

LabTech



MultiVap 54

AUTOMATIC EVAPORATION SYSTEM

USER MANUAL



Thank you for selecting our MultiVap 54 system. 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:

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 MultiVap 54

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1. INTRODUCTION

The MULTIVAP 54 is an automatic multichannel and multi-functional parallel instrument designed and processed by LabTech, including all accessories and functions to grant the highest standard of efficiency, speed, reliability, throughput and safety for any concentration process.

Nitrogen sweeping, needle level adjustment and visible concentration process are only few of the advantages offered by LabTech.

Condition of use

Power: 230 VAC, 50/60 Hz, 10 A Minimum

Nitrogen requirement: Nitrogen pressure 30 psi-100 psi

Nitrogen consume: 140l/min @ 12PSI

Room temperature: 10°C-30°C (283.15 K-303.15 K)

Relative humidity: 20%-80%

Dimensions: 51cm x 51cm x 48cm

Net weight: 34 kg

Features

6 channels of 9 needles each (for a total of 54 samples) able to work either individually or simultaneously

Automatic adjustment of nitrogen needles according to the sample volume reduction (via software)

Visible concentration process thanks to the front window and internal lights

Auto-locked cover during operations

Easy replacement of nitrogen needles

7" touch-screen colour control panel

Intuitive control interface

Possibility to use different vials from 10 mL up to 200 mL

Nitrogen flow controlled by software

Exhaust line to remove solvent vapours

Possibility to change individual gas nozzles for consistent flow gas

Possibility to reconfigure nozzles for other racks and glassware

Stainless steel liquid bath, temperature from ambient up to 100°C (373.15 K)

2. SAFETY RULES

General Information

Please read carefully this user manual before starting the system 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

Most reagents used in the MULTIVAP 54 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 MULTIVAP 54 system 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 54 is simple. 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 54.

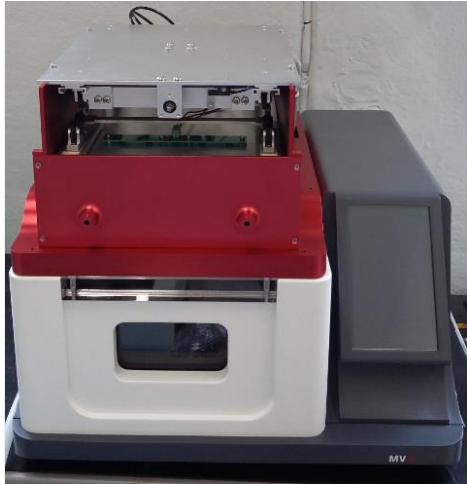





MultiVap 54 Overview

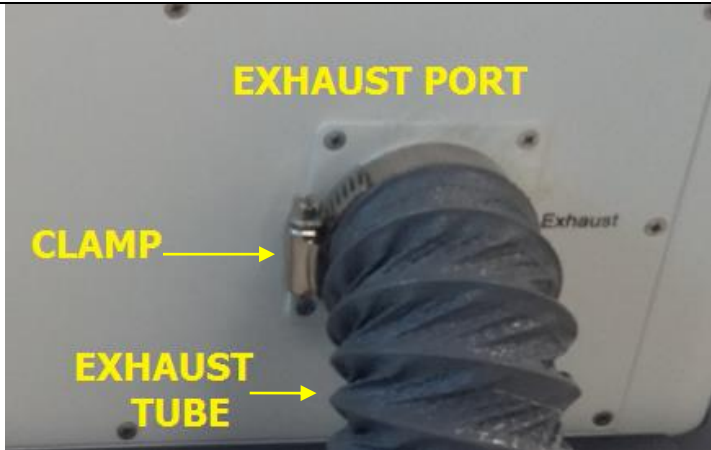
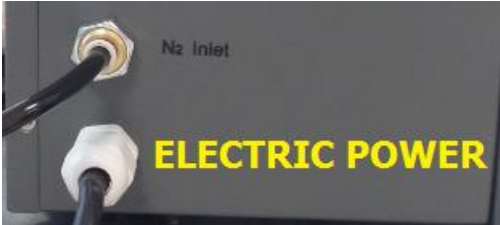
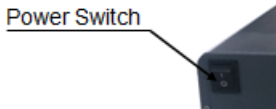

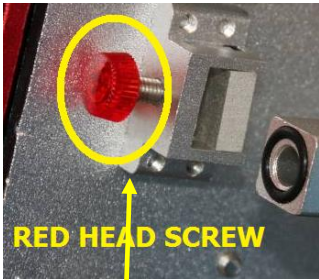
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|----------|--|--|
| <p>1</p> | <p>Front view: <u>Front Window</u> to check the evaporation status and <u>Control Panel</u> to set, save and load different methods</p> | |
| <p>2</p> | <p>Side view: <u>Manual Needle Level Control</u> to handle needles position and <u>Drain System</u> to empty water bath with the provided kit</p> | |

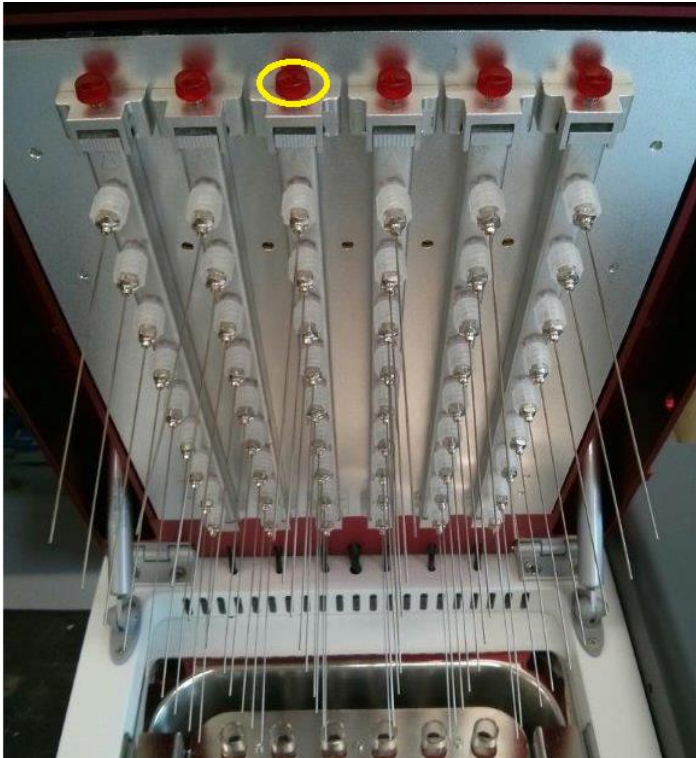
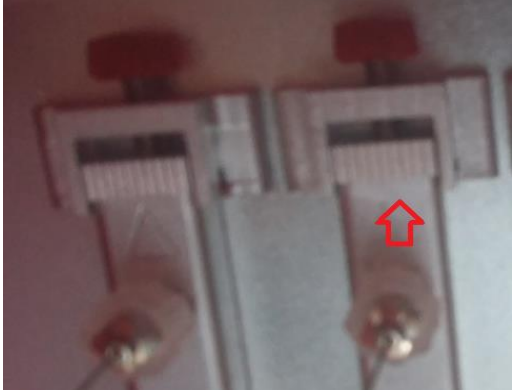

| | | |
|----------|--|--|
| <p>3</p> | <p>Back view: <u>Power Switch</u> to switch OFF and ON the instrument, <u>N₂ Inlet</u> tube, <u>Power Cord</u> and <u>Exhaust</u> solvent vapours tube</p> |  <p>The image shows the back of the instrument. On the left side, there is a power switch, an N₂ inlet tube, and a power cord. On the right side, there is an exhaust tube for solvent vapours.</p> |
|----------|--|--|



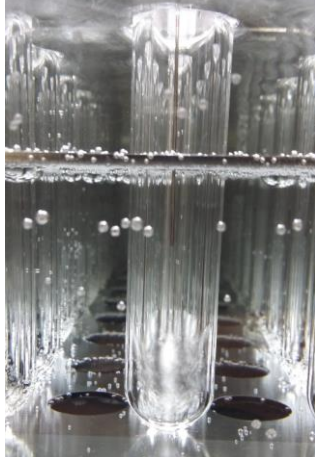
Installation

| STEP | DESCRIPTION | PICTURE |
|----------|--|---|
| <p>1</p> | <p>Put the instrument on the bench</p> |  <p>The image shows the MultiVap 54 instrument placed on a bench. The instrument is white with a red top section and a grey side panel. The 'MV' logo is visible on the bottom right corner of the instrument.</p> |
| <p>2</p> | <p>Take out the white top cover</p> |  <p>The image shows a hand lifting the white top cover of the instrument. The cover has the LabTech logo on the front. The internal components of the instrument are visible through the opening.</p> |

| | | |
|---|--|---|
| 2 | Fix it to the main unit body by the 8 provided screws |  |
| 3 | Fix the cover handle with the provided Allen wrench from the internal side |  |
| | | |

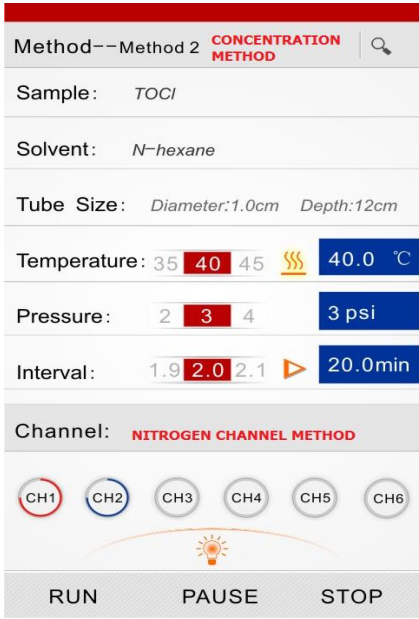
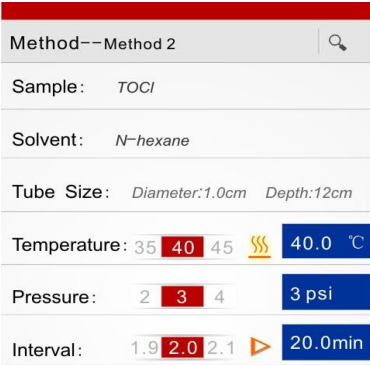


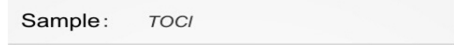
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| <p>4</p> | <p>Fix the exhaust pipe to the exhaust port on the back side of the instrument by the provided metallic clamp. Connect the other end on the laboratory exhaust line</p> |  |
| <p>5</p> | <p>Connect the nitrogen inlet connector to the gas source through a 6mm gas tube Connect the plug to the electric socket</p> |  |
| <p>6</p> | <p>Switch ON the unit</p> |  |
| <p>7</p> | <p>Move down the needle plate by the Manual Needle Level Control button on the right side of the instrument</p> |  |
| <p>8</p> | <p>Unscrew the six red head screws and fit the two ends of nitrogen needle channels into each line</p> |  |

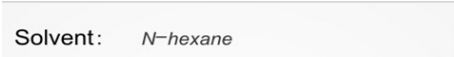
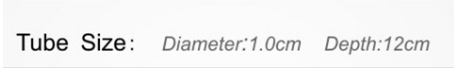






| | | |
|-----------|--|--|
| <p>8</p> | <p>Fix the nitrogen channels by screwing tightly the red head screw</p> |  |
| <p>9</p> | <p>Install the nitrogen needle channels taking care that the arrows are directed to the red hex head screw</p> |  |
| <p>10</p> | <p>Check that all the needles are perfectly aligned with the vials top mouth</p> |  |

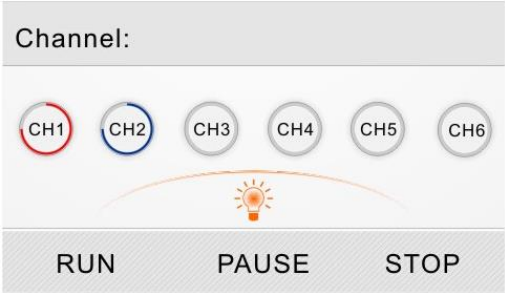



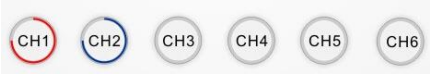




| | | |
|--|---|--|
| <p>11</p> | <p>Fill the bath (8 L volume) with a proper liquid (to avoid precipitation and contamination)</p> |  |
| <p>WARNING: <u>needles must be set at the up position during opening or closing of the instrument cover</u> to avoid needles damaging</p> | | |
| <p>12</p> | <p>Insert the rack (6x9 positions) with the provided vials in the liquid bath</p> |  |
| <p>13</p> | <p>The level of the liquid bath depends on user's needs. Standard procedures suggest to immerse at least half sample vials to optimize the heating function</p> |  |

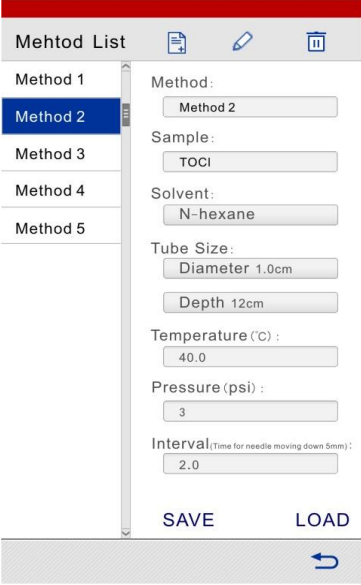
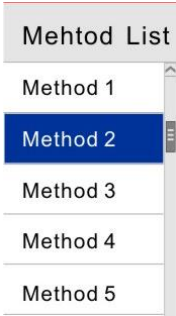




Now your MULTIVAP 54 is ready to be used!



4. SOFTWARE INTERFACE

| STEP | DESCRIPTION | PICTURE |
|------|---|--|
| 1 | The software is composed by two main interfaces: <u>Main interface</u> and <u>Method list interface</u> | |
| 2 | <p>Main interface is composed of two main parts:</p> <ul style="list-style-type: none"> • <u>concentration method</u> • <u>nitrogen channel method</u> |  <p>The screenshot shows the 'CONCENTRATION METHOD' interface with the following parameters: Method: Method 2, Sample: TOCI, Solvent: N-hexane, Tube Size: Diameter:1.0cm Depth:12cm, Temperature: 35, 40, 45 (40.0 °C selected), Pressure: 2, 3, 4 (3 psi selected), Interval: 1.9, 2.0, 2.1 (20.0min selected), Channel: NITROGEN CHANNEL METHOD, and six channel buttons (CH1-CH6) with a lightbulb icon and RUN, PAUSE, STOP buttons at the bottom.</p> |
| 3 | <p>Concentration method interface:</p> |  <p>This is a close-up of the concentration method interface showing: Method: Method 2, Sample: TOCI, Solvent: N-hexane, Tube Size: Diameter:1.0cm Depth:12cm, Temperature: 35, 40, 45 (40.0 °C selected), Pressure: 2, 3, 4 (3 psi selected), Interval: 1.9, 2.0, 2.1 (20.0min selected).</p> |
| 4 | Click  to open method details |  <p>The image shows a dropdown menu with the text 'Method--Method 2' and a magnifying glass icon on the right.</p> |
| 5 | Sample name |  <p>The image shows the 'Sample:' label followed by the text 'TOCI' in an input field.</p> |

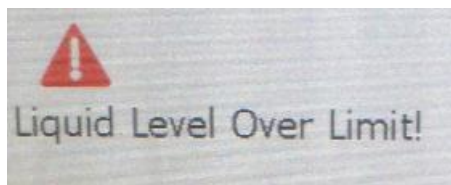
| | | |
|----|--|--|
| 6 | Solvent name |  |
| 7 | Vials size parameters: Diameter from 0 to 10 cm Height from 0 to 15 cm |  |
| 8 | Temperature (°C) of liquid bath: set value (red color) present value (blue color)  not working heating function,  working heating function |  |
| 9 | Pressure function: set value (red color) present value (blue color) The maximum pressure is 100 psi (6.89 bar). The common application range is about 10-20 psi (0.69 bar-1.38 bar). The nitrogen consumption is about 24 L/min at a pressure of 12 psi (0.85 bar) |  |
| 10 | Automatic control: needles automatically move down 5 mm every X minutes depending on set interval time. The time value in the blue box is the total experiment time based on automatic control time plus vial dimensions |  |
| 11 | Manual needle controller allows the control of needles deep via the up and down arrows button |  |

| | | |
|-----------|---|--|
| <p>12</p> | <p style="text-align: center;">Nitrogen channel method interface:</p>  | |
| <p>13</p> | <p>Activate the 6 nitrogen needle channels according to specific needs.</p> <p>There are 3 different status:</p> <ul style="list-style-type: none">  gray = unselected  blue = selected  red = currently on process <p>If a channel is unselected, thr nitrogen flow is automatically stopped</p> |  |
| <p>14</p> | <p>Light switch bottom:</p> <ul style="list-style-type: none">  OFF  ON |  |
| <p>15</p> |  <p>Run: the concentration method starts according the selected parameters</p> <p>Pause: the nitrogen blow function stops and nitrogen needles reset to the initial position. The instrument can be opened and samples taken out. Once the cover is closed, the nitrogen needles descend automatically to the last position and the method restarts</p> <p>Stop: all channels stop working and nitrogen needles reset to the initial position. A single channel can be stopped</p> | |





| | | |
|-----------|--|--|
| <p>16</p> | <div style="text-align: center;"> <h3>Method List Interface</h3>  <p>This interface allows to develop, save, delete and load methods</p> </div> | |
| <p>17</p> | <p>Storage method list</p> |  |
| <p>18</p> | <ul style="list-style-type: none">  create a new method  edit a selected method  delete the current method |  |


| | | |
|-----------|---|---|
| <p>19</p> | <p>Method parameters setting</p> <p>Interval: period to move down the nitrogen needles of 5mm</p> | <p>Method: <input type="text" value="Method 2"/></p> <p>Sample: <input type="text" value="TOCI"/></p> <p>Solvent: <input type="text" value="N-hexane"/></p> <p>Tube Size: <input type="text" value="Diameter 1.0cm"/> <input type="text" value="Depth 12cm"/></p> <p>Temperature (°C) : <input type="text" value="40.0"/></p> <p>Pressure (psi) : <input type="text" value="3"/></p> <p>Interval (Time for needle moving down 5mm) : <input type="text" value="2.0"/></p> |
| <p>20</p> | <p>Save or load methods. Click the arrow  to go back to main interface</p> | <p>SAVE LOAD</p> <hr/> <p></p> |

The MultiVap 54 includes a low level liquid alarm to prevent the bath to be dry; when the liquid level reaches the sensor (about half window), the instrument automatically alerts the operator with the message below:



5. ACCESSORIES

| | | |
|----------|--|--|
| <p>1</p> | <p>N° 54 spare needles</p> |  |
| <p>2</p> | <p>N°54 disposable PP vials</p> |  |
| <p>3</p> | <p>N°54 nitrogen flow stoppers; after the needle removal, stoppers have to be used to avoid nitrogen flowing</p> |  |
| <p>4</p> | <p>Connect the white tube to the drain connector to flow out the liquid and empty the bath</p> |  |

| | | |
|---|---|--|
| 5 | In case of needle vertical lift blockage, switch off the instrument and use the provided tool to move up and down the needles manually. |  |
|---|---|--|

6. SOLVENTS TABLE

| Solvent | Formula | Molar mass in g/mol | Evaporation energy in J/g | Boiling point at 1013mbar | Density in g/cm ³ | Vacuum in mbar for boiling point at 40 °C |
|-------------------------------------|---|------------------------|------------------------------|------------------------------|---------------------------------|--|
| Acetone | CH ₃ C(=O)CH ₃ | 58.1 | 553 | 56 | 0.790 | 556 |
| n-amylalcohol, n-pentanol | C ₅ H ₁₂ O | 88.1 | 595 | 37 | 0.814 | 11 |
| Benzene | C ₆ H ₆ | 78.1 | 548 | 80 | 0.877 | 236 |
| n-butanol | C ₄ H ₁₀ O | 74.1 | 620 | 118 | 0.810 | 25 |
| tert. butanol (2-methyl-2-propanol) | C ₄ H ₁₀ O | 74.1 | 590 | 82 | 0.789 | 130 |
| Chlorobenzene | C ₆ H ₅ Cl | 112.6 | 377 | 132 | 1.106 | 36 |
| Chloroform | CHCl ₃ | 119.4 | 264 | 62 | 1.483 | 474 |
| Cyclohexane | C ₆ H ₁₂ | 84.0 | 389 | 81 | 0.779 | 235 |
| Diethylether | C ₄ H ₁₀ O | 74.0 | 389 | 35 | 0.714 | 850 |
| 1,2-dichloroethane | C ₂ H ₄ Cl ₂ | 99.0 | 335 | 84 | 1.235 | 210 |
| 1,2-dichloroethylene (cis) | C ₂ H ₂ Cl ₂ | 97.0 | 322 | 60 | 1.284 | 479 |
| 1,2-dichloroethylene (trans) | C ₂ H ₂ Cl ₂ | 97.0 | 314 | 48 | 1.257 | 751 |
| Diisopropyl ether | C ₆ H ₁₄ O | 102.0 | 318 | 68 | 0.724 | 375 |
| Dioxane | C ₆ H ₁₀ O ₂ | 88.1 | 406 | 101 | 1.034 | 107 |
| DMF (dimethyl-formamide) | C ₂ H ₅ NO | 73.1 | | 153 | 0.949 | 11 |
| Acetic acid | CH ₃ COOH | 60.0 | 695 | 118 | 1.049 | 44 |
| Ethanol | C ₂ H ₅ OH | 46.0 | 879 | 79 | 0.789 | 175 |
| Ethylacetate | CH ₃ COOC ₂ H ₅ | 88.1 | 394 | 77 | 0.900 | 240 |
| Heptane | C ₇ H ₁₆ | 100.2 | 373 | 98 | 0.684 | 120 |
| Hexane | C ₆ H ₁₄ | 86.2 | 368 | 69 | 0.660 | 360 |
| Isopropylalcohol | C ₃ H ₈ O | 60.1 | 699 | 82 | 0.786 | 137 |
| Isoamylalcohol (3-methyl-1-butanol) | C ₅ H ₁₂ O | 88.1 | 595 | 129 | 0.809 | 14 |
| Methylethylketone | CH ₃ COCH ₂ CH ₃ | 72.1 | 473 | 80 | 0.805 | 243 |
| Methanol | CH ₃ OH | 32.0 | 1227 | 65 | 0.791 | 337 |
| Methylene chloride, dichloromethane | CH ₂ Cl ₂ | 84.9 | 373 | 40 | 1.327 | 850 |
| Pentane | C ₅ H ₁₂ | 72.1 | 381 | 36 | 0.626 | 850 |
| n-propylalcohol | C ₃ H ₈ O | 60.1 | 787 | 97 | 0.804 | 67 |
| Pentachloroethane | C ₂ HCl ₅ | 202.3 | 201 | 162 | 1.680 | 13 |
| 1,1,2,2-tetra-chloroethane | C ₂ H ₂ Cl ₄ | 167.9 | 247 | 146 | 1.595 | 20 |
| Tetrachlorocarbon | CCl ₄ | 153.8 | 226 | 77 | 1.594 | 271 |
| 1,1,1-trichloroethane | C ₂ HCl ₃ | 133.4 | 251 | 74 | 1.339 | 300 |
| Tetra-chloro-ethylene | C ₂ Cl ₄ | 165.8 | 234 | 121 | 1.623 | 53 |
| THF (tetrahydrofuran) | C ₄ H ₈ O | 72.1 | | 67 | 0.889 | 374 |
| Toluene | C ₇ H ₈ | 92.2 | 427 | 111 | 0.867 | 77 |
| Trichloroethylene | C ₂ HCl ₃ | 131.3 | 264 | 87 | 1.464 | 183 |
| Water | H ₂ O | 18.0 | 2261 | 100 | 1.000 | 72 |
| Xylene (mixture) | C ₈ H ₁₀ | 106.2 | 389 | | | 25 |
| o-xylene | C ₈ H ₁₀ | 106.2 | | 144 | 0.880 | |
| m-xylene | C ₈ H ₁₀ | 106.2 | | 139 | 0.864 | |
| p-xylene | C ₈ H 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:

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