LEARNER GUIDE

LLN READY

Safely handle bituminous materials

TICKET

Training support material for:

RIICBS203E
Safely handle bituminous materials

Produced by:

EASY GUIDES
Australia Pty Ltd

Contents

Introduction to bituminous materials

Introduction to safely handling bituminous materials

Handling bituminous materials safely is very important to keep workers and the environment safe. People should wear safety gear like gloves, glasses, and bright clothing, and use good ventilation and masks in small spaces to avoid breathing in bad fumes.

Workers need training to store, move, and throw away bituminous materials without making a mess.

Machines should be checked often to prevent accidents. Following these rules helps everyone work with bituminous materials in a safe way.

Prepare to safely handle bituminous materials

Element 1

Question 1. What is the difference between asphalt and bitumen?

Bitumen:

Bitumen is a naturally occurring or refined substance derived from petroleum. It is a thick, black, sticky, and viscous liquid or semi-solid material. Bitumen is the binding agent that holds the aggregates (such as crushed stone, sand, and gravel) together in asphalt pavement. It provides the adhesive and waterproofing properties that make asphalt effective as a road surface material. Bitumen is also used in various other applications, such as roofing, waterproofing, and industrial products.

bitumen

Asphalt:

Asphalt refers to the mixture of aggregates and bitumen that is used in road construction and pavement. It is created by combining the aggregates with bitumen at specific temperatures to form a cohesive material. The asphalt mixture is then laid down in layers, compacted, and cooled to create a solid and smooth road surface. The term "asphalt" is often used to describe the finished product—the paved road or surface.

In summary, bitumen is the sticky, black binder that holds the aggregates together, while asphalt is the composite material created by mixing bitumen and aggregates to create a durable road surface. The terms are related and often used interchangeably in everyday language, but they refer to different aspects of the asphalt pavement construction process.

asphalt

Question 2. What are the four different types of bitumen?

Asphalt:

Asphalt is one of the most well-known bituminous materials and is widely used in road construction and paving. It is a mixture of bitumen and aggregate materials, such as sand, gravel, or crushed stone. Asphalt is known for its durability and ability to withstand heavy traffic.

Bituminous roofing materials:

Bituminous roofing materials, including asphalt shingles, modified bitumen roofing, and built-up roofing, are used to waterproof and protect roofs. They typically consist of layers of bitumen-saturated felt or fabric reinforced with fiberglass or polyester.

Bituminous paints and coatings:

Bituminous paints and coatings are used for corrosion protection and waterproofing applications. These materials are made by blending bitumen with solvents and additives to create a protective layer. They are often applied to steel structures, pipelines, and other surfaces.

Bituminous membranes:

Bituminous membranes are used in various waterproofing applications, including below-grade waterproofing for foundations and basements. They are typically composed of layers of bitumen-modified materials, such as SBS (Styrene-Butadiene-Styrene) or APP (Atactic Polypropylene), and are often applied as sheets or rolls.

Question 10. What kinds of information do you need before starting work?

- Plans – what you need to do
- Specifications – rules and details about the job
- Operational details – how you will do the job
- Quality requirements of the job – the standards you are expected to meet.

Question 11. When planning your job, why do you need to know what other people are doing on site?

- To make sure you will not get in the way of other jobs being done
- To make sure you know what others are doing near where you must work.

Question 12. What are environmental issues when working with bitumen?

Water contamination: Improper handling can contaminate water sources, harming aquatic life and water quality.

Air pollution: Heating and processing release pollutants, impacting air quality and health.

Habitat disruption: Construction can damage ecosystems and wildlife habitats.

Wildlife impact: Spills can harm animals that come into contact with contaminated areas.

Soil contamination: Mishandling can lead to soil pollution, affecting land use and quality.

Greenhouse gas emissions: Bitumen processes contribute to climate-changing emissions.

Waste generation: Bitumen activities produce waste, which if mismanaged, leads to pollution.

Spills and accidents: Accidental spills cause long-lasting harm to soil, water, and wildlife.

water contamination

greenhouse gas emissions

Question 15. What PPE should you use when working with an bitumen?

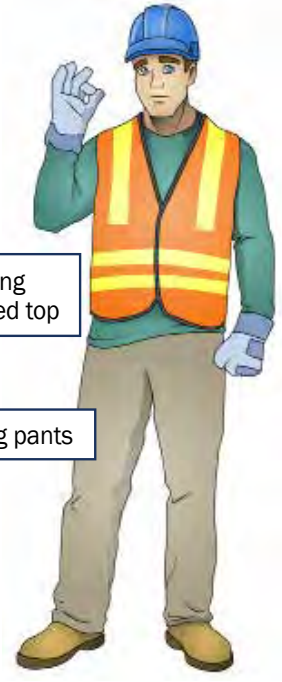
Following are examples of PPE you might need to use when working with bitumen:

Hard hat

Safety gloves

Hi-vis vest

Dust mask



Long sleeved top

Long pants

Ear muffs

Boots that cover the whole foot

Safety glasses/goggles, Sunglasses

Sunscreen

Question 16. When do you wear respiration gear such as a mask?

When the area is dusty or polluted.

Question 17. When do you wear hearing protection?

You must wear hearing protection when there is a danger to your hearing from the work site or the equipment you are operating.

Question 27. What tools might you use when working with bitumen?

Bitumen boiler: Also known as a bitumen melter or tar boiler, this equipment is used to heat and melt bitumen to a liquid state for various applications, such as roofing or road construction.

bitumen boiler

Lance or burner: A propane or gas burner, often attached to a lance, is used to apply heat to the bitumen for melting or repairing purposes.

Spreader or lute: This is a long-handled tool with a flat blade used to spread and level bitumen on surfaces like roads or roofs.

spreader or lute

Rollers: Rollers, such as vibratory or static rollers, are used to compact and flatten bituminous materials like asphalt. They ensure a smooth and durable surface.

Trowel: Trowels, which come in various sizes and shapes, are used for applying and shaping bitumen on small surfaces, such as when patching holes or cracks.

trowel

Brushes and brooms: These are used for applying bitumen coatings or sealants on surfaces, such as roofs or driveways. Brushes are often used for detail work, while brooms are used for larger areas.

Continued next page...

Continued from previous page

Squeegees: Squeegees are used to spread and distribute bitumen coatings evenly on surfaces. They are commonly used in waterproofing applications.

Sprayers: Bitumen sprayers are used to apply bitumen emulsions or asphalt in spray form, typically in road construction or maintenance.

Safety gear: When working with bitumen, it's essential to wear appropriate safety gear, including gloves, eye protection, respiratory protection, and protective clothing to safeguard against burns and fumes.

Pneumatic tools: Depending on the specific job, pneumatic tools like jackhammers may be used to remove existing bituminous materials.

Measuring and mixing equipment: For some applications, precise measurement and mixing of bitumen with other materials or additives are necessary. This may involve using calibrated containers, thermometers, and mixing equipment.

Transportation equipment: Trucks and other vehicles are used to transport bitumen from storage tanks to the job site.

Testing equipment: Various testing equipment, such as asphalt density gauges or thickness gauges, may be used to ensure that bituminous materials meet specifications and quality standards.

squeegee

bitumen sprayer

Question 28. What faults on tools and equipment should you check for?

Damage or wear: Check for cracks, bends, or excessive wear on tools that could affect their performance or structural integrity.

Proper functioning: Ensure that tools operate smoothly, have secure fastenings, and functional mechanisms.

Blade or edge condition: Examine cutting or spreading tools for sharpness and intact blades or edges.

Handle integrity: Inspect handles or grips for stability, firm attachment, and freedom from cracks or breaks.

Cleanliness: Remove built-up asphalt or debris from tools to maintain performance and prevent contamination.

Lubrication: Apply appropriate lubrication to tools with moving parts to ensure smooth operation and prevent rust or corrosion.

Calibration (for measuring tools): Verify the calibration of measuring tools for accurate readings and precise asphalt placement.

Safety features: Check the integrity and functionality of safety features such as guards or safety locks to prevent accidents or injuries.

tag out damaged tools

clean bitumen from tools

Work safely with bituminous materials

Element 2

Continued from previous page

Polymer modifiers:

Polymer modifiers, like styrene-butadiene-styrene (SBS) or styrene-butadiene rubber (SBR), are added to enhance the properties of asphalt mixes, including elasticity and resistance to cracking.

Antistripping agents:

Antistripping agents are used to improve the adhesion between the bitumen and aggregates, preventing stripping (loss of adhesion).

Rejuvenators:

Rejuvenators are used to restore the properties of aged asphalt surfaces. They help extend the life of the pavement.

Pigments:

Colored pigments can be added to bituminous materials to create colored asphalt for decorative or safety purposes, such as red or green bike lanes.

Emulsifiers:

Emulsifiers are used to create bitumen emulsions, which are used in chip seal and micro-surfacing applications.

Antistripping agent has been added to prevent stripping.

Rejuvenators can be used to extend the life of old pavement.

Continued next page...

Continued from previous page

Fibres:

Fibres, such as cellulose, polyester, or glass, can be added to asphalt mixes to improve crack resistance and reduce maintenance needs.

Adhesion promoters:

Adhesion promoters are used to enhance the bond between the old and new asphalt layers during resurfacing or overlay projects.

Warm mix asphalt (WMA) additives:

WMA additives reduce the production and laying temperature of asphalt mixes, which can lead to energy savings and reduced emissions.

The specific combination of bituminous materials and additives will depend on the project's requirements, including climate conditions, traffic volume, and the desired performance characteristics of the road surface. Engineers and asphalt mix designers carefully select the materials and additives to meet the project's specifications and ensure the longevity and safety of the road surface.

Warm mix asphalt additives can save energy.

Adhesion promoters help the bond between layers..

Question 33. What would be an example of a work plan for working with bituminous materials?

Bituminous Material Work Plan - Road Construction

Objective:

Scope: To construct a bituminous road in [Location].

Goal: Ensure a durable and safe road surface.

Safety Measures:

All personnel must wear appropriate PPE.

Regular safety briefings and hazard assessments.

Emergency response procedures in place.

Wear PPE.

Materials and Equipment:

Bitumen (Type [specify]).

Aggregates (Type [specify]).

Asphalt paver, roller, and compaction equipment.

Necessary hand tools and safety equipment.

Timeline:

Phase 1 (Preparation): [Start Date] - [End Date]

Phase 2 (Asphalt Application): [Start Date] - [End Date]

Phase 3 (Curing and Inspection): [Start Date] - [End Date]

Continued next page...

Demonstrate first aid for bitumen burns

Element 3

Question 35. What first aid should be done if someone gets a bitumen burn?

A bitumen burn, also known as an asphalt burn, can be a painful and potentially serious injury that occurs when hot bitumen (a thick, black, and sticky substance commonly used in road construction) comes into contact with the skin. Here are the steps to take for first aid if someone sustains a bitumen burn:

First aid is needed if someone gets a bitumen burn.

Remove the heat Source:

The first and most crucial step is to immediately remove the source of heat or bitumen from the affected area. This might involve gently brushing off any bitumen that is still in contact with the skin, taking care not to cause further damage or spread the hot material.

Cool the burn:

Use cool (not cold) running water to cool the affected area for at least 10-20 minutes. Do not use ice or very cold water, as it can further damage the skin. Cooling the burn helps to reduce pain and limit the depth of the injury.

Use cool running water on the burn for 10 to 20 minutes..

Protect the area:

Cover the burn with a clean, non-stick dressing or a sterile, lint-free cloth to prevent infection. Do not use adhesive bandages or anything that might stick to the burn.

Continued next page...

Continued from previous page

Seek medical attention:

Bitumen burns can vary in severity, and even minor burns may require medical evaluation. You should seek medical attention if the burn covers a large area, appears deep, or is causing significant pain. A healthcare professional can assess the burn and determine the appropriate treatment.

You may need medical attention.

Pain management:

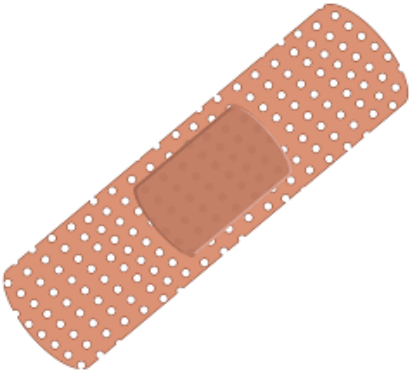
Over-the-counter pain relievers like ibuprofen or acetaminophen can be used to help manage pain. Always follow the recommended dosages on the packaging.

Do Not:

Do not attempt to pop any blisters that may form on the burn.

Do not use adhesive bandages, ointments, or creams directly on the burn.

Do not use adhesive tape to secure the dressing, as it may damage the burned skin.

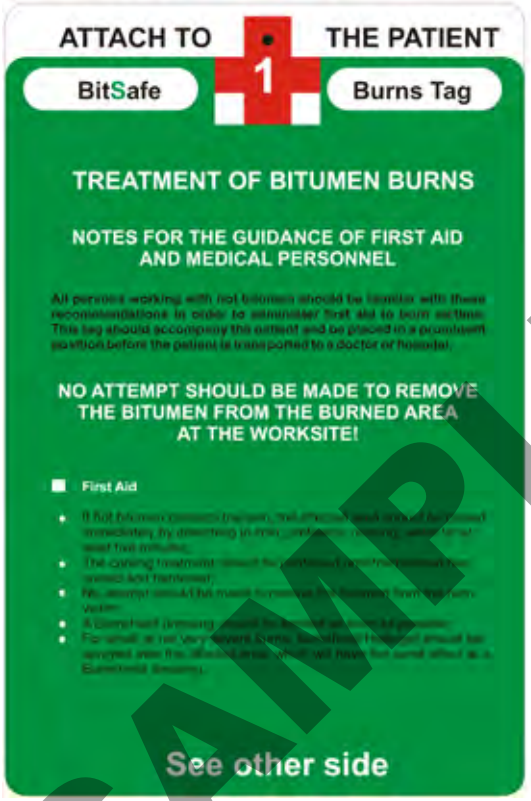


Do not use adhesive bandages, ointments, or creams directly on the burn.

It's important to remember that bitumen burns can be severe, and their treatment may require specialized care, especially if the burn is extensive or covers a sensitive area of the body. In some cases, surgical intervention or skin grafts may be necessary. For these reasons, seeking prompt medical attention is essential.

Question 36. What is a 'Bitumen Burn Tag'?

A 'Bitument Burn Tag' should be kept with the patient in a position where it can be seen. It tells what first aid to give.



Clean up

Element 4

Question 38. What maintenance do you need to do when you have finished working with bitumen?

Personal protective Equipment (PPE):

Inspect and clean personal protective equipment, such as gloves, safety glasses, and protective clothing.

Replace or repair damaged PPE to ensure it's in good working condition for future use.

Clean and / or maintain PPE.

Storage:

Properly store any remaining bitumen products, ensuring that containers are tightly sealed and stored in a cool, dry place to prevent contamination and maintain their integrity.

Store bitumen materials away from open flames, heat sources, and direct sunlight to prevent spontaneous combustion.

Inspection:

Regularly inspect tools and equipment used for bitumen work to identify and address any issues promptly. This includes checking for wear, leaks, or damage that could compromise safety or performance.

Clean up any bitumen spills.

Spill cleanup:

If there were any bitumen spills during the work, make sure that the affected area is properly cleaned and remediated. Use absorbent materials to clean up the spills and dispose of the contaminated materials according to local regulations.