Bitumen is essentially a non-volatile bonding agent and waterproofing material derived from the process of fractional distillation of crude oil. The manufacturing process involves separating lighter, more volatile fractions from the heavy crude oil. The resulting end-product (bitumen) is a highly viscous, thick thermo-plastic residue which is practically solid at ambient temperatures.

Bitumen use in road construction is inert and presents NO KNOWN health or environmental hazard.

The Department of Environmental Affairs define Dangerous Goods as:
"……goods containing any of the substances as contemplated in South African National Standard No. 10234, supplement 2008 1.00: designated "List of classification and labelling of chemicals in accordance with the Globally Harmonized Systems (GHS)" published by Standards South Africa, and where the presence of such goods, regardless of quantity, in a blend or mixture, causes such blend or mixture to have one or more of the characteristics listed in the Hazard Statements in section 4.2.3, namely physical hazards, health hazards or environmental hazards;".

Standard Penetration (or road grade) bitumens are not listed as dangerous goods in this SANS standard.

Hazards of working with bitumen

Due to its thermo-plastic and viscous characteristics, Bitumen is normally manufactured, stored, transported and handled at elevated temperatures. Hence the most significant physical hazard to workers exposed to hot bitumen is the potential of burns to exposed skin.

Bitumen is typically applied in a hot condition. Hot bitumen emits vapours and fumes which can cause respiratory tract or eye irritation. Apart from this temporary irritation, under normal conditions there is no evidence that working with bitumen is hazardous to worker health. The risk of exposure to this hazard - and, therefore, the potential health impact on workers - is minimised through good working practices such as temperature control and using appropriate Personal Protective Equipment.

The difference between bitumen and coal tar

Bitumen is distilled from crude oil and is very different from coal tar. Coal tar is the result of processing coal at very high temperatures. This is known as pyrolysis.

Although similar in appearance, the chemical composition of coal tar is unlike that of bitumen. In addition the type of hazard that coal tar presents to the user is very different from bitumen. The user must note that coal tar is classified as carcinogenic, whereas bitumen is not.

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IARC Classification

IARC, the International Agency for Research on Cancer brings together international panels of scientists in Lyon, France and has reviewed more than 900 chemicals and other agents since its founding in 1971.

IARC categorizes substances and exposures into five groups:

- *Group 1:* carcinogenic to humans (includes alcoholic beverages, solar radiation, and wood dust).
- *Group 2A:* probably carcinogenic to humans (includes high-temperature frying, household wood fires, and hairdressing/barber occupational exposures).
- *Group 2B:* possibly carcinogenic to humans (includes coffee cell phones and **bitumen fumes**).
- *Group 3:* not classifiable as to carcinogenicity in humans (includes tea).
- *Group 4:* probably not carcinogenic to humans. (Only one substance, caprolactam, has been placed by IARC in Group 4.)

Exposure to bitumen and asphalt vapours / fumes are in the same category as the use of cell phones and consumption and coffee.

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