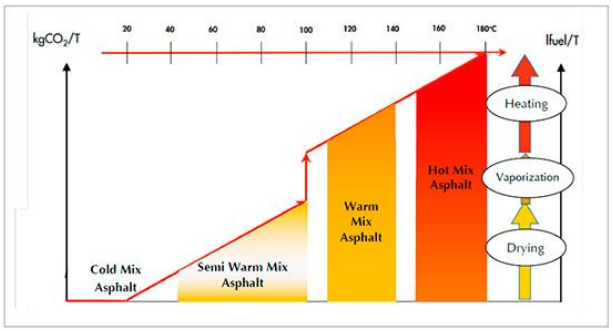
Hindustan Petroleum Corporation Limited
Green R&D Centre, Bengaluru

HP-WMA (Warm Mix additive)

Asphalt mixtures are the most widely used material in the construction of pavements for roads. The regular Hot Mix Asphalt (HMA) require high manufacturing temperature (around 160 ◦C), which is associated with the release of a large volume of greenhouse gases. Thus, in order to limit these problems, bituminous mixtures with lower manufacturing temperature are required without impacting their mechanical behavior. One possible alternative is the use of Warm Mix Asphalt (WMA), which is manufactured at 20–40◦C lower than the conventional Hot Mix Asphalt (HMA). WMA process leads to (i) lower emissions, fumes and odors and (ii) reduction of ageing of the bitumen. There are two types of additives associated with WMA production, namely, chemical additives and foaming additives (water-containing).

The chemical additives are either wax based (decrease the viscosity at lower temperature) or surfactants (act at the microscopic aggregate/binder interface to reduce internal friction during manufacturing). The foam additives are water based technologies.



We have developed two new families of dual functional (wax and surfactant) WMA additives from alkyl ester of oxalic acid and diamide of triglyceride oil. Reduction of viscosity at temperature close to compaction/mixing was achieved with 1-2 % w/w dosage of in-house developed warm mix additives with bitumen. During the field trials, 25 ºC reduction of compaction/mixing temperature was observed at a dosage of 2 %.

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