Automatic binder extraction principles using the Asphalt Analyzer

1. What is the asphalt analyzer
2. How to promote safe handling of solvents
3. Installation requirements
4. Test set up sequence
5. Results
   • Aggregates
   • Filler
   • Binder
6. Focus on solvent distillation
7. Rotary evaporator step
8. Vacuum pump option
InfraTest Asphalt Analyzer

Complies with EN 12697/1:
Original patented technology for closed solvent system for automatic asphalt extraction
Asphalt Analyzer: Making Solvent Use SAFE

Filling Device with foot pedal

DOW SAFECHEM – our worldwide partners in SAFE worldwide asphalt extraction
Unit Installation Requirements

1. Electrical connection
   • 400 V, 60 Hz, 3/N/PE, 7 kW
   • Fuse protection: separate electric circuit 3 x 16 A
   • Compatible with 208 V and 240 V systems - transformer required

2. Cooling Water
   • Temperature cooling water:
     ➢ 10-15°C (50 - 60 °F)
   • Volume of cooling water:
     ➢ 5-8 l/min
   • Water pressure range:
     ➢ 3-6 bar pressure (45 - 87 psi)

3. Exhaust Connection:
   • Connection to exhaust hood via ventilation exhaust hose 40mm diameter about 1000 mm length
Asphalt Analyzer: Test Set Up Sequence

1. Fill washing drum with sample (max. 7.7 lb/3.5 kg)/ Weigh the sample
2. Close the washing drum.
3. Insert drum into the washing chamber
4. Close the washing chamber door (secured lock that remains closed until extraction complete)
4. Insert paper liner into the centrifuge filler cup (Max filler capacity: 10.58 oz/300g)

5. Insert filler cup into centrifuge (Close the centrifuge cover.)

6. Choose the program sequence on touchscreen.
Asphalt Analyzer: Results
Washing drum principle

3 solvent spraying nozzles

Revolving washing drum

Max 3.5 kg asphalt mix

Ultra Sonic System

Asphalt Analyzer
Washing drum principle

Integrated heating system – yields clean dry results

Size of mesh: 0.063 µm (0.09 in some countries)
Asphalt Analyzer: Results

Filler
High speed centrifuge

Max cup capacity: 300g

7800 rpm

Intergrated heating system – yields dry filler results

Solvent binder mix flows through into distillation chamber

Filler particles do not enter into binder mix
Asphalt Analyzer: Results

Binder/solvent mixture
Asphalt Analyzer: Results

Left Side: Clean TCE Tank (25L)

Right Side: “Dirty” TCE + Recovered Binder Tank (25L)
Distillation Principle

Start condition before first extraction

Solvent calculation
Example:
- 2000 g. of HMA sample with 5 % binder
Distillation Principle

After extraction 1:

Solvent calculation

Example:

• 2000 g. of HMA sample with 5 % binder
After extraction 2:

Solvent calculation

Example:

- 2000 g. of HMA sample with 5% binder
- Solvent content gradually decreases with each subsequent extraction
- Max. solvent distillation levels will not be reached until the Concentration ON function is activated
After extraction 3:

23.3 Liter clean solvent

1.7 Liter solvent

300 g. binder

Solvent calculation
Example:
• 2000 g. of HMA sample with 5 % binder
Distillation Principle

After extraction 4:

Solvent calculation

Example:

- 2000 g. of HMA sample with 5% binder
- Solvent partially recovered automatically via concentration process.
Asphalt Analyzer: Results

Rotary evaporator

Note:
Solvent recovered in rotary evaporator can be added back to clean TCE side tank after stabilization
Vacuum Pump Option:

- If you don’t require binder for further testing
- Empty the dirty side in a waste container
- The residual amount of solvent present in this side of the chamber will be lost

Allows to safety and quickly drain the used solvent/binder mix from the system
Asphalt Analyzer – Timing Sequence

Total extraction time for 2 kg of asphalt mix:

1. Sample Preparation: 15 min
2. Extraction Asphalt Analyzer: 45 min

Now quantitative analysis of the binder can begin

3. Rotary evaporator: 45 min

Now physical properties of binder can be measured
Thank you!

Questions? Comments?

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