

Questions and Answers 3

VISCOSITY OF BITUMEN

Q1 Define viscosity

The viscosity of a fluid is the property that retards flow. In other words, viscosity describes a fluid's internal resistance to flow (e.g. water has lower viscosity than honey). (Google search for the Units of viscosity)

Q2 What do we mean by saying that bitumen is viscoelastic material?

We mean that the behaviour of bitumen depends on both the temperature, rate of loading, and duration of load application.

Q3 What do we mean when saying "bitumen is thermoplastic material"?

Bitumen softens (become softer or less viscous) when temperature rises. Bitumen hardens (become hard or more viscous) when temperature falls.

This is also referred to as temperature susceptibility.

Q4 Briefly describe the behaviour of bitumen at high temperatures and at low temperatures.

High temperature: the weather in the Kingdom of Saudi Arabia (desert climate).

In hot weather, bitumen acts like viscous liquid and shows clear forms of plasticity.

Possible related distress: asphalt mixtures flow under repeated wheel load causes rut distress (Google search for Rut distress in roads).

Low temperature: the weather in winter (Northern part of Canada). In cold weather, bitumen behaves like an elastic solid.

Possible related distress: Bitumen become too brittle and crack as a result of loading. (!!Watch for such cracking on the road surface when you drive back home!!)

Do you see some? You may take photos and attach it to your lab. report!!)

Exercise: Name the tests used to measure viscosity (only name the tests you performed in the laboratory)