LabTech

# MultiVap 6

## BASIC CONCENTRATOR

## USER MANUAL

Thank you for selecting our MultiVap 6.

We are sure that you will be completely satisfied with the performance of this new unit entering your laboratory. We invite you to read carefully this user manual and to keep it close to the instrument for convenient and fast consulting.

For any possible clarification or any request for assistance please contact either our local Representative or:

**LabTech Srl**

Via Fatebenefratelli, 1/5

24010 Sorisole (BG) Italy

Tel +39 035 576614

Website www.labtechsrl.com

E-mail customer.care@labtechsrl.com

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# 1. INTRODUCTION

The MultiVap 6 system is a 6-channel parallel nitrogen evaporator developed by LabTech. It is one of the sample preparation instruments for general-purpose and/or standard laboratories.

Compared with a traditional rotary evaporator, the MultiVap 6 system with 6-channel can process 6 parallel samples simultaneously, thereby increasing the laboratory throughput sample processing capability.

The nitrogen flow rate of each channel can be independently adjusted. The nitrogen purge needle in each channel can be adjusted up and down independently.

The system features a smart temperature controller to set and calibrate the temperature via thermocouples, using a robust resistance to heat the aluminum block that optimizes the temperature uniformity in each channel. The temperature difference is less than 5%.

The sample volume is up to 40 mL per channel. The concentration tube is 40 mL of glass vial with graduation and can be used for different instruments. Without transferring, samples are directly concentrated, thereby reducing transfer loss and improving recovery.

The system is compact (only 300 mm by 170 mm and 120 mm) and light with a weight of only 5 kg and can be easily placed in a fume hood.

## Features

Channel number: 6 parallel.

Heating mode: aluminum block dry heating.

Nitrogen purge: purge needle can be adjusted individually up and down as well as the nitrogen flowrate that can be adjusted individually.

Concentration tube: 40 mL graduated glass flat-bottom, 40 mL tail-tube with scale (1mL end-point).

Anti-corrosion material: PTFE or Teflon are used for the solvent exposed parts, can endure the dichloride methonal solvent.

Instrument dimensions: 300（W）×170（H）×120（D）mm.

Power: AC 230V, 50/60Hz.

Gas supply: nitrogen 0.1—0.2MPa.

Weight: 5 kg.

Max Temperature: 120°C.

Supplied with each MultiVap 6:

Collection bottle 40 mL: 6.

Power cord 220V 50/60Hz: 1.

Two-way connector O.D4mm/O. D6 mm: 1.

PU tubing O.D4 mm, 2 m: 1.

PU tubing O.D6 mm, 2 m: 1.

User manual: 1.

# 2. SAFETY RULES

### General Information

Please read carefully this user manual before starting to use the instrument and follow its prescriptions with the utmost care. This user manual is part of the delivery, hence must be always kept together with the instrument on its working place.

It is imperative that every person operating with this system has read and fully understood this manual. The non-observance of the instructions contained herein or improper use may involve damages/injuries that are not covered by product liability.

### Electrical safety

The instrument has to be used within the rated voltage. Prior to use, please check if the wire is aged. In case of aged wires, please contact the after-sales service for inspection. It is forbidden to disassemble the instrument and to connect internal circuit parts, in order to avoid a short circuit or open circuit.

### Fire safety

Numerous reagents are flammable and explosive. When the solvent vapor concentration reaches a certain level, it would be flammable and could cause fire. The instrument should be kept away from the sources of ignition and high temperature places. If there is solvent pungent smell, carefully check whether there is gas or liquid leakage, and turn off the power.

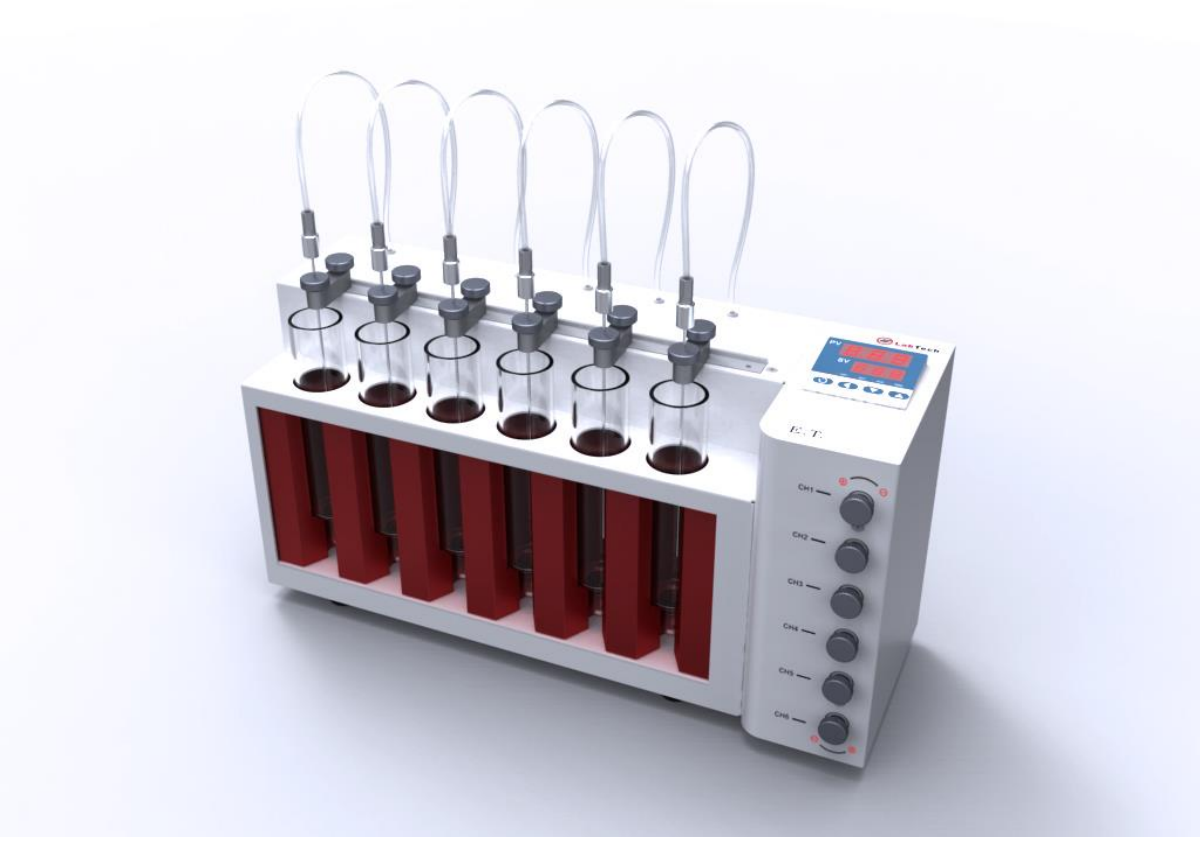
### Chemical safety

The instrument is an instrument for organic chemical sample pretreatment. The involved chemical solvents have harmful effects on the human health. Despite the instrument is fully closed and features full vent design, it is recommended to pay attention to the personal safety during the use. Regular check of liquid waste barrels as well as working conditions of the vent fan are required to avoid the risk of leakage caused by corrosion and to avoid the formation of organic solvent vapors affecting operators' health. If there is a fault, please contact the Labtech Service Team.

# 3. INSTALLATION

Setting up your LabTech MultiVap 6 Just follow the following instructions. Once completed the setup, take some time to explore the features of your system. The user manual provides tips and instructions to help you learn the basics of your MultiVap 6

**TOP VIEW**



The instrument consists of six channels, the gas flow rate and stainless-steel purge needle height can be independently adjusted in every channel.

The red painted part of the instrument is the heating aluminum block, which can uniformly heat six channels. The temperature is controlled by smart temperature controller, easy to use, easy and accurate to be set and calibrated. The temperature difference is less than 5%.

Concentration tube: 40 mL flat-bottom or tail tube with graduation (optional).

**TOP VIEW**

1 - Nitrogen tubing: FEP transparent tubing as the gas feeding pipe. FEP is a kind of polytetrafluoroethylene (PTFE), which is good anti-corrosive material for various solvents.

2 - Flanged/screwed joints: PP + fiberglass flange joints with good strength and solvent resistance, for connecting the purge needle and gas tubing.

3 - Purge needle holder: to control the purge needle adjusted up-down and left-right regulation.

4 - Concentration tubes: 40 mL graduated glass flat-bottomed or with tailpipe concentration vial with graduation.

5 - Purge needle: stainless steel purge needle can be adjusted up and down, left and right, to find the best concentrating position.

6 - Main body: MultiVap 6 nitrogen blowing concentrator main sheet metal shell, with insulated pad between heating aluminum block.

7 - Heating aluminum blocks: a special aluminum block used to uniformly heat concentration tubes.

8 - Smart temperature controller: temperature setting and calibration.

9 - Gas flow indicator: unscrew to increase the pressure, screw to lower the pressure.

10 - Gas flow adjustment knob: one knob per channel.

**TOP VIEW**

1 - power switch.
2 - three-phase power socket.
3 - 4 mm diameter gas inlet.

# 4. SYSTEM SETTING

1- Top display window (showing measuring value PV，parameter name).
2 - Bottom display window (showing the setting value SV，alarm code, parameter data, etc.).
3 - Setting button (to enter parameter setting, and confirming, etc.).
4 - Data moving button (may be used to integrate data).
5 - Data reducing button.
6 - Data increasing button.
7 - LED indicator (OP1/AU1/AU2/RUN showing data output, alarm setting 1,2 and running indicator).

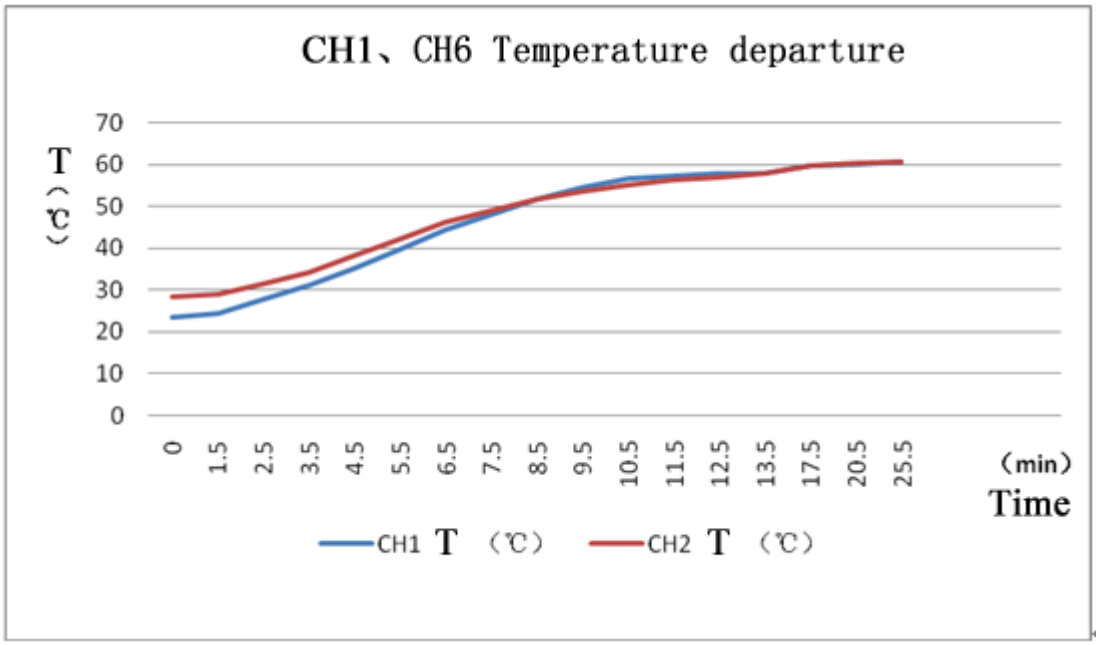
Basic display status:

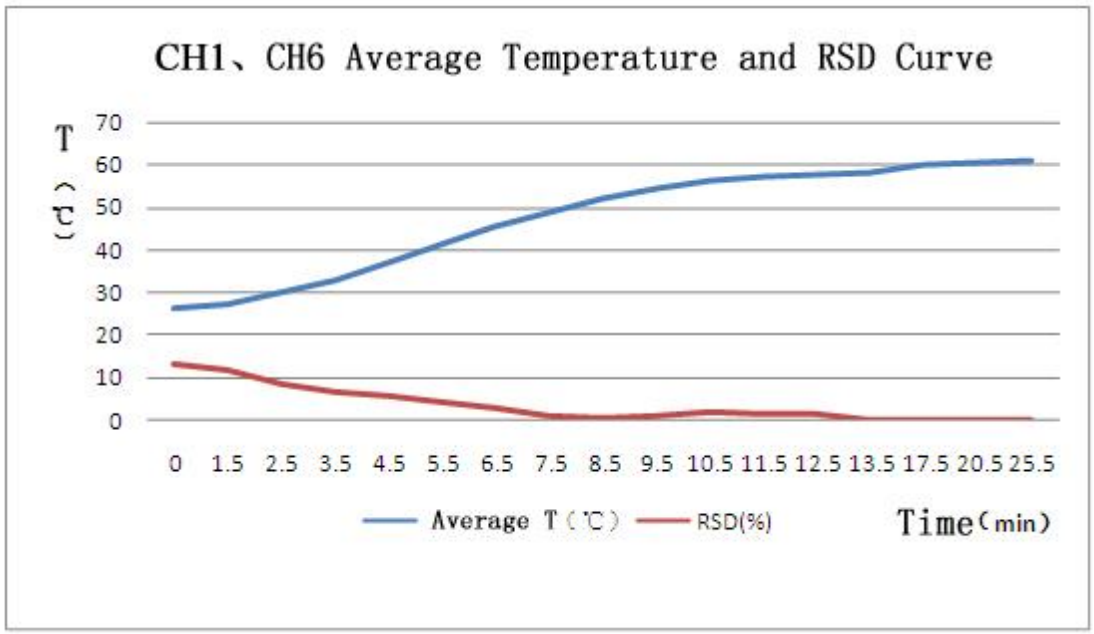
when the power is on, the display window displays the measurement value PV (top) and setting value SV (bottom). When the measurement value is out of range of the input value (such as thermocouple broken) "orA" is alternately displayed on the top window with measuring upper or lower limit and the instrument will be automatically stopped.

Set the given values:

in the basic display status, if the parameter lock is unlocked, the temperature control value can be modified on the bottom window by pressing ◄, ▼ or ▲, pressing ▼ to decrease the data and pressing ▲ to increase the data. The decimal point would flash for modifying data. Holding the buttons can quickly increase or decrease the value and speeding up with the decimal point shifted to the right. Pressing ◄ can move the location of the data (cursor) directly. Pressing ▼ or ▲ can modify the value of the flashing position and the operation is very quick.

# 5. TEMPERATURE CURVE



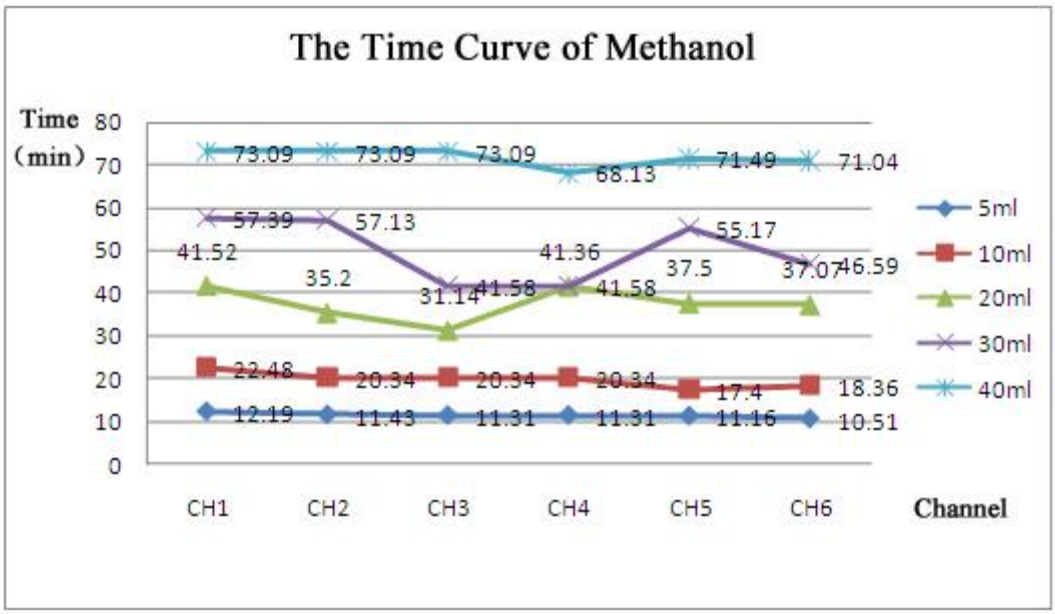



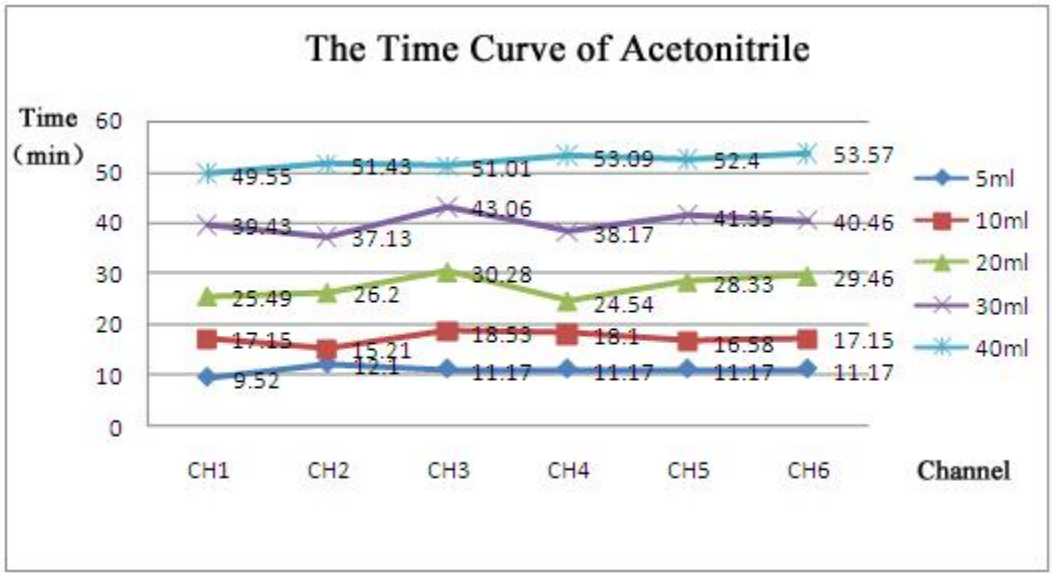

The temperature is increased quickly in the first 10 minutes, up to 4°C / more or less.
The minimum RSD between two channels: 0.11%, indicating that the temperature difference between channels is low.
There is about 5°C difference between the setting value and the real one.

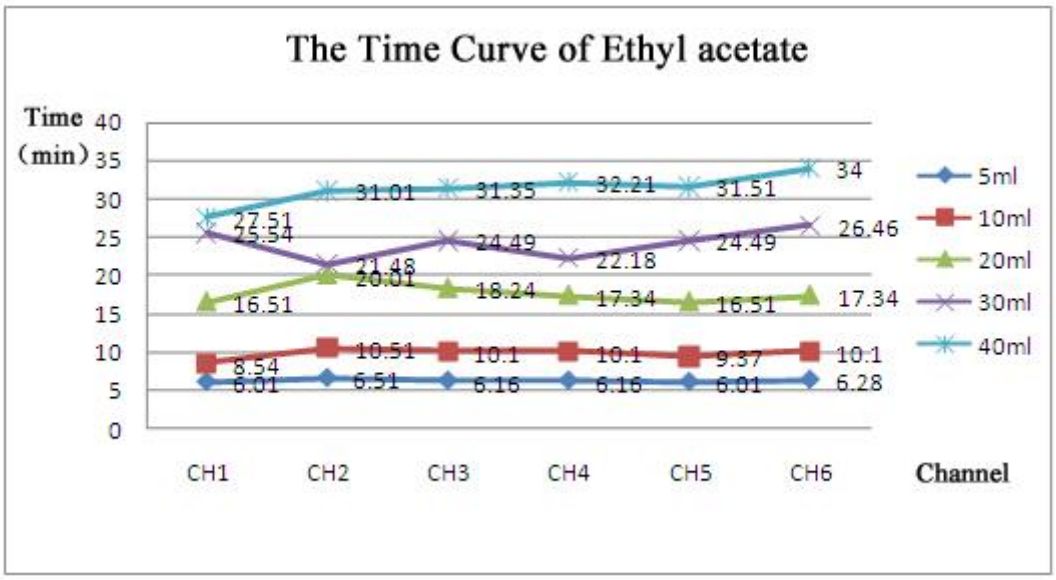
## 8 SOLVENTS TEST

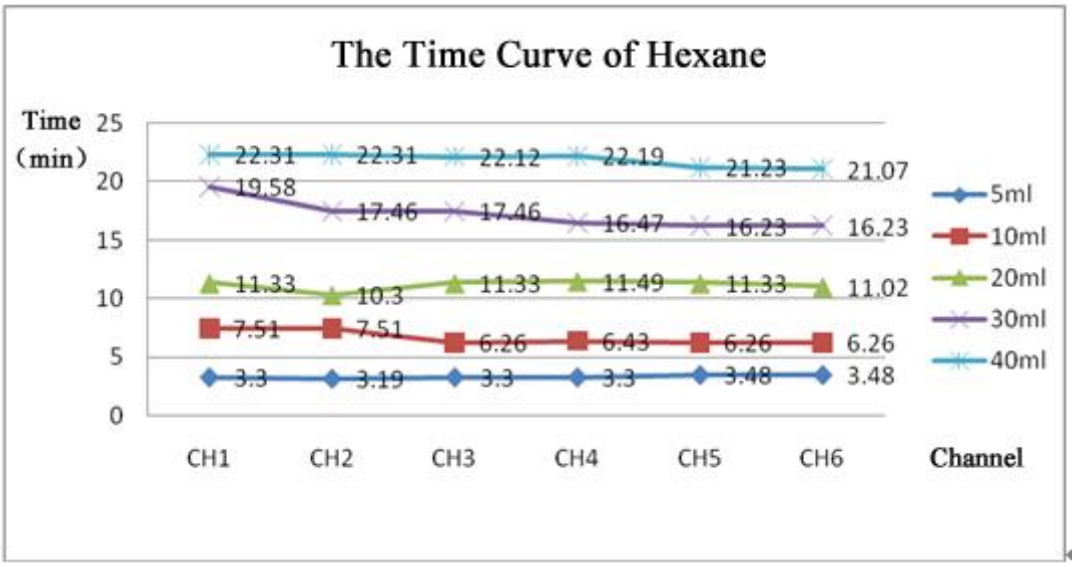
Parallel test among CH1-CH6 with conducting time and volume by using 5, 10, 20, 30 and 40 mL solvent as test solution, using a graduated cylinder to measure the volume and a stopwatch to measure the time.

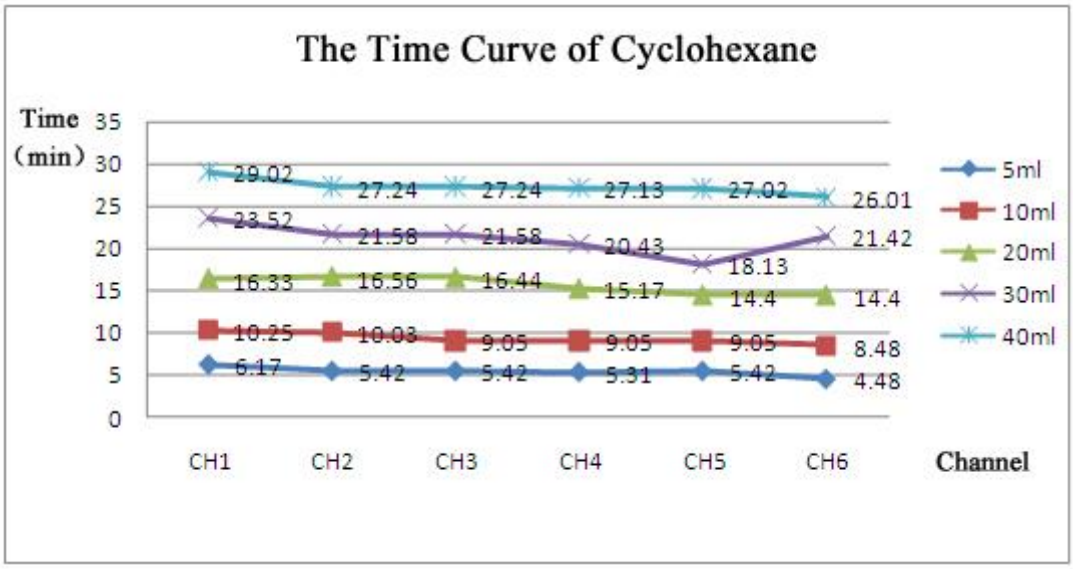
| Solvents | Boiling point℃ | Solvents | Boiling point℃ |
|---|---|---|---|
| Methanol | 64.8 | Cyclohexane | 80.7 |
| Acetonitrile | 81.1 | Methylene chloride | 39.8 |
| Ethyl acetate | 77.2 | Acetone | 56.5 |
| Hexane | 68.74 | Petroleum ether | 30-60 |

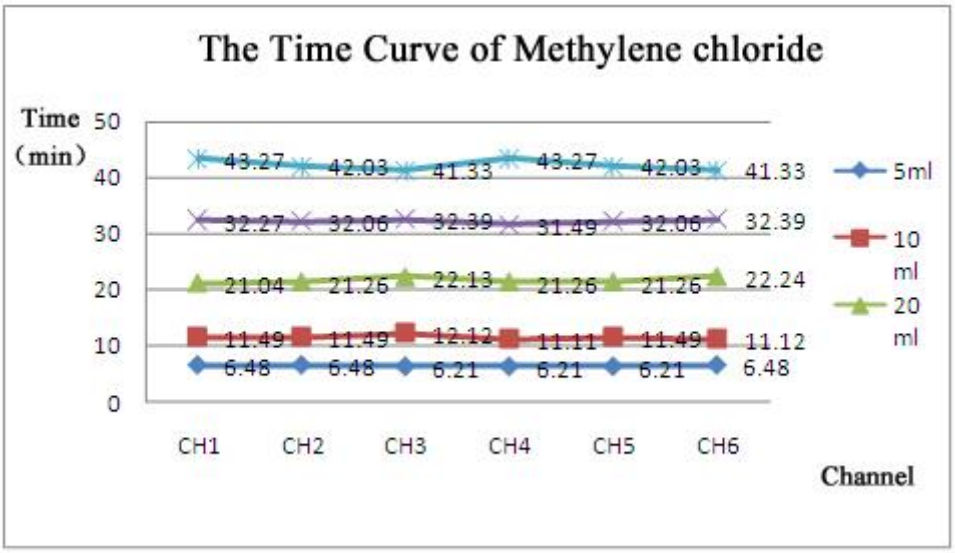


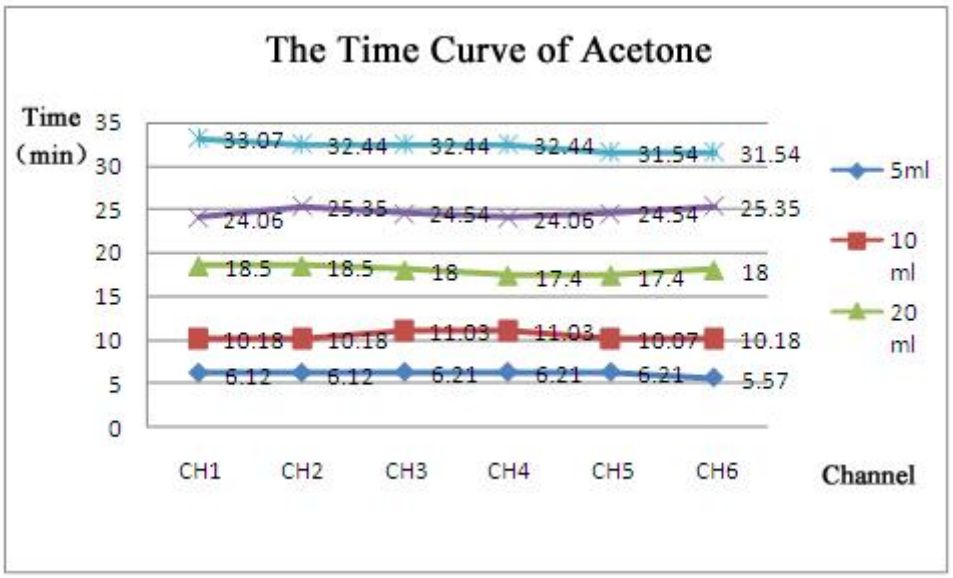



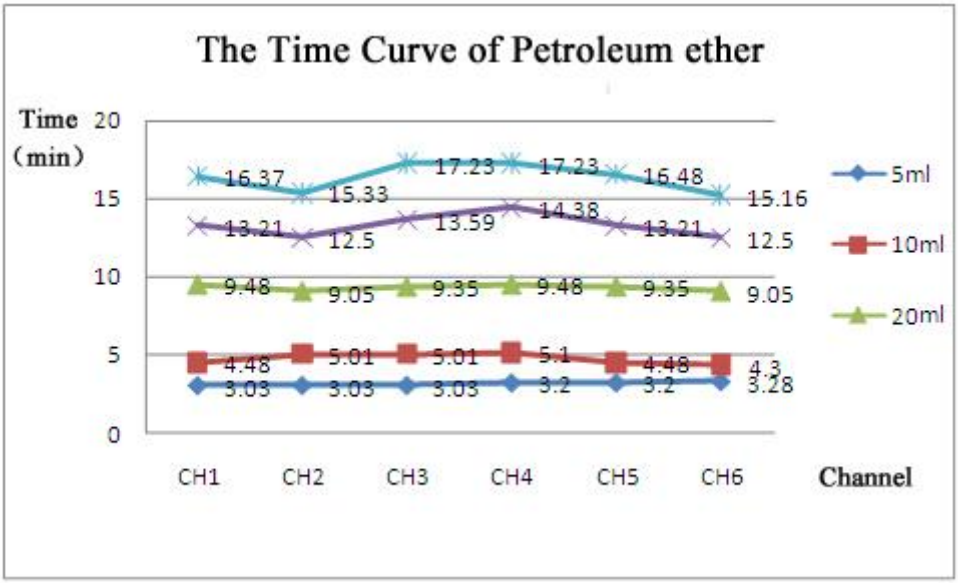

The Time Curve of Ethyl acetate
Time (min)
40
35
30
25
20
15
10
5
0
27.51
31.01
31.35
32.21
31.51
34
25.54
21.48
24.49
22.18
24.49
26.46
20.01
16.51
18.24
17.34
16.51
17.34
8.54
10.51
10.1
10.1
9.37
10.1
6.01
6.51
6.16
6.16
6.01
6.28
CH1
CH2
CH3
CH4
CH5
CH6
Channel
5ml
10ml
20ml
30ml
40ml


The Time Curve of Hexane
Time (min)
25
20
15
10
5
0
22.31
22.31
22.12
22.19
21.23
21.07
19.58
17.46
17.46
16.47
16.23
16.23
11.33
10.3
11.33
11.49
11.33
11.02
7.51
7.51
6.26
6.43
6.26
6.26
3.3
3.19
3.3
3.3
3.48
3.48
CH1
CH2
CH3
CH4
CH5
CH6
Channel
5ml
10ml
20ml
30ml
40ml


The Time Curve of Cyclohexane
Time (min)
35
30
25
20
15
10
5
0
29.02
27.24
27.24
27.13
27.02
26.01
23.52
21.58
21.58
20.43
18.13
21.42
16.33
16.56
16.44
15.17
14.4
14.4
10.25
10.03
9.05
9.05
9.05
8.48
6.17
5.42
5.42
5.31
5.42
4.48
CH1
CH2
CH3
CH4
CH5
CH6
Channel
5ml
10ml
20ml
30ml
40ml


The Time Curve of Methylene chloride
Time (min)
50
40
30
20
10
0
43.27 42.03 41.33 43.27 42.03 41.33
32.27 32.06 32.39 31.49 32.06 32.39
21.04 21.26 22.13 21.26 21.26 22.24
11.49 11.49 12.12 11.11 11.49 11.12
6.48 6.48 6.21 6.21 6.21 6.48
CH1 CH2 CH3 CH4 CH5 CH6
Channel
5ml
10 ml
20 ml


The Time Curve of Acetone
Time (min)
35
30
25
20
15
10
5
0
33.07 32.44 32.44 32.44 31.54 31.54
24.06 25.35 24.54 24.06 24.54 25.35
18.5 18.5 18 17.4 17.4 18
10.18 10.18 11.03 11.03 10.07 10.18
6.12 6.12 6.21 6.21 6.21 5.57
CH1 CH2 CH3 CH4 CH5 CH6
Channel
5ml
10 ml
20 ml


The Time Curve of Petroleum ether
Time (min)
20
15
10
5
0
16.37 15.33 17.23 17.23 16.48 15.16
13.21 12.5 13.59 14.38 13.21 12.5
9.48 9.05 9.35 9.48 9.35 9.05
4.48 5.01 5.01 5.1 4.48 4.3
3.03 3.03 3.03 3.2 3.2 3.28
CH1 CH2 CH3 CH4 CH5 CH6
Channel
5ml
10ml
20ml

# 6. SOLVENTS TABLE

| Solvent | Formula | Molar mass in g/mol | Evaporation energy in J/g | Boiling point at 1013 mbar | Density in g/cm³ | Vacuum in mbar for boiling point at 40 °C |
|---|---|---|---|---|---|---|
| Acetone | $CH_3H_6O$ | 58.1 | 553 | 56 | 0.790 | 556 |
| n-amylalcohol, n-pentanol | $C_5H1_2O$ | 88.1 | 595 | 37 | 0.814 | 11 |
| Benzene | $C_6H_6$ | 78.1 | 548 | 80 | 0.877 | 236 |
| n-butanol | $C_4H_{10}O$ | 74.1 | 620 | 118 | 0.810 | 25 |
| tert. butanol (2-methyl-2-propanol) | $C_4H_{10}O$ | 74.1 | 590 | 82 | 0.789 | 130 |
| Chlorobenzene | $C_6H_5Cl$ | 112.6 | 377 | 132 | 1.106 | 36 |
| Chloroform | $CHCl_3$ | 119.4 | 264 | 62 | 1.483 | 474 |
| Cyclohexane | $C_6H_{12}$ | 84.0 | 389 | 81 | 0.779 | 235 |
| Diethylether | $C_4H_{10}O$ | 74.0 | 389 | 35 | 0.714 | 850 |
| 1,2-dichloroethane | $C_2H_4Cl_2$ | 99.0 | 335 | 84 | 1.235 | 210 |
| 1,2-dichloroethylene (cis) | $C_2H_2Cl_2$ | 97.0 | 322 | 60 | 1.284 | 479 |
| 1,2-dichloroethylene (trans) | $C_2H_2Cl_2$ | 97.0 | 314 | 48 | 1.257 | 751 |
| Diisopropyl ether | $C_6H_{14}O$ | 102.0 | 318 | 68 | 0.724 | 375 |
| Dioxane | $C_4H_8O_2$ | 88.1 | 406 | 101 | 1.034 | 107 |
| DMF (dimethyl-formamide) | $C_3H_7NO$ | 73.1 | | 153 | 0.949 | 11 |
| Acetic acid | $C_2H_4O_2$ | 60.0 | 695 | 118 | 1.049 | 44 |
| Ethanol | $C_2H_6O$ | 46.0 | 879 | 79 | 0.789 | 175 |
| Ethylacetate | $C_4H_8O_2$ | 88.1 | 394 | 77 | 0.900 | 240 |
| Heptane | $C_7H_{16}$ | 100.2 | 373 | 98 | 0.684 | 120 |
| Hexane | $C_6H_{14}$ | 86.2 | 368 | 69 | 0.660 | 360 |
| Isopropylalcohol | $C_3H_8O$ | 60.1 | 699 | 82 | 0.786 | 137 |
| Isoamylalcohol (3-methyl-1-butanol) | $C_5H_{12}O$ | 88.1 | 595 | 129 | 0.809 | 14 |
| Methylethylketone | $C_4H_8O$ | 72.1 | 473 | 80 | 0.805 | 243 |
| Methanol | $CH_4O$ | 32.0 | 1227 | 65 | 0.791 | 337 |
| Methylene chloride, dichloromethane | $CH_2Cl_2$ | 84.9 | 373 | 40 | 1.327 | 850 |
| Pentane | $C_5H_{12}$ | 72.1 | 381 | 36 | 06.26 | 850 |
| n-propylalcohol | $C_3H_8O$ | 60.1 | 787 | 97 | 0.804 | 67 |
| Pentachloroethane | $C_2HCl_5$ | 202.3 | 201 | 162 | 1.680 | 13 |
| 1,1,2,2-tetra-chloroethane | $C_2H_2Cl_4$ | 167.9 | 247 | 146 | 1.595 | 20 |
| Tetrachlorocarbon | $CCl_4$ | 153.8 | 226 | 77 | 1.594 | 271 |
| 1,1,1-trichloroethane | $C_2H_3Cl_3$ | 133.4 | 251 | 74 | 1.339 | 300 |
| Tetra-chloro-ethylene | $C_2Cl_4$ | 165.8 | 234 | 121 | 1.623 | 53 |
| THF (tetrahydrofurane) | $C_4H_8O$ | 72.1 | | 67 | 0.889 | 374 |
| Toluene | $C_7H_8$ | 92.2 | 427 | 111 | 0.867 | 77 |
| Trichloroethylene | $C_2HCl_3$ | 131.3 | 264 | 87 | 1.464 | 183 |
| Water | $H_2O$ | 18.0 | 2261 | 100 | 1.000 | 72 |
| Xylene (mixture) | $C_8H_{10}$ | 106.2 | 389 | | | 25 |
| o-xylene | $C_8H_{10}$ | 106.2 | | 144 | 0.880 | |
| m-xylene | $C_8H_{10}$ | 106.2 | | 139 | 0.864 | |
| p-xylene | $C_8H_{10}$ | 106.2 | | 138 | 0.861 | |

## 7. SERVICE

The LABTECH worldwide technical support network consists of highly trained Field Service Engineers, Technical Support Specialists and Service Coordinators who are ready to quickly assist customers with answers and solutions to service needs and application questions.

For any possible clarification or any request for assistance please contact either our local Representative or:

**LabTech Srl**

Via Fatebenefratelli, 1/5

24010 Sorisole (BG) Italy

Tel +39 035 576614

Website www.labtechsrl.com

E-mail customer.care@labtechsrl.com