

Asphalt Emulsions

What are they

How do I use them

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Asphalt Emulsions

- Topics
 - What are asphalt emulsions
 - What are their uses
 - What do I test and what does it mean



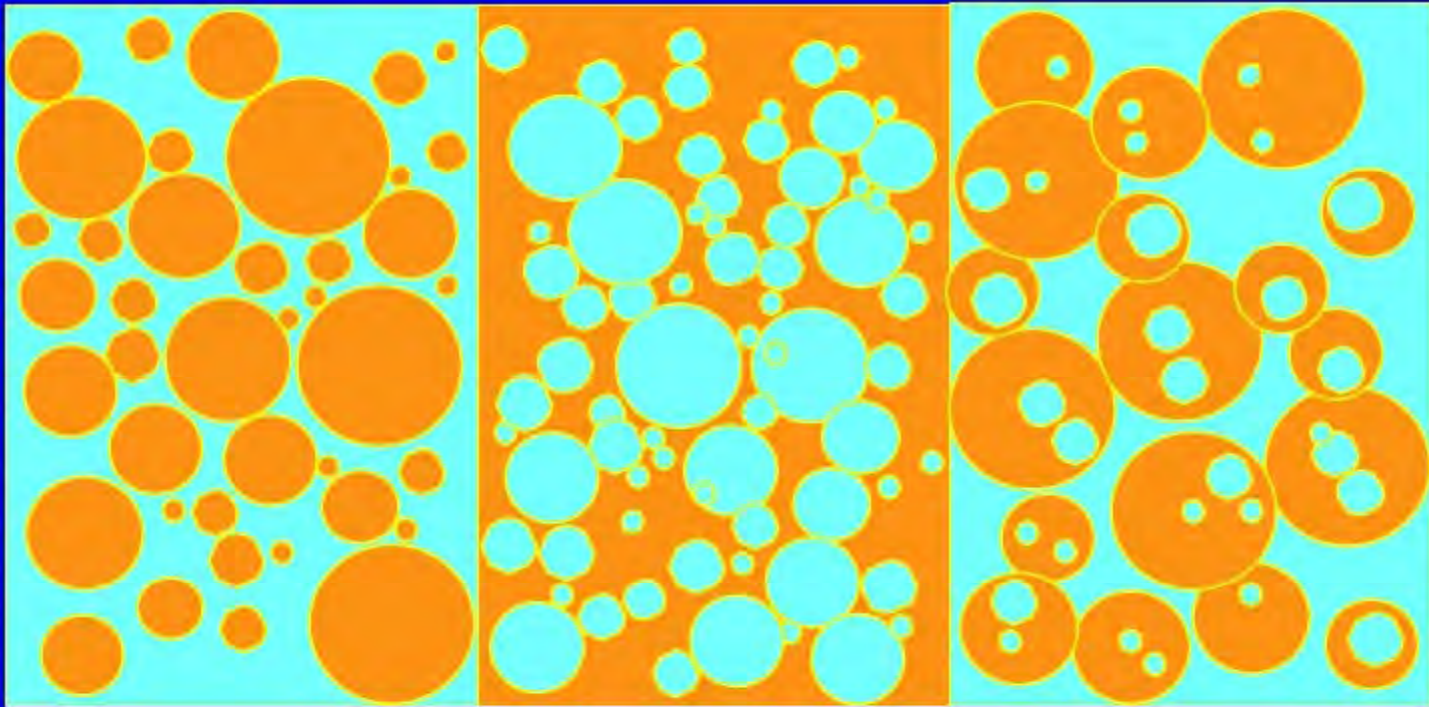
What is an asphalt emulsion

- A homogeneous mixture of two **insoluble** substances
Particles of one substances (dispersed phase -**asphalt**) are surrounded by molecules of the other substance (continuous phase- **water**)

Examples

milk , butter, mayonnaise, ice cream
asphalt emulsions

Emulsion Types



Oil -in-water
emulsion

Water-in oil
(inverted emulsion)

Multiple emulsion



Why Emulsify Asphalt

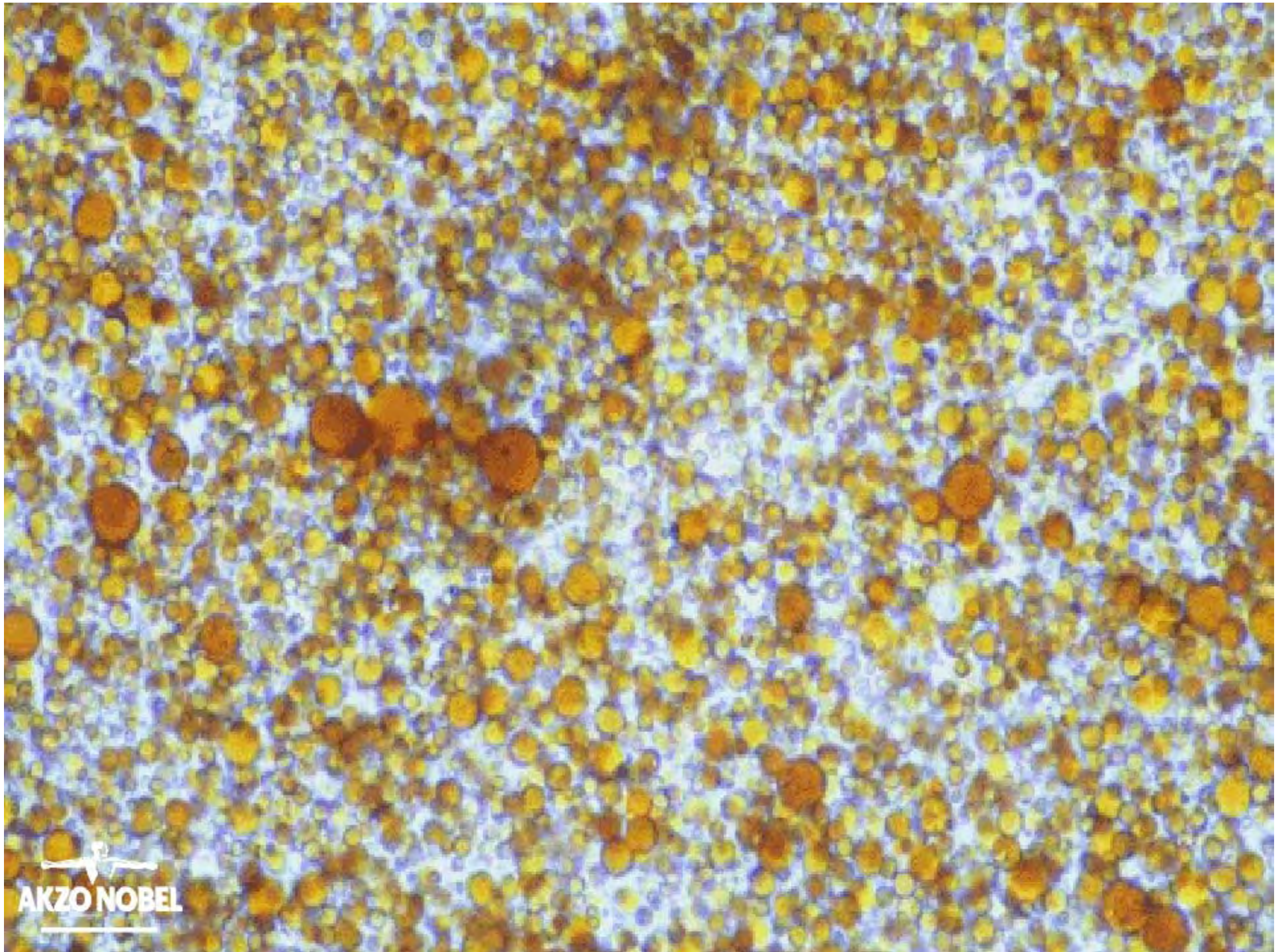
- Viscosity reduction and safer use at lower temperatures
- Change from “oil based” to “water based” system
- Reduced energy use, worker exposure and job site odor
- Properly formulated emulsion systems provide long term performance benefits



How do we make emulsions

- Molten asphalt and soap solution feed into a colloid mill
- Colloid mill grinds the asphalt droplet down in size
- The soap solution then stabilizes the asphalt drops not allowing them to coagulate back together
- The choice of chemistry package then determine the type of emulsion






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Types of Emulsions

- Cationic- positively charge asphalt droplets
- Anionic-negatively charged asphalt droplets
- Nonionic- neutrally charge asphalt droplets



Grades for Asphalt Emulsions

- Rapid setting – CRS, RS, HFRS-spray grades for chip seal
- Medium setting – CMS, MS, HFMS-mixing grades for cold mixes- chip seals with dirtier chip- scrub seals
- Slow setting- CSS, SS- very stable mixing grade
- Quick setting- CQS, QS- more for slurry and micro mixes to mix and break chemically



What do I test

What does it means

- Emulsion properties
 - Viscosity at 50°C or 25°C
 - Storage stability 1 day
 - Demulsibility (rapid sets) or cement mix test (slow sets)
 - Sieve test
 - Residue %
 - Oil content %



What do I test

What does it means

- Tests on Residue
 - Penetration
 - Ductility
 - Solubility
 - Elastic Recovery
 - Torsional Recovery
 - Viscosity on residue
 - Softening Point
 - DSR

Sampling of Emulsion



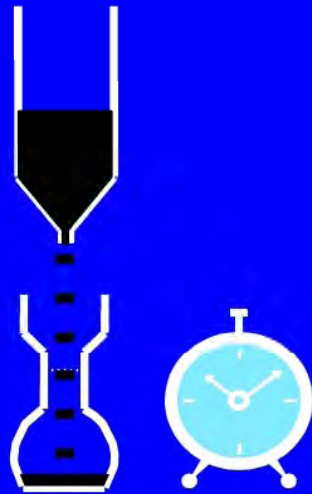
Proper sampling containers



Viscosity of Emulsions

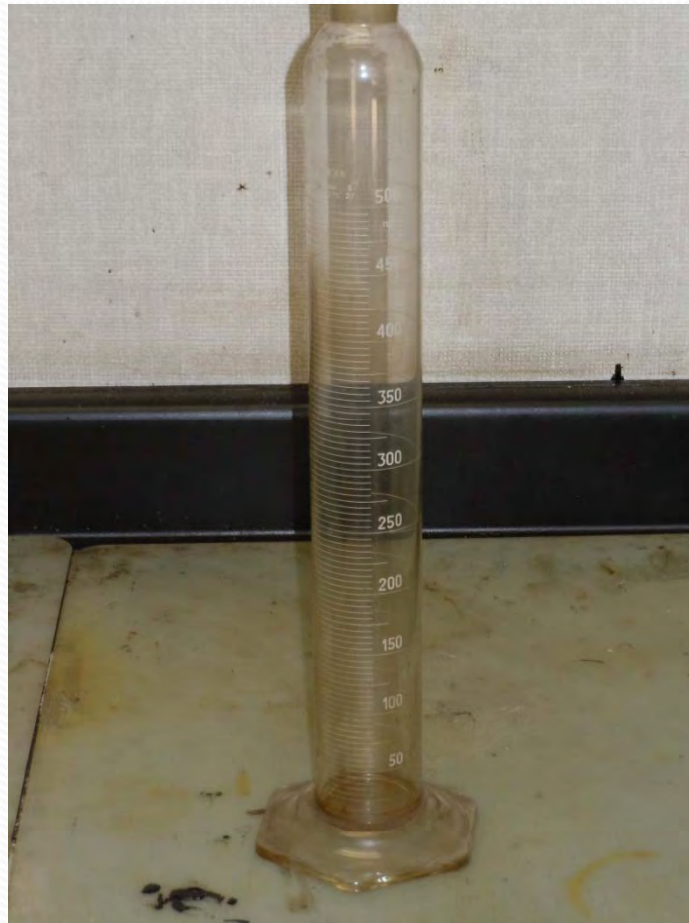


Viscosity of Emulsions



60 ml flow
Timed in seconds

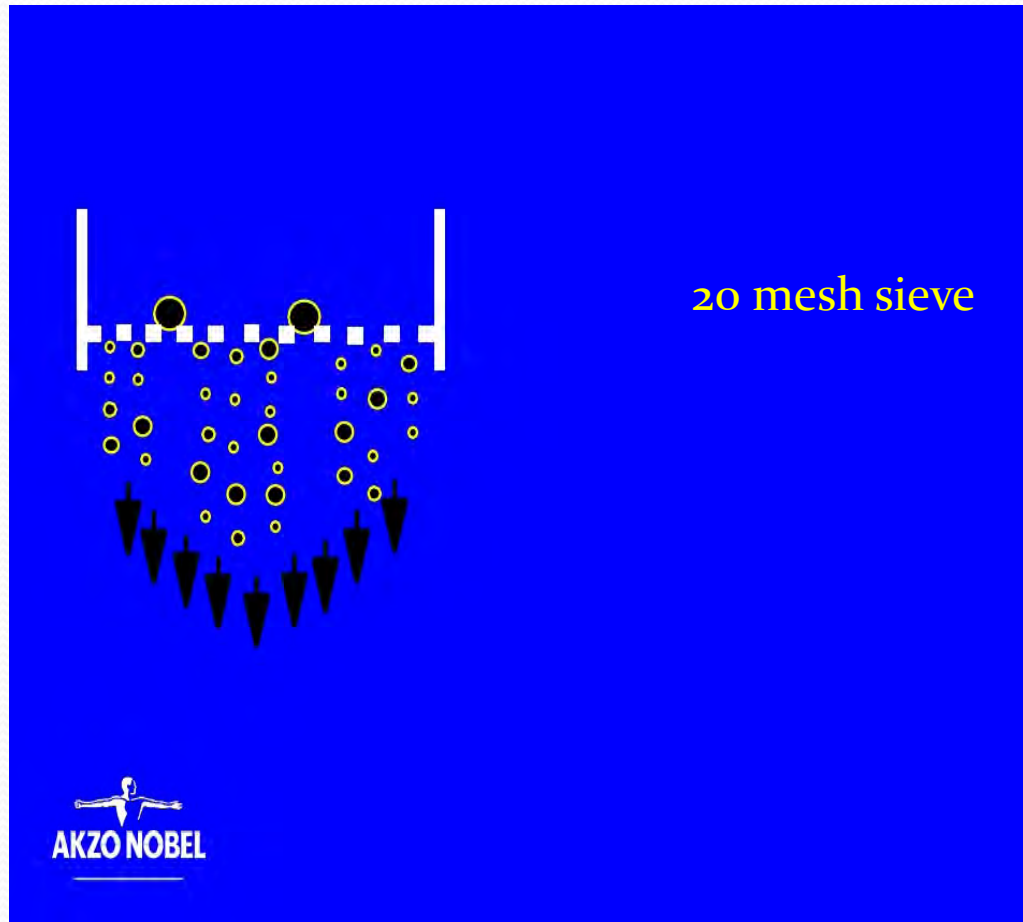
Storage Stability test



Demulsibility or Cement mix



Sieve test



Residue by Distillation



Residue by Evaporation



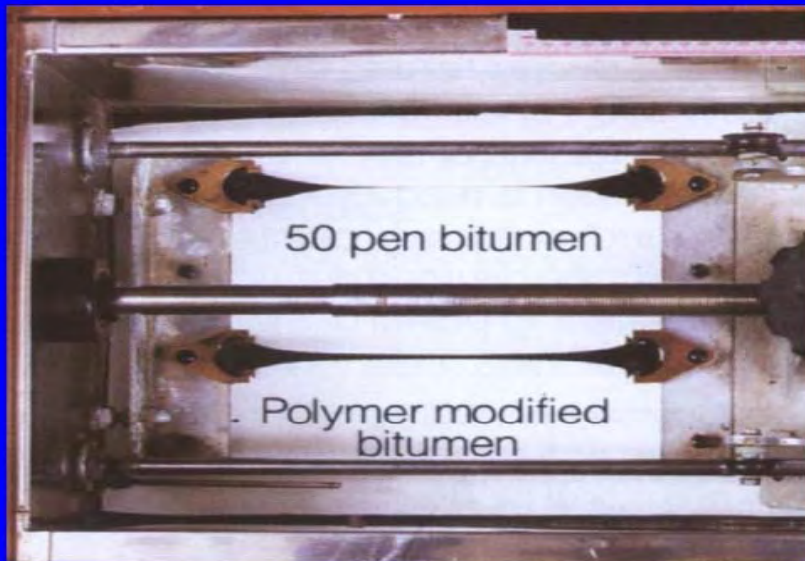
Tests on Residue Penetration



Tests on Residue Penetration



Tests on Residue Ductility

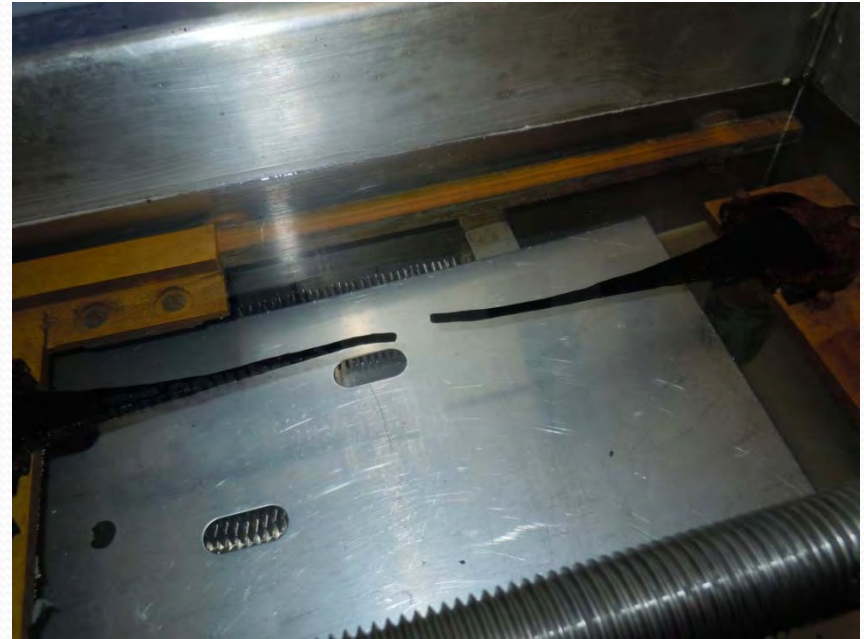




Tests on Residue Solubility

- Solubility is to determine if any inorganic material is or has been added to the asphalt
- Test is very difficult on polymer modified emulsions

Tests on Residue Elastic Recovery



Tests on Residue Elastic Recovery



Tests on Residue Viscosity



Tests on Residue

Torsional Recovery



Tests on Residue Softening Point



Tests of Residue

DSR





Summary

- What are asphalt emulsions
- What are their uses
- What do I test for and what does it mean



Thank You

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