SAFETY DATA SHEET

Polymer Modified Bitumen

SECTION 1: Identification Of The Substance And Supplier

Product Name:	Polymer Modified Bitumen
Other Names:	Flexi Bind, Flexiplus Bind, Fleximax Bind, Resistamax Bind, Barrier Bind, Flexi Seal 2-4%
Recommended Use:	Product is designed for use in the manufacture of polymer modified asphalt. The addition of these products significantly increase the performance of Asphalt Mixes.
Company Details:	Road Science
Address:	9 Owens Place, Mt Maunganui
Telephone Number:	07 575 1150
Emergency Telephone Number:	07 575 1150 24hr / 7 days or National Poisons Centre 0800 POISON (0800 764 766)

SECTION 2: Hazards Identification

Hazard Classification:	Not classified as a Hazardous Substance under the HSNO Act
Risk Phrase:	R35 - Causes severe burns in liquid state

SECTION 3: Composition/Information On Ingredients

Chemical Identity	Concentration	Cas Number
Petroleum Hydrocarbons	80 – 100%	64742-04-7
Polymer	0 – 20%	9003-55-8
Aromatic process oil	< 12%	064742-04-7
Paraffin wax	< 5%	8002-74-2
Sulphur	< 0.5%	7704-34-9

This is a commercial product whose exact ratio of components may vary slightly. Minor quantities of other non-hazardous ingredients are also possible

SECTION 4: First Aid Measures

Requirement for First Aid: Bitumen is unlikely to be ingested or swallowed in view of the handling temperature of the product (120 – 180°C). The most likely need for first aid when handling hot bitumen is the treatment of burns. Bitumen fumes give off Hydrogen Sulphide, which may irritate the eyes, nasal passages and throat.

Workplace Facilities: An emergency cooling shower with a step-on footplate (or equivalent hands-free mode of operation) and eyewash should be located within 5 metres of permanent discharge points. Every tanker or sprayer should be fitted with a readily accessible, clean, stainless steel water filled pressure extinguisher (fine spray nozzle) of minimum 9 litre capacity for first aid use.

FIRST AID INSTRUCTIONS:

Swallowed: Wash mouth out with water. Do not induce vomiting. Seek medical attention.

Eye: Rinse immediately with plenty of water for at least 20 minutes. DO NOT remove bitumen and seek medical attention.

Skin: *Bitumen Burns – First Aid.* If hot bitumen contacts the skin, no attempt should be made to remove it. The bitumen covered burn area should be drenched immediately in cold, preferably running water for at least 20 minutes. DO NOT use ice. Remove any constricting rings, belts etc provided doing so does not cause further damage to the burn area, but do NOT attempt to remove clothing stuck to the bitumen. Do NOT attempt to clean the affected area or apply lotions and ointments. Cover any exposed burns with clean non-stick dressings or cling film to exclude the air. Do not wrap dressings too tightly and DO NOT dress areas covered with bitumen.

Circumferential Burns. When hot bitumen completely circles a limb it may have a tourniquet effect and diminish blood circulation to the limb. If reduced circulation is evident, elevate the limb to reduce swelling. If it does not and advanced medical care is more than 20 minutes away, try carefully splitting the bitumen from the top to bottom with a heavy pair of scissors, using extreme caution to prevent damage to underlying skin. The patient should be referred urgently for medical attention

Inhaled: If inhalation of mists, fumes or vapour causes nose or throat irritation, or coughing, remove to fresh air. Keep patient warm and at rest. Seek medical advice if any symptoms persist.

Exposure to Hydrogen Sulphide. Casualties suffering ill effects as a result of exposure to hydrogen sulphide should be immediately removed to fresh air and medical assistance obtained without delay. Unconscious casualties must be placed in the recovery position. Monitor breathing and pulse rate and if breathing has failed, or is deemed inadequate, respiration must be assisted, preferably by the mouth-to-mouth method. Administer external cardiac massage if necessary. Seek immediate medical attention.

Medical Attention/Special Treatment: For severe skin burns refer to the Bitumen Burns Card accompanying the patient.

SECTION 5: Fire-Fighting Measures

Fire and Explosion Hazards: Polymer Modified Bitumen is classed as an Elevated Temperature Liquid N.O.S at temperatures above ambient. PMB is a combustible product. There is a slight risk of explosion from this product if commercial quantities are involved in a fire. Violent steam generation or eruption may occur upon application of direct water stream on hot liquid. Hydrogen Sulphide vapours from this product are heavier than air and may accumulate in sumps, pits and other low-lying spaces, forming potentially explosive mixtures. They may also flash back considerable distances. Combustion products include oxides of carbon, nitrogen and sulphur.

Extinguishing Media & Methods: Use foam, CO_2, or dry powder fire extinguishers. Cool tanks and containers exposed to fire with water mist and avoid spraying directly into storage containers because of the danger of boil-over. Ensure any water spray does not spread fire over a large area.

Hazchem Code: 2W

Recommended Protective Clothing: Structural fire-fighting clothing, gloves, boots and helmet should be worn when extinguishing bitumen fires. In confined spaces where there is a lack of natural ventilation, fires should be dealt with by trained personnel wearing self-contained breathing apparatus (SCBA).

SECTION 6: Accidental Release Measures

Land Spill – Prevent additional discharge of material if possible to do so safely. If a large spill and in a public area, keep public away upwind and advise authorities. Prevent product from entering sewers, watercourses or low areas. Contain spilled liquid with sand, gravel, or earth bunds. Do not use combustible materials such as sawdust. Wear overalls, protective goggles, and heat resistant gloves.

Water Spill – Remove from water with shovels or earthmoving machinery and immediately load into suitable receptacles for recycling or disposal.

Disposal – Scrape up and ensure waste disposal conforms with local waste disposal regulations. Recovered material may be disposed of to approved landfill. Do not dispose of product or container near ponds, ditches, down drains or into soil. Consult an expert on disposal of recovered material and ensure conformity to local disposal regulations.

SECTION 7: Handling and Storage

Precautions for Safe Handling: Avoid contact with strong oxidising agents and ignition sources. Avoid skin and eye contact. Avoid inhalation of mists, fumes or vapour generated during use. Always wash hands with soap and water after using hand cleansers to remove bitumen residue.

Bitumen storage and transfer should occur in areas that are well ventilated to prevent the inhalation and contact with vapours, mists or fumes that may be generated during use. If such vapour, mists or fumes are generated, their concentration in the workplace air should be controlled to the lowest practicable level. This material can contain hydrogen sulphide (H2S) an extremely toxic and flammable gas (refer to the RNZ Code of Practice for Safe Handling of Bituminous Materials Used in Roading).

High standards of personal hygiene and plant cleanliness must be maintained at all times. Wash hands thoroughly after contact. Removal of bitumen from the skin is best achieved by the use of a suitable hand cleaner. DO NOT use solvents such as turpentine or kerosene. When product is heated to high temperatures, mists or fumes may be given off and may condense, contaminating the clothing or skin of operatives. Prolonged or repeated exposure with this condensate may give rise to dermatitis or other skin conditions. Remove any contaminated clothing and launder before use. Use disposable cloths and discard when soiled. Do not put soiled cloths into pockets.

Handling Practices: Under no circumstances should hot product be allowed to contact water or damp surfaces, as frothing and rapid expansion of the product may occur, sometimes resulting in boil-over from tanks.

Due to the elevated temperature of the product, tanks and pipe-work should be insulated or lagged to minimise the risk of burns from hot surfaces.

Conditions for Safe Storage: Product is stored at temperatures above 100°C. Therefore, avoid contact of hot product with water or damp surfaces, as frothing and rapid expansion of the product may occur, sometimes resulting in boil-over from tanks. For bulk product, particular care should be taken to ensure that bulk storage tanks are watertight and that any steam-heated coils are regularly checked for leaks. The storage temperature should not fluctuate above and below 100°C as this increases the risk of water condensation leading to boil-over. Care must always be exercised when heating product through 100°C.

Overheating of product may cause thermal decomposition, resulting in the generation of flammable vapours, and cross-linking of the polymers, resulting in solidification of the product. Maintain blended product storage temperatures and handling temperatures below 190°C.

Highly toxic hydrogen sulphide gas may be emitted form hot product and accumulate in enclosed spaces or the headspace of product storage tanks. Concentrations of hydrogen sulphide above 10ppm may cause eye irritation. Higher concentrations may be an irritant to the skin and respiratory system. Extremely high concentrations (1000-2000ppm) may be immediately lethal.

Extreme care must therefore be taken during the venting of tanks and enclosed spaces which have at any time contained hot product. Under no circumstances should entry be made into small enclosures without taking full precautions.

Confined spaces contaminated with hydrogen sulphide must always be considered as constituting potentially life-threatening environments. The atmosphere in empty storage tanks must be carefully checked before entering and precautions for confined space entry followed as per AS/NZS 2865.

Carbonaceous deposits can form on inner surfaces of bitumen storage tanks and sometimes, on external surfaces where spillage or overflow occurs. These deposits may provide a source of ignition due to auto-ignition of pyrophors. To reduce this risk, always maintain storage at the lowest practical temperature and maintain stable storage temperatures. Avoid exposure of tank vapour spaces to air flow. Clean tanks at regular intervals.

Store Site Requirements: Storage tanks and depots should at the minimum meet the requirements of the RNZ Code of Practice for Safe Handling of Bituminous Materials Used in Roading 9904 (section 3). For larger bulk storage tanks, an international standard such as API 653 is acceptable reference.

Packaging: Where bitumen is packed in smaller containers such as pails or drum, these must be constructed of steel and be of an approved construction. Aluminium is not a recommended storage material. When cold, bitumen is not a Class 9 product and therefore dangerous goods labelling is not required.

SECTION 8: Exposure Control/Personal Protection

1) Workplace Exposure Guidelines: Bitumen handling operations should take place in a well ventilated area to ensure that ventilation is adequate to maintain air concentrations below exposure standards.

NZ Workplace Exposure Standards (WES):	TWA mg/m^3	STEL mg/m^3
Hydrogen Sulphide	14	21
Asphalt (Bitumen) Fumes	5	Not set

3) Personal Protective Equipment (PPE)

General: When using hot PMB, wear suitable protective clothing and equipment manufactured to an appropriate AS/NZS standard.

Eye/Face Protection: Visor to protect face, and balaclava or head covering with cotton flap to protect neck and throat.

Skin Protection: Overalls impervious to bitumen (100% cotton or 65% cotton/35% polyester mix) covering full body and limbs with legs worn over protective boots.

Respiratory Protection: Respiratory protection is not normally required if airborne concentrations are below the recommended NZ WES. Where the bitumen WES is exceeded, wear an approved respirator that provides adequate protection such as air purifying dust/mist respirators. Where Hydrogen Sulphide WES is exceeded wear a positive pressure air-supplying respirator.

Hand Protection: Gauntlet gloves that are heat resistant and impervious to bitumen.

General Hygiene: Protective clothing should be regularly dry cleaned and laundered. Change heavily contaminated clothing as soon as reasonably practicable and launder before re-use. Wash any contaminated underlying skin with soap and water.

SECTION 9: Physical and Chemical Properties

Physical Appearance:	At normal room temperature these products are black rubbery solids. During use, product is heated to melting point and is a black liquid.	
Melting Point:	50 – 95°C	
Boiling Point:	Not available	
Vapour Pressure:	No data	
Vapour Density:	No data	
Water Solubility:	Insoluble	
pH	Not applicable	
Specific Density:	1.010 – 1.033	
Flashpoint:	No data	
Flammability Limits:	LEL: 0.3%	UEL: 6.0%
Auto-ignition Temperature:	No data	

SECTION 10: Stability and Reactivity

Chemical Stability: Bitumen is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure. Reacts with oxidising agents.

Conditions to Avoid: Overheating of product may cause thermal decomposition, resulting in the production of vapours of a flammable nature. Maintain product storage and handling temperatures below 200°C.

Materials to Avoid: Avoid contact of hot product with water or damp surfaces, as frothing and rapid expansion of the product may occur, sometimes resulting in boil-over from tanks. Avoid contact with strong oxidising materials.

Hazardous Decomposition Products: Combustion products include oxides of carbon. Overheating can cause thermal decomposition, resulting in the generation of flammable vapours, and cross-linking of the polymers, resulting in solidification of the product. Thermal decomposition products will vary with conditions. Incomplete combustion will generate smoke, carbon dioxide and hazardous gases including carbon monoxide, hydrogen sulphide and oxides of sulphur. Overheating in storage may cause partial vaporisation and decomposition with the production of toxic hydrogen sulphide gas (H2S).

Hazardous Polymerization: Hazardous polymerisation has not been reported to occur under normal ambient and anticipated storage and handling conditions of temperature and pressure.

SECTION 11: Toxicological Information

Symptoms from Likely Routes of Exposure:

Eyes: May damage eyes if contact with hot product occurs. May be irritating to eyes if exposed to vapours, mist or fumes.

Skin: Unlikely to cause harm to the skin on brief or occasional contact but may cause dermatitis. Hot product may cause burns to the skin.

Ingestion: Unlikely to be swallowed in view of handling temperatures. Hot product may cause burns to mouth.

Inhalation: At normal ambient temperatures this product will be unlikely to present an inhalation hazard because of it's low volatility.

Sub-chronic and chronic toxicity studies found that no systematic effects have been noticed other than skin and lung irritancy. No acute toxicity studies have been published although extrapolation from data on sub-chronic and chronic studies suggest that the acute toxicity of bitumen is likely to be very low.

There is no conclusive data available on long term exposure to Bitumen fumes. All studies to date have shown no long term effects on humans. Bitumen is classified by IARC as a Class 3 carcinogen – unclassifiable as to carcinogenicity to humans.

SECTION 12: Ecotoxicity Information

Spillages are unlikely to penetrate soil. Bitumen contains hydrocarbon compounds in the molecular weight range from 500 to 15,000. Water solubility will be so low that significant migration of the material into water is improbable. Concentrations acutely toxic to aquatic organisms will not occur and significant bioaccumulation is unlikely because of the light molecular weight of the hydrocarbons. The components of bitumen are not biodegradable to any significant extent and although it may accumulate in soil or water, it will not cause any significant environmental impact.

SECTION 13: Disposal Considerations

Contain spills and sprinkle with sand or absorbent material. Product may then be placed in steel drums, removed and disposed of in accordance with local regulations. Recovered material may be disposed of to approved landfill, or if approved, allowed to remain insitu. Where possible, arrange for product to be recycled.

SECTION 14: Transport Information

UN Number:	3257
UN Proper Shipping Name:	ELEVATED TEMPERATURE LIQUID N.O.S
Class:	9
Subsidiary Risk:	Nil
Packing Group:	III
Hazchem Code:	2W

SECTION 15: Regulatory Information

Regulatory Status:	HSNO Approval Code:	Not yet transferred

SECTION 16: Other Information

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Key/Legend:
ERMA – Environmental Risk Management Authority
IARC – International Agency for Research on Cancer
IBP – Initial boiling Point
HSNO – Hazardous Substances and New Organisms Act
PMB – Polymer Modified Bitumen
RNZ – Roading New Zealand
UN Number – United Nations Number
WES – Workplace Exposure Standards