High RAP Asphalt – recycling old asphalt to reduce environmental impact
Boral supports clients needs for high RAP content as a sustainability initiative and for structural benefit in pavements. The major benefits of RAP are:

• Reduction in waste to landfill;

• Reduction the use of natural resource (aggregate and bitumen)

ROAD MAINTENANCE PRODUCTS
Boral Asphalt & Spray Seal Products – made to last
Asphalt and spray seal products such as FlexoCap and CooPav are excellent at preserving existing surfacing, swords network and reducing the environmental impact in comparison to conventional products.

Frontotem Patch Repair (FPR) – Cool Mix
This highly-advanced high-performance material made under license using MacoRb technology from Macromo International Ltd. FPR has the following advantages:

• Reduced mixing temperature reduces binder ageing and can contribute to longer pavement life;

• Improved working conditions for laying crews;

• Lower production and placement temperature;

• Reduced emissions (and greenhouse gases);

• Reduced traffic congestion caused by untimely road maintenance or remedial works, with potentially more durable, longer life pavement products such as WarmPave;

• Contributing to the development of ‘Perpetual Pavement’ which use less maintenance live asphalt base to spend only require the thin finish layer to be replaced periodically.

PAVEMENT SOLUTIONS
Boral can achieve to the required performance from your pavement. We can do this by:

• Helping pavement designers develop pavement solutions that can render a longer design life;

• Reducing the impact of remedial work on the operation of a facility during its service life;

• Minimising expensive maintenance, reconstruction or remedial works, with potentially more durable, longer life pavement products such as WarmPave;

• Leased to the operation of asphalt laying vehicles;

• Contributing to the development of ‘Perpetual Pavement’ which use less maintenance live asphalt base to spend only require the thin finish layer to be replaced periodically.

TOWARDS A SUSTAINABLE PAVEMENT PROFILE
Boral Asphalt develops materials with properties that achieve excellent road performance. Below are the key properties of asphalt components that contribute to a ‘perpetual pavement’;

• High Fatigue resistance
• High binder modulus
• Rut resistant
• High resistance to fatigue
• High binder content

Don’t delay. Build your better roads with Boral today.

Boral website: For the full range of asphalt products visit: www.boral.com.au/asphalt
For asphalt news and information visit: www.boral.com.au/asphaltnews
For asphalt projects go to: www.boral.com.au/asphaltprojects

Contact us:
For the full range of asphalt products contact Boral Asphalts Australia on: 1800 555 445 or email: info@boral.asphalt.com.au
For ride ability contact: 1300 132 964
For Victoria contact: (03) 3268 8011
For New South Wales contact: (02) 9645 0140
For South Australia contact: (08) 8425 0400
For Queensland contact: (07) 3268 8011
For Western Australia contact: (08) 9458 0400

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MSDS: A Material Safety Data Sheet is available on the Boral website or by contacting Boral Asphalts customer service.

GATT Surfacing – graded aggregate, self priming treatment
GATT can be used as a step surface for gravel roads with high maintenance, when reconstruction is not timely, or as a sealant. GATT can be used to:

• Prevent erosion of gravel by traffic and weather;

• Improve the load distribution to the subgrade or underlying gravel by eliminating voids;

• Improve road safety by treating loose gravel, corrugations and mud on unsealed roads;

• Provide all weather accessibility as it is easier to drive on a sealed road.

Boral does not recommend the use of GATT on high-speed main roads or as a sealant for gravel roads with high maintenance, when reconstruction is not timely, or as a sealant. GATT cannot be used:

• As a structural component of an appropriately designed pavement;

• Placed smooth and joint free compared to bound asphalt;

• Specifically formulated to resist deformation under low stationary loads at high ambient temperature;

• Designed to withstand the heavy loadings imposed by both containers and the vehicles that are used to handle the containers;

• Placed smooth and joint free compared to bound pavements;

• A structural component of an appropriately designed pavement;

• Opened to port vehicles sooner than alternatives that require demolition or mobilising.

Warmpave – less energy, fewer emissions and less heat than hot mix
Results from laboratory and field tests in Boral and the USA support Warmpave’s environmental and pavement performance credentials compared to hot mix asphalt. Amongst the benefits of Warmpave are:

• Reduced emissions (and greenhouse gases);

• Reduced production and placement pavement;

• Improved working conditions for laying crews;

• Reduced energy and fuel consumption; and

• Lower mixing temperature reduces binder ageing and can contribute to longer pavement life.

Boral Asphalt develops materials with properties that achieve excellent road performance. Below are the key properties of asphalt components that contribute to a ‘perpetual pavement’;

• High Fatigue resistance
• High binder modulus
• Rut resistant
• High resistance to fatigue
• High binder content

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• As a structural component of an appropriately designed pavement;

• Placed smooth and joint free compared to bound asphalt;

• Specifically formulated to resist deformation under low stationary loads at high ambient temperature;

• Designed to withstand the heavy loadings imposed by both containers and the vehicles that are used to handle the containers;

• Placed smooth and joint free compared to bound pavements;

• A structural component of an appropriately designed pavement;

• Opened to port vehicles sooner than alternatives that require demolition or mobilising.
Boral Asphalt is building roads to last.

Boral has developed and adopted innovative technology which aims to improve the sustainability credentials of our asphalt products and optimize their quality and performance.

In the diagram and points left/below, we show you some of the sustainability measures used during Boral’s asphalt manufacturing and application process. Measures such as reducing emissions, noise and dust, using recycled materials are all positive points of difference that help make Boral Asphalt products the smart choice for future pavements.

**RAW MATERIALS**

- Re-use Reclaimed Asphalt Pavements (RAP)
- Vary the source, type and combination of raw materials in our Asphalt mixes
- Maintain clean manufacturing sites to minimize dust emissions
- Use recycled glass as a sand fraction in the asphalt mix
- Use rubber modifier crumbs to modify the binder
- Use reclaimed tire fines as filler
- Use fly ash as filler

**HEATING**

- Use natural gas as fuel to dry aggregates
- Use foam blankets or additives to reduce mixing temperatures
- Cover aggregate stockpiles to keep them dry
- Recycle fumes from hot asphalt into dryer
- Use active carbon filters on our blast furnace

**MANUFACTURING**

A holistic approach to asphalt manufacturing

- Maintain clean manufacturing sites to minimize dust emissions
- Reduce noise through engineered sound attenuation features of the manufacturing plant
- Operates a continuous improvement philosophy for all operations

**TESTING**

- Testing asphalt mixes
- Use less flammable solvents, or adopt alternative solvent free test methods
- Use ignition ovens to determine bitumen contents
- Use high flash solvents for binder extractions
- Recycle high flash solvent

**PAVING**

Managing the fundamentals of application

- Use additives to lower paving temperatures, such as warm mix asphalt
- Upgrading the power cell by fitting timing vacuum
- Fixing at night (outside peak traffic periods)
- Using emulsions for spray sealing

**ASPHALT & SPRAY SEAL PRODUCTS**

Our products have demonstrated comparative performance and economic benefits.

- Novachip – thin layer asphalt with good texture
  
  **Enhanced skid resistance**
  
  **Improved surface stability**
  
  **Enhanced resistance to rutting**

- Durapave® – polymer modified thin layer asphalt with high stone interlock
  
  **Reduced tyre noise compared to spray seals**
  
  **Improved skid resistance, especially in wet weather**
  
  **Can reduce whee spray**

- GacoLo Noise™ – can reduce the influence of traffic noise
  
  **Provides quiet ride experience which can improve safety and serviceability**
  
  **Inhibits the transmission of noise from the roadway**

**Crumb Rubber Seal – using crumbled rubber for demanding conditions**

**Crumb Rubber Seal – using crumbled rubber for demanding conditions**

- Incorporating rubber as a modifier to deliver new results in asphalt, crumb rubber asphalt can also:
  
  **Reduce pavement layer thickness**
  
  **Increase service life of the pavement**

**Boral Asphalt’s paving products make sustainable pavements a reality.**
Boral Asphalt is building roads to last.

Boral has developed and adopted innovative technology which aims to improve the sustainability credentials of our asphalt products and optimise their quality and performance.

In the diagram and points below, we show you some of the sustainability measures used during Boral’s asphalt manufacturing and application process. Measures such as reducing emissions, noise and dust, using recycled materials are all positive points of difference that help make Boral Asphalt products the smart choice for future pavements.

**HEATING**

- Alternative tank, additive and practical storage methods
  - Use natural gas as heating fuel in dry aggregates
  - Use form fillers or additives to reduce melting temperatures
  - Cover aggregate stockpiles to keep them dry
  - Recycle fines from hot bins into dry drum
  - Use active carbon filters on our bitumen tanks

**TESTING**

- Recycle solvents, use less flammable solvents, or adopt alternative solvent free test methods
  - Use ignition ovens to determine bitumen contents
  - Use high flash solvents for binder extractions
  - Use additives to lower paving temperatures, such as warm mix asphalt

**MANUFACTURING**

- A holistic approach to asphalt manufacturing
  - Maintain clean manufacturing sites to minimise dust emissions
  - Reduce noise through engineered sound attenuation features of the manufacturing plant
  - Operates a continuous improvement philosophy for all operations

**TRANSPORTING**

- Leveraging transport alternatives and technology
  - Deliver aggregates by rail-tan car to Boral’s Enfield Asphalt Plant
  - Use additives to lower paving temperatures, such as warm mix asphalt

**PAVING**

- Managing the fundamentals of application
  - Use additives to lower paving temperatures, such as warm mix asphalt
  - Upgrading the power fed by lighting flame extractors
  - Fixing at night (outside peak traffic period)
  - Using emulsions for spray-sealing

**ASPHALT & SPRAY SEAL PRODUCTS**

Our products have demonstrated comparative performance and economic benefits.

Novachip™ – thin layer asphalt with good texture

- Provides good skid resistance which can improve safety
  - A durable overlay that can improve the service life of asphalt

Novachip™ can have:
  - Reduced tyre noise compared to spray seals.
  - Good resistance to rutting due to high stone to stone interlock
  - Specially formulated hot-mix asphalt low noise surfacing incorporating rubber granules that can
  - Improve driver visibility in wet weather due to reduced spray and splash
  - Provide good skid resistance which can improve safety

Duprapave® – polymer modified thin layer asphalt with high stone interlock

Delivers high fatigue and rut resistance as demonstrated in laboratory testing. Europave can also offer:

- Enhanced skid resistance via visual dense-asphalt close up of the surface
- A durable overlay that can improve the service life of asphalt
- Enhanced skid resistance
- Reduced tyre noise compared to spray seals.

Duprapave® can also offer:
  - Increased service life of the pavement
  - Improved performance of the surfacing
  - Specially formulated hot-mix asphalt low noise surfacing incorporating rubber granules that can
  - Improve driver visibility in wet weather due to reduced spray and splash
  - Provide good skid resistance which can improve safety

Crumb Rubber Asphalt – taking advantage of waste rubber

Incorporating rubber as a modifier to deliver new results in asphalt, crumb rubber asphalt can also:

- Increase service life of this pavement
- Help to preserve the environment by reducing old tyre rubber to landfill

Novachip™ – can reduce the influence of traffic noise

Specially formulated hot-mix asphalt low noise surfacing incorporating rubber granules that can

- Reduce the perception of traffic noise by about 25%.
- Provides good skid resistance which can improve safety
- Result in a service life between 30% and 50% higher
- Helps to preserve the environment by reducing old tyre rubber to landfill

Le Noise™ – can reduce the influence of traffic noise

Specially formulated hot-mix asphalt low noise surfacing incorporating rubber granules that can

- Reduce the perception of traffic noise by about 25%.
- Provides good skid resistance which can improve safety
- Result in a service life between 30% and 50% higher
- Helps to preserve the environment by reducing old tyre rubber to landfill

Porous Asphalt – polymer modified open graded asphalt with high voids

Research has shown open graded asphalt voids allow surface water to drain away for improved safety and noise-amenity for the motorists.

Some things open graded asphalt can do are:

- Improve driver visibility in wet weather due to reduced spray and splash
- Lower noise levels to the benefit of both users and residents
- Improve skid resistance in wet weather due to improved surface drainage
- Good resistance to rutting due to high stone to stone interlock
- Acts as a water attenuation layer by storing water in the interconnected air voids

Crumbed Rubber Seal – using crumb rubber for demanding conditions

Crumb rubber seal are requested by asset owners in demanding conditions

Crumb Rubber Seal – using crumb rubber for demanding conditions

Crumb rubber seal are requested by asset owners in demanding conditions
GATT Surfacing – graded aggregate, self priming treatment

GATT can be used as a one step surfacing for gravel roads, with high maintenance, when reconstruction is not timely or, as a main surfacing treatment can be used to:

• Prevent erosion of gravel by traffic and weather
• Improve the ride for communities not used to surfaced roads by eliminating dust
• Improve road safety by reducing loose gravel, corrugations and mud in unsealed roads
• Provide all weather accessibility as it is easier to drive on a sealed road

Results from laboratory and field tests in Boral and the USA support GATT’s environmental and pavement performance credentials compared to hot mix asphalt. Amongst his benefits of WarmPave are:

• Reduced emissions (and greenhouse gases);
• Reduced production and pavement temperature;
• Improved working conditions for laying crews²;
• Reduced energy and fuel consumption; and,
• Lower mixing temperature reduces binder ageing and can contribute to longer pavement life.

Lower mixing temperature reduces binder ageing and can contribute to longer pavement life. Reduced emissions (and greenhouse gases); Reduced production and pavement temperature; Improved working conditions for laying crews²; Reduced energy and fuel consumption; and, Lower mixing temperature reduces binder ageing and can contribute to longer pavement life.

PAVEMENT SOLUTIONS

Boral can contribute to the achieved requirements of a maximum performance from your pavement. We can do this by:

• Helping pavement designers develop pavement solutions that can render a longer design life;
• Reducing the impact of remedial works on the operation of a facility during its service life;
• Minimising expensive maintenance, reconstruction or remedial works, with potentially more durable, longer life pavement products such as WarmPave;
• Reducing traffic congestion caused by entirely road maintenance with efficient asphalt surfacing alternatives;
• Providing alternative non-renewable resources such as bitumen and aggregates in the maintenance and construction of flexible pavements; and,
• Contributing to the development of ‘Perpetual Pavements’ which use low maintenance life asphalt technology to ensure that not only require the thin surface layer to be replaced periodically.

Boral supports client needs for high RAP content as a sustainability initiative and for structural benefit in pavements. The major benefits of RAP are:

• Reduction in waste to landfill; and,
• Reducing the use of natural resource (aggregate and binder)

TOWARDS A SUSTAINABLE PAVEMENT PROFILE

Boral Asphalt develops materials with properties that achieve excellent road performance. Below are the key properties of asphalt components that contribute to a ‘permanent pavement’;

ROAD MAINTENANCE PRODUCTS

Boral Asphalt & Spray Seal Products – made to last asphalt and spray seal products such as EcoSeal and Copaspray are excellent at preventing existing surface water networks and reducing the environmental impact in comparison to conventional products.

FrontRow Pavement Repair (FRR) Cold Mix

This mixed, high-performance paving material made under licence using MacAllister technology from Macalm International Ltd. FRR has the following advantages:

• Insignificant levels of volatile organic compounds (VOCs);
• Application at ambient temperature;
• No heating of the product is required during application; and,
• It has a up to 2 year shelf life when properly stored.

Reference: 1. FRR Specialty Product Introduction, Boral, August 2013

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• Providing alternative non-renewable resources such as bitumen and aggregates in the maintenance and construction of flexible pavements; and,
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• Reduced production and pavement temperature;
• Improved working conditions for laying crews²;
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• Minimising expensive maintenance, reconstruction or remedial works, with potentially more durable, longer life pavement products such as WarmPave;
• Reducing traffic congestion caused by entirely road maintenance with efficient asphalt surfacing alternatives;
• Providing alternative non-renewable resources such as bitumen and aggregates in the maintenance and construction of flexible pavements; and,
• Contributing to the development of ‘Perpetual Pavements’ which use low maintenance life asphalt technology to ensure that not only require the thin surface layer to be replaced periodically.

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Boral supports client needs for high RAP content as a sustainability initiative and for structural benefit in pavements. The major benefits of RAP are:

• Reduction in waste to landfill; and,
• Reducing the use of natural resource (aggregate and binder)
Boral Asphalt

SUSTAINABLE ROADS

GAFF Surfacing – graded aggregate, self priming treatment

GATF can be used as a step change surfacing for great roads with high maintenance, when reconstruction is not timely or, as a means GATF can be used to:
- Prevent erosion of great by traffic and weather
- Increase the life of an asphalt layer at a road site that is not regularly serviced
- Provide all-weather accessibility as it is easier to drive on a sealed road

High RAP Asphalt – recycling old asphalt to reduce environmental impact

Boral supports client needs for high RAP content as a sustainability initiative and for structural benefit in pavements. The major benefits of RAP asphalt are:
- Reduction in need to landfill and,
- Reduction of use of natural resource (aggregate and bitumen)

ROAD MAINTENANCE PRODUCTS

Boral Asphalt & Spray Seal Products – made to last

Asphalt and spray seal products such as FastCap and Causaparm are excellent at preserving an existing surface. Seal-coating the road network and reducing the environmental impact in comparison to conventional products.

Frontran Pavement Repair (FPR) Cold Mix

This mix – high performance paving material made under licence using Macellbiotechnology from Macelco International Ltd. FPR has the following advantages:
- Insignificant levels of volatile organic compounds (VOCs)
- Application at ambient temperature
- No heating of the product is required during application; and,
- It has up to a 2 year shelf life when properly stored.

Reference:
1. FastCap Performance Case Study, Mills Road, City of Greater Bendigo
2. Deer Park Bypass QA Test Report, 2009

PAVEMENT SOLUTIONS

Boral can contribute to achieving the required performance from your pavement. We can do this by:
- Helping pavement designers develop pavement solutions that can render a longer design life
- Reducing the impact of wear and tear on the operation of a facility during its service life
- Minimising expensive maintenance, reconstruction or remedial works, with potentially more durable, longer life pavement products such as WarmPave.
- Contributing to the development of ‘Perpetual Pavements’ which use low maintenance life asphalt to lead to the preservation of the thin surface layer to be replaced periodically.

Boral website:
For full details and information visit:
www.boral.com.au/asphalt
For the full range of asphalt products, please:
www.boral.com.au/asphaltproducts
For businesses and commercial organisations, please:
www.boral.com.au/asphaltbusiness

Contact us:
For further information or to order asphalt please contact us:
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- NSW: (02) 8801 2000
- QLD: (07) 3032 2000
- SA: (08) 8425 0400
- WA: (08) 9458 0400

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