汉邦科技
Hanbon Sci. & Tech.

INDUSTRIAL PREPARATIVE HPLC SYSTEM

2018-2019

PRODUCT MANUAL



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H A N B O N S C I . & T E C H .

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HPLC SYSTEM

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01 CS-Prep Industrial Preparative HPLC System

CS-Prep HPLC system consists of infusion, injection, detection, collection, controlling and data processing modules. System design totally meets requirements of GMP, cGMP and FDA. Its integrated modules can realize balance, injection, flushing, elution, auto collection, CIP and other processes. Besides, we can provide the complete validation documentation conforming to the requirements of GMP and other laws and regulations.

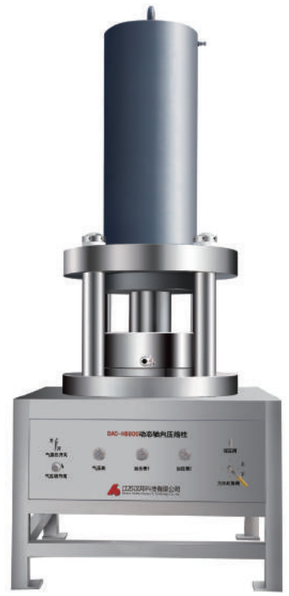
CS-Prep HPLC system has the features of high efficiency, fast, automatic operation and anti-explosion, tec. It can be applied to the separation of pharmaceuticals, chemical industry, phytochemical fields, food industry, etc. This equipment can effectively improve the production efficiency, automaticity, purity and recovery.

Product Features

- Conform to GMP & cGMP & FDA
- Key parts are from internationally famous top brands.
- High accuracy; Excellent stability;
- Based on IFix, control software is further developed and conforms to the requirements of 21 CFR Part 11.
- The design and the operation are based on GAMP5, with the validation documentation conforming to the requirements of GMP and FDA.

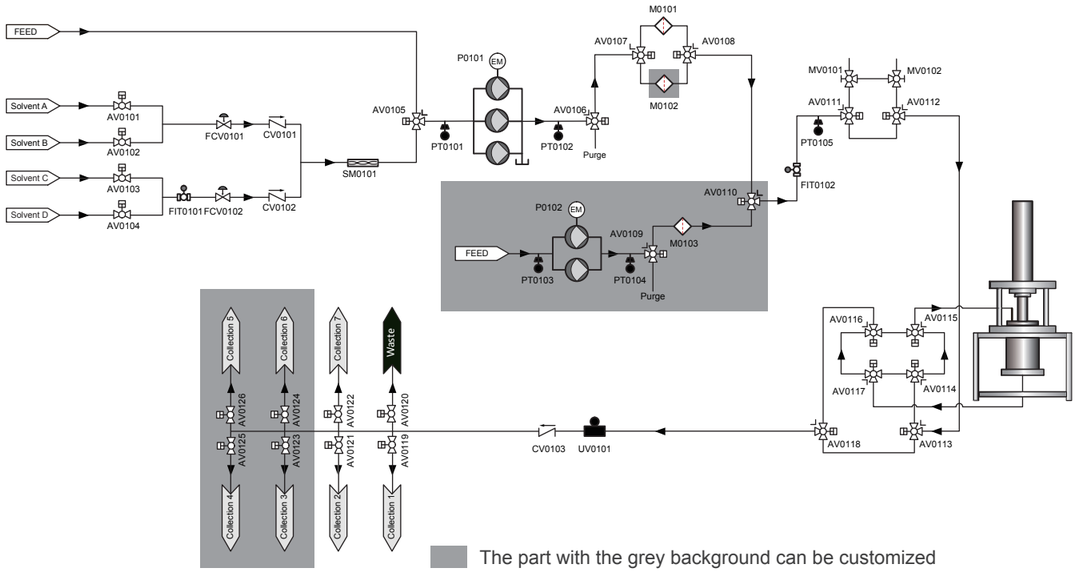






01 CS-Prep Industrial Preparative HPLC System

Standard Gradient System P&ID Drawing



The part with the grey background can be customized

P&ID Drawing Introduction

AV0101~AV0104	FCV0101~FCV0102	FIT0101~FIT0102	CV0101~CV0103
Pneumatic two-way ball valve	Fow regulator	Mass flow meter	Check valve
SM0101	AV0105~AV0118	P0101~P0102	PT0101~PT0105
Static mixer	Pneumatic three-way ball valve	Infusion diaphragm pump	Pressure transmitter
M0101~M0103	UV0101	AV0119~AV0126	MV0101~MV0102
Online filter	UV detector	Pneumatic two-way ball valve	Manual three-way ball valve

01 CS-Prep Industrial Preparative HPLC System

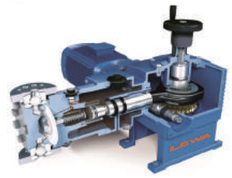
Key Parts

Diaphragm Metering Pump

The key part in the infusion module is LEWA diaphragm metering pump with three pump heads. Its pump head adopts DPS diaphragm protection system and diaphragm position control technology, conforming to the requirements of GMP、cGMP and FDA.



Based on the LEWA patent----adjustable eccentricity and piston ring seal design, the stroke adjustment is a non-torque transmission, easy to adjust, and the locking is good. When the pump runs or stops, the stroke can be adjusted from 0 to 100%. The stroke adjustment system has good linear, perfect reproducibility and high accuracy.



Other Key Parts

Other key parts in the system are all from internationally famous brands, such as E+H, MASONEILAN, Swagelok, HAM-LET and SIEMENS, which guarantees the stability and reliability of instrument.



E+H



MASONEILAN



SIEMENS



E+H

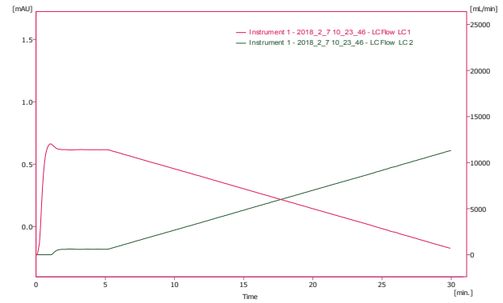


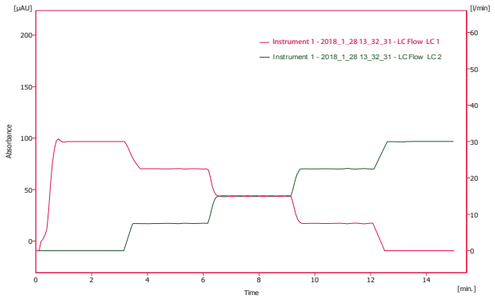
Swagelok



KNAUER

High Accuracy Flow Gradient Control





01 CS-Prep Industrial Preparative HPLC System

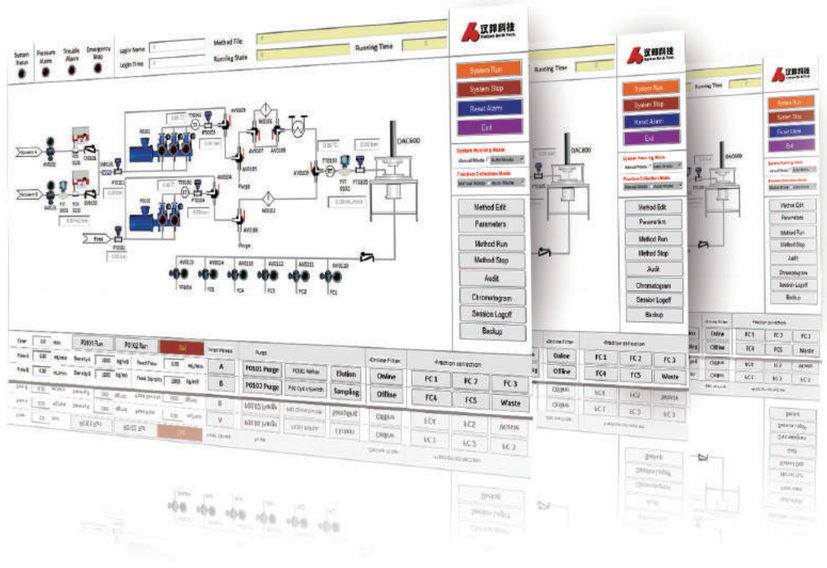
Controlling Software

The system software can set running parameters including flow rate, valve switching, sampling time, elution time, collection condition, etc., according to production process. It can run automatically according to the preprogrammed program, also can run manual mode with customized process and parameter. Designed according to the requirements of GAMP5 and FDA 21 CFR Part11, it has perfect audit trail, electronic record, electronic signature, multi-level user right management, etc. All operations of a user have a special document to record. Besides, the system has complete log output and automatic backup function.

Product Features

- All running parameters under monitoring; multiple safety interlocking and alarm, such as pressure abnormity, diaphragm break, etc.
- Excellent interface and clear method editintg; easy operation for various functions.
- Multi-mode operation---- debug, manual and automatic
- Consistent with the requirements of GAMP 5 and FDA 21 CFR Part 11; with the functions of signature and electronic record
- Multi levels of operation right to ensure no unauthorized process parameters modification.
- Multi-task, hyper-threading and fast data processing
- Complete audit trail function and data operation log.

Software Interface



01 CS-Prep Industrial Preparative HPLC System

Diaphragm Pump System Parameters

Type	CS-Prep 150/200	CS-Prep 300	CS-Prep 400 ~ 500	CS-Prep 600	CS-Prep 800	CS-Prep 1000/1100	CS-Prep 1200
Infusion pump max flow (L/h)	200	300	500	1200	2000	3000	5000
Column	DAC150～200	DAC300	DAC400～500	DAC600	DAC800	DAC1000～1100	DAC1200
Dimension (cm)	260×100×184		300×140×202				350×160×230
Weight (kg)	1500		2000		2300	2500	3000
Tubes	1/4"或3/8" ferrule tubes		1/2" ferrule tubes		3/4" ferrule tubes		1" ferrule tubes
Material	ASTM A269(SS316L)						
Max work pressure (bar)	100				70		
Detector	single wavelength, double wavelengths or four wavelengths（200～400nm or 190～700nm）						
Power	380VAC 50Hz						
Work temperature (℃)	4～40						
Compressed air (bar)	5～7						
ATEX level	ExdIIBT4						

Note: the type and parameters of key parts can be customized.

01 *CS-Prep Industrial Preparative HPLC System*

CS-Prep 200
Industry ATEX Preparative HPLC system



CS-Prep 600
Industry ATEX Preparative HPLC system



01 *CS-Prep Industrial Preparative HPLC System*

CS-Prep 800
Industry ATEX Preparative HPLC system



CS-Prep 1200
Industry ATEX Preparative HPLC system



02 *Dynamic Axial Compression Chromatography Column*

DAC----Dynamic Axial Compression Column is the most mature packing technology in the field of preparative chromatography. The advanced DAC column can finish packing or unpacking automatically and keep column pressure. It has both chromatography column and column packer functions. A chromatography column in the way of DAC packing can meet the requirements of continuity, uniformity, stability and tightness for the column bed and the column bed won't collapse.

In 2005, Hanbon developed the first DAC with Chinese patents and became the biggest workshop for the DAC producing and assembling in the world. After continuous improvement, Hanbon has a good reputation in the international market. Our customers are all over the world, India, South Korea, Norway, Hungary, Germany, UK, Russia and so on. Hanbon can provide the DAC ID from 50mm to 2000mm, and also provide customized service.



DAC-50



DAC-80/100



DAC-150

Features

- Mature technology; Stable performance
- Independent intellectual property; Many patents;
- Excellent distributor design for the linear amplification
- Perfect matching device for easy and fast operation
- Column size: ID from 50mm----2000mm or customized

DAC-50 Technical Parameters

No.	Configuration	Parameter
1	ID	50mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤10MPa
6	End cap connection	Chain clamp
7	Dimension	600*600*2000mm
8	Packing method	Down

* ID, length and max pressure can be customized.

DAC-80/100 Technical Parameters

No.	Configuration	Parameter
1	ID	80/100mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤10MPa
6	End cap connection	Chain clamp
7	Dimension	600*600*2300mm
8	Packing method	Down

* ID, length and max pressure can be customized.

DAC-150 Technical Parameters

No.	Configuration	Parameter
1	ID	150mm
2	Length	680mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤10MPa
6	End cap connection	Chain clamp
7	Dimension	650*650*2350mm
8	Packing method	Down

* ID, length and max pressure can be customized.

02 *Dynamic Axial Compression Chromatography Column*



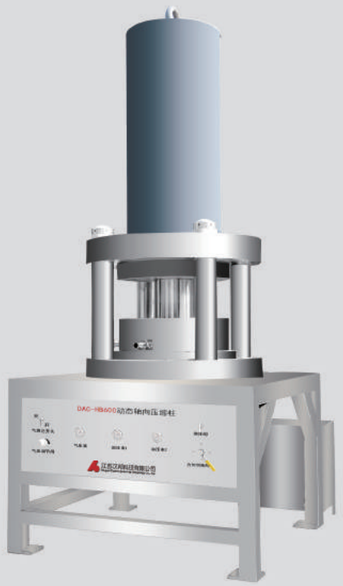
DAC-200



DAC-300



DAC-400/450



DAC-500/600

DAC-200 Technical Parameters

No.	Configuration	Parameter
1	ID	200mm
2	Length	680mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤10MPa
6	End cap connection	Chain clamp
7	Dimension	650*650*2450mm
8	Packing method	Down

* ID, length and max pressure can be customized.

DAC-300 Technical Parameters

No.	Configuration	Parameter
1	ID	300mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤8MPa
6	End cap connection	Chain clamp
7	Dimension	900*900*3000mm
8	Packing method	Down

* ID, length and max pressure can be customized.

DAC-400/450 Technical Parameters

No.	Configuration	Parameter
1	ID	400/450mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤8MPa
6	End cap connection	Chain clamp
7	DAC400 Dimension	1200*1200*3000mm
	DAC450 Dimension	1350*1350*3400mm
8	Packing method	Down

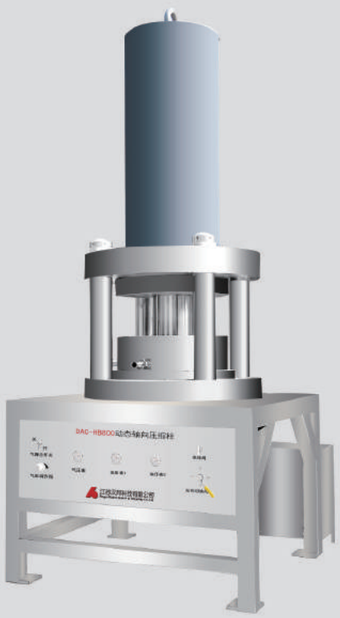
* ID, length and max pressure can be customized.

DAC-500/600 Technical Parameters

No.	Configuration	Parameter
1	ID	500/600mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤8MPa
6	End cap connection	Chain clamp
7	DAC500 Dimension	1200*1700*3400mm
	DAC600 Dimension	1400*1900*3600mm
8	Packing method	Down

* ID, length and max pressure can be customized.

02 *Dynamic Axial Compression Chromatography Column*



DAC-800



DAC-1000~1200

DAC-800 Technical Parameters

No.	Configuration	Parameter
1	ID	800mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤7MPa
6	End cap connection	Bolt
7	Dimension	1000*2400*4200mm
8	Packing method	Down

* ID, length and max pressure can be customized.

DAC-1000~1200 Technical Parameters

No.	Configuration	Parameter
1	ID	800mm
2	Length	650mm（standard）
3	Inner roughness	≤0.2μm
4	Effective packing length	≤450mm
5	Max pressure	≤7MPa
6	End cap connection	Bolt
7	DAC1000 Dimension	2300*2300*4600mm
	DAC1100 Dimension	Customized
	DAC1200 Dimension	Customized
8	Packing method	Down

* ID, length and max pressure can be customized.

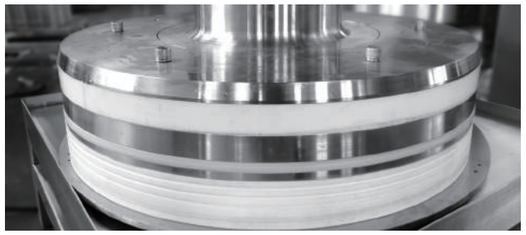
02 Dynamic Axial Compression Chromatography Column

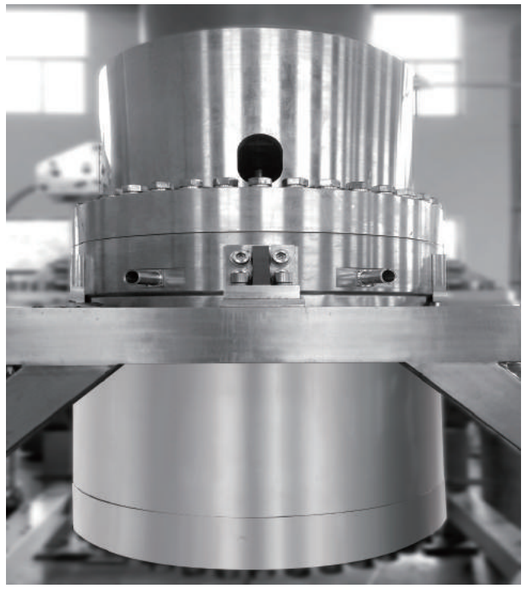
Key Parts

Piston, Column tube, End cap

The filter plate is the internationally famous brand. It can guarantee the smoothness the and uniformity of pore size.

The tube is manufactured as a whole by forging, rolling, solid solution and so on. Meanwhile, the inner roughness is qualified through honing, grinding and polishing. The tube wall effect is greatly reduced and the performance gets improved.





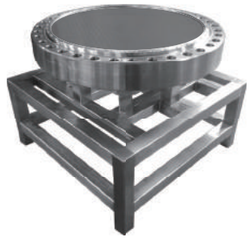
Matching Device



Piston over-turn rack



Piston storage rack



End cap storage rack

03 Slurry System

In the small capacity slurry tank, slurry is transmitted and cycled through pneumatic diaphragm pump. Pneumatic motor mixer can adjust the mixing speed by the air pressure. The blade is designed with low shear force to avoid the damage of the packing materials. The pressure regulator can be locked after the required air pressure is set to avoid misoperation. A CIP cleaning ball is fixed on the top of tank for on-line cleaning.

The capacity can be customized for various chromatography columns. Accessories in slurry system are imported from famous brands, which guarantees a stable and reliable performance.

For large capacity slurry tank, pneumatic motor is replaced by the variable frequency motor. A vacuum feeding device is matchable. It can effectively avoid the dust damage and ensure the health of the personnel.



▲ Matchable



▲ Standard

Product Features

- Key parts are all from international top brands.
- Consistent with GMP ; manufactured according to ASME BPE requirements Wetted materials are SS316L; Ra≤4μm
- Moderate force blade for no damage to packing materials
- Sprinkler ball design for online cleaning

Configuration Parameters

Type	ST50	ST100	ST150	ST200	ST400	ST600	ST800	ST1000
Rated Capacity (L)	50	100	150	200	400	600	800	1000
Drive way	Pneumatic motor				ATEX motor			
Seal form	Mechanical seal							
Transmission way	Pneumatic diaphragm pump							
Size (cm)	80x50x170	90x53x185	100x70x195	100x70x210	105x85x240	135x90x255	145x100x275	155x110x290
Weight (kg)	165	200	230	255	295	330	530	600
Compressed air (bar)	5-7							
Working temp(℃)	4-40							
Power (KW)	／				0.55	1.1	2.2	2.2

04 Pre-column & System

During the fermentation, extraction and synthesis of products, a small amount of impurities and pigments will still remain after pre-processing filtration, decolorization, centrifugation, etc. In order to protect the expensive packing materials with large diameter and filter, sample pretreatment usually is needed. And we still adopt DAC loading method with the chromatographic packing materials of big diameter. Sample will be pumped into the pretreatment column through the pretreatment system, temporarily stored in a storage tank.

Features

- Mature products; stable performance
- Perfect configuration for easy and fast operation
- Pre-processed column: diameter 50-600mm



05 Plunger Pump Infusion System

To meet different requirements from clients, Hanbon innovated in mass flow plunger pump industrial CS-Prep HPLC system with multi-pump head design, which can decrease flow pulsation.

Plunger pump infusion system has high cost performance, good absorption and low dead volume.



Features

- High nominal pressure; stable flow
- Easy cleaning
- Simple structure

Parameter of Plunger pump system

Type	3L Infusion Pump	5L Infusion Pump	10L Infusion Pump	20L Infusion Pump	30L Infusion Pump	40L Infusion Pump	50L Infusion Pump	80L Infusion Pump
Pump head quantity	5	5	5	5	5	7	7	7
Flow	0.3~3L/min	0.5~5L/min	1~10L/min	2~20L/min	3~30L/min	4~40L/min	5~50L/min	8~80L/min
Inlet diameter	3/8"	1/2"	3/4"	3/4"	1"	1.1/4"	1.1/2"	1.1/2"
Outlet diameter	1/4"	3/8"	1/2"	1/2"	3/4"	1"	1.1/4"	1.1/4"
Motor power(KW)	2.2	2.2	4	7.5	11	15	18.5	22
Dimension(mm)	735×650×1000	735×650×1000	860×1000×110	860×1040×130	1000×1200×14	1200×1220×14	1400×1300×16	1500×1300×17
Weight(kg)	180	200	0	0	00	00	50	00
Flow accuracy	280 ±1.5%							
Work pressure(MPa)	≤10							
Work temperature(℃)	4～40							

Note: The parameter table is for reference, and key parts and types can be customized.

06

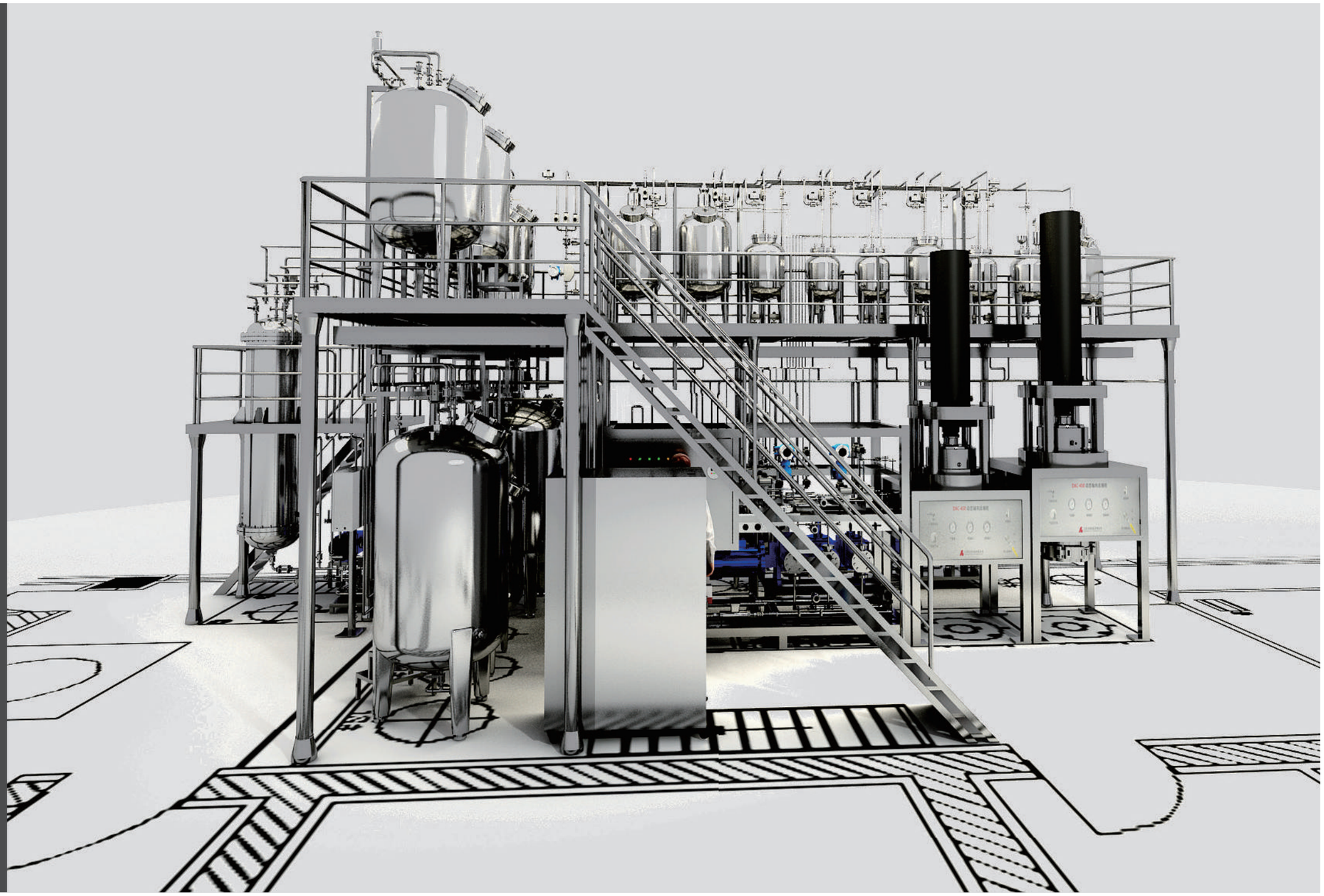
Pharmaceutical Industry Overall Solution

Profile

Hanbon can give you an overall solution with the technology of chromatographic separation and purification.

In the solution, process development, pilot scaling up and industrial production are included. What we can do includes but not limited to: sample process system, purification system(high pressure, medium pressure, low pressure), solvent recycle, auto control, common medium plan design, equipment configuration, supply, installation and tubing construction, etc. Besides, we can provide verification documents which conform to GMP requirements.

Hanbon keeps innovating and developing process technology(such as continuous ion exchange, online fast detection and monitoring, auto solvent dosing, pervaporation, membrane process, rotation distillation technology) and chromatographic purification assistive technology to optimize clients' production process for more efficiency, higher yield and better quality with less materials and energy consumption and less environmental pollution.



07 *Low Pressure Silica Gel Column & System*

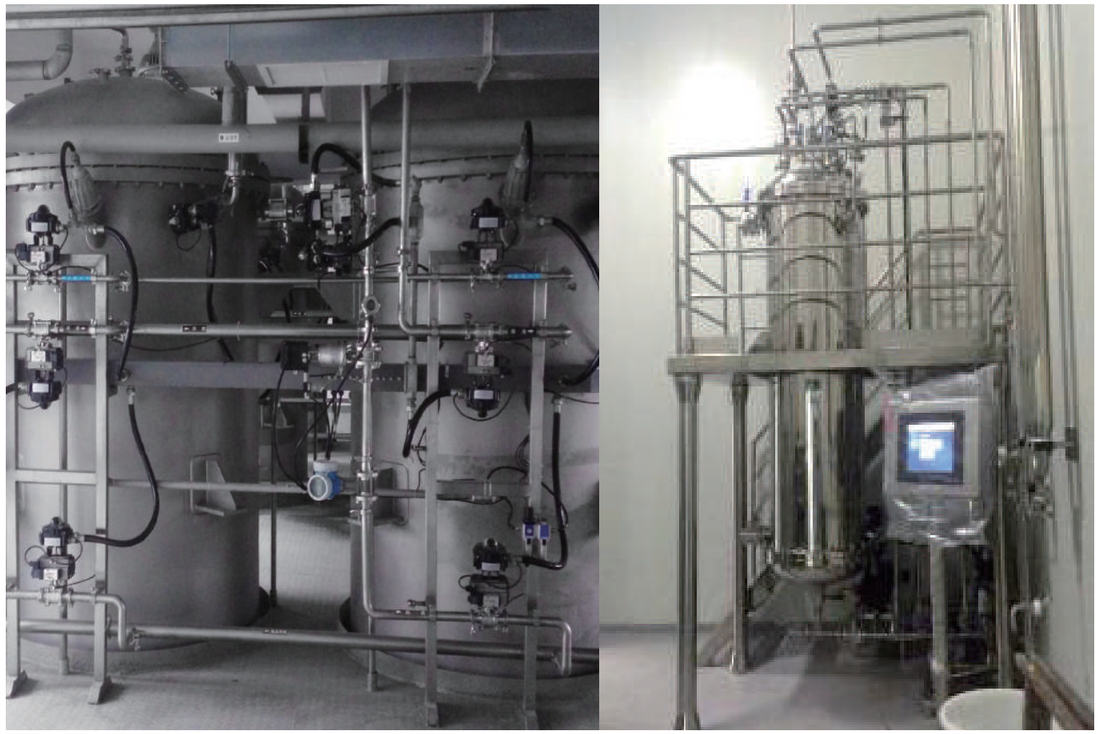


Brief introduction

Hanbon applied DAC dynamic axial compression column design concept to low pressure silica gel column. Advanced distributor structure design ensures good distribution effect and high efficiency of material purification. The structure design of silica gel column can use either upper and lower flat-plate closure or DAC piston drive mode to maintain the stability of silica gel column bed.

The sample feeding and discharging is always a difficult problem because it adopts positive phase system, which is inflammable, explosive and harmful to human body. Hanbon owns our patented design to realize the automatic feeding and discharging of silica gel under the sealing tubing out of touch with people, which fundamentally solves the problem.

08 *Low Pressure Resin Chromatography Column & System*

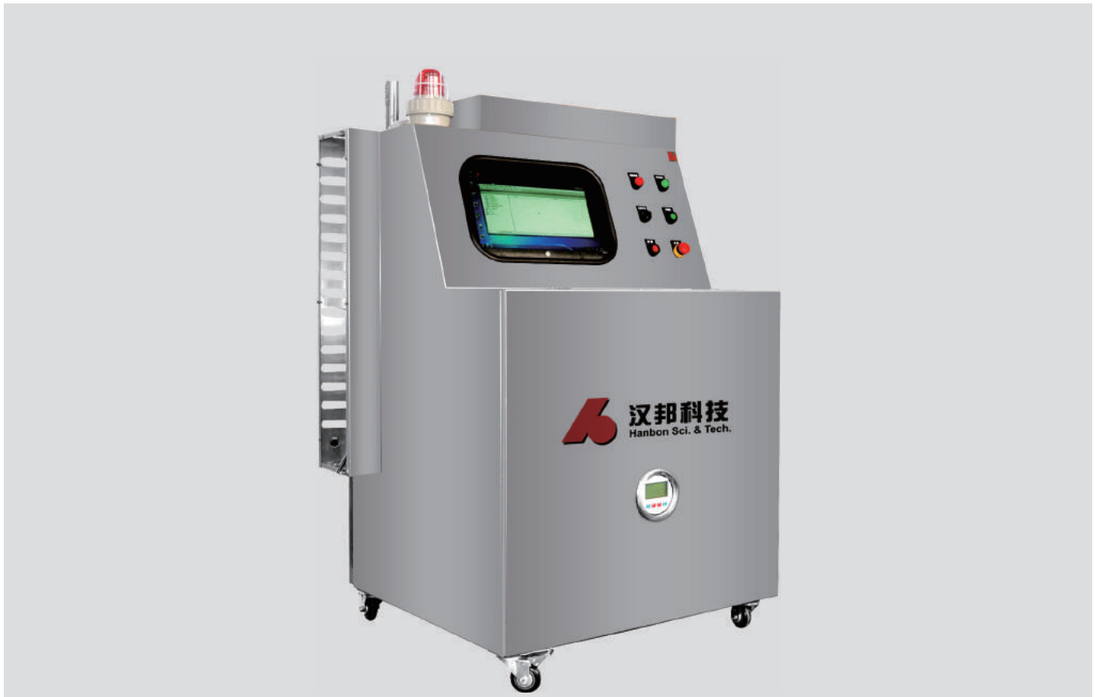


Brief Introduction

In the field of traditional low pressure resin column and system, Hanbon constantly improves the structure of the resin bed design, with better column head allocation, and we use multi-layer sintering filter to replace the traditional filter cap structure. The system can provide stainless steel material, PP, inner coating halal, F40, etc.

As to the infusion system control unit, Hanbon changed the traditional manual operation and sampling inspection, and realized the automatic process control, on-line monitoring/detection, automatic collection, solvent recovery and reuse etc. It greatly saves the area of equipment and plant, reduces the risk of manual operation and cuts down the number of on-site operators.

09 On-line Fast Detection/Monitoring System



Brief introduction

It can realize rapid on-line detection or process detection for traditional chromatography column, so as to avoid manual sample taking and feeding. According to the custom parameters, the system can control the elution pump, elution valve and collection valve in real time, and further achieve an auto control.

A set of on-line rapid detection and monitoring system can simultaneously monitor multiple sets of chromatography columns.

Features

- On-line sampling; on-line dilution; auto sample feeding; detection and analysis
- No manual sampling, TLC, detection operation, check, etc. to save labor costs
- Test results automatically control storage tank switching to avoid human error
- Save storage tanks and space
- System can be customized according to user requirements, and can further realize auto control.
- Meeting FDA 21 CFR Part 11 requirements

10 Automatic Desolved System



Brief introduction

Automatic solvent dosing system is a new technology which can monitor solvent concentration online and match solvent ratio and detect online via mass flow meter, flow regulator, mixer, etc. The precision and stability of the solution.is guaranteed with the advanced technology of closed-loop control.

Features

- Stable matching ratio; good reproducibility
- Advanced automation, safe and reliable
- Online closed-loop control for dosing precision improvement
- Cost reduction with smaller area and less storage tanks