabling Boral to maintain an unparalleled “family” of long term, high-quality resources.

Soils Laboratory

The core function of the Soils Laboratory is compliance testing and certification of roadbase and sub-base materials. These materials are referred to as pavement materials and can be manufactured using natural products, recycled materials or a combination of both. The Soils Laboratory offers the full suite of compliance testing required by RMS QA Specification 3051 (Granular Pavement Base and Sub-Base Materials) and all other relevant specifications. In addition to all standard compaction and classification testing, the Soils Laboratory offers other earthworks assessments including:

- Bearing strength tests (CBR)
- Uniaxial strength tests (UCS, MDCS)
- Direct shear strength tests (60, 100 and 300 mm shear boxes)
- Triaxial strength tests (Modified Texas Triaxial)
- Permeability tests (constant and falling head)

In recent years, the Soils Laboratory has been undertaking extensive research and development programs to ensure Boral recycled materials are a viable option for the production of specific pavement materials.



BORAL MATERIALS TECHNICAL SERVICES

Concrete Laboratory

The Boral Materials Technical Services' Concrete Laboratory undertakes routine and specialised testing on fresh and hardened concrete.

Field testing of all Boral concrete supplied in the Sydney metropolitan area is carried out by staff based at our laboratory staff to ensure concrete workability and consistency. Slump is a standard field test and assessed at all delivery points. Vebe and several different slump flow tests can be carried out at the Concrete Laboratory. Air content, fresh density, compactability and bleeding can all be measured.

The Concrete Laboratory Trial Mix area is temperature-controlled and can be regulated from 9°C to 36°C to simulate various environmental conditions during trial mixes. The laboratory can conduct a wide range of tests on hardened concrete to prove its ability to perform according to mix design or investigate characteristics if its history is unknown.

Compressive strength of concrete cylinders is the most familiar test for quality control purposes. The Concrete Laboratory has been equipped to process up to 400 compressive strength specimens on a daily basis. It also uses a commercial Laboratory Information Management System and internally developed software to capture data and report results.

Concrete beams can be tested for flexural strength and other specimens can be cast to assess other properties such as shrinkage, modulus of elasticity and water permeability.

The Concrete Laboratory has been involved in specific testing for major projects in Australia such as the expansion of Port Botany and the construction of Barangaroo, NorthConnex, Pacific Highway Upgrades, wind farms and Northern Road Project in NSW; Forrestfield-Airport Link in Perth; West Gate Tunnel project and Melbourne Metro in Victoria and trials for the Warragamba Dam, WestConnex and the Snowy 2.0 project in NSW.



Asphalt Laboratory

The Asphalt Laboratory carries out all standard quality control asphalt tests with specialised capabilities in:

- Wheel tracking (rut deformation)
- Beam fatigue
- Resilient modulus

Bitumen compliance testing has expanded to include the full suite of viscosity, density, segregation, softening point, flash point, durability and toughness assessments.

Recently, the Asphalt Laboratory has been involved in the development of a Boral fuel-resistant binder as well as various high durability and specific purpose asphalt products such as:

- Durapave – designed to provide exceptional fatigue performance, long service life and enhanced skid resistance to an existing pavement
- Railpave® – Australia's first asphalt rail pavement product purposely designed for rail track construction
- Aeropave® – developed specifically for the aviation industry to provide a durable high-performance asphalt surface for safe operation on runways and taxiways
- LoNoise™ – a thin asphalt wearing course designed to reduce noise pollution on heavily trafficked roads in urban and suburban areas, it provides a durable road surface with resistance to rutting



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A History of Innovation

The Boral Materials Technical Services concrete laboratory has a long history of innovation and is at the forefront of concrete technological advances in Australia and the world. Some examples include:

1966-68: The development and use of fly ash in concrete.

1966-69: The development and use of retarded coloured brick mortars.

1970-72: The development and use of ground granulated blast furnace slag as a cement replacement.

1969-72: The development and use of foam cellular lightweight concrete for use in the Sydney Opera House and subsequent roll out and use around Australia.

1973-74: Introduction of vacuum dewatering technology.

1973-74: Constructed the first commercial concrete-walled house using special formwork to emulate a brick pattern.

1974-78: The development of super plasticiser admixtures and self-levelling concrete called Superflow with rollout around Australia. The products were the forerunners to more general use of super workable concrete of the 1990s and to present day.

1986-90: The development and production of high strength concrete such as 80MPa and 100MPa were carried out by the research laboratory.

1996-98: The use of a new surface hardness performance testing method (Chaplin Abrasion test) to develop high-performance concrete for Sydney projects such as the Fairfax Production Facility at Chullora and the Franklins Distribution Centre in Ingleburn.

1995-99: The use of new durability tests to develop high performance, high durability concretes for use in projects such as the M5 and Walsh Bay Development in Sydney as well as numerous other projects around Australia.

1995-present: Development of "Green Concrete" – now sold as Envirocrete® with use of recycled raw materials contributing up to 42 per cent potential reduction in greenhouse gas emissions.

2009-present: Assisted in the development of ENVISIA® lower carbon concrete with high early strength, superior durability and lower shrinkage.

2009-10: Introduction of remote, computer-based temperature-matched curing at Baulderstone's Port Botany Project to enable early stripping without cylinder testing.

2011-present: Development of high durability asphalt and related products such as Durapave, Railpave® and Aeropave®

2017-present: Development of Aspire®, a very high strength, high modulus of elasticity, low shrinkage concrete for high rise buildings.

2018-present: Development of Enflo®, a self-compacting concrete.

2020: Development of INNOVO™, an enhanced sustainable asphalt, incorporating everyday products such as glass, plastic and tyres that are likely to end up in landfill.



CONTACT US

Boral Materials Technical Services

Unit 4/3-5 Gibbon Road

Baulkham Hills NSW 2153

Phone +61 2 9624 9900

To view our technical papers and find out more visit:

www.boral.com.au

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