

Residual Solvent Analyzer

Organic residual solvents used in the manufacture of pharmaceuticals and found in the inks used for the printing of packaging materials for food and drug products are known to be hazardous to human health if ingested. YL Residual Solvent Analyzer can accurately and efficiently detect and quantify residual solvents.

• Useful Information

• Sample Injection Condition

* Pharmaceutical raw materials

Incubate the vial containing the standard and the sample in the Headspace Autosampler in a dry oven for 60 minutes at 85 °C. Sample 1.0 - 1.5 ml of above the gas phase from the vial with a gastight syringe and inject it.

Note that the incubation temperature and time are flexible, which is based on the boiling points of the organic solvents.

* Food packaging materials

Inject 1.0 - 1.5 ml of the gas phase sampled by a gastight syringe after heating the tripod flask containing the standards and the sample in a dry oven for 30 minutes at 80 °C.

• Automation

Headspace Autosampler can make automation of sample preparation and Injection to the Residual Solvent Analyzer.

• Recommended Columns

- Food packaging material: G1 or G5 (30 m, 0.32 mm, 1.0um)
- Pharmaceutical raw materials: G16 (30 m, 0.53 mm, 1.0 μm), G43, G1

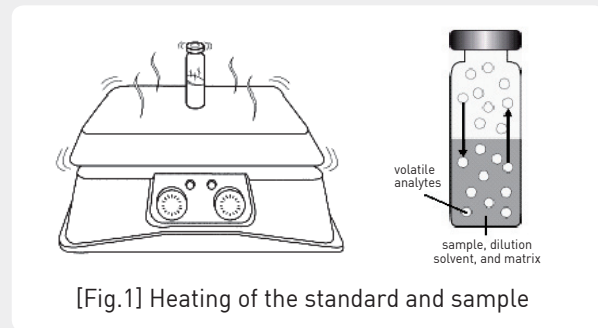
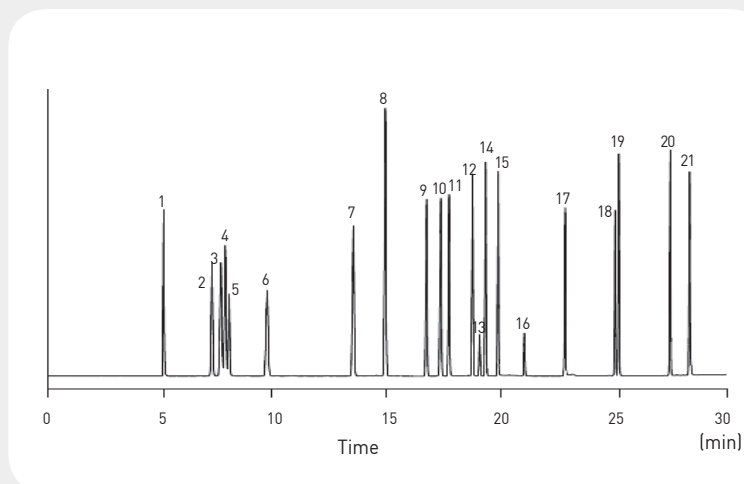
• Application

- Residual solvents in food packaging materials
- Residual solvents in pharmaceutical raw materials

■ Solvent Mixture

- Oven : 35 °C (10 min) → 5 °C/min → 160 °C (5 min)
- Column : HP-INNOWAX (60 m, 0.32 mm, 0.5 μm)
- Carrier gas : He / 1 ml (Split ratio 100:1)
- Injector : Capillary 250 °C
- Detector : FID 300 °C

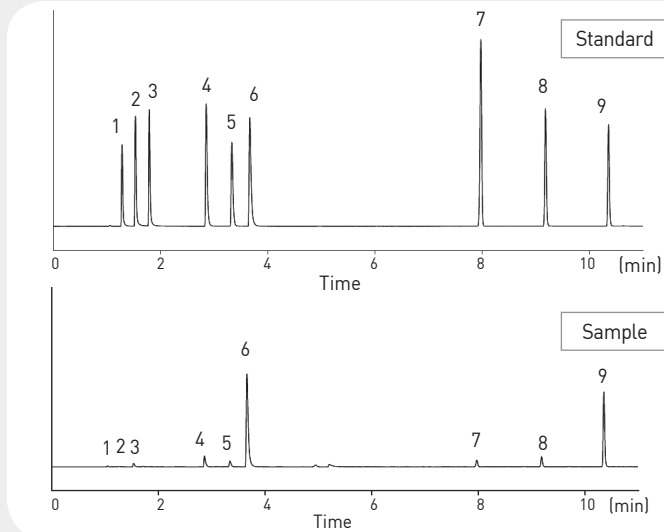
- | | |
|---------------------------|---|
| 1. Acetone | 12. p-xylene |
| 2. Ethyl acetate | 13. Xylene impurity |
| 3. Iso propyl acetate | 14. Propylene glycol - monomethyl ether |
| 4. Methanol | 15. Butanol |
| 5. Methyl ethyl ketone | 16. o-xylene |
| 6. Iso-propanol | 17. Ethyl cellosolve |
| 7. Methyl isobutyl ketone | 18. Cellosolve acetate |
| 8. Toluene | 19. Cyclohexanone |
| 9. Butyl acetate | 20. Diacetone alcohol |
| 10. Isobutyl isobutyrate | 21. Butyl cellosolve |
| 11. Iso-butanol | |



[Fig.1] Heating of the standard and sample

■ Residual Solvents in the Food Packing Materials

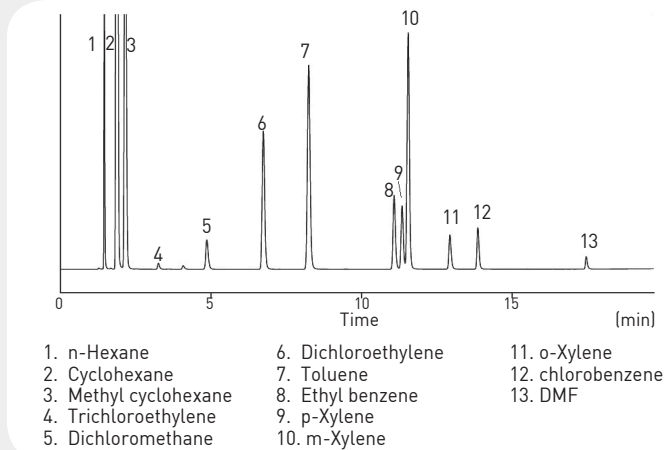
- Oven : 35 °C (5 min) → 10 °C/min → 150 °C (5 min)
- Column : HP-5 (30 m, 0.32 mm, 1.0 μm)
- Carrier gas : He, 3 ml/min (Split ratio 10:1)
- Injector : Capillary 230 °C
- Detector : FID 250 °C
- Headspace : 80 °C, 30 min Heating, Gas 1 ml Injection



- | | |
|---------|---------------|
| 1. MeOH | 6. THF (ISTD) |
| 2. EtOH | 7. Tol |
| 3. IPA | 8. BA |
| 4. MEK | 9. PMA |
| 5. EA | |

■ Residual Solvents on Class 2

- Oven : 35 °C (5 min) → 5 °C/min → 100 °C (0.1 min)
→ 13 °C/min → 200 °C (5 min)
- Column : HP-INNOWAX (30 m, 0.53 mm, 1.0 μm)
- Carrier gas : He, 6 ml/min (Split ratio 5:1)
- Injector : Capillary 230 °C
- Detector : FID 250 °C
- Headspace : 80 °C, 60 min Heating, Gas 1 ml Injection



- | | | |
|-----------------------|---------------------|-------------------|
| 1. n-Hexane | 6. Dichloroethylene | 11. o-Xylene |
| 2. Cyclohexane | 7. Toluene | 12. chlorobenzene |
| 3. Methyl cyclohexane | 8. Ethyl benzene | 13. DMF |
| 4. Trichloroethylene | 9. p-Xylene | |
| 5. Dichloromethane | 10. m-Xylene | |

■ Ethanol in Hand Washes

- Oven : 50 °C (3 min) → 15 °C/min → 150 °C (1 min)
- Column : HP-INNOWAX (30 m, 0.53 mm, 1.0 μm)
- Carrier gas : He, 6 ml/min (Split ratio 15:1)
- Injector : Capillary 230 °C
- Detector : FID 250 °C
- Injection volume : 1 μl Direct Injection

