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1.设备交接清单

1.1 货物交接清单

合同编号：豫财招标采购-2020-1495

最终用户：郑州大学

序号	名称	品牌型号	数量	备注
1	全自动智能蛋白液相色谱系统	Cytiva AKTA avant	1 台	送货
2	快速蛋白层析系统	Cytiva AKTA pure	1 台	送货

地址：郑州市科学大道 100 号

签收之前请务必确认以下内容：

- 1、收货时请勿拆托盘；
- 2、外包装是否破损；
- 3、货物数量是否正确；
- 4、货物由送货师傅送到贵司指定实验室，费用由卖方承担，请勿重复结算任何费用。

中标商签字：常朝朝

接收人签字：江

签收日期：2021.3.15

3



Attention:
Bill To:
LUMIERE TECH LIMITED
#606, LEFTBANK COMMUNITY
NO.68, BEISHUAN XI LU HAI DIAN DIST
BEIJING, BEIJING, CN

Attention: Ship To:
CERNET CORPORATION
TSINGHUA SCIENCE PK BLDG 8
CERNET TOWER
NO.1 ZHONGGUANCUN EAST RD
BEIJING, BEIJING CN

Attention:
Deliver To:
LUMIERE TECH LIMITED
RM806, LEFT BANK COMMUNITY
NO.68, BEISHUAN XI LU HAI DIAN DIST
BEIJING, BEIJING

For Ordering and Information: 021 58692900

Billing: C/P-BEIJING/PREPAID AND ADD
Shipping Cond.: Ambient
Ship Method: GEODIS AIR STD D2A

Date of Delivery: 17-DEC-2020
WEEE:
Gross Weight(Kg): 61

Customer Service Rep: Zhou, Huizhu
Billing: CP, BEIJING/PREPAID AND ADD

Date of Delivery: 17-DEC-2020

Shipping Cond: Ambient
Ship Method: GEODIS AIR STD D2A

Parcel Type: PRODUCT PACKAGE
Dimensions (Cm): 60x76.5x87.5

Shipping Instructions: Cytiva, formerly part of GE Healthcare Life Sciences, was acquired by Danaher on 31 March 2020. Visit us at cytiva.com/customers for information about our transition.

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
1.1	1	29018227 29018227	AKTA pure 25 M1	203.262 1213194		Ambient	SE
Serial Number :		2693049					

Place your order online. Visit us at www.cytiva.com for more information. Find product documents at www.cytiva.com/certificates

Packing Note



Package No: SGD000129555
 Shipment No: 114745678
 Print Date: 17-Dec-2020
 Page Number: 1 of 1

Shipper: Global Life Sciences Solutions Singapore Pte. Ltd. C/o DHL Supply Chain Pte. Ltd. 1 Greenway Drive, Unit #03-03 Block 2 Level 2, Tampines Logistics Park SINGAPORE-533855 SG	Attention: Bill To: LUMIERE TECH LIMITED RM506, LEFTBANK COMMUNITY NO.68, BEISHUAN XI LU HAI DIAN DIST BEIJING, BEIJING, CN	Ship To: CERNET CORPORATION TSINGHUA SCIENCE PARK BLDG 8 CERNET TOWER NO.1 ZHONGGUANCUN EAST RD BEIJING, BEIJING, CN	Attention: Deliver To: LUMIERE TECH LIMITED RM506, LEFTBANK COMMUNITY NO.68, BEISHUAN XI LU HAI DIAN DIST BEIJING, BEIJING
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For Ordering and Information: 021 58692900

Customer Service Rep: Zhou, Huizhu	Billing: CIP/BEIJING/PREPAID AND ADD	Date of Delivery: 17-DEC-2020	Parcel Type: PRODUCT PACKAGE
Caller Name/ Caller Number:	Shipping Cond.: Ambient	WEEE:	Dimensions (Cm): 101.7x20x98.7
	Ship Method: GEODIS AIR STD_D2A	Gross Weight(Kg): 161	

Shipping Instructions: Cytiva, formerly part of GE Healthcare Life Sciences, was acquired by Danaher on 31 March 2020.
 Visit us at cytiva.com/customers for information about our transition.

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
1.1	1	28976337 28976337	AKTA event 150	2031263 1213193		Ambient	SE
Serial Number :		2693056					

Place your order online. Visit us at www.cytiva.com for more information. Find product documents at www.cytiva.com/life-sciences
 This is to certify that these products conform to Global Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.



Packing Note

Package No: SCD000129560
 Shipment No: 114745678
 Print Date: 17-Dec-2020
 Page Number: 1 of 4

Shipper: Global Life Sciences Solutions Singapore Pte. Ltd. C/o DHL Supply Chain Pte Ltd 1 Greenwich Drive, Unit #03-03 Block 2 Level 2, Tampines Logistics Park SINGAPORE-537865 SG	Attention: Bill To: LUMIERE TECH LIMITED RM806, LEFTBANK COMMUNITY NO.68, BEISHUAN XI LU, HAIADIAN DIST BEIJING, BEIJING, CN	Attention: Ship To: CERNET CORPORATION TSINGHUA SCIENCE PK BLDG 8 CERNET TOWER NO.1 ZHONGGUANCUN EAST RD BEIJING, BEIJING, CN	Attention: Deliver To: LUMIERE TECH LIMITED RM806, LEFTBANK COMMUNITY NO.68, BEISHUAN XI LU, HAIADIAN DIST BEIJING, BEIJING
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For Ordering and Information: 021 58692900

Customer Service Rep: Zhou Huizhu	Billing: CIP:BEIJING/PREPAID AND ADD	Date of Delivery: 17-DEC-2020	Parcel Type: HALF WOODEN PALLET
Carrier Name/ Caller Number:	Shipping Cond.: Ambient	WEEL:	Dimensions (Cm): 84x54x80
	Ship Method: GEOPS_AIR_STD_02A	Gross Weight(kg): 40	

Shipping Instructions: Cytiva, formerly part of GE Healthcare Life Sciences, was acquired by Danaher on 31 March 2020.
 Visit us at www.cytiva.com for information about our transition.

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
3.1	1	29203183 29203183	UNICORN 7.1 DVD pk no license	2081263 1213193		Ambient	SE
4.1	2	28956282 28956282	Column holder	2081263 1213193		Ambient	SE
5.1	4	11000407 11000407	INLET FILTER HOLDER KIT (AKTAL)	2081263 1213193		Ambient	SE
7.1	2	11000339 11000339	UNION VALCO F/F	2081263 1213193		Ambient	SE
8.1	1	18111253 18111253	PEEK TUBING ID 0.75MM ID/16in	2081263 1213193		Ambient	SE

Place your order online: Visit us at www.cytiva.com for more information. Find product documents at www.cytiva.com/certificates
 This is to certify that these products conform to Global Life Sciences Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.

Packing Note



Package No: SGD000129560
Shipment No: 114745678

Print Date: 17-Dec-2020
Page Number: 2 of 4

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order / Our Order	Lot Number / Expiration Date	Storage Temp.	Country of Origin
9.1	1 ✓	18111583 18111583	PEEK TUBING ID 1.0MM (1/16)	208J263 1213193		Ambient	US
10.1	1 ✓	13102711 13102711	ONLINE FILTER KIT, PKG/10(100 ML/MIN AKTA SYSTEMS)	208J263 1213193		Ambient	SE
11.1	2 ✓	28954326 28954326	Union 1/16 m/e/male, ID=0.5mm (5-pack)	208J263 1213193		Ambient	SE
12.1	2 ✓	18111257 18111257	UNION 1/16in FEMALE/M6 MALE	208J263 1213193		Ambient	SE
13.1	2 ✓	19214301 19214301	TUBING CONNECTOR SPTC-2	208J263 1213193		Ambient	SE
14.1	2 ✓	18111258 18111258	UNION M6 FEMALE 1/16in MALE	208J263 1213193		Ambient	SE
15.1	2 ✓	18111368 18111368	PEEK TUBING, 2M/ID 0.5/OD 1/16	208J263 1213193		Ambient	US
16.1	1 ✓	28956427 28956427	Cossette, for 3 ml tubes (2-pack)	208J263 1213193		Ambient	SE
17.1	6 ✓	28956404 28956404	Cossette, for 15 ml tubes (2-pack)	208J263 1213193		Ambient	SE
18.1	2 ✓	18111398 18111398	SAMPLE LOOP 100 U.L. INP-907	208J263 1213193		Ambient	SE

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This is to certify that these products conform to Global Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.

Packing Note



Package No: SGD00129560
Shipment No: 114745678

Print Date: 17-Dec-2020

Page Number: 3 of 4

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Number	Lot Number/Expiration Date	Storage Temp.	Country of Origin
19.1	2 ✓	18111399 18111399	SAMPLE LOOP 500 µL, INV-907	208J263 1213193		Ambient	SE
20.1	2 ✓	18111401 18111401	SAMPLE LOOP 10 ML, INV-907	208J263 1213193		Ambient	SE
21.1	2 ✓	18111402 18111402	SAMPLE LOOP 20 ML, INV-907	208J263 1213193		Ambient	SE
22.1	2 ✓	18114053 18114053	SAMPLE LOOP 5 ML PEEK	208J263 1213193		Ambient	SE
23.1	2 ✓	28988937 28988937	RK 16/20 column	208J263 1213193		Ambient	SE
24.1	3 ✓	28989448 28989448	RK 26/20 column	208J263 1213193		Ambient	SE
25.1	1 ✓	28989858 28989858	Packing Reservoir RK 16/26	208J263 1213193		Ambient	SE
27.1	1 ✓	28989861 28989861	Packing Reservoir RK 50	208J263 1213193		Ambient	SE
28.1	4 ✓	28980319 28980319	Rock for 50 mL tubes	208J263 1213193		Ambient	SE
29.1	1 ✓	28401081 28401081	HTRAP_HRPREP_1_16 CONNECAKTA	208J263 1213193	10301043 29-FEB-2048	Ambient	SE

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This is to certify that these products conform to Global Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.

Packing Note



Package No: SGD00129560	Print Date: 17-Dec-2020
Shipment No: 114745678	Page Number: 4 of 4

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
30.1	1 ✓	18111251 18111251	UNION LUER FEMALE/HPLC MALE	20BJ263 1213193		Ambient	SE
31.1	1 ✓	18111255 18111255	FINGERTIGHT CONNECTOR 1/16in	20BJ263 1213193		Ambient	SE
32.1	1 ✓	11000464 11000464	STOP PLUG FEMALE, 1/16 IN	20BJ263 1213193	10296401 30-NOV-2047	Ambient	SE
33.1	1 ✓	13385801 13385801	UNION M6 F - 1/16in M PEEK	20BJ263 1213193		Ambient	SE
34.1	1 ✓	18111252 18111252	STOP PLUG 1/16in, PKG/5	20BJ263 1213193		Ambient	SE
35.1	1 ✓	11000355 11000355	FINGERTIGHT STOP PLUG	20BJ263 1213193		Ambient	SE

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Packing Note

Package No: SGD000129562	Print Date: 17-Dec-2020
Shipment No: 114749785	Page Number: 1 of 1

Shipper: Ginkgo Life Sciences Solutions Singapore Pte. Ltd. C/o: DHL Supply Chain Pte. Ltd. 1 Greenwich Drive, Unit #02-03 Block 2 Level 2, Tompkins Logistics Park SINGAPORE-533865 SG	Attention: Bill To: LUMIERE TECH LIMITED RM806, LEFTBANK COMMUNITY NO.68, BEISHIHUAN XI LU, HAIJIAN DIST BEIJING, BEIJING, CN	Attention: Ship To: CERNET CORPORATION TSINGHUA SCIENCE PK BLDG 8 CERNET TOWER NO.1 ZHONGGUANJUN EAST RD BEIJING, BEIJING, CN	Attention: Deliver To: LUMIERE TECH LIMITED RM806, LEFTBANK COMMUNITY NO.68, BEISHIHUAN XI LU, HAIJIAN DIST BEIJING, BEIJING
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For Ordering and Information: 021 58692920.

Customer Service Rep: Zhou Huizhu	Billing: CIP/BEIJING/PREPAID AND ADD	Date of Delivery: 17-DEC-2020
Caller Name/ Caller Number:	Shipping Cond.: Ambient	WEEE:
	Ship Method: GEODIS_AIR_STD_D2A	Gross Weight(kg): 2
		Parcel Type: CARTON
		Dimensions (Cm): 45.4x34.4x38.7

Shipping Instructions: Cytiva, formerly part of GE Healthcare Life Sciences, was acquired by Danaher on 31 March 2020.
Visit us at cytiva.com/customers for information about our transition.

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/Expiration Date	Storage Temp.	Country of Origin
6.1	2	289401081 28401081	HITRAP_HIPREP_L_35 CONNEX AKTA	203J263 1213193	10301043 29-FEB-2046	Ambient	SE
25.1	1	28988952 28988952	xx 50/20 column	203J263 1213193		Ambient	SE

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 This is to certify that these products conform to Ginkgo Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.



Packing Note

Package No: SGD000129544	Print Date: 17-Dec-2020
Shipment No: 114744648	Page Number: 1 of 3

Shipper: Global Life Sciences Solutions Singapore Pte. Ltd. C/o DHL Supply Chain Pte. Ltd. 1 Greenway Drive, Unit #03-03 Block 2 Level 2, Tampines LogisticsPark SINGAPORE 533865 SG	Attention: Ship To: CERNET CORPORATION CERNET SCIENCE PK 3LDG 8 CERNET TOWER NO.1 ZHONGGUAN CUN EAST RD BEIJING, BEIJING, CN	Attention: Deliver To: LUMIERE TECH LIMITED RM806, LEFTBANK COMMUNITY NO.68, BEISHUAN XI LU HAIJIAN DIST BEIJING, BEIJING, CN
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For Ordering and Information: 021 58692900

Customer Service Rep: Zhou Huihu	Billing: CIF-BEIJING/PREPAID AND ADD	Date of Delivery: 17-DEC-2020
Callor Name/ Caller Number:	Shipping Cond: Ambient	WEEE
	Ship Method: GEODIS AIR STD D2A	Gross Weight(Kg): 35
		Parcel Type: HALF WOODEN PALLET
		Dimensions (Cm): 84x64x80

Shipping Instructions: Cytiva, formerly part of GE Healthcare Life Sciences, was acquired by Danaher on 31 March 2020. Visit us at cytiva.com/customers for information about our transition.

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
4.1	1	29297751 29297751	UNICORN 7.3 DVD pk no license	208J262 1213194		Ambient	SE
5.1	1	29011359 29011359	pH Valve Kit (V9-SH)	208J262 1213194		Ambient	SE
Serial Number : 2687745							
6.1	1	29387193 29387193	pH Electrode	208J262 1213194	17208146 18-SEP-2021	Ambient	SE
7.1	1	29011362 29011362	Fraction Collector F9-R	208J262 1213194		Ambient	SE
Serial Number : 2700611							

Please your order online. Visit us at www.cytiva.com for more information. Find product documents at www.cytiva.com/certificates
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Packing Note

Package No: SGD000129574	Print Date: 17-Dec-2020
Shipment No: 114744648	Page Number: 2 of 3

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
8.1	1	29011355 29011355	Column Valve (V9 Cs, 1-column)	208J262 1213194		Ambient	SE
Serial Number : 2695373							
9.1	2	18111315 18111315	INLET FILTER ASSEMBLY	208J262 1213194		Ambient	SE
10.1	1	18111368 18111368	PEEK TUBING, 2M/ID 0.5/OD 1/16	208J262 1213194		Ambient	US
11.1	1	18111253 18111253	PEEK TUBING ID 0.75MM (1/16in)	208J262 1213194		Ambient	SE
12.1	1	28956282 28956282	Column holder	208J262 1213194		Ambient	SE
13.1	1	28956378 28956378	UV flow cell U9-10	208J262 1213194		Ambient	SE
Serial Number : 2674052							
14.1	1	29148721 29148721	Superdex 75 Increase 10/300 GL	208J262 1213194	10293124 28-FEB-2025	Ambient	SE
15.1	1	29091596 29091596	Superose 6 Increase 10/300 GL	208J262 1213194	10297990 30-APR-2025	Ambient	SE
16.1	2	17508701 17508701	HiPREP 26/10 DESALTING	208J262 1213194	10295508 30-NOV-2023	Ambient	SE

This is to certify that these products conform to Global Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.

Place your order online. Visit us at www.cytiva.com for more information. Find product documents at www.cytiva.com/certificates

Packing Note



Package No: SOD000129544	Print Date: 17-Dec-2020
Shipment No: 114744648	Page Number: 3 of 3

Line#	Shipped Qty.	Catalogue Item Number	Item Description	Your Order Our Order	Lot Number/ Expiration Date	Storage Temp.	Country of Origin
18.1	1 ✓	17051001 17051001	Q SEPHAROSE FAST FLOW 300 ML	208.262 1213194	10300447 31-OCT-2025	Ambient	SE
19.1	1 ✓	17537201 17507201	Q SEPHAROSE XL 300 ML	203.262 1213194	10298303 30-SEP-2025	Ambient	SE
20.1	1 ✓	17094602 17094602	OCTYL SEPHAROSE 4 FAST FLOW 200 ML	208.262 1213194	10294976 31-MAY-2025	Ambient	SE
21.1	1 ✓	17106201 17106201	PHENYL SEPHAROSE HIGH PERF. 75 ML	208.262 1213194	10297691 31-AUG-2025	Ambient	SE
22.1	1 ✓	17003402 17003402	SEPHADEN G-25 COARSE 500 G	208.262 1213194	10292009 31-MAR-2028	Ambient	SE

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This is to certify that these products conform to Global Life Sciences Solutions Singapore Pte. Ltd. specifications. All the products are manufactured, certified and tested in accordance with documented quality procedures.

2.设备安装调试报告

2.1 设备安装调试报告--全自动智能蛋白液相色谱系统

用户名称	郑州大学		
设备名称	全自动智能蛋白液相色谱系统	品牌型号	Cytiva AKTA avant
联系人	江冰	电话	13051575129
外观质量（有无破损）：设备交接时，外观完好，无碰撞破损现象，开箱后设备完好，无碰撞破损现象。			
清点数量（主机、配件、型号、规格、产地是否与招投标文件、合同、装箱单数量相同，如有出入，说明缺件名称、规格、数量、金额） 主机、配件、型号、规格、产地与招投标文件、合同、装箱单数量相符。			
仪器设备是否经过安装调试，（测试内容及结果） 仪器设备是否经过安装调试，（测试内容及结果） 1. 打开设备外包装，清点货物，连接好样品收集器，连接电源，安装设备系统 2. 准备缓冲液冲洗泵和管路，分别对两个泵、紫外检测器、电导检测器，系统压力进行检测 3. 检测结果：梯度在 0%到 99%之间呈线性关系，电导率测试 100%通过，压力检查通过，压力低于 0.2MPa，紫外线响应测试结果通过了吸光度比（2/1）=1.17 允许区间：1.08-1.27 吸光度比（2/3）=1.40 允许区间：1.26-1.59！			
工程师签字	江冰	用户签字	江冰

2.2 设备调试报告-快速蛋白层析系统

用户名称	郑州大学			
设备名称	快速蛋白层析系统	品牌型号	Cytiva AKTA pure	
联系人	江冰	电话	13051575129	
外观质量（有无破损） 设备交接时，外观完好，无碰撞破损现象，开箱后设备完好，无碰撞破损现象。				
清点数量（主机、配件、型号、规格、产地是否与招投标文件、合同、装箱单数量相同，如有出入，说明缺件名称、规格、数量、金额） 主机、配件、型号、规格、产地与招投标文件、合同、装箱单数量相符。				
仪器设备是否经过安装调试，（测试内容及结果） 1. 打开设备外包装，清点货物，连接好样品收集器，连接电源，安装设备系统 2. 准备缓冲液冲洗泵和管路，分别对两个泵、紫外检测器、电导检测器，系统压力进行检测 3. 检测结果：梯度在 0%到 99%之间呈线性关系，电导率测试 100%通过，压力检查通过，压力低于 0.2MPa，紫外线响应测试结果通过了吸光度比（2/1）=1.17 允许区间：1.08-1.27 吸光度比（2/3）=1.40 允许区间：1.26-1.59！				
工程师签字			用户签字	

3 设备性能测试报告

3.1 设备性能合格测试报告 -AKTA avant 150

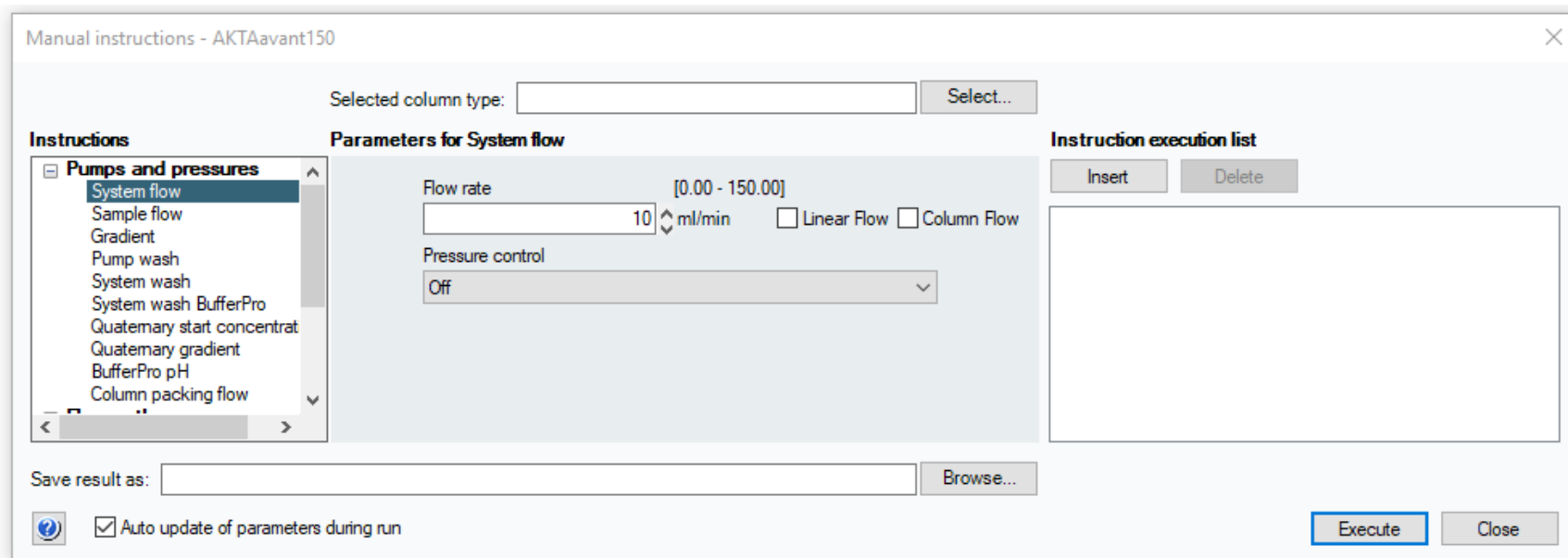
测试设备品名：全自动智能蛋白液相色谱系统

测试时间：2021 年 5 月 1 日

测试人员：王肖增

测试样品：科研蛋白

1、系统泵单泵流速 0.01-150ml/min，软件运行三种流速 10、50、150 ml/min，测试通过。下图为流速设置和图谱显示的界面：



Manual instructions - AKTAavant150

Selected column type:

Instructions

- ☒ **Pumps and pressures**
- ☐ System flow
- ☐ Sample flow
- ☐ Gradient
- ☐ Pump wash
- ☐ System wash
- ☐ System wash BufferPro
- ☐ Quaternary start concentrat
- ☐ Quaternary gradient
- ☐ BufferPro pH
- ☐ Column packing flow

Parameters for System flow

Flow rate [0.00 - 150.00] ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

Instruction execution list

Save result as:

☐ ☒ Auto update of parameters during run

Manual instructions - AKTAavant150

Selected column type:

Instructions

- ☒ **Pumps and pressures**
 - System flow
 - Sample flow
 - Gradient
 - Pump wash
 - System wash
 - System wash BufferPro
 - Quaternary start concentrat
 - Quaternary gradient
 - BufferPro pH
 - Column packing flow

Parameters for System flow

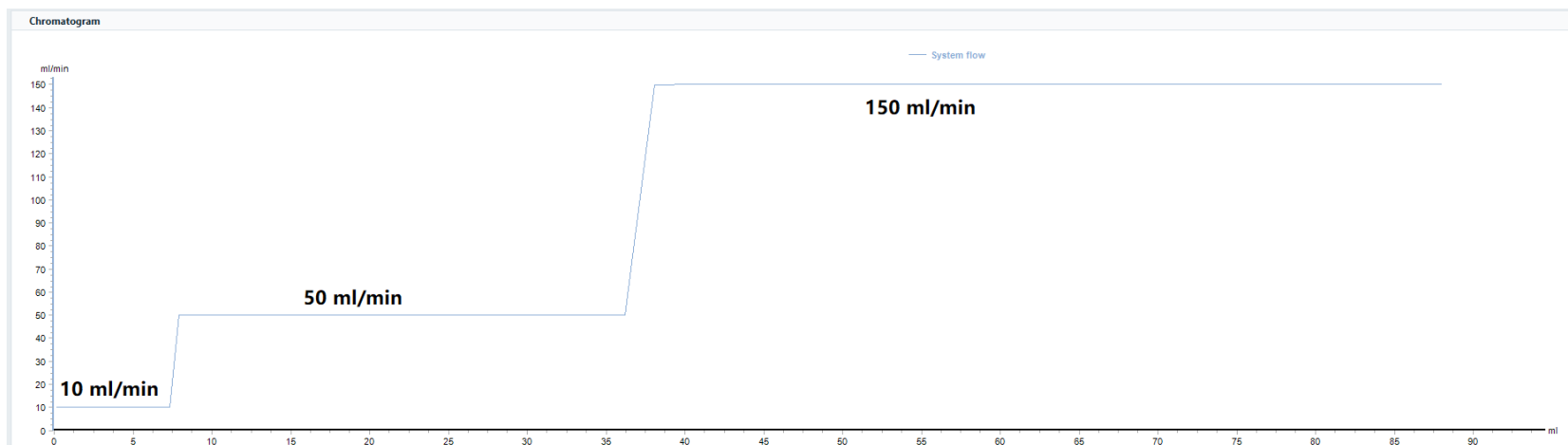
Flow rate [0.00 - 150.00]
 ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

Instruction execution list

Save result as:

☒ Auto update of parameters during run



2、双泵模式 0.01-300ml/min，软件运行测试通过，下图为 300 ml/min 流速设置和运行图谱界面

Selected column type:

Instructions

[-] Pumps and pressures

System flow

Sample flow

Gradient

Pump wash

System wash

System wash BufferPro

Quaternary start concentrat

Quaternary gradient

BufferPro pH

Column packing flow

Parameters for Column packing flow

Flow rate

[0.00 - 300.00]

ml/min

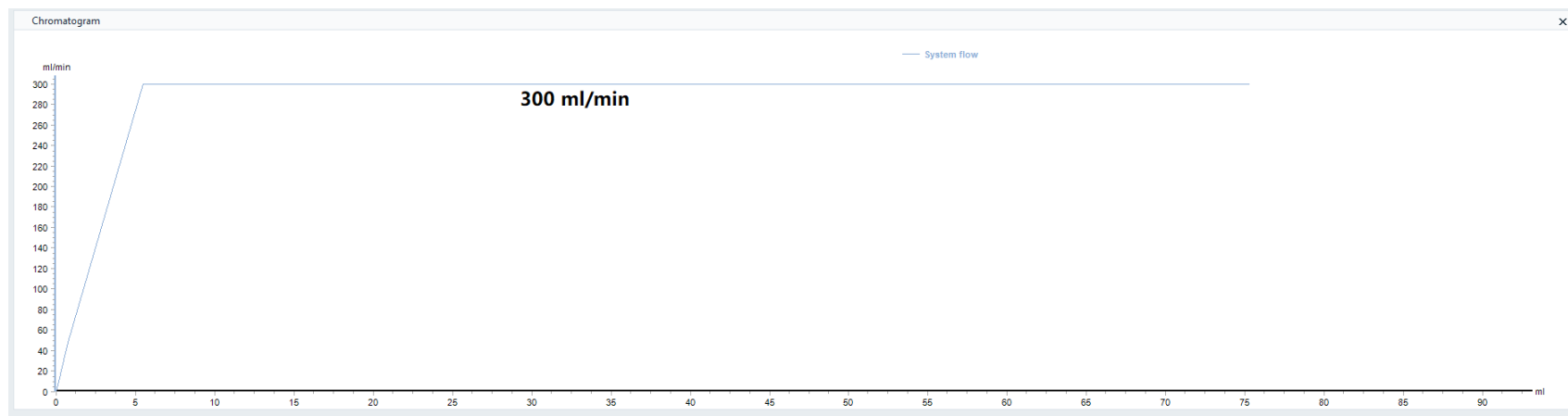
☐ Linear Flow

☐ Column Flow

Instruction execution list

Save result as:

☒ Auto update of parameters during run



3、系统泵压力范围：0-5 MPa，软件运行测试压力可以设置报警数值，压力实时显示，并且超压能够报警暂停：

Selected column type:

Instructions

- Alarms
 - Alarm system pressure
 - Alarm sample pressure
 - Alarm delta column pressure
 - Alarm pre column pressure
 - Alarm UV1
 - Alarm conductivity
 - Alarm pH
 - Alarm air sensors
 - Alarm analog in 1
 - Alarm analog in 2

Parameters for Alarm system pressure

Mode
☐ Disabled ☒ Enabled

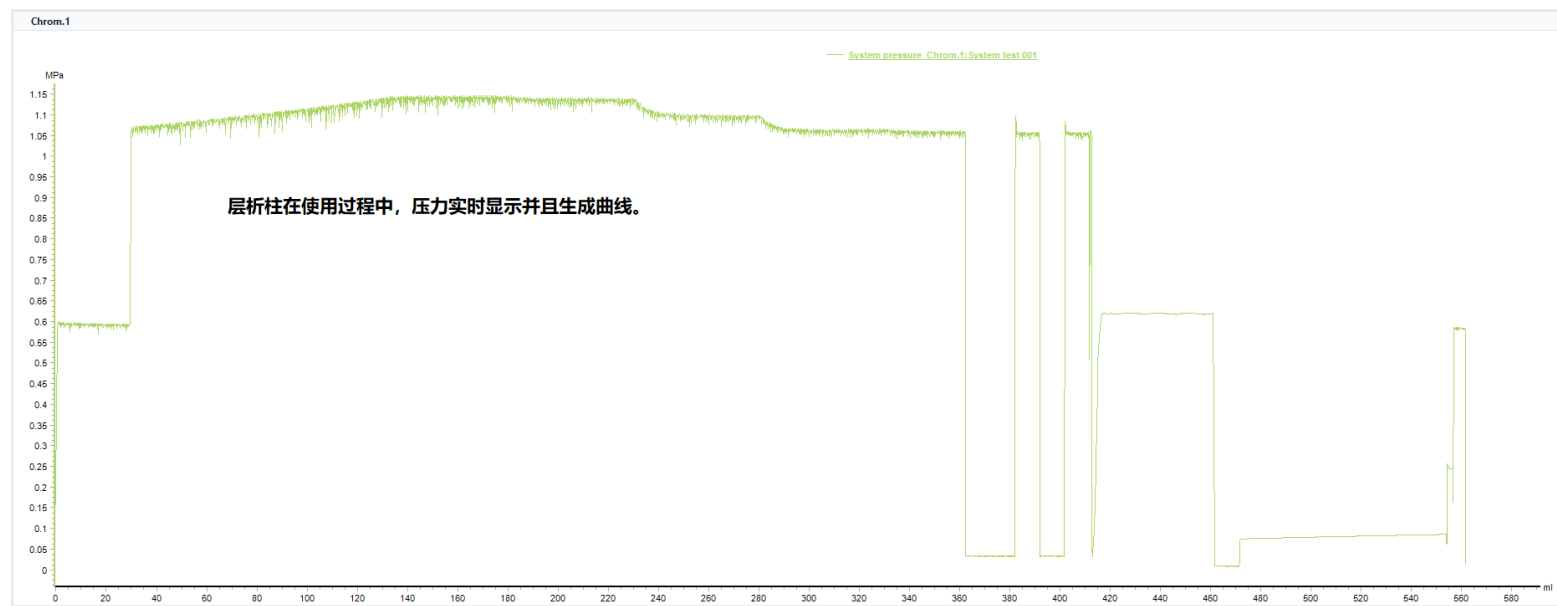
High alarm [0.00 - 5.00]
 MPa

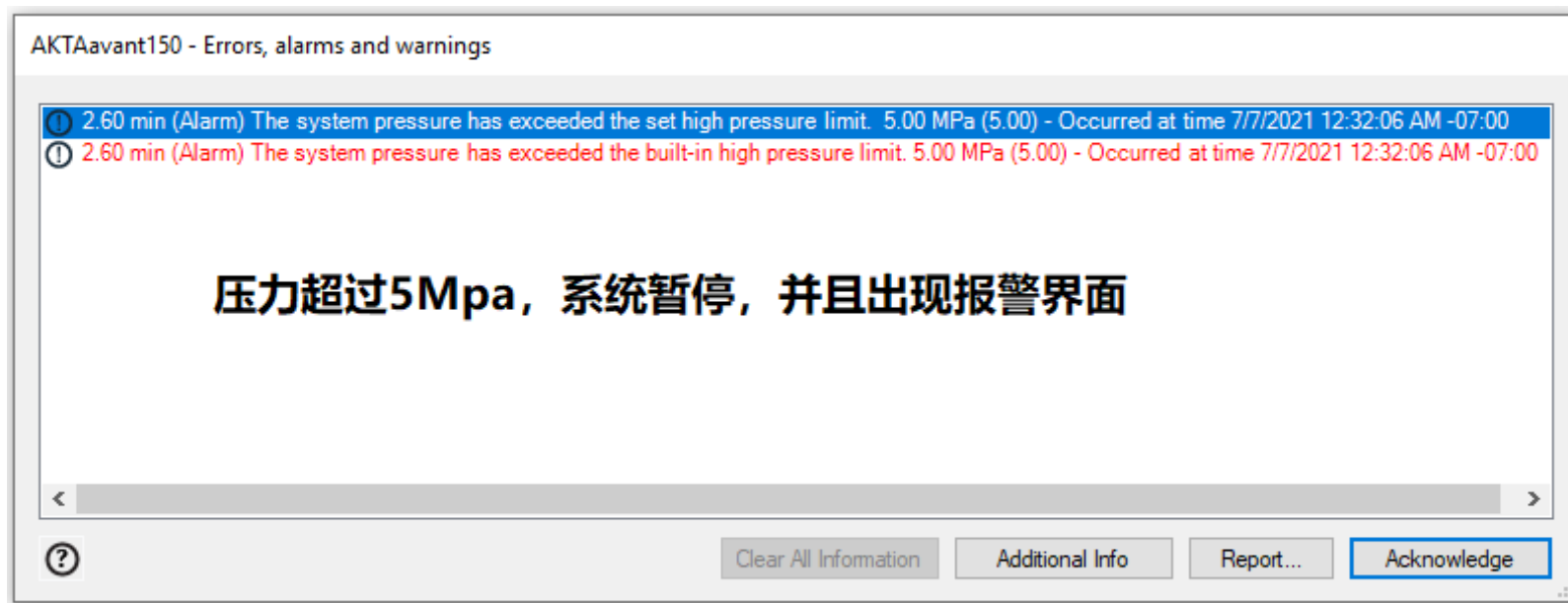
Low alarm [0.00 - 5.00]
 MPa

Instruction execution list

Save result as:

☒ Auto update of parameters during run





- 4、系统泵粘度范围：0.35-5 cP，用标准粘度液体以及用户常用的溶液进行测试，泵运行正常。
- 5、恒压控制流速功能，软件测试运行正常。

Selected column type:

Select...

Instructions

Advanced

- Constant pressure flow
- Constant pressure flow para
- Pressure control parameters**
- System and pump wash set
- Start volume count
- Stop volume count
- Method progressing flow
- Set trigger 1
- Set trigger 2
- Set trigger 3

Parameters for Pressure control parameters

P factor [0.0 - 10000.0]
 ↕

I factor [0.0 - 100000.0]
 ↕

Target value for pressure control [10 - 90]
 ↕ %

Pressure control min flow rate [0.00 - 150.00]
 ↕ ml/min ☐ Linear Flow ☐ Column Flow

Instruction execution list

Insert

Delete

Save result as:

Browse...

☒ Auto update of parameters during run

Execute

Close

6、样品泵单泵流速 0.01-150ml/min，软件运行测试 10、50、150 ml/min 三种流速，流速能够运行，下图为三种流速设置的界面和测试实验运行的图谱。

Manual instructions - AKTAavant150

Selected column type:

Instructions

- ☒ **Pumps and pressures**
 - System flow
 - Sample flow**
 - Gradient
 - Pump wash
 - System wash
 - System wash BufferPro
 - Quaternary start concentrat
 - Quaternary gradient
 - BufferPro pH
 - Column packing flow

Parameters for Sample flow

Flow rate [0.00 - 150.00]
 ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

Instruction execution list

Save result as:

☒ Auto update of parameters during run

Manual instructions - AKTAavant150

Selected column type:

Instructions

- System flow
- Sample flow**
- Gradient
- Pump wash
- System wash
- System wash BufferPro
- Quaternary start concentrat
- Quaternary gradient
- BufferPro pH
- Column packing flow

Parameters for Sample flow

Flow rate [0.00 - 150.00]
 ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

Instruction execution list

Save result as:

☐ ☐ Auto update of parameters during run

Manual instructions - AKTAavant150

Selected column type:

Instructions

- ☐ Pumps and pressures
 - System flow
 - Sample flow**
 - Gradient
 - Pump wash
 - System wash
 - System wash BufferPro
 - Quaternary start concentrat
 - Quaternary gradient
 - BufferPro pH
 - Column packing flow

Parameters for Sample flow

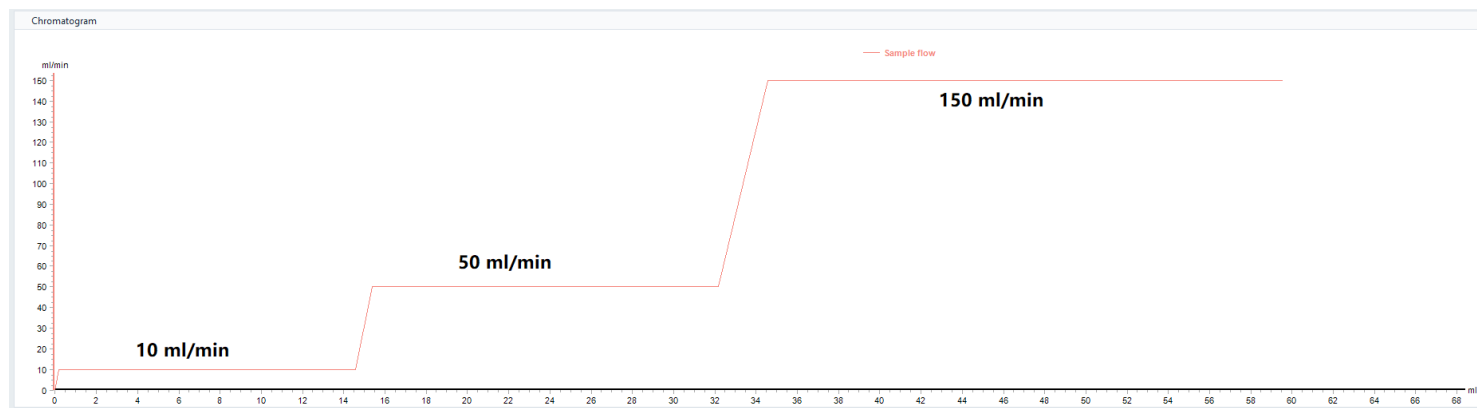
Flow rate [0.00 - 150.00] ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

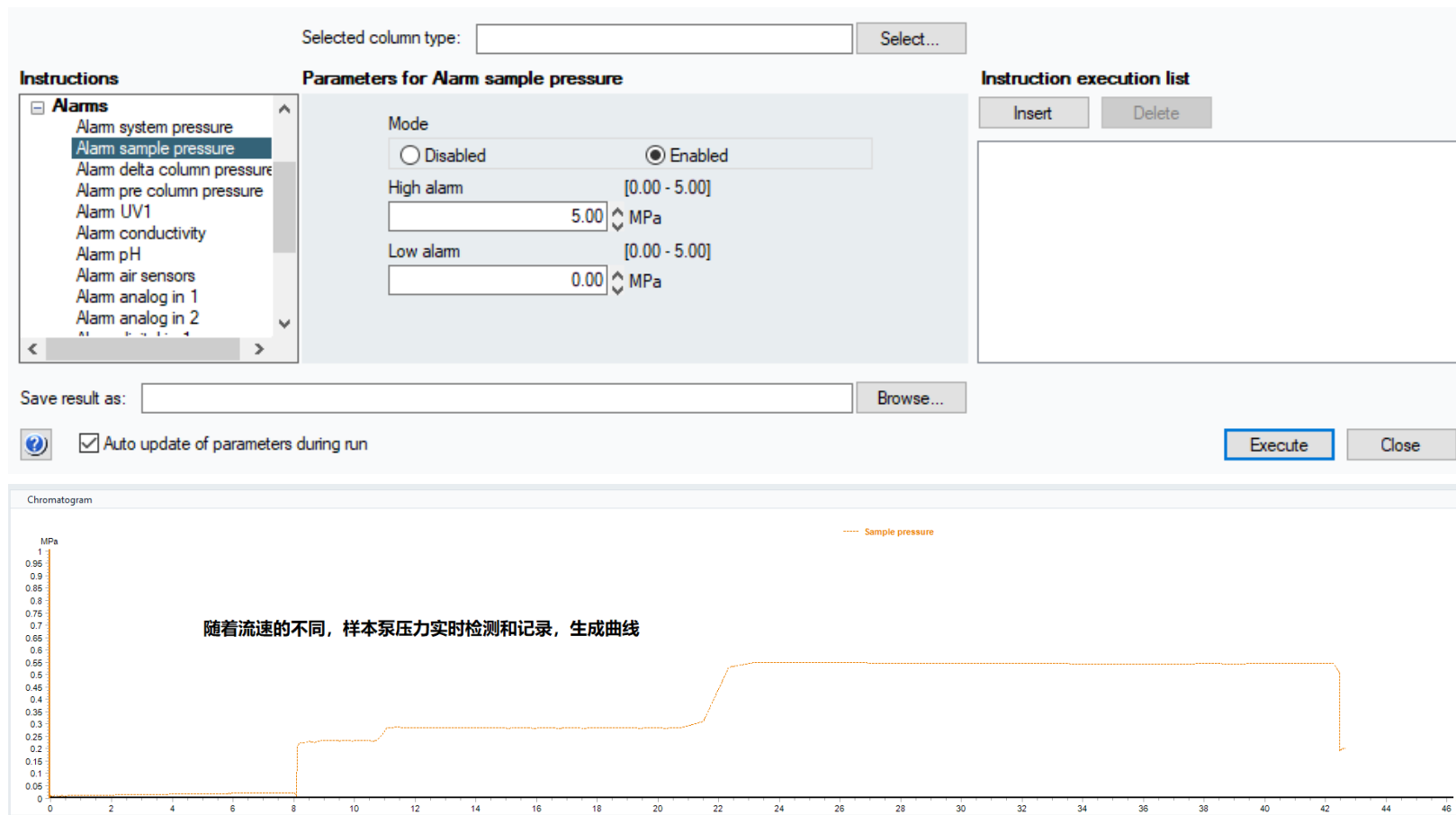
Instruction execution list

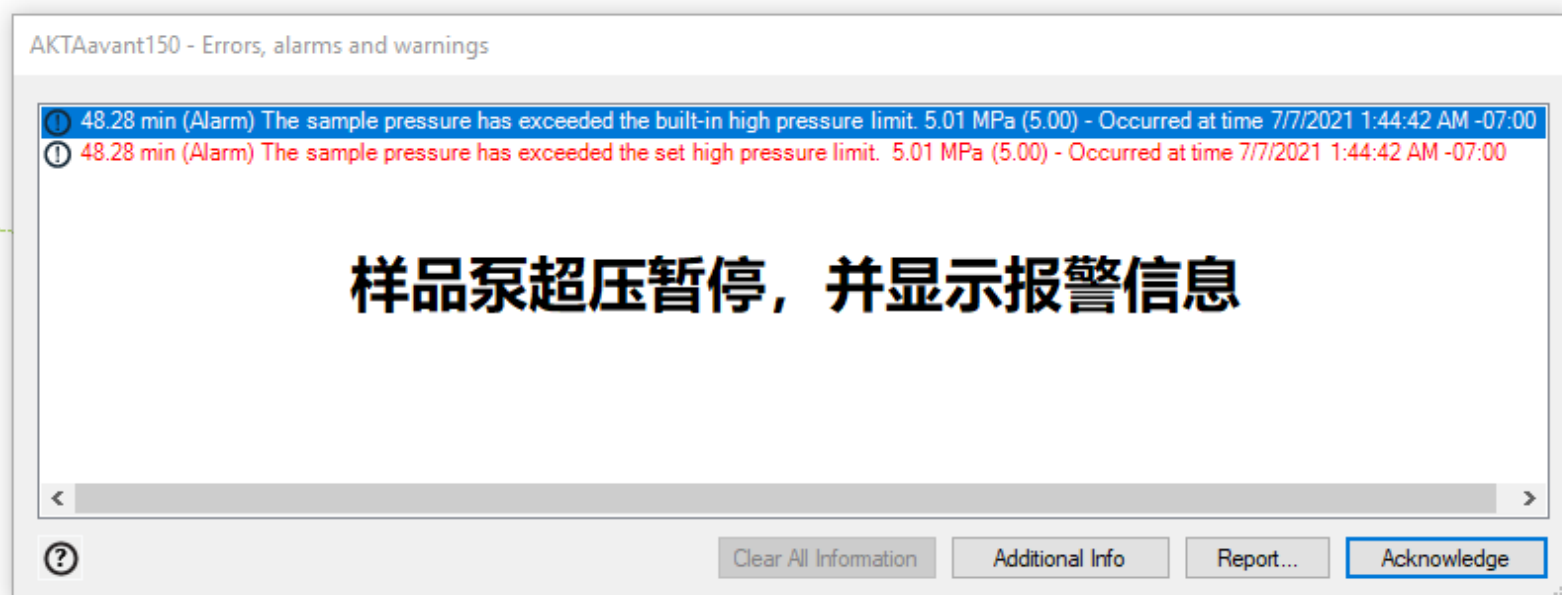
Save result as:

☐ ☒ Auto update of parameters during run



7、样品泵压力范围：0-5 MPa，软件运行测试显示样品泵压力实时检测样品泵端的压力并且生成曲线，并且能够超压报警。





8、样品泵粘度范围：0.7-10 cP，用标准粘度液体测试，泵运行正常。

9、紫外光源即开即用，软件可以设置紫外灯的实时开启和关闭，开启后，UV 立即可以检测有信号。

Selected column type:

Instructions

+ Pumps and pressures

+ Flow path

- Monitors

- Auto zero UV
- Wavelength
- Noise reduction UV
- Relative scale cond
- UV lamp
- Reset auto zero UV

+ Fraction collection

+ I/O-box

+ Alarms

- Advanced

Parameters for UV lamp

Mode

☐ Off ☒ On

Instruction execution list

Save result as:

 ☒ Auto update of parameters during run

28

10、紫外灯波长范围：190-700nm，软件测试通过，设置 260、254、280nm，测试检测正常。下图为设置窗口和测试实验结果图谱

Selected column type:

Instructions

- Pumps and pressures
- Flow path
- Monitors
 - Auto zero UV
 - Wavelength
 - Noise reduction UV
 - Relative scale cond
 - UV lamp
 - Reset auto zero UV
- Fraction collection
- I/O-box
- Alarms
- Advanced

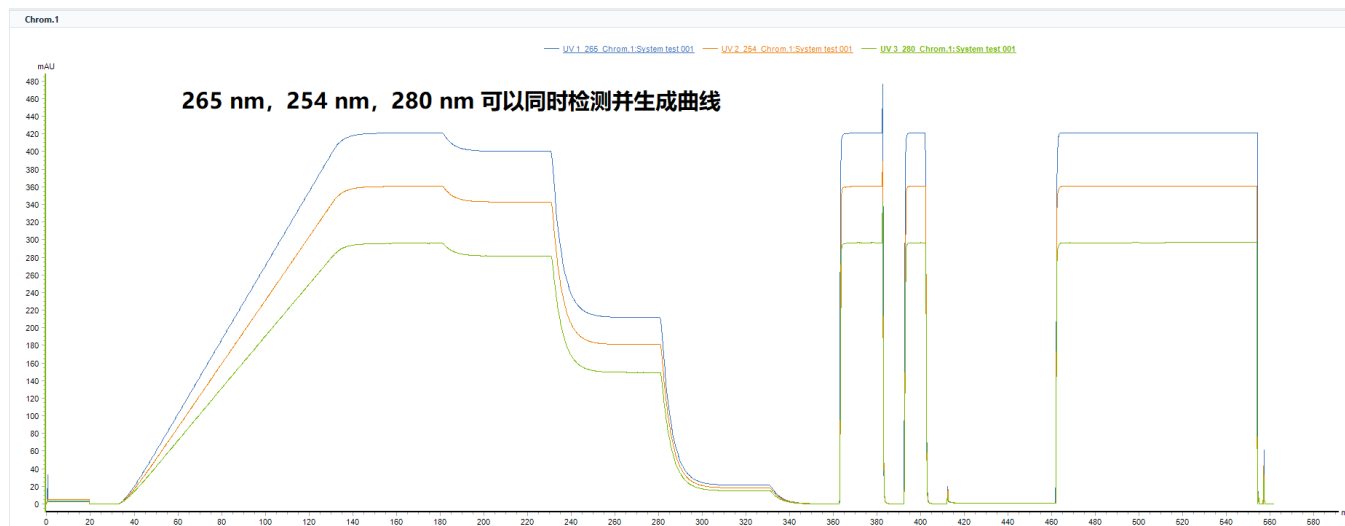
Parameters for Wavelength

UV 1	[190 - 700]	
280	nm	
UV 2	[190 - 700]	
190	nm	☐ Off
UV 3	[190 - 700]	
190	nm	☐ Off

Instruction execution list

Save result as:

☒ Auto update of parameters during run



11、紫外灯检测范围：-6000 mAU 到 6000 mAU，软件测试通过。

Selected column type:

Instructions

- Alarms
 - Alarm system pressure
 - Alarm sample pressure
 - Alarm delta column pressure
 - Alarm pre column pressure
 - Alarm UV1**
 - Alarm conductivity
 - Alarm pH
 - Alarm air sensors
 - Alarm analog in 1
 - Alarm analog in 2

Parameters for Alarm UV1

Mode

☐ Disabled ☒ Enabled

High alarmLow alarm

Instruction execution list

Save result as:

☒ Auto update of parameters during run

12、紫外灯线性范围：在梯度模式下 $\pm 2\%$ ，实际运行测试结果为在梯度 2%-98%的线性度为 1%，测试通过。

13、紫外波长设置数量 3 个，软件测试通过，测试实验结果显示三个波长曲线。

Selected column type:

Instructions

- ☒ Pumps and pressures
- ☒ Flow path
- ☒ Monitors
 - Auto zero UV
 - Wavelength**
 - Noise reduction UV
 - Relative scale cond
 - UV lamp
 - Reset auto zero UV
- ☒ Fraction collection
- ☒ I/O-box
- ☒ Alarms
- ☒ Advanced

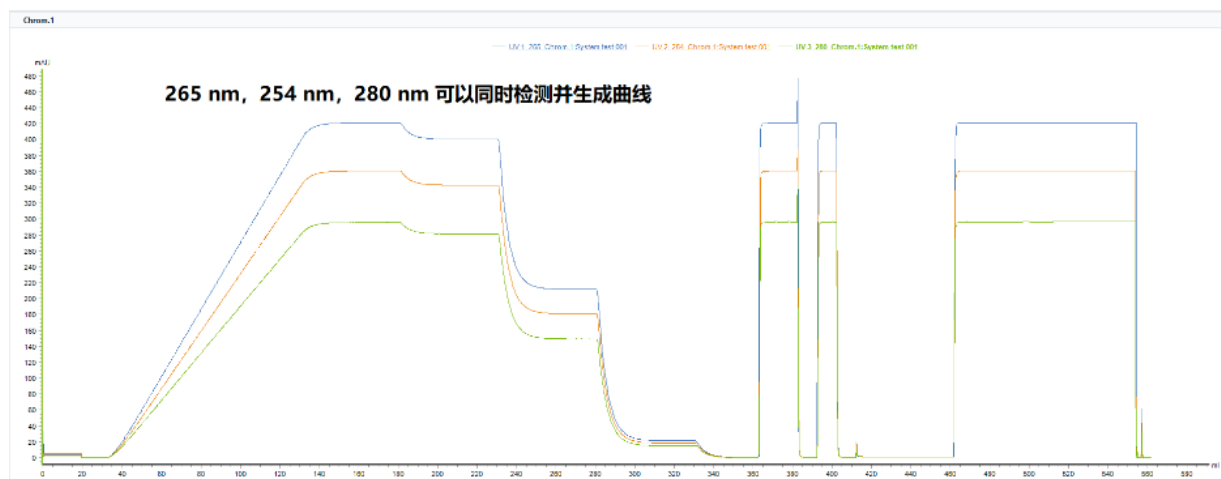
Parameters for Wavelength

UV 1	280	[190 - 700]	
UV 2	190	[190 - 700]	☐ Off
UV 3	190	[190 - 700]	☐ Off

Instruction execution list

Save result as:

☒ Auto update of parameters during run



14、电导检测范围：0.01-999.99mS/cm，软件测试通过

Selected column type:

Instructions

- Alarms
 - Alarm system pressure
 - Alarm sample pressure
 - Alarm delta column pressure
 - Alarm pre column pressure
 - Alarm UV1
 - Alarm conductivity**
 - Alarm pH
 - Alarm air sensors
 - Alarm analog in 1
 - Alarm analog in 2

Parameters for Alarm conductivity

Mode
☐ Disabled ☒ Enabled

High alarm [0.00 - 999.99]
 mS/cm

Low alarm [0.00 - 999.99]
 mS/cm

Instruction execution list

Save result as:

☒ Auto update of parameters during run

测试标准 PBS 的 buffer，测试了五次，电导数值分别为 15.59，15.53，15.61，15.57，15.61 mS/cm。经过计算，准确率为 0.6%。

15. 电 导 精 确 度 2% ， 具 有 温 度 补 偿 ， 软 件 测 试 通 过

Instructions

+ UV

- Conductivity

Alarm conductivity

Relative scale cond

Cond temp compensation

+ pH

+ Pressure alarms

+ Air sensor

+ I/O-box

+ Fraction collection

+ Watch parameters

+ Advanced

+ Data collection

Parameters for Cond temp compensation

Compensation factor

[0.0 - 9.9]

2.0

↕ %

Reference temperature

[0.0 - 40.0]

25.0

↕ °C



Reset to defaults

OK

Cancel

测试用同一个 PBS 在 4 度、16 度和 26 度下，电导数值均为 15.59，表明温度补偿功能正常。

33

16、标配阀门含有：缓冲液入口阀，四元阀，样品选择阀，自动进样阀，柱位选择和方向阀，收集阀，pH 计阀。经过主机面板上面的确认，这些阀门都已经正常安装。



17、整合了实验设计 DOE（Design of experiments）功能，软件测试通过

Design of Experiments ✕

Responses Factors & Design Experiment

Factors:

Name	Abbreviation	Unit	Range	Method Variable	Method Phase
Click Add to define a factor					

Add... Edit... Delete

Design selection

Objective **Screening** Design Advanced...

Total number of runs, including center points:

 OK Cancel

18、设备具有自动配液功能，具有 26 种配方，软件测试可以配置配方中的缓冲液

BufferPro Recipes

Recipes:

配方列表

Show: All

Recipe name	pH	Type
Acetate 0-1M NaCl	3.8 - 5.4	PD
Acetate with HCl 0-1M NaCl	4.0 - 5.1	PD
AIEX-mix 0-1M NaCl	5.8 - 8.9	PD
Bicine 0-1M NaCl	7.7 - 8.7	PD
Bis-Tris 0-1M NaCl	6.0 - 7.1	PD
Bis-Tris Propane 0-1M NaCl	6.6 - 7.7	PD
Carbonate 0-1M NaCl	9.2 - 10.5	PD
Carbonate with HCl 0-1M NaCl	9.5 - 10.2	PD
CIEX-mix 0-1M NaCl	2.0 - 7.0	PD

Stock Solutions:

Inlet	Stock solutions	Concentration (M)	Substance
Q1	Buffer substances	0.2000	Sodium Acetate 碱
Q2	Acid or Base	0.2000	Acetic Acid 酸
Q3	Water 水		
Q4	Salt 盐	4.0000	NaCl

Achievable ranges with recipe:

pH

3.8 - 5.4

Acetate

0.0500 - 0.1000 M

NaCl

0.0000 - 1.0000 M
(0 - 100 % B)

配方能配出的pH范围
和盐浓度

Description:

Follow the safety instructions for each bulk chemical when preparing the BufferPro stock solutions!

Sodium Acetate 0.2000M: 16.41g Sodium Acetate to prepare 1 litre (Mw=82.03)

Acetic Acid 0.2000M: 12.01g (or 11.45ml) Glacial Acetic Acid to prepare 1 litre (Mw=60.05, density 1.049g/ml)

NaCl 4.000M: 233.8g to prepare 1 litre (Mw=58.44)

Note: Not recommended for AIEX.

配方的具体配置过程

New...

Edit...

Rename

Delete

Export...

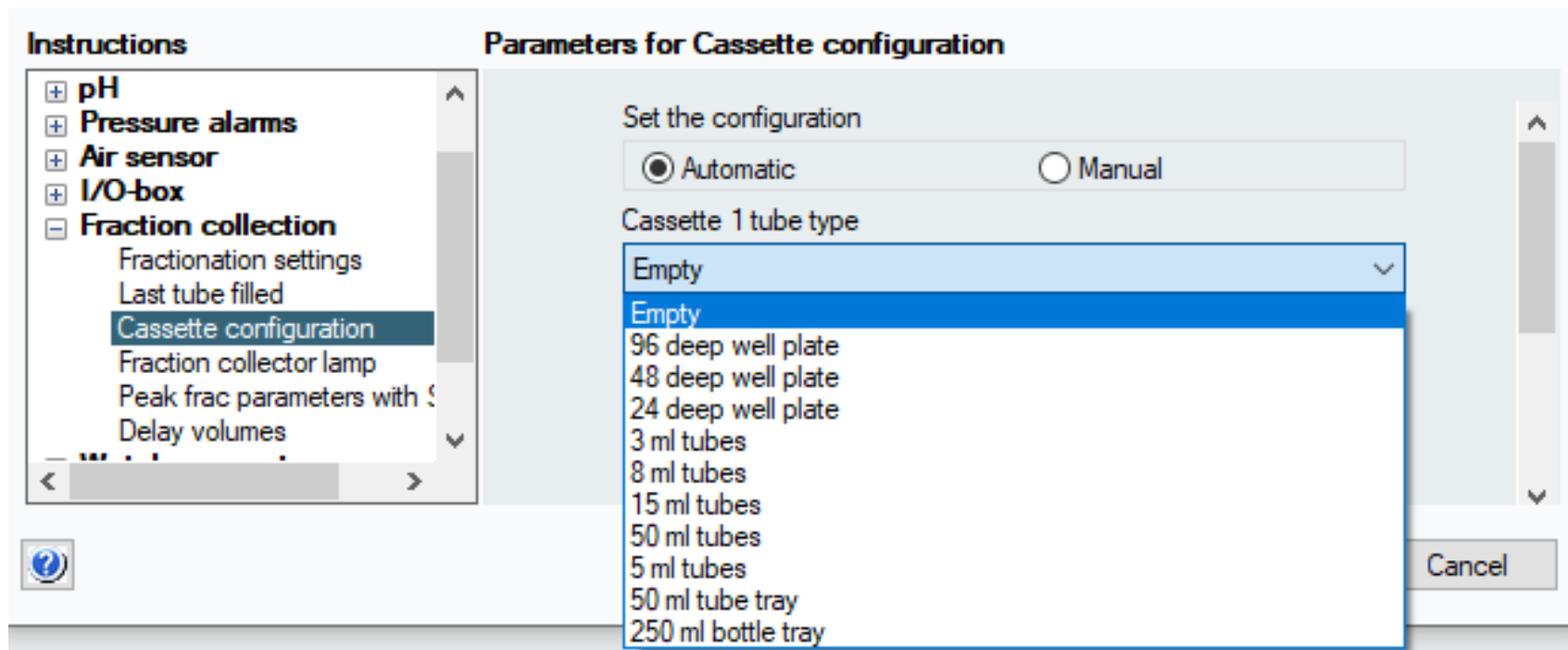
Import...

Print...

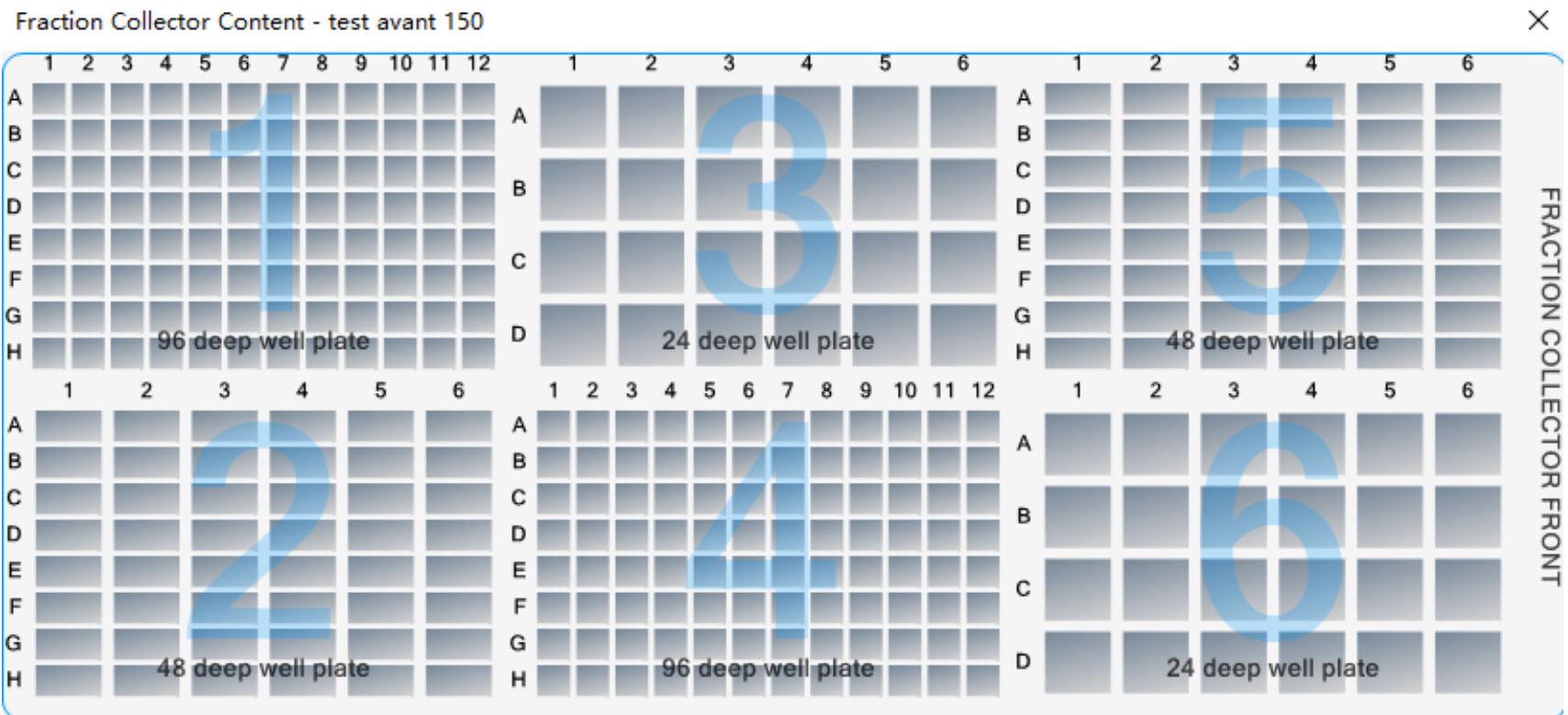
Explore Proportions...

Close

19、收集器可以放置 3 8 15 50ml 试管或 24 48 96 孔板 250ml 收集瓶，软件测试通过



20、收集器能放 6 个收集架子，软件测试通过



21、设备具有三个空气感应报警，软件测试可以设置报警开启，并且气泡进入管道内，实验暂停，并且显示报警信息。

Selected column type:

Select...

Instructions

Alarms

Alarm system pressure

Alarm sample pressure

Alarm delta column pressure

Alarm pre column pressure

Alarm UV1

Alarm conductivity

Alarm pH

Alarm air sensors

Alarm analog in 1

Alarm analog in 2

Alarm analog in 3

Parameters for Alarm air sensors

Alarm Inlet valve A

☒ Disabled

☐ Enabled

Alarm Inlet valve B

☒ Disabled

☐ Enabled

Alarm Sample inlet valve

☒ Disabled

☐ Enabled

Instruction execution list

Insert

Delete

Save result as:

Browse...

☒ Auto update of parameters during run

Execute

Close



22、设备具有四个压力表检测和报警，软件测试通过，具有系统泵，样品泵、柱前和柱后压力检测和压力。

Selected column type:

Instructions

Alarms

Alarm system pressure

Alarm sample pressure

Alarm delta column pressure

Alarm pre column pressure

Alarm UV1

Alarm conductivity

Alarm pH

Alarm air sensors

Alarm analog in 1

Alarm analog in 2

Parameters for Alarm pre column pressure

Mode

☐ Disabled

☒ Enabled

High alarm

2.00

↕

MPa

[0.00 - 5.00]

Low alarm

0.00

↕

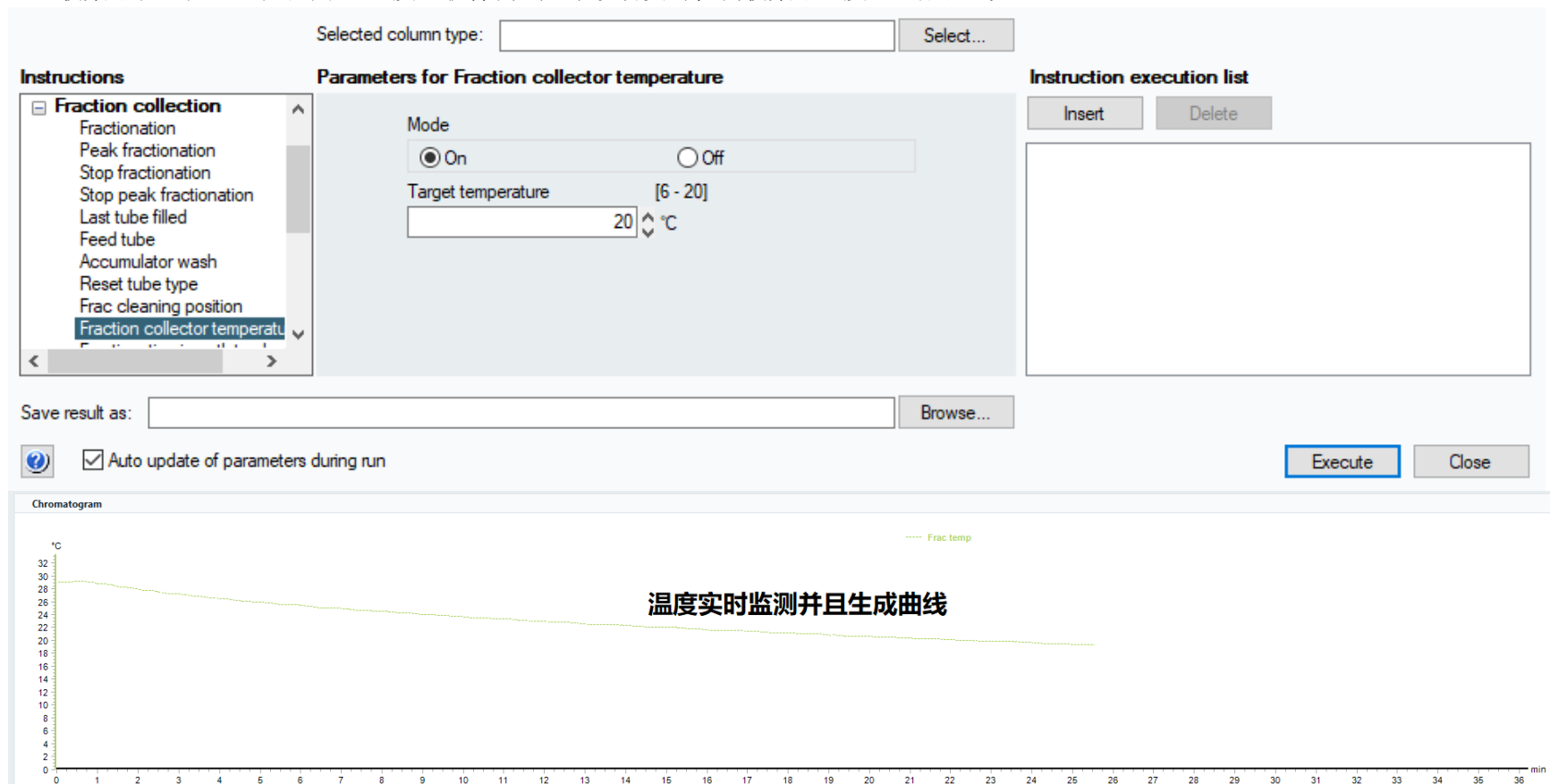
MPa

[0.00 - 5.00]

Save result as:

☒ Auto update of parameters during run

23、收集器和温控，温控范围 6-20 度，软件测试显示设备实时检测收集器温度，生成曲线。



24、系统具有 logbook 功能，软件测试通过

Column Type Parameters

Column Logbook

Select Column IDs

Code

lot

exp.

ID

Find by ID:

-

-

-

Clear

Find by alias:

Find

Columns:

Alias

ID

记录使用次数

清洗次数

柱效信息

Column Logbook:

Column Data	Value	Unit
Type		
Resin Batch ID		
Resin expiration date		
Date of first use		
Number of runs		
Max of delta pressure		MPa
Number of runs since last CIP		
Number of runs since last Column performance test		
Measured bed height		cm
Column volume**		
Resolution*		
Asymmetry*		
HETP*		cm
Reduced plate height*		
Plates per meter*		N/m
Kav*		
Retention factor*		
Performance validation result		

** Value is calculated using the Measured bed height

New...

Delete

Print...

Export...

Import...

Column History

Performance Report

Notification Limits...

Notes...

25、系统具有电子签名功能，软件测试通过

Sign Result - 20170411 002

Sign result

View signatures

☐ Use Windows Authentication

Signing user

Default

Full name

Default account

Job title

Default

Signature description

Signature password

☒ Lock

OK

Cancel

26、系统内置上百种层析柱和凝胶的信息，从1ml的小柱到几百升的工业生产柱，软件测试通过。

Column Handling

Show Column Types by:
Technique:
Any
Diameter (cm):
-1.0; 0.77-2.6; 2.6-7.0; 7.0-30.0; 30.0-
Access label:
Predefined; Global; Personal
Search (names or diameter range):
Column types: 334 of 334
HiLoad 26/10 SP Sepharose HP
HiLoad 26/60 Superdex 30 pg
HiLoad 26/60 Superdex 75 pg
HiLoad 26/60 Superdex 200 pg
HiLoad 26/600 Superdex 200 pg
HiLoad 26/600 Superdex 30 pg
HiLoad 26/600 Superdex 75 pg
HiPrep 16/10 ANX FF (high sub)
HiPrep 16/60 Sephacryl S 100 HR
HiPrep 16/60 Sephacryl S 200 HR
HiPrep 16/60 Sephacryl S 300 HR
HiPrep 16/60 Sephacryl S 400 HR
HiPrep 16/60 Sephacryl S 500 HR
HiPrep 26/10 Desalting
HiPrep 26/10 Sepharose 6 FF
HiPrep 26/60 Sephacryl S 100 HR
HiPrep 26/60 Sephacryl S 200 HR
HiPrep 26/60 Sephacryl S 300 HR
HiPrep 26/60 Sephacryl S 400 HR
HiPrep 26/60 Sephacryl S 500 HR
HiPrep Butyl FF 16/10
HiPrep CM FF 16/10
HiPrep DEAE FF 16/10
HiPrep Heparin FF 16/10
HiPrep IMAC FF 16/10
HiPrep Octyl FF 16/10
HiPrep Phenyl FF (high sub) 16/10
HiPrep Phenyl FF (low sub) 16/10
HiPrep Phenyl HP 16/10
HiPrep Q FF 16/10
HiPrep Q HP 16/10

Column Type ParametersColumn Logbook

Name: 123 (Personal)

Run Parameters:

Parameters	Value	Unit
Technique	Affinity	
Column volume	4.712	ml
Column volume unit	ml	
Max pre-column pressure	5.0	MPa
Max delta column pressure	0.1	MPa
Pressure unit	MPa	
Default flow rate	3.0	ml/min
Max flow rate	15.0	ml/min
Default linear flow rate	229.18	cm/h
Max linear flow rate	1145.92	cm/h
Min pH value (short term)	3	
Max pH value (short term)	9	
Min pH value (long term)	3	
Max pH value (long term)	9	

Details:

Parameters	Value	Unit
Hardware diameter	1.0	cm
Bed height	6.0	cm
Typical loading range		mg
Total liquid volume (Vt)		ml
Void volume (Vo)		ml
Typical peak width at base		ml
Average particle diameter	90.0	µm
Molecular weight range		Mr

Ordering Information:

Parameters	Value
Name	123
Code number	
Resin name	Con A Sepharose 4B
Resin code number	17-0440-03
Hardware name	Tricom 10/100
Hardware code number	28-4064-15

New...Edit...DeletePrint...Export...Import...

27、系统软件具有watch功能，软甲测试通过。

Selected column type:

Select...

Instructions

+ Fraction collection

+ I/O-box

+ Alarms

+ Advanced

- Watch parameters

- Watch UV parameters
- Watch cond parameters
- Watch flow parameters
- Watch pH parameters
- Watch pressure parameters
- Watch analog in parameter

Parameters for Watch UV parameters

Delta peak

mAU

[0.00 - 6000.00]

Accepted fluctuation (+/-)

mAU

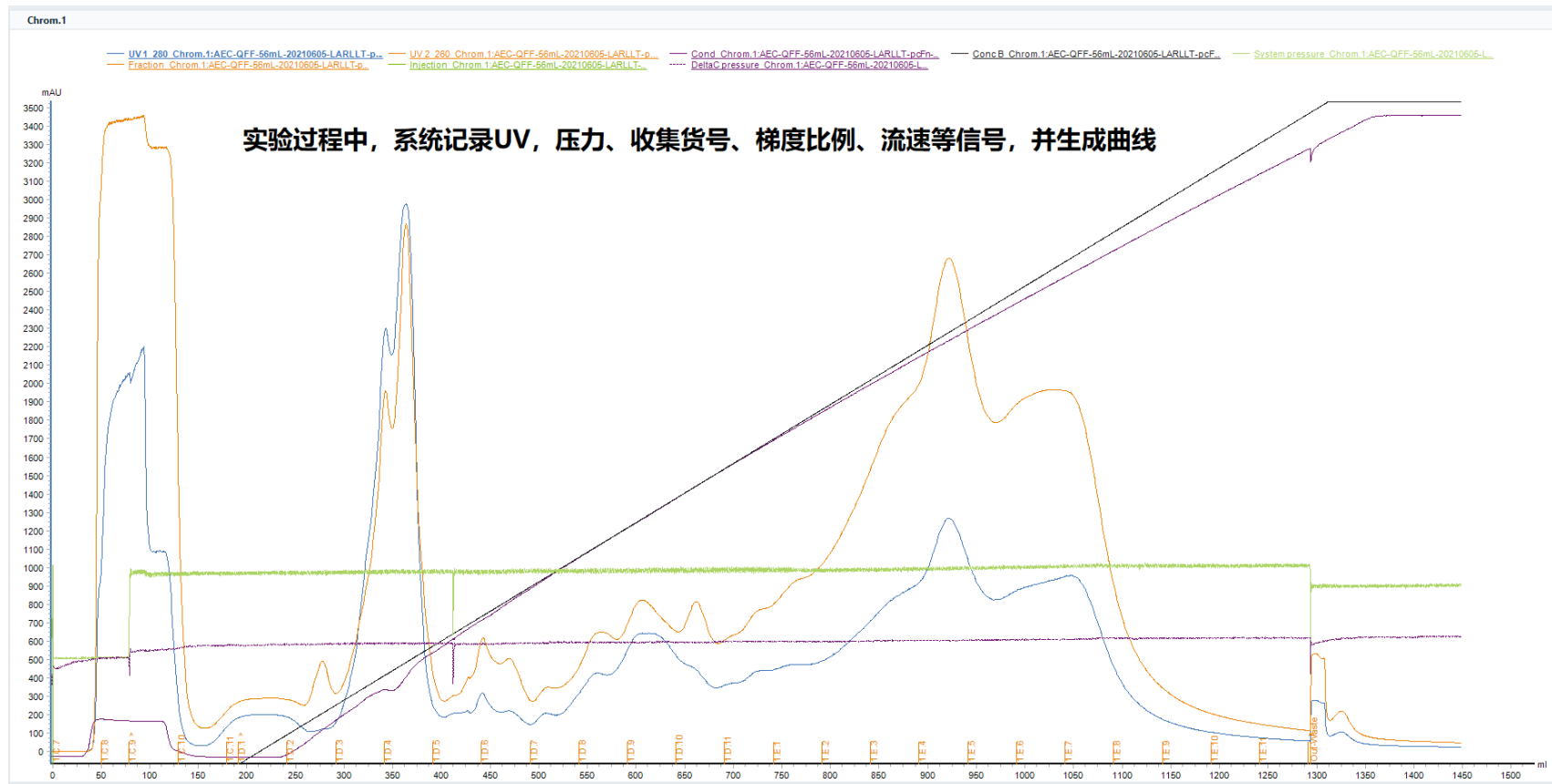
[0.00 - 6000.00]

Save result as:

Browse...

二、样品的实际运行测试：

样品为科研蛋白样品，层析柱为Hitrap Q离子交换柱，柱体积5 ml，整个实验通过手动操作完成，最后实验结果较好，并且图谱数据得到了详细的分析。下图为曲线图谱：



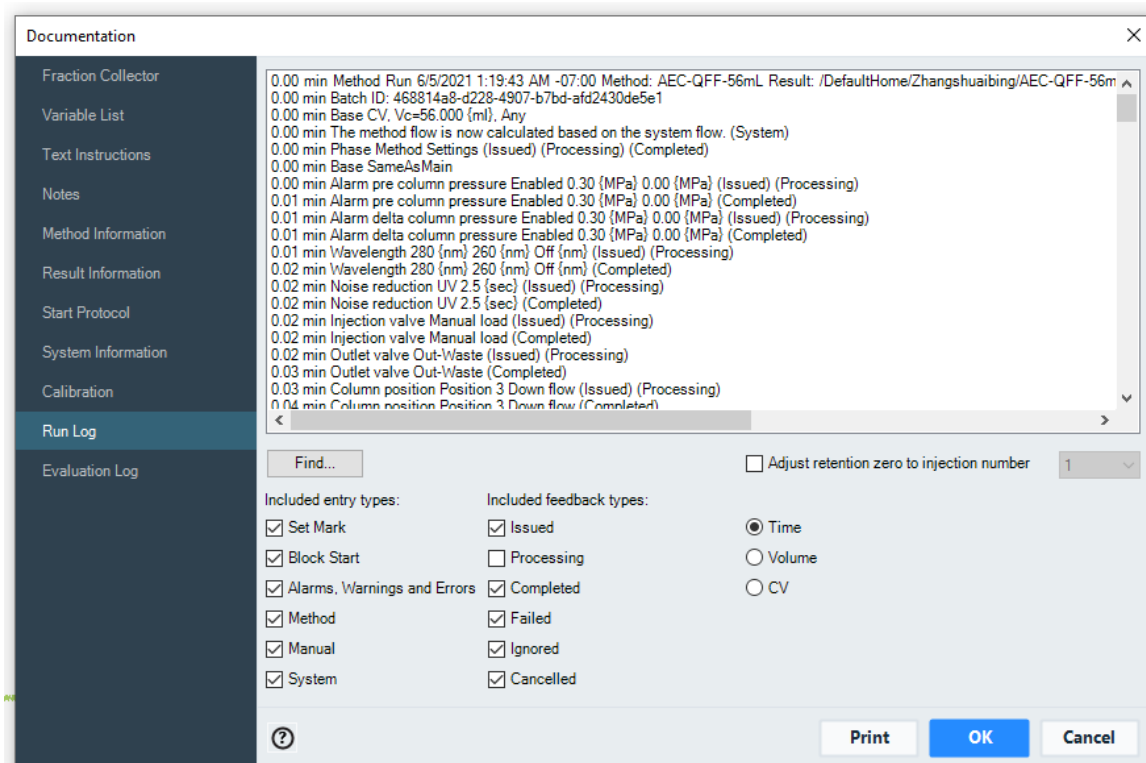
峰积分数据列表

A: UV_1_280@01.PEAK

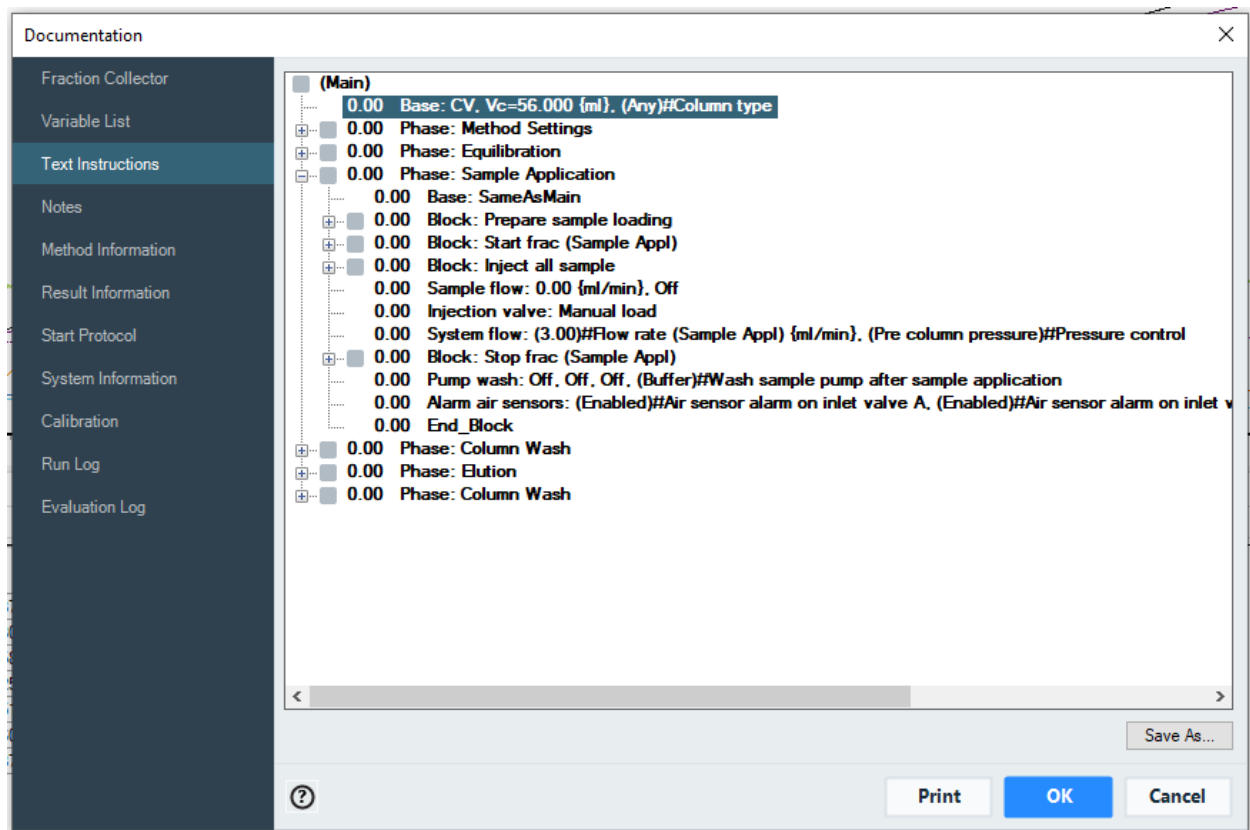
Peak data		Integration summary								
No	Peak name	Retention (min)	Area (m ² mAU)	% of total area	% of total peak area	Height (mAU)	Width (m)	Width at half height (m)	Sigma (m)	Asymmetry
1		79.425	58531.8300	16.13	19.37	2021.433	39.37	29.66	17.412	0.02
2		94.038	50931.9000	14.04	16.85	2155.225	51.30	13.35	15.158	4.65
3		342.774	53210.1900	14.67	17.61	2139.300	60.58	22.56	15.345	0.17
4		363.415	68878.9500	18.99	22.79	2805.603	53.25	25.12	8.888	1.48
5		606.860	23614.7100	6.51	7.81	359.066	104.51	65.66	25.414	1.91
6		920.944	30476.5200	8.40	10.08	589.637	84.60	49.16	20.737	1.52
7		1053.551	16568.9100	4.57	5.48	429.103	58.37	39.21	14.174	2.26

峰积分运算计算出峰下面积，半峰宽，对称性，峰的比例等数据

结果操作记录列表



方法列表图



结论

在系统测试中，对设备的关键参数和标准的模块阀门进行确认和测试，全部通过，对实际样品的测试，检测设备在实际样品运行时的表现，结果为完全可以满足用户的分离纯化的实验要求。因此，设备运行测试合格。

3.2 设备性能合格测试报告 -AKTA pure 25

测试设备品名：快速蛋白层析系统

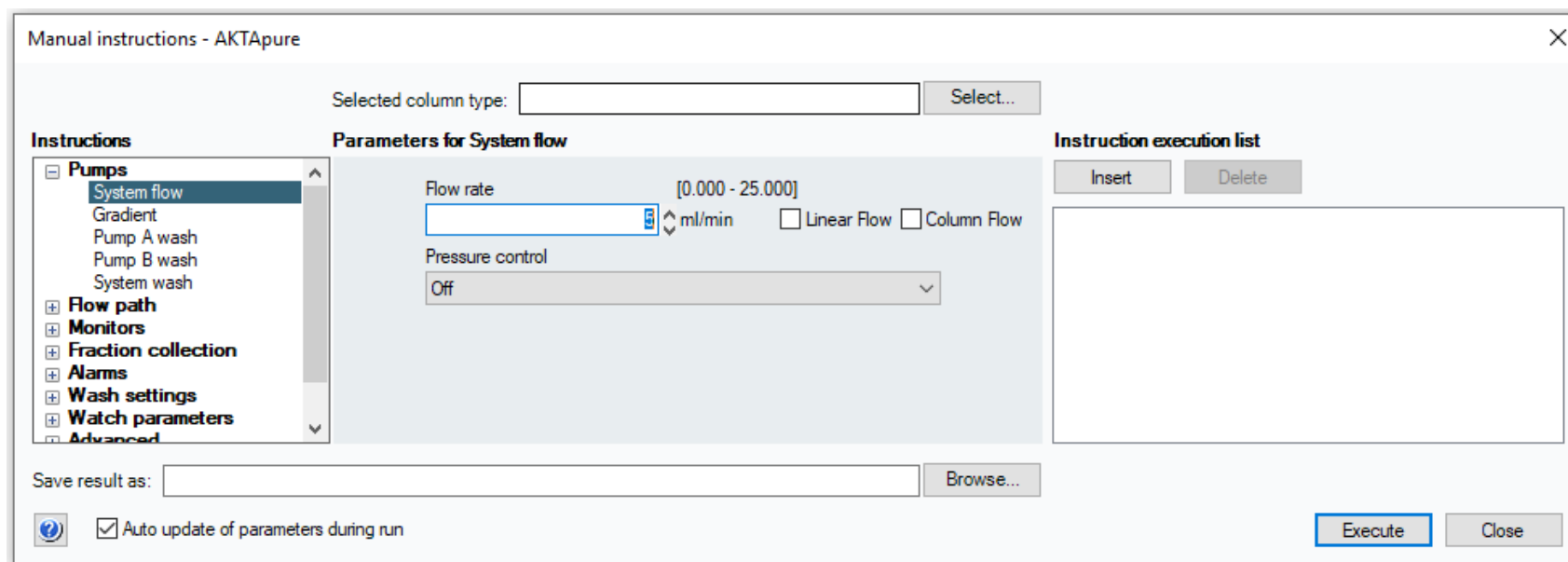
测试时间：2021 年 5 月 1 日

测试人员：王肖增，

测试样品：科研蛋白

一、系统测试

1、系统泵单泵流速 0.001-25ml/min，软件运行测试三种流速，下图为流速的设置界面和实验运行图谱



Manual instructions - AKTApure

Selected column type:

Instructions

- ☒ **Pumps**
 - System flow
 - Gradient
 - Pump A wash
 - Pump B wash
 - System wash
- ☐ **Flow path**
- ☐ **Monitors**
- ☐ **Fraction collection**
- ☐ **Alarms**
- ☐ **Wash settings**
- ☐ **Watch parameters**
- ☐ **Advanced**

Parameters for System flow

Flow rate: [0.000 - 25.000] ml/min ☐ Linear Flow ☐ Column Flow

Pressure control:

Instruction execution list

Save result as:

☒ Auto update of parameters during run

Manual instructions - AKTApure

Selected column type:

Instructions

- ☒ **Pumps**
 - System flow
 - Gradient
 - Pump A wash
 - Pump B wash
 - System wash
- ☐ **Flow path**
- ☐ **Monitors**
- ☐ **Fraction collection**
- ☐ **Alarms**
- ☐ **Wash settings**
- ☐ **Watch parameters**
- ☐ **Advanced**

Parameters for System flow

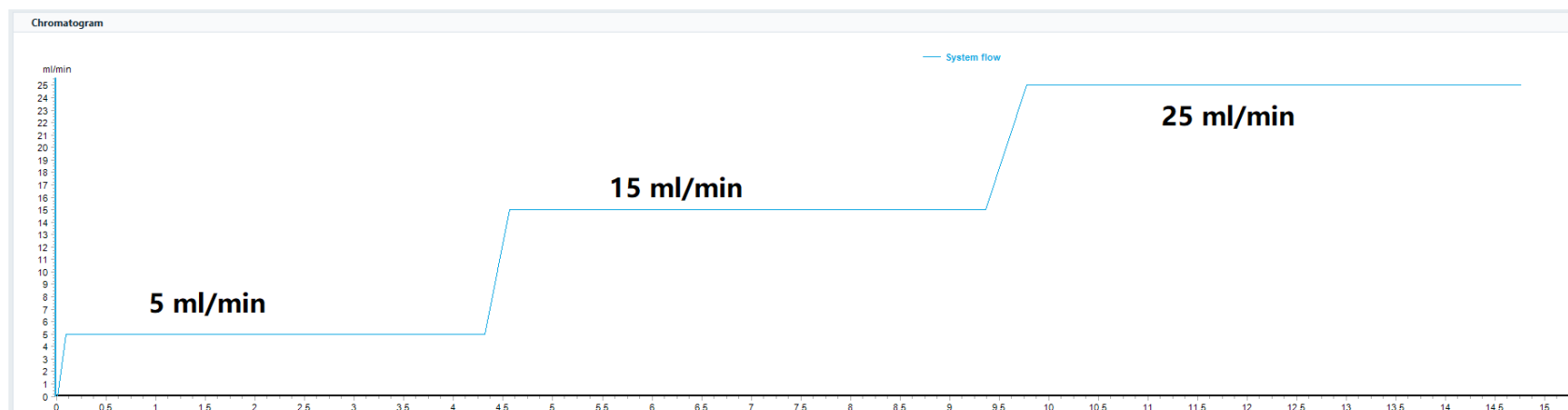
Flow rate [0.000 - 25.000] ml/min ☐ Linear Flow ☐ Column Flow

Pressure control

Instruction execution list

Save result as:

☒ Auto update of parameters during run



2、装柱模式 0.1-50ml/min，软件运行测试通过

Selected column type: Select...

Instructions

Advanced

Pressure control parameters

Constant pressure flow

Constant pressure flow para

Column packing flow

Delay volume: Monitor to ou

Delay volume: Monitor to fra

Start volume count

Stop volume count

Set trigger 1

Set trigger 2

Set trigger 3

Parameters for Column packing flow

Flow rate

[0.00 - 50.00]

ml/min

☐ Linear Flow

☐ Column Flow

Instruction execution list

Insert

Delete

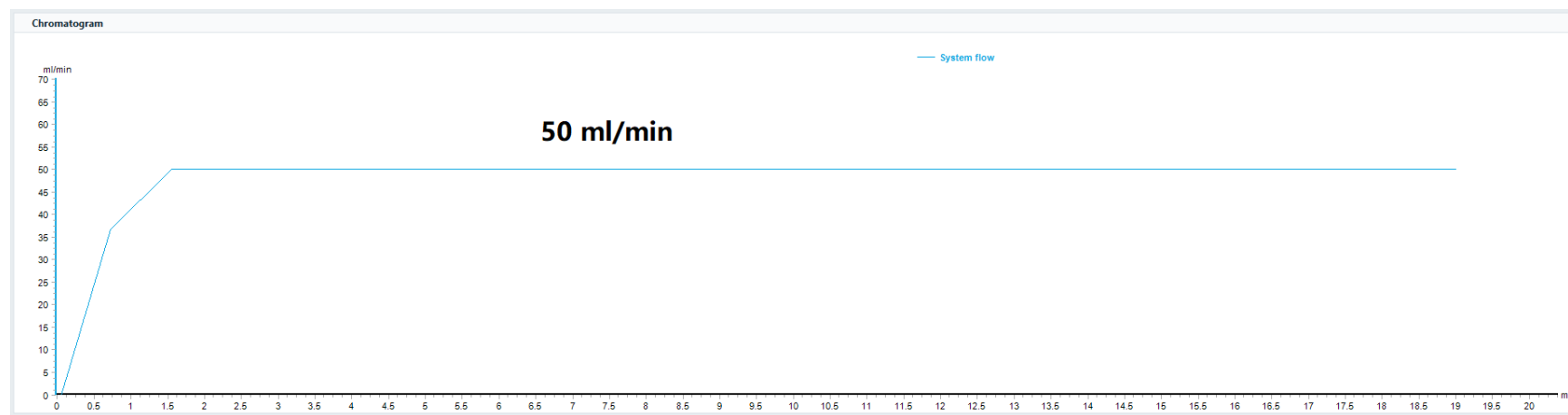
Save result as:

Browse...

☒ Auto update of parameters during run

Execute

Close



3、系统泵压力范围：0-20 MPa，软件运行结果显示在实验过程中，压力实时监测并且生成曲线，系统压力超过报警值，系统暂停并显示报警信息。

Selected column type:

Instructions

- ☒ Pumps
- ☒ Flow path
- ☒ Monitors
- ☒ Fraction collection
- ☒ Alarms
 - Alarm system pressure
 - Alarm pre column pressure
 - Alarm UV1
 - Alarm conductivity
 - Alarm pH
- ☒ Wash settings
- ☒ Watch parameters
- ☒ Advanced

Parameters for Alarm system pressure

Mode
☐ Disabled ☒ Enabled

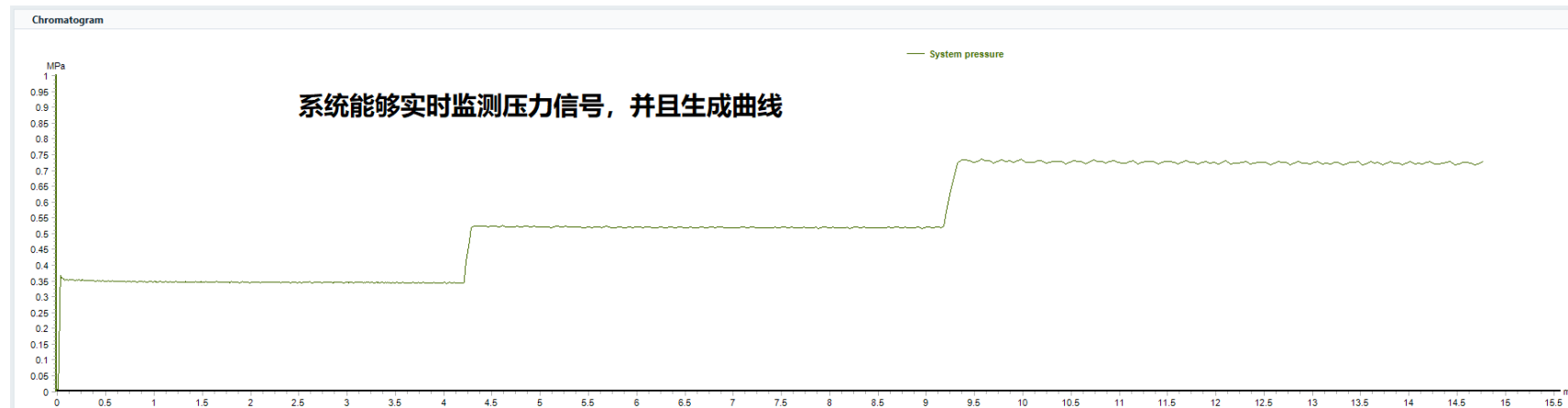
High alarm [0.02 - 20.00]
 MPa

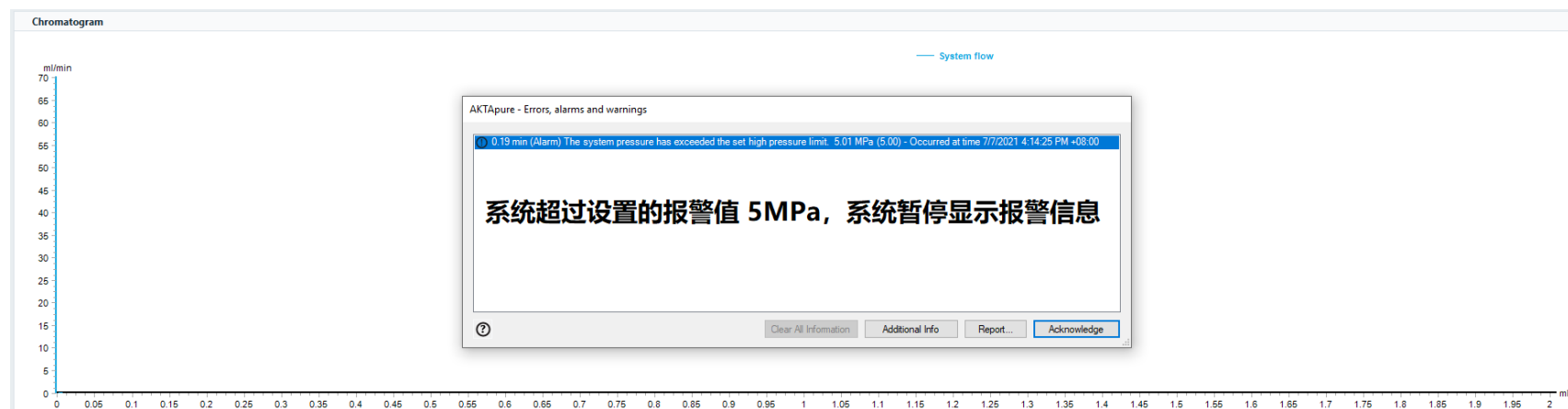
Low alarm [0.00 - 20.00]
 MPa

Instruction execution list

Save result as:

☒ Auto update of parameters during run





4、系统泵粘度范围：0.35-10 cP，用标准粘度液体以及用户常用的溶液进行测试，泵运行正常。

5、恒压控制流速功能，软件测试运行正常。

The screenshot shows a software window for configuring pressure control parameters. At the top, there is a 'Selected column type:' dropdown menu and a 'Select...' button. Below this, the window is divided into three main sections: 'Instructions', 'Parameters for Pressure control parameters', and 'Instruction execution list'. The 'Instructions' section on the left contains a list of instructions, with 'Advanced' selected. The 'Parameters for Pressure control parameters' section in the center contains several input fields: 'P factor' with a range of [0.0 - 10000.0] and a value of 8.0; 'I factor' with a range of [0.0 - 100000.0] and a value of 40.0; 'Target value for pressure control' with a range of [10 - 90] and a value of 90%; and 'Min allowed system flow rate' with a range of [0.000 - 25.000] and a value of 0.010 ml/min. There are also checkboxes for 'Linear Flow' and 'Column Flow'. The 'Instruction execution list' section on the right has 'Insert' and 'Delete' buttons and a large empty box. At the bottom, there is a 'Save result as:' field with a 'Browse...' button, a help icon, a checkbox for 'Auto update of parameters during run' which is checked, and 'Execute' and 'Close' buttons.

Selected column type: Select...

Instructions

- Advanced
- Pressure control parameters
- Constant pressure flow
- Constant pressure flow para
- Column packing flow
- Delay volume: Monitor to ou
- Delay volume: Monitor to fra
- Start volume count
- Stop volume count
- Set trigger 1
- Set trigger 2
- Set trigger 3

Parameters for Pressure control parameters

P factor [0.0 - 10000.0]
8.0

I factor [0.0 - 100000.0]
40.0

Target value for pressure control [10 - 90]
90 %

Min allowed system flow rate [0.000 - 25.000]
0.010 ml/min ☐ Linear Flow ☐ Column Flow

Instruction execution list

Insert Delete

Save result as: Browse...

☐ Auto update of parameters during run

Execute Close

6、系统泵流速精度±1.2%，系统测试，选择 10 ml/min，流速经过精密电子秤称量，流速为 10.85ml/min，在精度±1.2%范围内，测试通过。

7、梯度准确性为±0.6%，经过测试，从 0-99%梯度准确度为 0.55%，测试通过。

8、紫外光源即开即用，软件可以设置紫外灯的实时开启和关闭，开启后，UV 立即可以检测有信号。

Selected column type:

Instructions

- ☐ Pumps
- ☐ Flow path
- ☒ Monitors
 - Auto zero UV
 - Wavelength
 - Noise reduction UV
 - UV lamp**
 - Relative scale cond
 - Reset auto zero UV
- ☐ Fraction collection
- ☐ Alarms
- ☐ Wash settings
- ☐ Watch parameters

Parameters for UV lamp

Mode

☐ Off ☒ On

Instruction execution list

Save result as:

☒ Auto update of parameters during run

9、紫外灯波长范围：190-700nm，软件测试设置 265、254、280 nm 波长，测试能够运行

Selected column type:

Instructions

- ☐ Pumps and pressures
- ☐ Flow path
- ☒ Monitors
 - Auto zero UV
 - Wavelength**
 - Noise reduction UV
 - Relative scale cond
 - UV lamp
 - Reset auto zero UV
- ☐ Fraction collection
- ☐ I/O-box
- ☐ Alarms
- ☐ Advanced

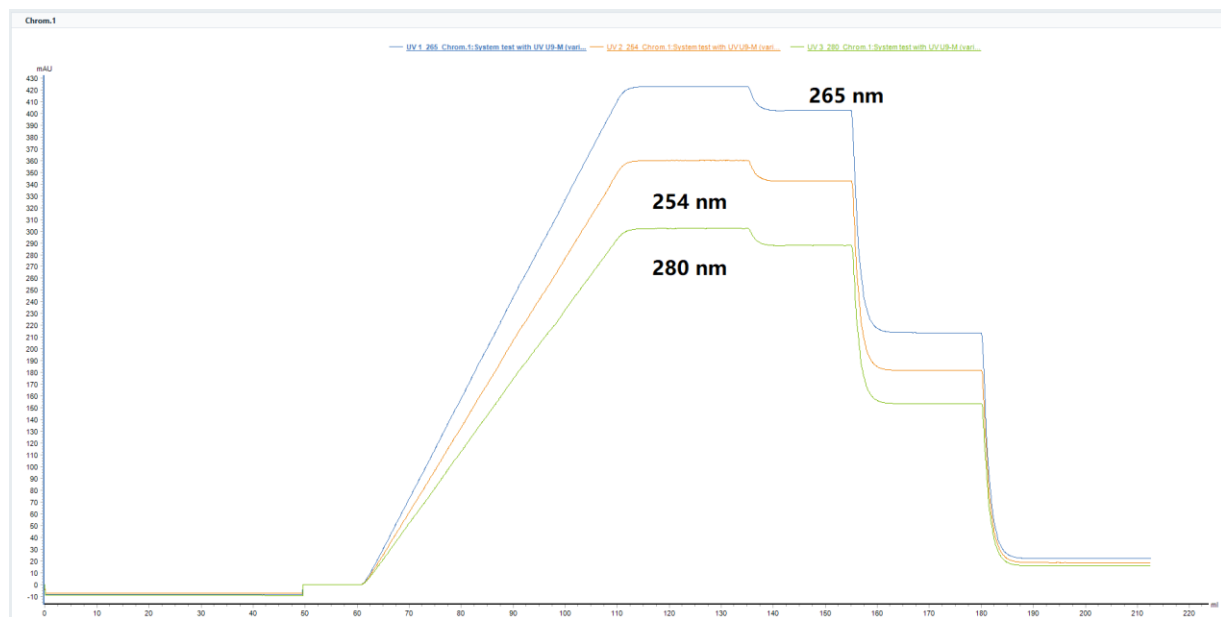
Parameters for Wavelength

UV 1	280	[190 - 700] nm	
UV 2	190	[190 - 700] nm	☐ Off
UV 3	190	[190 - 700] nm	☐ Off

Instruction execution list

Save result as:

☒ Auto update of parameters during run



10、紫外灯检测范围：-6000 mAU 到 6000 mAU，软件测试通过。

Selected column type: Select...

Instructions

- Pumps
- Flow path
- Monitors
- Fraction collection
- Alarms
 - Alarm system pressure
 - Alarm pre column pressure
 - Alarm UV1
 - Alarm conductivity
 - Alarm pH
- Wash settings
- Watch parameters
- Advanced

Parameters for Alarm UV1

Mode

☒ Disabled
☐ Enabled

High alarm

[-6000 - 6000]

Low alarm

[-6000 - 6000]

Instruction execution list

Insert

Delete

Save result as: Browse...

☒ Auto update of parameters during run

Execute

Close

11、紫外灯线性范围：在梯度模式下 $\pm 2\%$ ，实际运行测试结果为在梯度 0%-99%的线性度为 1%，测试通过。

12、紫外波长设置数量 3 个，软件测试显示系统可以监测 3 个波长信号

Selected column type:

Instructions

- + Pumps and pressures
- + Flow path
- Monitors
 - Auto zero UV
 - Wavelength**
 - Noise reduction UV
 - Relative scale cond
 - UV lamp
 - Reset auto zero UV
- + Fraction collection
- + I/O-box
- + Alarms
- Advanced

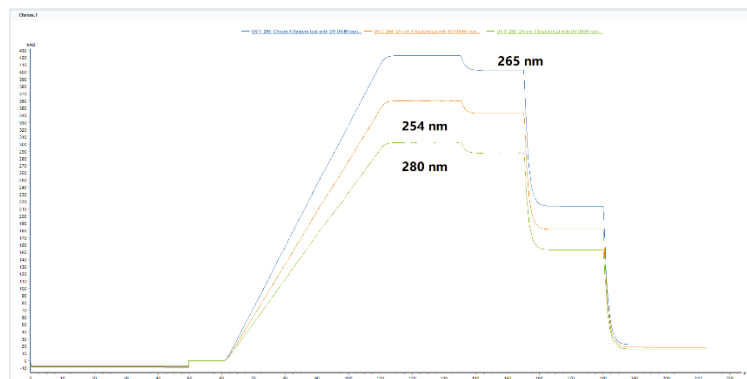
Parameters for Wavelength

UV 1	[190 - 700]	
	280	nm
UV 2	[190 - 700]	
	190	nm ☐ Off
UV 3	[190 - 700]	
	190	nm ☐ Off

Instruction execution list

Save result as:

☒ Auto update of parameters during run



13、电导检测范围：0.01-999.99mS/cm，软件测试通过

Selected column type:

Select...

Instructions

Pumps

Flow path

Monitors

Fraction collection

Alarms

Alarm system pressure

Alarm pre column pressure

Alarm UV1

Alarm conductivity

Alarm pH

Wash settings

Watch parameters

Advanced

Parameters for Alarm conductivity

Mode

☒ Disabled

☐ Enabled

High alarm

999.99

mS/cm

[0.00 - 999.99]

Low alarm

0.01

mS/cm

[0.00 - 999.99]

Instruction execution list

Insert

Delete

Save result as:

Browse...

☒ Auto update of parameters during run

Execute

Close

14. 电 导 精 确 度 2% ， 具 有 温 度 补 偿 ， 软 件 测 试 通 过

Selected column type:

Instructions

Alarms

Alarm system pressure

Alarm sample pressure

Alarm delta column pressure

Alarm pre column pressure

Alarm UV1

Alarm conductivity

Alarm pH

Alarm air sensors

Alarm analog in 1

Alarm analog in 2

Parameters for Alarm conductivity

Mode

☐ Disabled ☒ Enabled

High alarm mS/cm [0.00 - 999.99]

Low alarm mS/cm [0.00 - 999.99]

Instruction execution list

Save result as:

☒ Auto update of parameters during run

15、pH 检测范围为 0-14，软件测试通过

Selected column type:

Instructions

- ☒ Pumps
- ☒ Flow path
- ☒ Monitors
- ☒ Fraction collection
- ☒ Alarms
 - Alarm system pressure
 - Alarm pre column pressure
 - Alarm UV1
 - Alarm conductivity
 - Alarm pH**
- ☒ Wash settings
- ☒ Watch parameters
- ☒ Advanced

Parameters for Alarm pH

Mode
☒ Disabled ☐ Enabled

High alarm [0.00 - 14.00]

Low alarm [0.00 - 14.00]

Instruction execution list

Save result as:

☒ Auto update of parameters during run

16、标配阀门含有：单缓冲液入口阀，自动进样阀，单柱位选择和方向阀，单收集阀，pH 计阀。经过主机面板上面的确认，这些阀门都已经正常安装（如下图所示）。

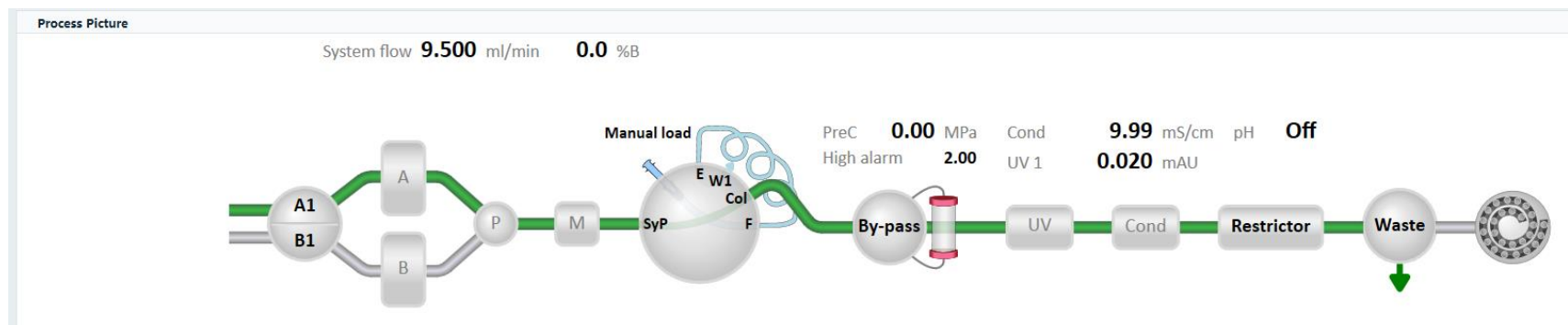


17、组分收集器可以收集体积为 0.1-50 ml，软件测试通过。

The screenshot shows a software interface for fractionation control. At the top, there is a field for 'Selected column type:' with a 'Select...' button. Below this, the interface is divided into three main sections: 'Instructions', 'Parameters for Fractionation', and 'Instruction execution list'. The 'Instructions' section on the left contains a list of commands, with 'Fractionation' selected. The 'Parameters for Fractionation' section in the center has a 'Base' section with radio buttons for 'Time' and 'Volume' (the latter is selected). Below this is a 'Fraction size' field set to '50.000' with a range of '[0.000 - 50.000]' and a unit of 'ml'. The 'Instruction execution list' on the right has 'Insert' and 'Delete' buttons and an empty list area. At the bottom, there is a 'Save result as:' field with a 'Browse...' button, a checkbox for 'Auto update of parameters during run' which is checked, and 'Execute' and 'Close' buttons.

测试 10 ml 每管收集，经过称量达到 10ml 体积。

18、流路实时在线，实时监控和控制。交互式的流路控制，方便了解液体流向，并且直接可在流路图上进行控制。软件测试通过



19、系统具有电子签名功能，软件测试通过。

Sign Result - 20170411 002

Sign result View signatures

☐ Use Windows Authentication

Signing user Default

Full name Default account

Job title Default

Signature description

Signature password

☒ Lock

OK Cancel

20、系统内置上百种层析柱和凝胶的信息，从1ml的小柱到几百升的工业生产柱，软件测试通过。

Column Handling

Show Column Types by:

Technique:

Any

Diameter (cm):

-1.0; 0.77-2.6; 2.6-7.0; 7.0-30.0; 30.0-

Access label:

Predefined; Global; Personal

Search (names or diameter range):

Column types: 334 of 334

HiLoad 26/10 SP Sepharose HP
HiLoad 26/60 Superdex 30 pg
HiLoad 26/60 Superdex 75 pg
HiLoad 26/60 Superdex 200 pg
HiLoad 26/600 Superdex 200 pg
HiLoad 26/600 Superdex 30 pg
HiLoad 26/600 Superdex 75 pg
HiPrep 16/10 ANX FF (high sub)
HiPrep 16/60 Sephacryl S 100 HR
HiPrep 16/60 Sephacryl S 200 HR
HiPrep 16/60 Sephacryl S 300 HR
HiPrep 16/60 Sephacryl S 400 HR
HiPrep 16/60 Sephacryl S 500 HR
HiPrep 26/10 Desalting
HiPrep 26/10 Sepharose 6 FF
HiPrep 26/60 Sephacryl S 100 HR
HiPrep 26/60 Sephacryl S 200 HR
HiPrep 26/60 Sephacryl S 300 HR
HiPrep 26/60 Sephacryl S 400 HR
HiPrep 26/60 Sephacryl S 500 HR
HiPrep Butyl FF 16/10
HiPrep CM FF 16/10
HiPrep DEAE FF 16/10
HiPrep Hepatin FF 16/10
HiPrep IMAC FF 16/10
HiPrep Octyl FF 16/10
HiPrep Phenyl FF (high sub) 16/10
HiPrep Phenyl FF (low sub) 16/10
HiPrep Phenyl HP 16/10
HiPrep Q FF 16/10
HiPrep Q HP 16/10

Column Type ParametersColumn Logbook

Name: 123 (Personal)

Run Parameters:

Parameters	Value	Unit
Technique	Affinity	
Column volume	4.712	ml
Column volume unit	ml	
Max pre-column pressure	5.0	MPa
Max delta column pressure	0.1	MPa
Pressure unit	MPa	
Default flow rate	3.0	ml/min
Max flow rate	15.0	ml/min
Default linear flow rate	229.18	cm/h
Max linear flow rate	1145.92	cm/h
Min pH value (short term)	3	
Max pH value (short term)	9	
Min pH value (long term)	3	
Max pH value (long term)	9	

Details:

Parameters	Value	Unit
Hardware diameter	1.0	cm
Bed height	6.0	cm
Typical loading range		mg
Total liquid volume (Vt)		ml
Void volume (Vo)		ml
Typical peak width at base		ml
Average particle diameter	90.0	µm
Molecular weight range		Mr

Ordering Information:

Parameters	Value
Name	123
Code number	
Resin name	Con A Sepharose 4B
Resin code number	17-0440-03
Hardware name	Tricom 10/100
Hardware code number	28-4064-15

New...

Edit...

Delete

Print...

Export...

Import...

21、系统软件具有watch功能，软甲测试通过。

Selected column type:

Select...

Instructions

+ Fraction collection

+ I/O-box

+ Alarms

+ Advanced

- Watch parameters

Watch UV parameters

Watch cond parameters

Watch flow parameters

Watch pH parameters

Watch pressure parameters

Watch analog in parameter

Parameters for Watch UV parameters

Delta peak

[0.00 - 6000.00]

0.00

↕

mAU

Accepted fluctuation (+/-)

[0.00 - 6000.00]

0.10

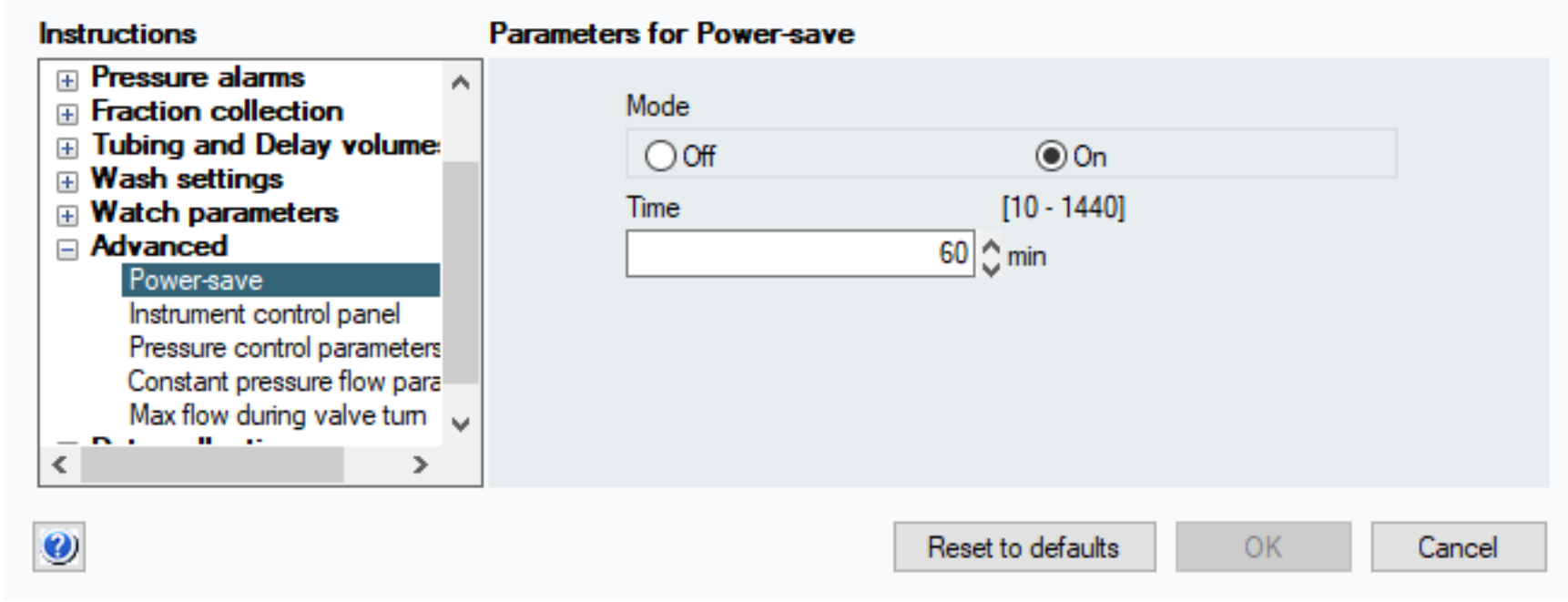
↕

mAU

Save result as:

Browse...

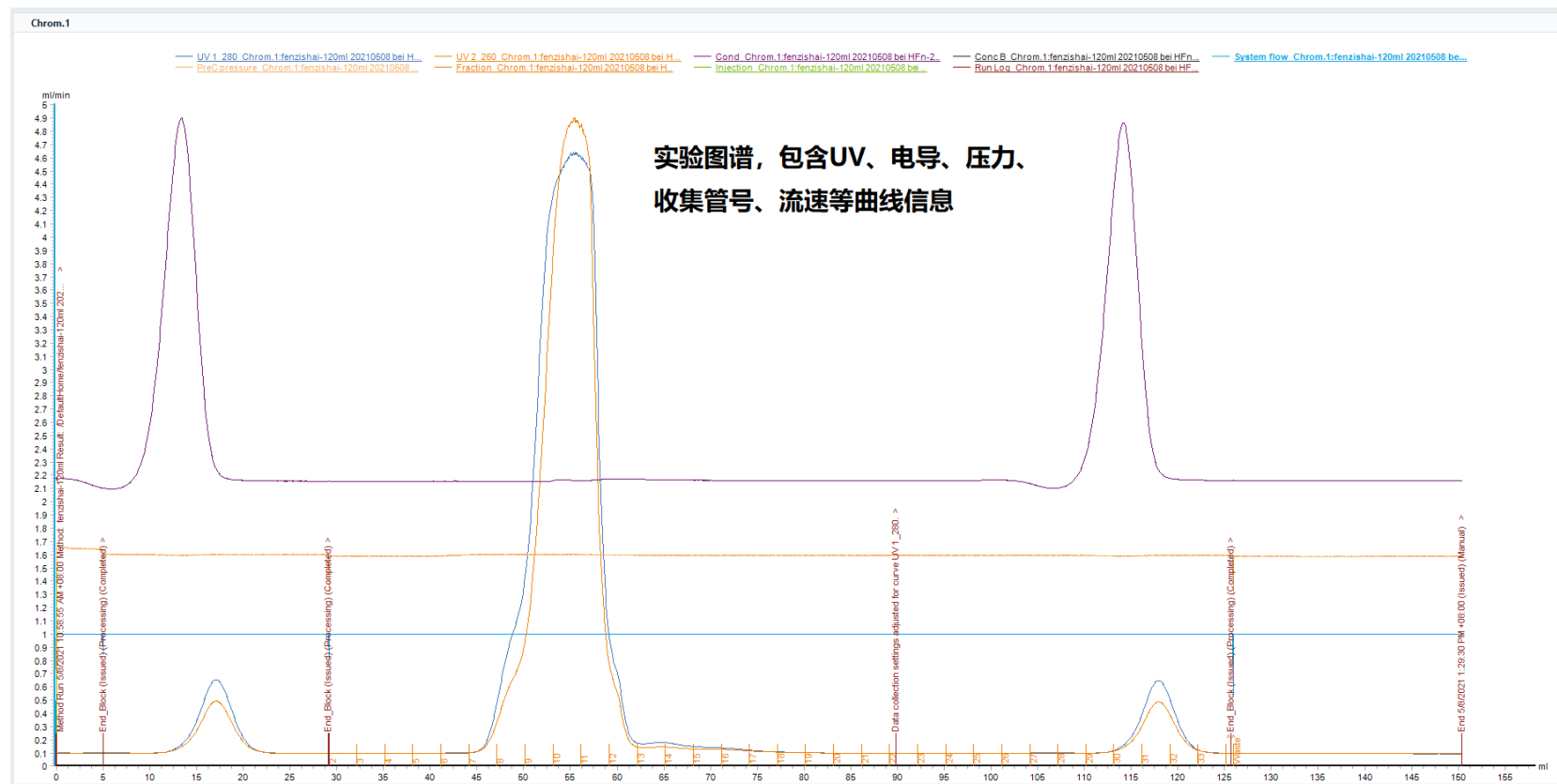
22、设备具有节电模式，软件测试通过。



经过测试，60min后设备进入待机状态。

样品的实际运行测试：

样品为科研蛋白样品，层析柱为superose increase 10-300 GL分子筛，柱体积24 ml，整个实验通过手动操作完成，最后实验结果较好，并且图谱数据得到了详细的分析。



下图为峰积分运算列表

A: UV 1_280@01.PEAK

Peak data

Integration summary

No	Peak name	Retention (min)	Area (mAU)	% of total area	% of total peak area	Height (mAU)	Width (min)	Width at half height (min)	Plate height (cm)	Plates per meter	Resolution	Asymmetry	Kav
1		17.088	1925.4950	5.82	5.90	457.861	13.60	3.81	0.53938	185.4		0.92	
2		55.568	28832.3500	87.13	88.30	3721.511	17.87	6.93	0.16859	593.2	4.21	0.59	0.19
3		117.910	1896.4270	5.73	5.81	452.676	15.63	3.78	0.01112	8989.1	6.85	0.94	0.97

根据UV曲线进行峰积分运算，出峰、生成峰下面积，对称性、半峰宽等数据

下图为实验操作记录列表

Documentation

Variable List

Text Instructions

Notes

Columns

Method Information

Result Information

Start Protocol

System Information

Calibration

Run Log

Evaluation Log

0.00 ml Method Run 5/8/2021 10:58:55 AM +08:00 Method: fenzishai-120ml Result: /DefaultHome/fenzishai-120ml 20210508 bei f

0.00 ml Batch ID: 5a090a25-33b9-4c4d-8bee-6f21e73a065b

0.00 ml Base CV: Vc=120.637 (ml), HiLoad 15/600 Superdex 200 pg

0.00 ml Phase Method Settings (Issued) (Processing) (Completed)

0.00 ml Base SameAsMain

0.00 ml Alarm pre column pressure Enabled 0.50 (MPa) 0.00 (MPa) (Issued) (Processing)

0.00 ml Alarm pre column pressure Enabled 0.50 (MPa) 0.00 (MPa) (Completed)

0.00 ml Wavelength 280 (nm) 260 (nm) Off (nm) (Issued) (Processing)

0.00 ml Wavelength 280 (nm) 260 (nm) Off (nm) (Completed)

0.00 ml Noise reduction UV 5.0 (sec) (Issued) (Processing)

0.00 ml Noise reduction UV 5.0 (sec) (Completed)

0.00 ml Injection valve Manual load (Issued) (Processing)

0.00 ml Injection valve Manual load (Completed)

0.00 ml Column position 1 Down flow (Issued) (Processing)

0.00 ml Column position 1 Down flow (Completed)

0.00 ml pH valve Off-line In-line (Issued) (Processing)

0.00 ml pH valve Off-line In-line (Completed)

0.00 ml Inlet A A1 (Issued) (Processing)

0.00 ml Inlet A A1 (Completed)

0.00 ml Inlet R R1 (Issued) (Processing)

Find...

☐ Adjust retention zero to injection number

1

Included entry types:

☒ Set Mark

☒ Block Start

☒ Alarms, Warnings and Errors

☒ Method

☒ Manual

☒ System

☐ Issued

☐ Processing

☒ Completed

☒ Failed

☒ Ignored

☒ Cancelled

☐ Time

☒ Volume

☐ CV

Print

OK

Cancel

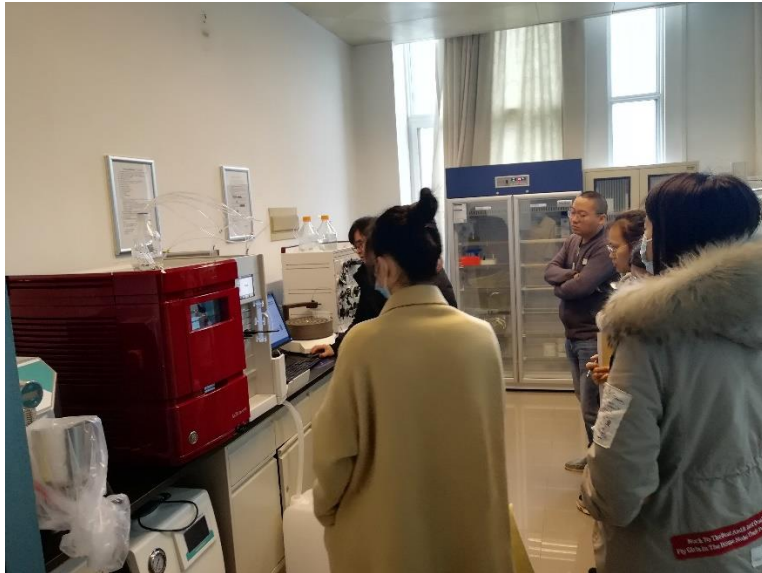
结论

在系统测试中，对设备的关键参数和标准的模块阀门进行确认和测试，全部通过，对实际样品的测试，检测设备在实际样品运行时的表现，结果为完全可以满足用户的分离纯化的实验要求。因此，设备运行测试合格。

4.设备培训

4.1 设备培训报告-全自动智能蛋白液相色谱系统

用户名称	郑州大学		
设备品名	全自动智能蛋白液相色谱系统	品牌型号	Cytiva AKTA avant
联系人	江冰	联系电话	13051575129
培训时间	2021 年 3 月 18 日	培训地点	基础医学院 5 楼
	培训内容		是否掌握
	仪器工作原理、以其结构等相关基础知识		✓
	仪器操作、仪器调整及软件使用		✓
	上机操作		✓
	仪器的日常维护及维修		✓
	仪器应用		✓
工程师签字	王育增	用户签字	江冰



4.2 设备培训报告-快速蛋白层析系统

用户名称	郑州大学		
设备品名	快速蛋白层析系统	品牌型号	Cytiva AKTA pure
联系人	江冰	联系电话	13051575129
培训时间	2021 年 3 月 18 日	培训地点	基础医学院 5 楼
	培训内容	是否掌握	
	仪器工作原理、以其结构等相关基础知识	✓	
	仪器操作、仪器调整及软件使用	✓	
	上机操作	✓	
	仪器的日常维护及维修	✓	
	仪器应用	✓	
工程师签字	王育增	用户签字	江冰

