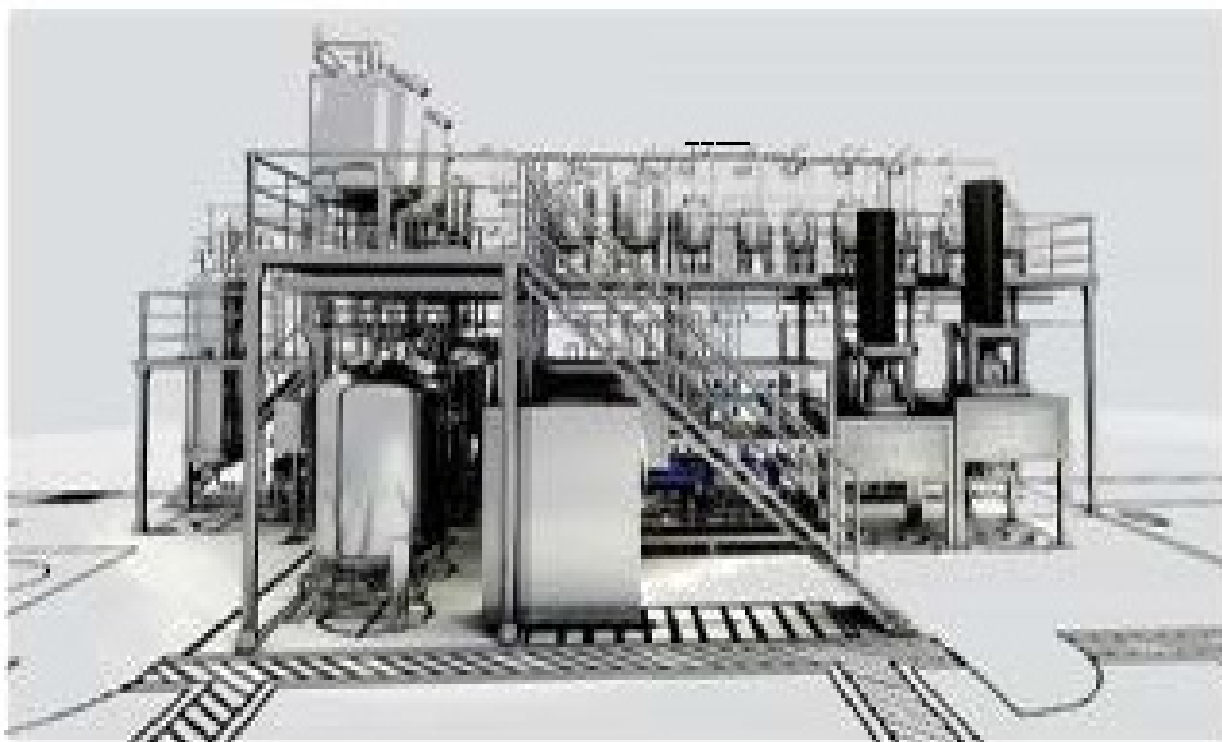


**Liquid Chromatography
Downstream Processing Design
Industrial Hemp and CBD
Isolation and Purification**



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Total Price: **\$5,500,000 USD**



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1. General

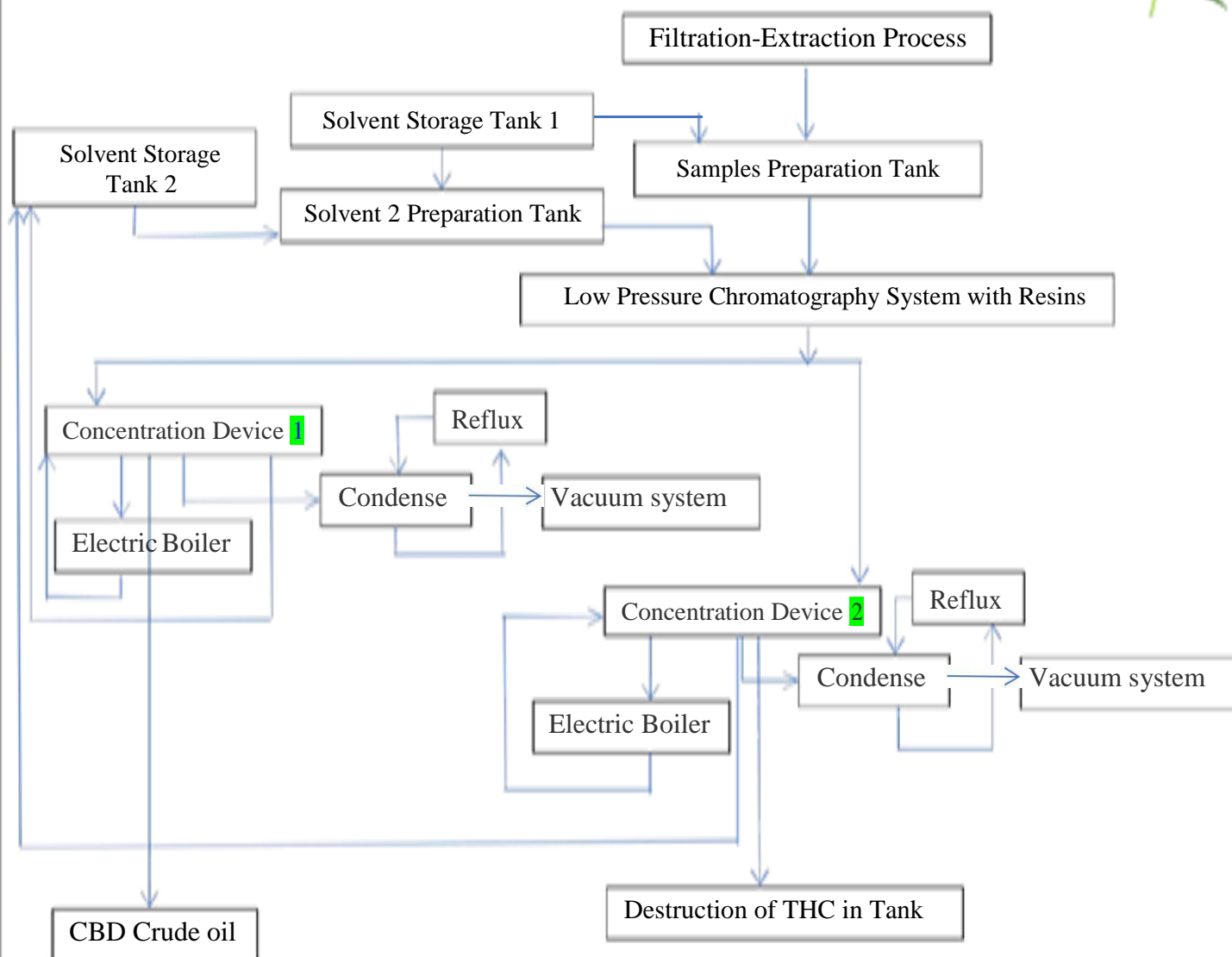
With the development of Industrial Hemp and CBD, The technical Chromatography Isolation and Purification process is very necessary, So We designed the whole process for the Chromatography isolation and purification. It has been used in some of Industrial Hemp client's factory.

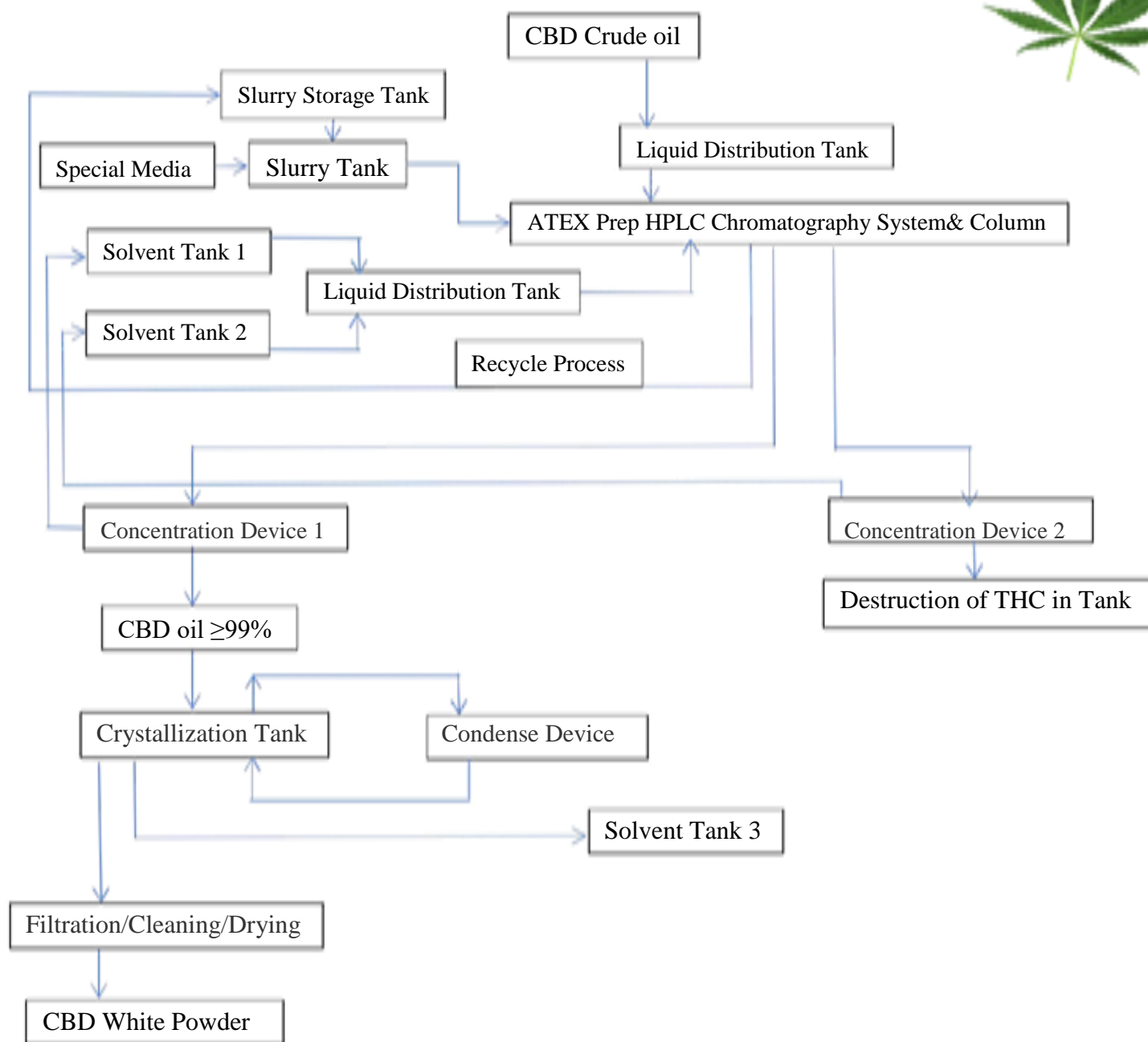
2. Purpose of Chromatography Downstream Processing

1. According to the principles of environmental protection, high energy, high efficiency and optimal technology, We make the process plan and design;
2. The purity of CBD extracted from the leaves and flowers of the industrial hemp plant is more than 99%;
3. FOR CHINESE Operations, The THC is controlled below 0.1%, Closed destruction mode (by enhancing carbonization)
4. Annual production capacity: 3 tons (production time: 300 days and 24 hours)
5. The third step of extraction can be divided into full-spectrum oil and more than 99% CBD process
6. The specific process needs to be customized according to customers' raw materials and specific requirements.
7. In view of the foreign market demand out of China, We plan to develop designs the following craft route.



3. Industrial Hemp and CBD Chromatography Process Plan





Notes: The above process is only the structures of design for the Industrial Hemp and CBD with more than 99% purity and Once the project is confirmed, We will provide the detailed Design Qualifications.

4. Project Whole Execution Plan and Schedule



Project #	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
Process Development and Equipment Selection												
Equipment Layout Designing/DQ/Manufacturing												
Client's Plant Drawing Design, including Pipes, Tanks and so on, Confirmation and Preparation												
Equipment Installation/IQ/OQ/PQ/PV and Confirmation												
The Entire system installation and system operation												
Trial production Operation												

5. Entire System Main configuration list

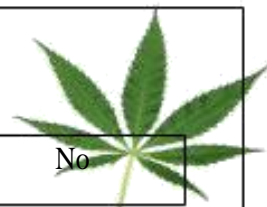
Item	Specification	Type	Qty	Material	Stir or not
Sample slurry tank	1500L		1	304	stir
Pure water tank	5000L	Magnetic pump	1	304	
Sample preparation tank	3000L		1	304	stir
Filter			1	304	
Preparation tank 1	5000L	Magnetic pump	2	304	
Solvent tank 2	5000L		1	304	
Partial collection tank	300L	0.7×2700m	6	304	
Collection tank	5000L		4	304	
Scraper concentrator		Mechanical diaphragm metering pump	1	304	
Spherical concentrator			2	304	No





Double effect concentrator		Magnetic pump	1	304	
Solvent recovery tank	10000L	Rising film evaporator	1	304	No
Pneumatic diaphragm pump			1	304	No
centrifugal pump		Domestic water ring type	12	304	
Resin column	2000L (800×4000)		1	304	No
Sample slurry tank	500L		1	304	stir
Storage tank 3	5000L		1	304	
Storage tank 4	10000L		2	304	
Eluent preparation tank	10000L		1	304	stir
Eluent preparation tank	10000L		1	304	stir
1200 system			1	304	No
DAC1200 column			1	304	No
Slurry tank	1000L		1	304	
Solvent tank	1000L		1	304	
Collection tank	2000L	dichloro	1	304	
Collect tank	200L	impurities behind	3	304	
Collect tank	4000L	Impurities before 100min	1	304	
Collect tank	8000L	sample	1	304	No
Recovery tank	3000L		1	304	No
Recovery tank 2	10000L		1	304	No
Spherical concentrator	200L/h		1	304	No
Spherical concentrator	500L/h		1	304	No
Spherical concentrator	1000L/h		1	304	Stir



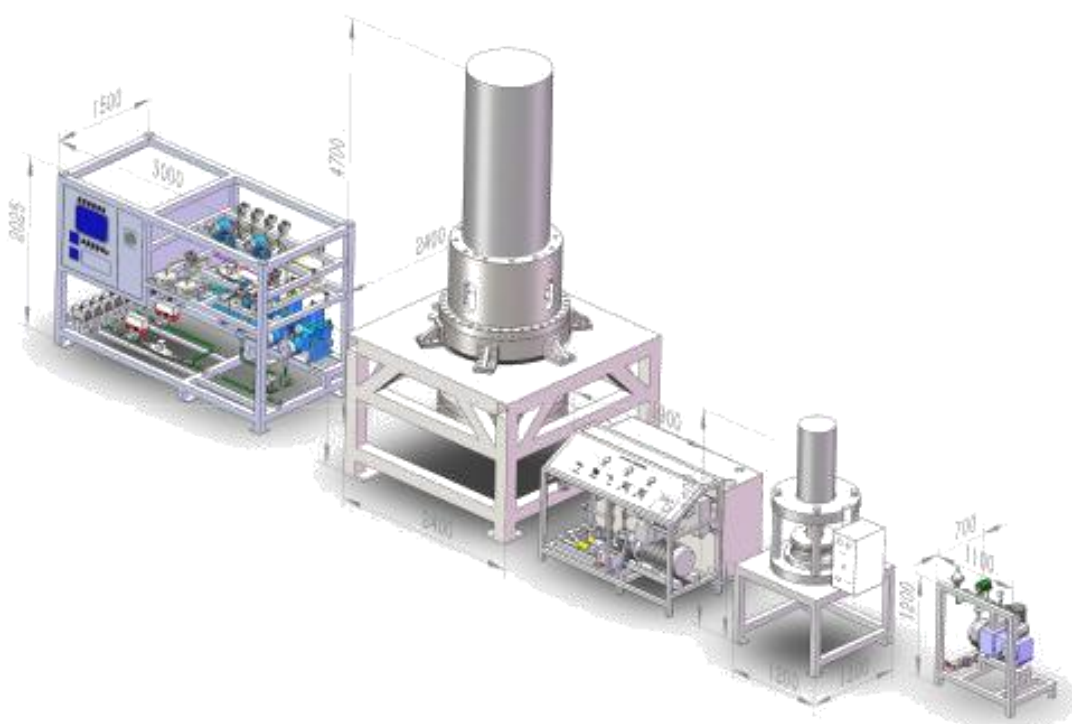


Centrifugal pump			6	304	No
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6.- Price Summary

Item	Total(USD)
Low Pressure Chromatography Unit,Including the pipes/tanks---220m2	5,500,000.00
High Pressure Chromatography Unit,Including the pipes/tanks--1200m2	
Crystallization Unit, Including pipes/tanks-- 80m3	
Installation and DQ/IQ/OQ/PQ/FAT/SAT/GMP documentation, Including the client's plant process design drawings	
Application Method Process and Validation	
Low Pressure Resins	
High Pressure bonded Silica	
Notes: The Supplier will provide the project management for the above at free of cost and also provide the trial operation to the client, But all jobs start should be based on the official legal licenses the client has already got from the government. If any legal problems during the process at the client's country , The supplier will not be responsible for that.	

7 ATEX Prep HPLC System with 1200mm ID Dimensions:



The Dimensions only refer the DQ docs finally



8. Equipment Test/Acceptance Document Description:

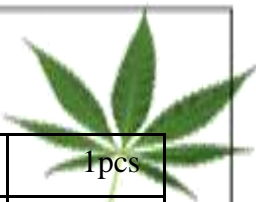
8.1 The other requirements of system

NO.	Requirements
1	All the measurement use metric system.
2	Supplier should provide a control platform with a stable system performance, and equip necessary communication interface.
3	Supplier should provide related software instruction files of program development, encoding procedure usage and so on.
4	Supplier should list the power supply which meet the usage of equipment and other requirements of utility system.
5	Equipment/system is scheduled to run for 10 years, 24 hours a day and 120 hours per week
6	Equipment running noise is less than 60db (within three inch from equipment)
7	This equipments should be provided with the ability of anti-electromagnetic interference and radio wave interference. The release and electromagnetic interference should meet the requirements of CE certification.
8	All the material contact with products should meet requirements of current EU cGMP, FIDGMP, USP Class VI and Chinese GMP.
9	All the pipeline's welding points which contact with products should meet the requirements of current ASME BPE specification.
10	The material of system pipeline is polypropylene or similar polymer system, the material of pipeline gasket/joint ring should be EPDM or PTFE.
11	Supplier should provide supporting documents and Compatibility list of material of system.
12	The whole surface of system should meet the requirement of wipe disinfection and air sterilization.
13	All the assembly, control circuit, connecting line etc. should be marked and easy to be identified.

8.2 Accompanying documents items

No.	Name	QTY
-----	------	-----







1	Design Qualification	1pcs
2	Quality Project Plan	1pcs
3	Functional Design Specification	1pcs
4	Hardware Design Specification	1pcs
5	Software Design Specification	1pcs
6	Impact Assessment	1pcs
7	Required Traceability Matrix	1pcs
8	Factory Acceptance Test	1pcs
9	Installation Qualification	1pcs
10	Operational Qualification	1pcs
11	Installation manual	1pcs
12	Operational Manual	1pcs
13	Standard Operating Procedure	1pcs
14	Drawings	1pcs
15	All Certificates (MOC, EU, etc)	1pcs
16	Software Backup CD's	1pcs
12	Packing list	1pcs
13	Spare parts list	1pcs

8.3 After Sales Service Requirement:

No.	Requirements	
1	Provides computer program CD backups 1pc	
2	Provides computer and PLC data line 1pc for each	
3	Provides Written equipment maintenance, maintenance plan	
4	Provides record and control software maintenance plan	
5	Provides the equipment maintenance tools 1set	
6	Supply of equipment spare parts within the service life and provide preferential supply commitment.	
7	To provide users with equipment excellent performance that meet the user's technical parameters	
8	After Equipment is arrival, the internal connection of pipeline and control line installation, public line connection.	
9	If Equipment is failed, we shall respond upon receipt of notification within 24 hours	






10	Provide users with equipment excellent performance that meet the user's technical parameters
11	After Equipment is arrival, the internal connection of pipeline and control line installation, public line connection.
12	Regular inspection on equipment, freely assist the equipment examination and basic maintenance without additional cost.
13	<p>Equipment supplier is responsible for user training, and the content includes:</p> <ul style="list-style-type: none"> --- HPLC basic principle; equipment basic composition ; --- Understanding of each component of the new technology ; --- Assembly and disassembly on ID column and internal structure ; --- The operation status under the running. --- Operating system interface and method of operation ; ; --- Equipment daily maintenance ; ; --- Equipment failure analysis method and solving steps.
14	Equipment supplier provides wearing parts, consumable list, the use of brand and specifications/model.

9. Company Profile:





The company SCIENCE AND TECHNOLOGY CO.,LTD, China was established in 1998, which is a largest professional Preparative HPLC system and ID/SAC column and SMB manufacturer in China. We are specially majoring in Products research, Methods development and Lab and Industrial Scale Prep HPLC system and ID column production and relevant continuous chromatography equipment.



ATEX Prep600 HPLC system with diaphragm pump at customer's site



ATEX Prep1200 HPLC system with diaphragm pump

The company includes more professional Labs for samples analysis, Preparative process scale-up, process optimization, QC and so on. It is focus on technology innovation and Prep Chromatography equipment construction. We have more than 200 employees who are engaged in Preparative Chromatography Industry. All these are very professional and technical.

In 2005, the first Chinese ID column with our Chinese first intellectual property patent was developed by our company. In 2006, the simulated moving bed chromatography equipment for

sugar alcohol, chemical and pharmaceutical industries was successively developed by Hanbon with our Chinese first patents.



At the same year, the development of five separation projects for Chromatography Industry was listed into "2006 Sci&Tech. project" "2006 Innovative funds project" and other awards. We have more than 13 patents, 3 high tech products in china and 20 registration trademarks.

In 2009, the company established the "Biological Process Control center" with a Chinese Academy of Sciences (CAS) . All these are the first in china. At the same time, we are establishing the best long-term business relationship with many famous International Pharmaceutical companies in the world. We have the best professional International team to market our own products. They will provide the best technical services to you quickly.

Also, we have built more local sales partnership in many countries; they can also provide the best local services for you. The company has a great reputation and a lot of experience on Chinese Chromatography Technical Application Field. We hope that you chose us to help you for your Bio-process development.



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V. Our company

Global Hemp Solutions is your all inclusive post-harvest processing and extraction equipment provider. We have partnerships with some of the world's largest and best manufacturers. We not only provide you with the best equipment to help make you successful, we are there every step of the way even after the installation of the equipment. We value long term relationships and are truly here to serve you.



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All prices and shipping times subject to change. Please contact us for updated lead times and pricing.



Sales@Global-Hemp-Solutions.com