

BITUMENS AND BITUMEN EMISSIONS, AND SOME N- AND S-HETEROCYCLIC POLYCYCLIC AROMATIC HYDROCARBONS

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GLOSSARY

Air blowing: Process by which compressed air is blown into a bitumen feedstock typically at 230–260 °C. This process results in complex reactions that raise the softening-point and viscosity of the bitumen. See **oxidized bitumens**.

Air-blown asphalts: See **oxidized bitumens**.

Air-rectified bitumen or **Air-refined bitumen** (synonym for **semi-blown bitumen**): A bitumen that has been subjected to mild oxidation with the goal of producing a bitumen that meets paving-grade bitumen specifications, typically having a penetration index of ≤ 2.0

Asphalt: A mixture of bitumen and mineral materials used as a paving material that is typically produced at temperatures in the range of 140–160 °C.

Asphalt binder: A term used in the USA and some other countries for **bitumen**.

Asphalt cement: A term used in the USA and some other countries for **bitumen**.

Asphalt cold mixes: Asphalt mixtures made using cutback bitumens or bitumen emulsions that can be applied at ambient temperature.

Asphalt paving mixtures: Mixtures of graded mineral aggregates (sized stone fractions, sands and fillers) with a controlled amount of **straight-run** or **paving bitumen**.

Bitumen, petroleum-derived: A dark brown to black cement-like residuum obtained from the distillation of suitable crude oils. The distillation processes may involve one or more of the following atmospheric distillation, vacuum distillation, steam distillation. Further processing of distillation residuum may be blended to yield a material, the physical properties of which are suitable for commercial applications. These additional processes can involve air oxidation, solvent stripping or blending of residua of different stiffness characteristics.

Bitumen emissions: The complex mixture of aerosols, vapours and gases from heated bitumen and products containing bitumen; although the term “bitumen fume” is often used in reference to total emissions, technically bitumen fume refers only to the aerosolized fraction of total emissions (i.e. solid particulate matter, condensed vapour and liquid bitumen droplets).

Bitumen-emission condensate: The condensate of emissions from heated bitumen; the chemical composition may vary with the temperature and the type of bitumen.

Bitumen emulsion [Class 4]: Mixtures of two normally immiscible components (bitumen and water) and an emulsifying agent (usually a surfactant); bitumen emulsions are used in paving, roofing and waterproofing operations. These materials are also called **asphalt emulsion** (North America).

Bitumen extract: The fraction of bitumen that is soluble in organic solvents such as benzene, toluene, carbon disulfide or dimethyl sulfoxide.

Bitumen fume: Refers to the aerosolized fraction of total emissions (i.e. solid particulate matter, condensed vapour and liquid bitumen droplets); term wrongly used to define **bitumen emissions**.

Bitumen vapour: Refers to vapours and gases from heated bitumen.

Built-up roofing asphalt (BURA): In North America, **oxidized bitumen** used in the construction of low slope built-up roofing systems; specification defined by ASTM D312. The **oxidized bitumen** typically has a penetration index of ≥ 2.0 .

Coal tar: A dark brown to black, highly aromatic material manufactured during the high-temperature carbonization of bituminous coals, which differs from bitumen substantially in composition and physical characteristics. It was previously used in the roofing and paving industries as an alternative to bitumen.

Coal-tar pitch: A black or dark brown cementitious solid that is obtained as a residue in the partial evaporation or fractional distillation of **coal tar**. Coal-tar pitch has been used in the past in roofing as an alternative to bitumen.

Cutback bitumens [Class 3]: Bitumens, the viscosity of which has been reduced by the addition of a **cutback solvent** derived from petroleum.

Cracking-residue bitumen: See **thermally cracked bitumens**.

Hard bitumens: Bitumens produced using extended vacuum distillation with some air rectification from propane-precipitated bitumen. Hard bitumens have low penetration values and high softening-points.

Macadam: A type of **asphalt** mix with a high stone content and containing 3–5% bitumen by weight.

Mastic asphalt: A type of **asphalt** made using a very fine mineral aggregate with a **hard bitumen**. These materials can be poured and levelled by hand. The application temperatures are typically between 200 and 250 °C.

Modified bitumens [Class 5]: Products or specialized applications made by incorporating polymers, elastomers or other products into **straight-run** or **oxidized bitumens**.

Natural asphalt: Naturally occurring mixture of bitumens and mineral matter formed by oil seepages in the earth's crust.

Oxidized bitumens [Class 2]: Bitumens produced by reaction with air under temperature-controlled conditions, typically 260 °C. Also referred to as **air-blown asphalts** or **roofing asphalts** in the USA.

Penetration index or grade: A measure of change in penetration with temperature.

Propane-precipitated asphalt. See **solvent precipitation**.

Road oils: A term sometimes used to describe very soft vacuum residue or other low-viscosity bitumen products that are generally used to produce paving products for use on very low-volume roads in moderate to cold climates.

Roofing asphalts: See **oxidized bitumens**.

Roofing felt: A sheet material saturated and coated with bitumen, generally supplied in rolls and used for waterproofing roofs.

Solvent precipitation: Process by which **propane-precipitated asphalt** [bitumen] is separated from a vacuum residue by solvent precipitation, usually with propane. In the USA, the term used is “solvent deasphalting”.

Solvent-refined asphalt: Term used in the USA to define **propane-precipitated asphalt**.

Stone-mastic asphalt: A high stone-content paving mixture used in some countries.

Steam-refined bitumens: Vacuum residues that have been subjected to injection of steam to aid vacuum distillation. See **straight-run bitumens**.

Straight-run bitumens or **paving bitumens** [Class 1]: These are usually produced from the residue from atmospheric distillation of petroleum crude oil by applying further distillation under vacuum, solvent precipitation or a combination of these processes. Also called “steam-refined bitumens” or “straight-reduced bitumens”.

Thermally cracked bitumens or **thermal bitumens** [Class 6]: Bitumens produced by thermal cracking at high temperatures, typically 440–500 °C.

Warm-mix asphalt: A type of hot-mixed asphalt, which is produced at lower than normal temperatures. Typically warm-mixed asphalts are produced at temperatures between 100 and 130 °C.

