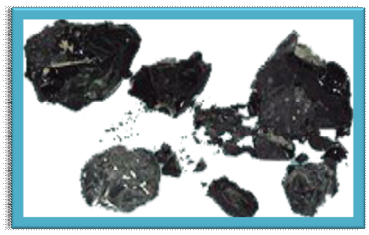
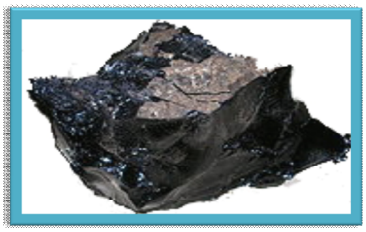
Bitumen





❖Glossary

Additive:

Any substance that is added in small proportions to bitumen to impart some particular property e.g. improved adhesion, emulsification etc.

Adhesion agent:

An additive that forms a water-resistant chemical bridge between binder and aggregate surface, and hence improves adhesion.

Anti-foam agent:

A substance, e.g. silicone oil, which when added to a bitumen will reduce the surface tension and hence the frothing tendency of hot bitumen in the presence of water.

Asphalt:

A mixture of mineral aggregate and a bituminous binder. A natural mixture in which bitumen is associated with a substantial proportion of inert mineral matter e.g. Trinidad Lake Asphalt.

Note: In the US 'Asphalt' is used as the term for the bitumen itself.

Asphaltenes:

The high molecular weight hydrocarbon fraction precipitated from bitumen by a designated paraffinic solvent.

Auto-ignition temperature:

The temperature above which a substance, when exposed to air, might ignite in the absence of a source of ignition as a result of contact with a hot surface or by self-heating alone.

Auto-ignition temperature is not an intrinsic property of the substance. It depends upon the surrounding physical circumstances including the size and shape of the substance and the degree of ventilation around it. Therefore, the auto-ignition temperature for any substance can only be indicated approximately.

Bituminous Binder:

A modified bitumen, or mixture of bitumen with fluxes, etc used for road sealing or the manufacture of asphalt mixes.

Bitumen:

A virtually in volatile, adhesive and waterproofing material obtained by refinery processes from crude petroleum, or present in natural asphalt deposits in some parts of the world. It is black or brown in color and completely or nearly completely soluble in toluene. It is very viscous or near solid at ambient temperatures and softens gradually when heated.

Bitumen emulsion:

A dispersion of bitumen in water achieved by the use of suitable chemical emulsifying agents. The emulsified bitumen droplets may be anionic (negative charge), cationic (positive charge) or non-ionic (neutral).

❖**Blown bitumen (Oxidized bitumen):**

Bitumen used in a wide variety of 'industrial' applications including roofing, flooring, pipe-coating etc. They are produced by passing air through soft bitumen/flux mixtures under controlled temperature conditions. British Standard grades (BS 3690) are normally designated by two numbers representing the mid-points of their softening point and penetration ranges.

❖**Boil-over (Froth-over):**

The rapid increase in volume caused by the presence of water in hot bitumen and the subsequent overflow from a tank.

❖**Cutback bitumen:**

Bitumen whose viscosity has been reduced by the addition of a relatively volatile flux such as kerosene, to render it more fluid for ease of application.

❖**Emulsifier:**

A chemical additive that is used to stabilize a suspension of bitumen in water in emulsion manufacture. The emulsifier determines the charge of the emulsion and controls the stability.

❖**Flash point:**

The lowest temperature at which the application of a small flame in a prescribed manner causes the vapor above a flammable product to ignite when the product is heated under prescribed conditions. The flash point may be measured according to IP Method 34/88 or equivalent in a Closed Cup or by IP 36/84 in an Open Cup.

❖**Paving grade bitumen:**

Bitumen used to coat mineral aggregate in the construction and maintenance of paved surfaces.

They are usually produced by vacuum distillation of petroleum, followed in some cases by oxidation/blending process. British Standard Grades (BS EN 12591) are normally designated by the range of the penetration values.

❖**Penetration value:**

A measure of the consistency of bitumen, determined as the depth to which a standard needle penetrates the sample under the conditions prescribed by BS EN 1426 or equivalent.

❖**Penetration Index (PI):**

A measure of the way the binder's consistency (penetration value) changes with temperature. It may be calculated from the penetration at two different temperatures or from the penetration at one temperature and the softening point.

❖**Polycyclic Aromatic Hydrocarbons (PAH):**

Also synonymously known as 'Polycyclic Aromatics (PCA)' or 'Polynuclear Aromatics (PNA)'. High boiling members of the family of ring type aromatic hydrocarbons present in the low percentage range in bitumen, some of which, with four to six fused rings and present in minute traces in bitumen.

❖**Polymer Modified Bitumen (PMB):**

Bituminous binders containing selected polymers to produce enhanced performance characteristics. They can be used in the same variety of applications as unmodified bitumen.

❖**Archeology:**

Physical study of the deformation of materials linked to viscosity, elasticity, plasticity and flow.

❖**Slurry Seal:**

A mixture of bitumen emulsion, well-graded fine aggregate, mineral filler or other additives, and water. Slurry seals are used as surface treatments in road maintenance.

❖**Softening point:**

The temperature in degrees C at which a bitumen attains a particular degree of softness with reference to test conditions prescribed by BS EN 1427 or equivalent.

❖**Soft Paving grade bitumen:**

Paving bitumen used in the manufacture of soft asphalt.

❖**Viscosity:**

A measure of the resistance of a fluid to flow. Various scales of measurement are used. The Standard Tar Viscometer (STV) is used in the IP Method 72/86 to characterize cutback bitumen in 'seconds'. Kinematic viscosity is a derived characteristic that can be used to represent the fluid in technical calculations.

❖ **Pyrophoric deposit:**

A deposit, normally formed in an oxygen depleted environment, which can produce self-heating when its temperature or the surrounding oxygen concentration is increased.

❖Bitumen Analysis

SPECIFICATION	60/70	85/100	40/50	30/40	100/120	Test Method
SPECIFIC GRAVITY @25/25	1.01/1.06	1.01/1.05	1.01/1.06	1.01/1.06	1.01/1.04	D-70
PENETRATION @ 25	60.70	85.100	40.50	30.40	100.120	D-3
SOFTENING POINT	49/59	45/52	52/60	55/63	49/42	D-36
DUPLICITY @25	100 min	100 min	100 min	100 min	100 min	D-13
LOSS ON HEATING (WT)%	0.2 max	0.5 max	0.2 max	0.2 max	0.2 max	D-6
DROP IN PENETRATION AFTER HEATING %	20 max	20 max	20 max	20 max	20 max	D-5 , D-6
FLASH POINT C	250 min	250 min	250 min	250 min	250 min	D.92
SOLUBILITY IN CS2(WT)%	99.5 min	99.5 min	99.5 min	99.5 min	99.5 min	D-4
ORGANIC MATTER INSOLURLE IN S2(WT)%	--------	0.2 max	--------	-------	0.2 max	D-4
SPORT TEST	Negative	Negative	Negative	Negative	Negative	A.A.S.H.O.T 102