

HP VisABit

Viscosity Improving Additive for Bitumen

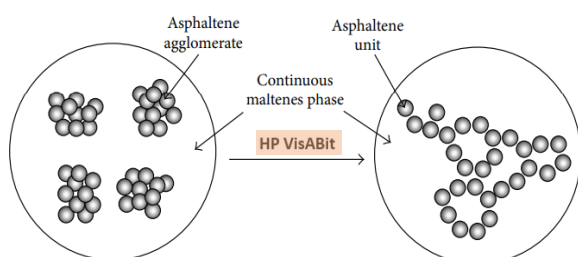
Background

Bitumen with higher viscosity grade is particularly required for heavy load pavements. Production of high viscosity bitumen, similar to VG 40 and VG 40 Super bitumen is difficult to produce consistently from refinery units. Thus, viscosity improving additives are used to produce higher viscosity grade bitumen. Polyphosphoric acid (PPA) is widely used commercial additive for this purpose. PPA is classified as a chemical modifier as it reacts with some of the components of bitumen and it is typically used in the range of 0.5 - 2 wt%, based on feed bitumen properties. HINCOL is currently producing VG 40/Super by upgrading VG 30 using PPA as additive.

Development of HP VisABit

HPGRDC has developed novel viscosity improving additives to upgrade short residues/VG10 to VG 30 bitumen and VG 30 to VG 40 / VG 40 Super.

Reactivity of VisABit increases with the polarity of the asphaltene fraction as it enhances dissociation of the additive and triggers chemical modification reactions in aromatics and resins to increase the asphaltene content and thereby increases the viscosity. It also disrupts the hydrogen bond network within the Asphaltene agglomerates and improves the distribution of asphaltenes in the maltene phase and shifting the bitumen towards a more elastic gel-type



HP VisABit has lower viscosity (Table-1) and lesser corrosive compared to commercial additive, which improves the ease of handling.

Additive	Physical state	pH	Specific gravity (g/cm ³ at 20 °C)	Viscosity (mPa.s at 25 °C)
Commercial additive	Highly Viscous Liquid	<1	2.05	6000-6500
HP VisABit	Viscous Liquid	<1	1.84	1400-1700

Table-1: Comparison of Physical properties

HP VisABit has shown superior performance in upgrading VG 10/Short residue to VG 30 and VG 30 to VG 40, compared to commercial additive at lower dosage.

S. No	Feed	Additive dosage (%)	Product VG compliance
1	VG-30	Commercial additive (0.5%)	VG 40
2	VG-30	HP VisABit (0.35%)	VG 40
3	Short residue	Commercial additive (1%)	VG 30
4	Short residue	HP VisABit (0.6%)	VG 30

Table-2: Comparison of performance

Field trials

Field trials were conducted at HINCOL-Vashi plant on a 60 MT batch with an additive dosage of 0.8 wt% for upgrading VG 30 to VG 40 Super. HP VisABit demonstrated superior performance by significantly reducing batch production time from 3 hr to 1 hr, outperforming the commercial additive. Additionally, the lower viscosity of HP VisABit contributed to improved ease of handling, making it a more convenient option.