User Manual

DRAWELL

Artist of Science

DW-LC1620A

Liquid Chromatography Routine Maintenance and Announcements

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Liquid Chromatography Routine Maintenance and Announcements

Thank you for purchasing our DW-LC1620A liquid chromatography. In order to give you a better use of the product and the greatest help to your work. Please carefully read the following 《liquid chromatography system routine maintenance and matters needing attention》.

Matters needing attention of the Instrument installation conditions

The experimental station of the instrument should be level, steady, and have enough space for placing.

Avoid installing the instrument in the place where exist corrosive gas, strong magnetic field or a large number of dust, otherwise it will affect the normal operation of equipment and shorten the service life of the instrument

Because the solvents used in the instrument are flammable and toxic, so the installation of the equipment room should be thoroughly ventilated, and having a device out exhaust, otherwise it will cause poisoning or physical discomfort, may cause fire.

Should be installed more than four three core power socket (220V, 5~10A), must have a special grounding wire (never use power line as the grounding line), and ensure the voltage stability instrument power in AC (220 ± 22) V, otherwise it will cause instrument in abnormal operation even damage the instrument.

If the laboratory don't have special grounding wire, copper is generally used a diameter of 15~20mm into the 1~1.5 meters underground, with a diameter of about 1.2mm plastic strand of wire connected to the ground terminal of the power supply socket.

If the laboratory voltage instability or not in AC (220 ± 22) V range, must be used with enough power regulator and other necessary equipment, ensure that the power supply voltage stability.

The room temperature of the laboratory as far as possible control in 15 ℃ -30 ℃, and the fluctuation is smaller. The relative humidity is in the range of 45%-85%.

The air flow produced by the air conditioning or other equipment doesn't blow straight the instruments, avoid direct light and vibration.

Instrument startup sequence: first open the high pressure constant flow pump and UV detector, after the UV detector wavelength self inspection, return to the default 254nm, open the workstation software.

Instrument shutdown sequence: press the pump to stop, close the deuterium lamp, exit the workstation software, and then close the instrument.

The instrument should be specifically responsible for, if the user is not fixed, please prepare 《the registration of instrument use》, in order to clear the situation, timely treatment and maintenance.

Notes of using

Notes of using the mobile phase

You must use the HPLC level or equivalent to the level of the mobile phase, and through 0.45 μ m thin film filter first. After filtering, the mobile phase must be thoroughly degassed, to remove the dissolved gas (such as O_2), if not degassing, produce bubbles easily, increase baseline noise, resulting in decreased sensitivity, even can't analysis.

Comparison of several degassing methods:

1、Helium degassing method: Using the solubility of helium in liquid lower than in air, continuous blow helium degassing, effect is good, but the cost is high.

2、Heating reflux: The effect is good, but the operation of complex and the volatile is toxic.

3、Vacuum degassing method: To take the organic phase easily.

4、Ultrasonic degassing method: The mobile phase is placed in the ultrasonic container, using ultrasonic vibration for 10-15 minutes, the effect is poor, but the simple operation

PEEK resin components are used in the pipeline of the instrument; please don't use the following mobile phase:

Concentrated sulfuric acid, concentrated nitric acid, dichloroacetic acid, acetone, tetrahydrofuran, methylene chloride, chloroform and dimethyl sulfoxide.

Special Note:
the cleaning method of the mobile phase containing salt:
1. first with 10:90 methanol / water wash more than one hour, to wash the buffer salts
2. Then 90:10 methanol / water flush the system, and the system is stored in the mobile phase. The cleaning time is at least 40 minutes.

Replacement of the mobile phase

During the analysis, the mobile phase may need to be replaced for analysis. Pay attention to mobile phase and the prior are compatible or not. If the mobile phase and the prior cannot be used with compatibility, then you should pay special attention. Then you need a solvent which can be compatible with these two kinds of the mobile phase to transfer and clean. The commonly used mobile phase for transition is isopropanol, But the actual operation depends on the specific circumstances, the principle is these two mobile phase need to be replaced with a mobile phase compatibility of the mobile phase. General cleaning time is 30-40 minutes, until the system is completely stable.

If you do not carry over "special attention" the above steps, it will cause the system to pipe blockage. And even cause serious pollution clogging the flow cell; have to replace the flow cell. Users must bear the unnecessary loss.

Precautions accumulator

Keep the mobile phase reservoir clean is the key to ensure the normal use of the instrument. Use HPLC grade solvents, if use the solvents containing with salts or not HPLC grade solvents, please use 0.45μm filter to remove particulate matter.

Note pipeline connection

1 fully inserted into the open end of the tube until it collides with the end of the open end up. Otherwise, produce the dead volume, causing peak broadening.
2 In order to minimize the outer column effect, to obtain the desired results of the analysis, try to use the small diameter pipe as the connection.
3 Do not over tighten pipe joints to prevent damage to the threads.

Basic Handling Precautions

Open drain valve before the pump is running, extract the mobile phase with the syringe, and observe 10 seconds, the mobile phase should be continuous outflow.
Close drain valve when don’t use, otherwise the mobile phase flow from the outlet drain valve under atmospheric pressure.

In the using of the instrument, note the mobile phase is enough, if exhausted, replace it as soon as possible.

Be sure to stop the pump when replacing the mobile phase to prevent the inhalation of air, affecting the normal operation of the instrument.

When start analyzing injections, quickly moving the injection valve plate, otherwise it will cause the system pressure jumps, affect the instrument's life.

If higher requirements for qualitative, quantitative analysis of samples should be configured column oven, keep the temperature constant.

If the mobile phase is not pure methanol, after analysis must use HPLC grade methanol to clean injection pump and valve, after about half an hour, until the pressure back down and stabilize you can shut the pump.

If the mobile phase contains salts, shall be cleaned according to the special cleaning methods (already mentioned above).

Routine maintenance of each unit

Column Care Matters

In order to protect the column and extend its life, the following measures should be taken in using:

Should plus stainless steel filter before stigma, plus guard column when you need

in order to prevent clogging the stigma and impact analysis results; using a pre-column with the same kind of large particle size filler when the mobile phase PH> 7; keep the chemically aggressive of solvents not so strong; avoid particles settlement in stigma.

In order to prevent high impact, the limit of the pump pressure is not set too high, generally 15 ~ 20MPa, should be set slightly higher in old column or gradient elution, in order to avoid the half-way down in normal use because the upper limit is set too low; when don't use the column for a long time, should be stored with full of solvent (methanol or acetonitrile) in the columns, sealed at both ends.

Precautions of manual injection valve

After using each time, use special tools (not with a syringe needle) flush the injection valve especially when the samples' concentrations have relatively large differences. Injection valve must be flushed several times with several milliliters each time. To prevent the inorganic deposition and sample particles causing internal valve wear or obstruction, and cross-contamination of samples.

In installation 5, 6 exports of the injection valve and the syringe should at the same level to prevent siphoning phenomenon, or resulting in differences in sample volume repeatability.

The volume of the injection depends on loop volume.

Use a special liquid injection syringe, the syringe must not be a gas injection needle tip. Use a special filter before the sample syringe.

Precautions of the pump

Pump seals are most likely worn parts, the damage of seals can cause the system failure. The length of Seals' life relate to the material quality, the use of pressure, maintenance and buffer. Take the following measures can extend seal's life:

Absolutely not allowed to start the pump without the mobile phase or the mobile phase has not yet entered the pump head;

After using the system every day should clean the pipeline to prevent salt deposition, the entire pipeline should be immersed in the absence of buffer solution or organic solvent; flush the entire pipeline pump periodically even though do not use it for a long time;

Use HPLC grade reagents;

Use stainless steel filter to prevent damage of plunger rod caused by excessive pressure or burn out the motor;

The low limit pressure should be set at 0.5 ~ 1MPa, to prevent the liquid phase is drained and cause serious leakage or dry grinding the plunger rod caused by severe leakage.

The pressure of pump is unstable

During installation and commissioning, as well as in everyday use, if there is pressure instability phenomenon. There are several reasons:

There are bubbles in pipe. Proposal to remove air bubbles more time, or open the drain valve, use the syringe in accessories for more times. Then high velocity flushes. The inlet check valve failure caused, which is often encountered. First of all, how to determine the inlet check valve is failure. The steps are:

If it is a gradient analysis system, the pressure instability must be caused by one of the pumps, the analysis must be individually:

1 In the premise UV detector and workstation off, open one of the pumps with pure water as the mobile phase.

2 Open the drain valve, pull out some of the mobile phase with a syringe, confirm that the pump has been filled of the mobile phase. Use cylinder to mount the liquid from the drain valve.

3 Press the "Set" button until the "flush" appear, choose this key and press the Enter key twice to start the flushing function. Flow rate is 5ml/min, time 5min (Note: At this point drain valve still open, otherwise the column would be washed out).

4 After washing is completed, make sure that the mobile phase volume in cylinder is 25ml (5 × 5 = 25), if correct, it shows that the pump without failure at low pressure; If incorrect, then a one-way valve in the pump failure (typically the inlet check valve).

5 Test the other pump with the same method .

6 If isocratic, only one pump need to test.

The reason of the failure of check valve

1 There is a period time from the finished liquid chromatography to the customer, each instrument factory to go through commissioning, before leaving the factory each instrument must go through commissioning, the residue mobile phase would stick with the Gem Ball over time. It will result in the similar situation if the customers

don’t use it for a long time. Customers are advised to use the methanol as the mobile phase to clean the pipeline once a week when do not use it for a long term, open it at least one hour so that the pipe is filled with liquid.

2 The impurities in the mobile phase or other reasons pollute the check valve. While some customers think the mobile phase was filtered already, after long-term use, would inevitably lead to a similar situation because liquid chromatography is microanalysis instrument, this is a common phenomenon in liquid chromatography, d as long as the pump is a passive one-way valve, there will be a similar phenomenon occurs, it is not the quality of the instrument, but part of routine maintenance. Now introduce a simple and effective approach to the one-way valve failure.

Check valve failure treatment:

1 Unscrew the inlet check valve (total of two)
2 Put the two valves into the water in an ultrasonic cleaner, cleaning 10 minutes
3 Wash them with a special needle (the needle is tighten to the input of the one-way valve, see Parts List), hold the gasket in front of the check valve when rushing, to prevent the gasket is dashed.
4 After completed, the inlet check valve can be loaded back to the original position. (Note that the one-way valve shall be tightened).

If the flow rates of both pumps are correct at low pressure, it is recommended that the two are connected to the column for the high-pressure pump test.

The specific operation test under high pressure

1 Under the premise of two-pump connected to the system; only one of the pumps needs to turn on (confirm the connection of mobile phase).
2 Set the flow rate at 1ml/min.
3 Turn on the pump.
4 During operation, observe the pump pressure is stable or not, If stable, indicating that the pump is no problem. If the pump pressure is unstable, you should check that whether the pipe joints are leaking and tight the leaking pipe joints. If there is no leak, the problem may still be out on a one-way valve, check valve must be washed again, and repeated tests. (Note: do not need to open the UV detector)
5 Repeat the above steps for the other pump high-pressure test.

If the pressure is unstable situation still occur, there may be damage to seals, propose to replace it.

Precautions of the UV detector

Keep the flow cell clean; wash the entire pipeline after each use. To backwash the cell with a strong solvent periodically (broken column) to clean the flow cell.
Use degassed mobile phase, to prevent the bubble remaining in the flow cell, affect the analysis results.

Attention to deuterium lamp's maintenance, in order to save the life of the lamp turns off the light when don't use. Suggestion: the free time is more than four hours you can turn off the lights, because frequent light switch will also shorten the life of the lamp.

Liquid chromatography is a precision micro-analytical instrument, the function's full performance without your meticulous care. If have any questions in practical work, please feel free to contact us, we will be happy to serve you.

Drawell International Technology Limited
Shanghai Drawell Scientific Instrument Co.,Ltd

Add : Room 211,Building 7,ShengYu Industrial Park,No.365 ChuanHong Road,PuDong,Shanghai,China
Tel/ Fax: 0086 21 50966080
Web : www.drawell.com.cn
Email : sales01@drawell.com.cn