Innovative chemistry for a better future

PharmaBlock

An Integrated CDMO to Advance Your Molecule from Development to Commercial

Jun 2022

www.pharmablock.com
product.pharmablock.com

PharmaBlock

PharmaBlock Footprint

PharmaBlock

Started Operation
BB Design and Process R&D

2008.10

Established PharmaBlock US in California
BB Sales

2012.5

IPO
(SZSE:300725)

2016.1

Established PharmaBlock Shandong
Manufacturing Site of Intermediates

2017.11

Established PharmaBlock Zhejiang
API Manufacturing Site

2017.12

Pennsylvania, US
BB Sales & Process R&D

2018.9

2000+ Employees
800+ Well-trained scientists
100+ PhDs
$189M Revenue (2021)

2021.9

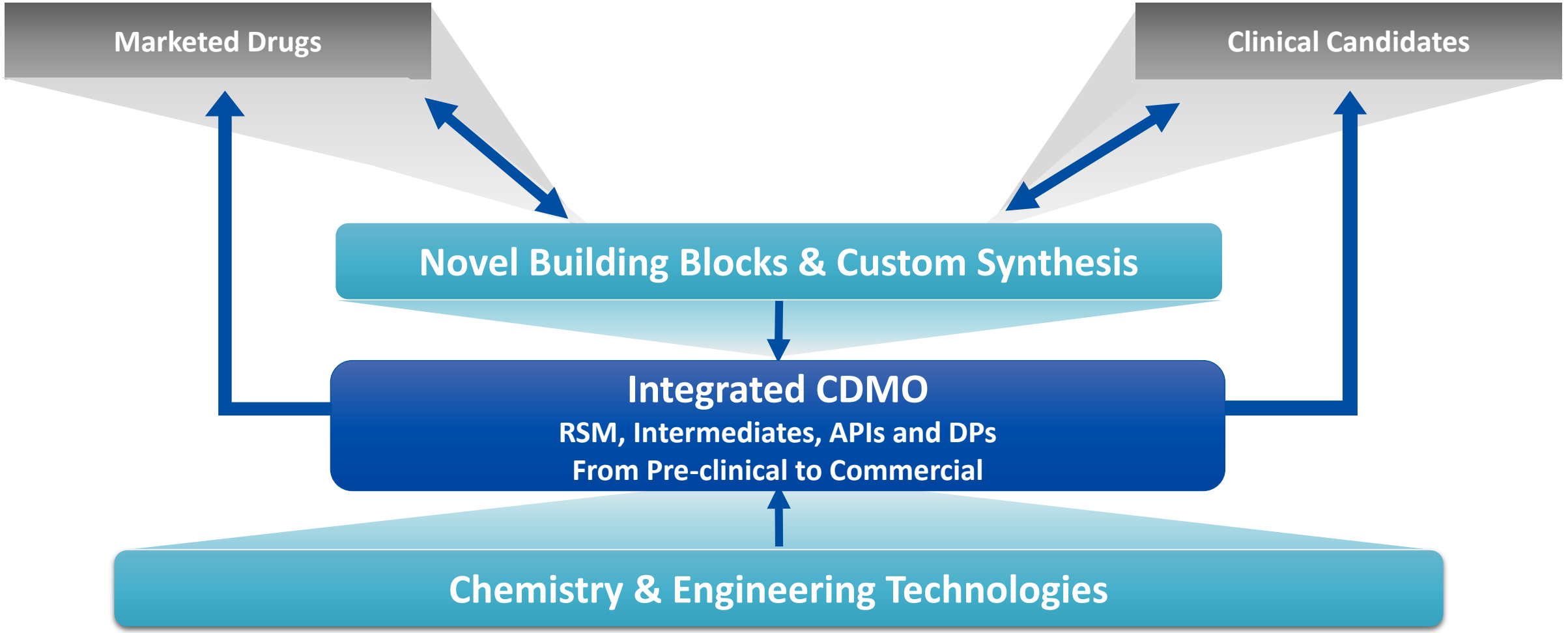
PharmaBlock Shandong
DP Manufacturing Site

*BB: Building Block

Business Strategy

PharmaBlock

From the drugs, for the drugs



Fully Integrated CMC Platform

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BBs Intermediates APIs	Process R&D, Solid State Research BBs, RSMs, Intermediates and APIs Manufacturing
Drug Products	Pre-formulation and Formulation R&D Drug Products Manufacturing
Analytical R&D	Analytical R&D, QC, Stability Studies
Regulatory Affairs	Global Regulatory CMC Filing Support

CDMO Leadership Team-Industry Veterans

PharmaBlock

Dr. Wenfang Miao
CEO

- 20+ yr experience in CMC development, Quality & RA
- PhD at Texas Christian University
- VP/Senior VP at WuXi STA, Pharmaron,
- Principle Scientist at GSK drug development

Dr. Xudong Wei
Sr. VP
Head of CDMO

- 20+ yr experience
- PhD at Nanjing University
- Postdoctoral at Tübingen, York and Emory
- API leader, 15 yr at Boehringer-Ingelheim
- VP at Pharmaron
- 80+ articles, 16 patents

Dr. Shijie Zhang
CTO

- 25+ yr experience
- PhD at Emory University
- CMC Director at Agios
- Advanced 2 compounds from preclinical to commercial
- 40+ articles and patents

Dr. Jing Li
Sr. VP
Process Chemistry

- 20+ yr experience in new drug research and process development
- PhD at Nanjing University
- Postdoctoral at UTSW Medical Center
- Assoc. Director at Merck
- 40 articles and patents, including 18 international patents

Dr. Zhengtian Gu
Sr. VP
Quality & Regulatory Affairs

- 20+ yr experience
- PhD at Columbia University
- VP at Theravance
- P&G, GSK, 3M
- Led over 10 new drug development projects, 5 were approved for market

Dr. Jack Chen
VP
Process R&D

- 20+ yr experience
- PhD at Michigan University
- VP at Clariant
- Pfizer, GSK, Asymchem, DSM
- 20+ articles and patents

Dr. Ke Zhao
VP
DP Development

- 25+ yr experience
- PhD at Mississippi University
- TWi, Anbison, Yangzijiang
- Developed 12+ FDA approved DP, including 6 first-time generic drugs, avoid 100+ patent risks

Dr. Jingwei Zhu
VP; GM of Zhejiang Site
DS Production

- 10+ yr experience in process chemistry, supply chain management and production operation
- PhD at Beijing Institute of Technology
- 20+ articles and patents

Project Delivery Team-Talented and Motivated

PharmaBlock

Dr. Yuanming Zhu
VP
Chemistry & Engineering Technologies

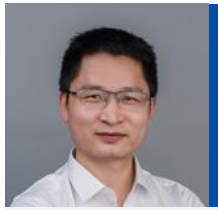
- 20+ yr experience
- PhD at Duquesne University
- Postdoctoral at Colorado State University
- Head of Adama R&D Center (China)
- 40 international patents

Dr. Zhihua Chen
Exec. Director
Process Chemistry

- 15+ yr experience in process R&D
- PhD at Lanzhou University
- Postdoc at Purdue University
- 20+ SCI publications and patents

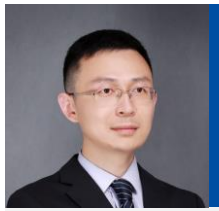
Juan Conde
Exec. Director
Process R&D

- 20+ yr experience in drug development, and CMC management
- Master at University of Montreal
- CMC leader at GSK
- 10+ publications and patents



Dr. Yufeng Wei
Senior Director
Crystal Engineering

- 15+ yr experience in crystallization
- PhD at Tianjin University
- Served at Novartis R&D Center, Porton
- 10+ SCI publications and patents



Dr. Mingli Zhao
Director
Process Chemistry

- 15+ yr experience in PPQ process development
- PhD at Zhengzhou University
- Served at Hansoh, CTTQ Pharma

Xiao Gu
Director
Regulatory Affairs

- 12+ yr experience in regulatory affairs
- Master at China Pharmaceutical University
- Served at Hansoh (top pharma in China)

Dr. Cheng Shen
Director
Process Chemistry

- 10+ yr experience
- PhD at Nanjing University of Science and Technology
- 10+ SCI publications

Dr. Larry Y. Wang
Director
Process Chemistry

- 8+ yr experience
- PhD at University of Minnesota
- B.S. Chemistry & Economics, Peking University
- 6 SCI publications

Quality & EHS & IP- Our Top Priorities

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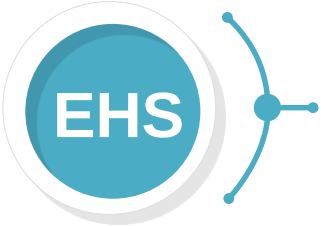
Complete Quality, EHS, IP manual and training system

- ❑ cGMP compliant at Zhejiang (US FDA/China NMPA audited), Shandong and US sites
- ❑ ISO 9001 certified at other sites



- ❑ ISO 14001, ISO 45001 certified from lab to manufacturing
- ❑ Benchmark in the industrial park
- ❑ One of the first CDMO process safety labs certified by CNAS

- ❑ National Standard GB/T 29490-2013 implemented
- ❑ Strict SOPs covering HR, access, IT security and document control

Project Management-BAT Model for Customer

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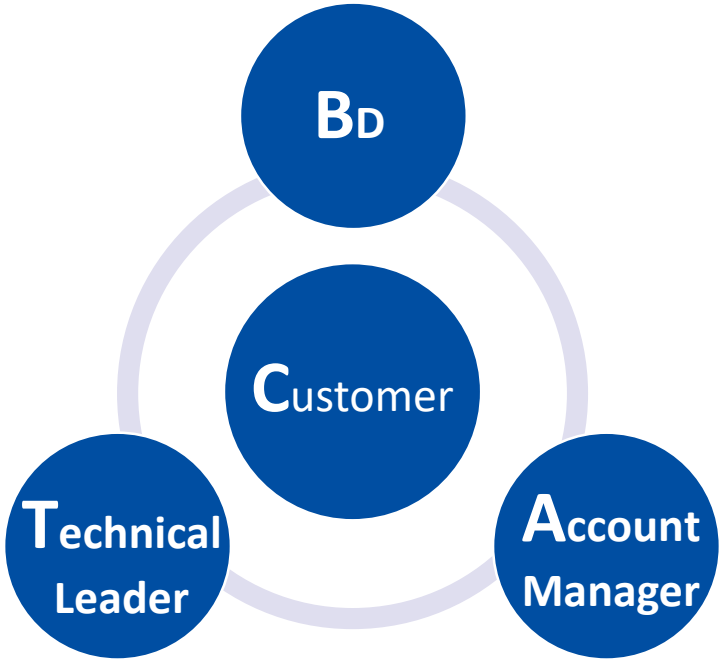
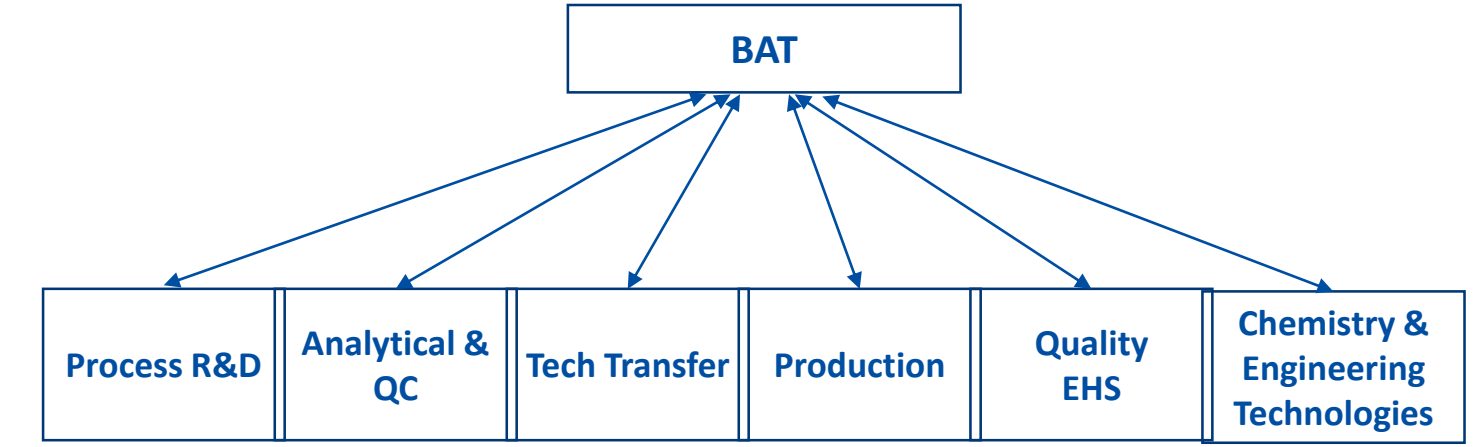
Orchestrated efforts to advance your project at full speed

BAT Model for Customer





Tech Transfer Flow

Process R&D

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Strong Chemistry Experience

800+ scientists, **100+** PhDs, **400+** Masters

1500+ projects delivered in 2021

New Technologies

Flow chemistry

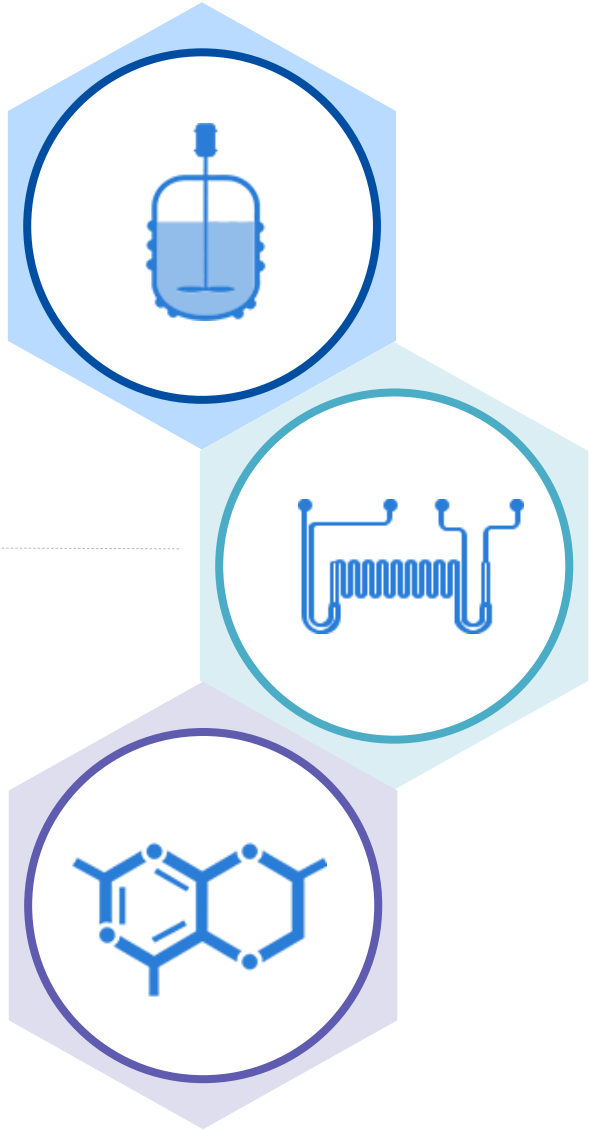
Micropacked bed hydrogenation

Biocatalysis; Heterogeneous catalysis

Building Blocks Accumulation

150,000+ BB profiles

5,000+ with scale up process



R&D Center-Nanjing Site

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Nanjing-1

New CDMO Process R&D Center, 679,000 ft^2 \ 1000+ hoods

Nanjing-2

CDMO Process R&D, 58,000 ft^2

Nanjing-3

Building Block R&D for Drug Discovery, 38,000 ft^2

Process R&D Center-USA Site

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- ✓ Greater Philadelphia area (Hatfield, PA)
  - 15,000 ft^2 of offices, labs and warehouse:
  - ISO9001 certified
  - cGMP API Kilo-lab for clinical supply
- ✓ Capacity Expansion (West Chester, PA):
  - 29-30K sqf usable space
  - 3 GMP kilo lab suites (up to 250L)
  - 2 Clean rooms
  - 3 Process labs with 25 fume hoods

Hatfield (PA) Site since 2017

West Chester (PA) Site
target operational Q4 2022

Chemistry lab at Hatfield
9’ fume hoods (5X)

Analytical lab
LCMS & UPLC, HPLC, GC, KF, DSC, NMR

Kilo lab
8’ walk in hoods (2X)

DS Manufacturing Capabilities

Zhejiang GMP Site Overview

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PharmaBlock Zhejiang established in **Sep. 2018** by acquisition from Porton
Facility established in **2014** （Porton Zhejiang)
Production started in **Dec. 2015**
FDA inspected in **Jul. 2019**

~700 employees

Total area: 1,436,000ft²(~133,400m²)
Building area: 1,052,000ft² (~97688m²)

Production of **building blocks, RSMs, GMP intermediates, and APIs**
Support **preclinical, phase I-III, and commercial-scale** needs

Geographic Advantages

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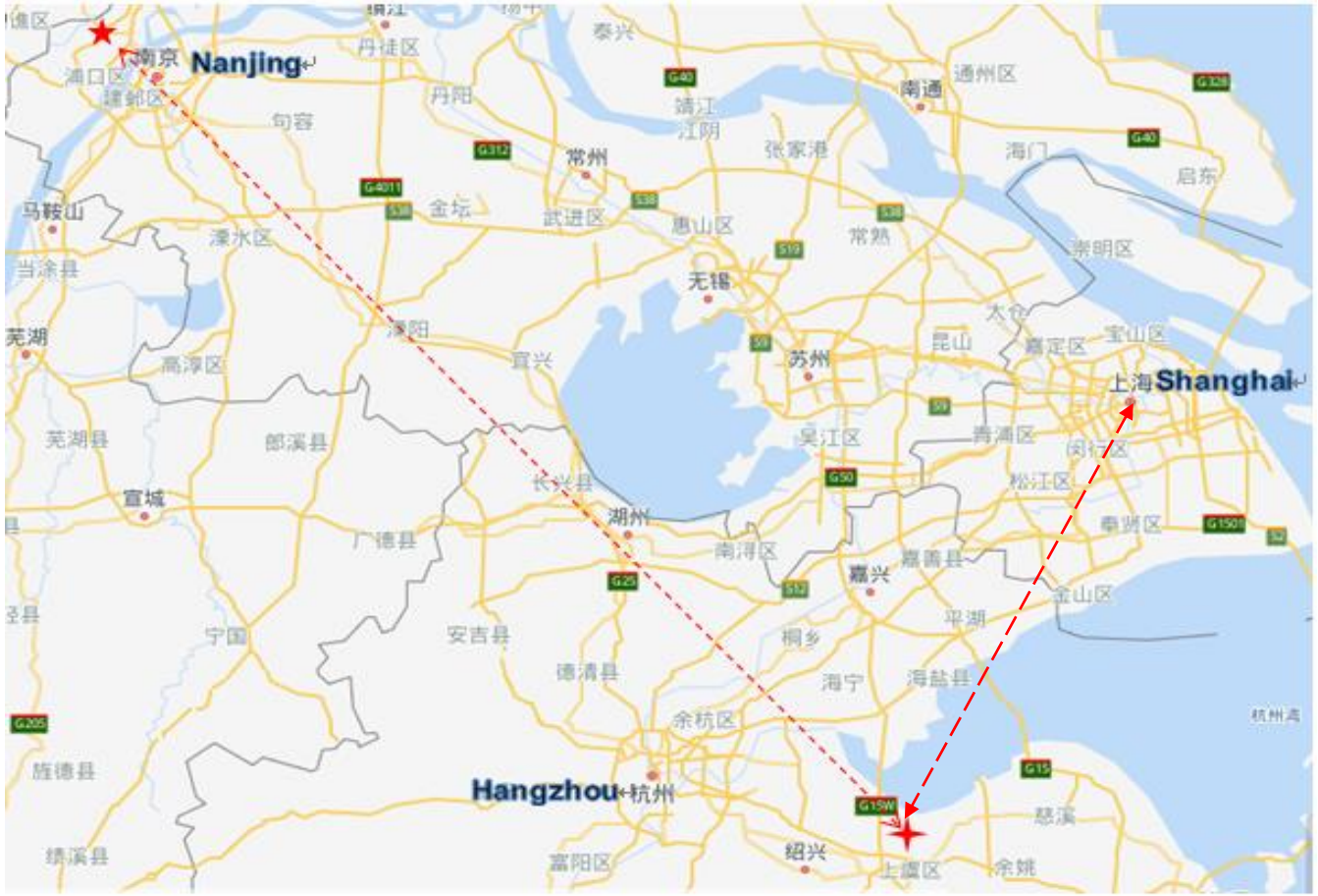
★ PharmaBlock Nanjing



★ PharmaBlock Zhejiang

- Located in Hangzhou Bay Shangyu Economic & Technological Development Area, Shaoxing, Zhejiang.
- It is a **national-level chemical industry park**, established in 1998, total area about 275 km^2.
- ~ 400km from Zhejiang Site to Nanjing HQ
  - ✓ 2 hours by high speed train
- ~200km from Zhejiang Site to Shanghai
  - ✓ 1.5 hours by high speed train
  - ✓ 2.0 hours by driving

Site Layout

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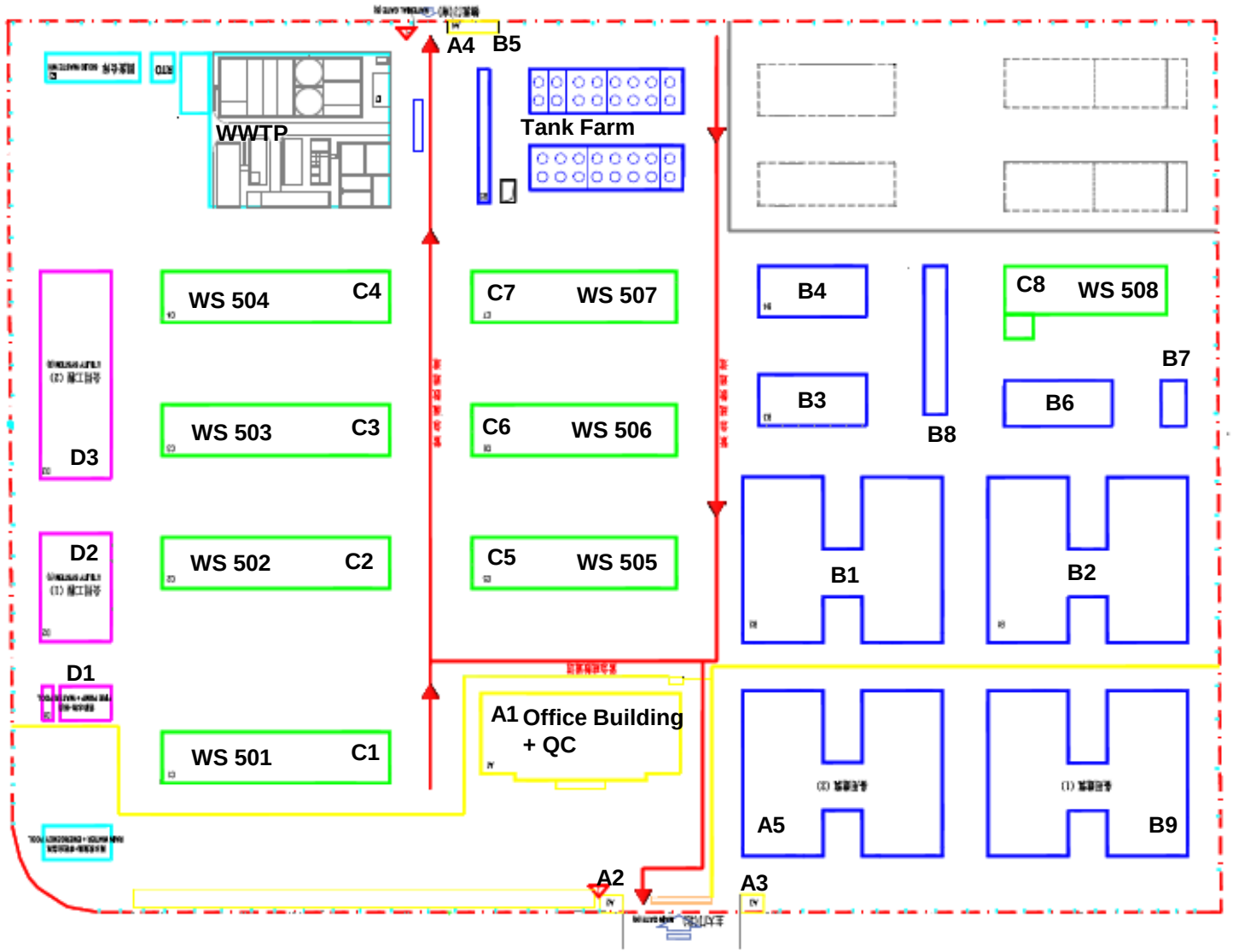
Building #	Usage / Function
B1	Three floors: - Temperature controlled warehouse - Outer package material warehouse - Inner package material warehouse - Hygroscopic material warehouse - Production consumables warehouse
B2	East side of first floor: - Solid raw material warehouse - Temperature controlled warehouse West side of first floor: - Special raw material warehouse and finished product warehouse for type 3 and 4 products - Temperature controlled warehouse
B3, 4	liquid raw materials warehouse
B5	Tank Farm
B6, B7, B8	Class A warehouses, mainly for the storage of gases, liquids and solid raw materials
B9	Future expansion
C1	Workshop 501 for intermediates
C4	Workshop 504 for intermediates
C7	Workshop 507 for intermediates and APIs
C8	Workshop 508 for hydrogenation
C2, C3	API Workshop under construction
C5, C6	Future expansion
A1	Office Building, including QC
A5	Process development and research, Kilogram Lab
D2, D3	Public system



Facility Design

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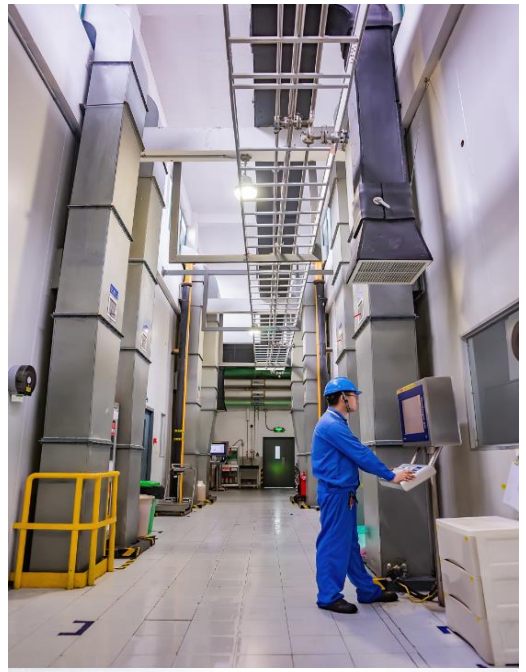
- Gravity flow design (3 floors)
- DCS system for process control
- Heating and cooling exchange medium: Glycol and heat transfer oil
- Relief system for reactors and tanks
- General ventilation
- Local Exhaust Ventilation (LEV)
- Dedicate area for dispensing in the WS with down flow booth
- Powder charge by PTS and other containment technology



Current Manufacturing Capacity

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Workshop	Bay No.	Total reactor vol.	Reactor No.	Size range	Centrifuges	Dryers	Others
WS 501 (Mar. 2022) Multi-Purpose for Intermediates	5	165 m^3	38	500 L – 8,000L (GL, SS)	9	5	
WS 504 (Dec. 2015) Multi-Purpose for Intermediates	8	~ 120m^3	40	500 – 6,300L (GL/SS/HC)	8	6	
WS 507 (Dec. 2015) Multi-Purpose for Intermediates	8	~ 60m^3	45	300– 3,000L (GL/SS/HC)	9	7	
API Clean Room Area (Jun. 2019) **WS 507, 2nd Floor**	N/A	~ 2.5m^3	2	500 L, 1000 L (GL)	1	2 (1 spray dryer)	Fixed Crystallizer: 2 Jet Mill: 1
WS 508 (Oct. 2019) Hydrogenation Workshop	7	N/A	5	100L (SS), 500L (SS), 1000L (SS/GL), 2000L (SS)	N/A	N/A	Micropacked Bed Hydrogenation Unit: 3 (5L, 10L, 10L)
GMP Kilo Lab–1 (Oct. 2020) With One Class D Cleaning Area	N/A	N/A	11	20~100 L(Glass)	N/A	4	Jet Mill: 1

Capacity Expansion in Zhejiang Site (2022-2023)

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Workshop	Total reactor vol.	Reactor No.	Size range	Centrifuges	Dryers	Others
W502 (2022 Q3)	94m^3	36 Reactor: 31 Cryogenic Reactor: 2 High Temperature Reactor: 3	500-6,300L (GL, SS, HC)	11	9	Continuous manufacturing facilities 3 API lines with 2 jet mill, 3 filter dryers, 1 cone mill, 1 double cone dryer OEB-4
W503 (2023 Q1)	190m^3	41 Reactor: 36 High Temperature Reactor: 5	500-8,000L (GL, SS, HC)	11	8	2 API lines with 1 jet mill, 1 filter dryer, 1 cone mill, 1 spray dryer OEB-4
GMP Kilo Lab-2 (2022 Q2)	700 L	9	20-100 L	3	4	GMP control, class D cleaning area, for clinical APIs production
HP Kilo Lab (2022 Q4)	220 L	4	20-100 L	2 filter dryers		For high potent API manufacturing OEB-5

Analytical Instruments

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Instrument	Brand & Type
GC	Agilent 7890B (Qty.7) Agilent 7820A (Qty.3), Agilent 8860 (Qty. 2), Agilent 8890 (Qty. 2), Agilent 8890+7697A (Qty. 1), Agilent 7890B+7697A (Qty. 1) (include 4 headspace injection system)
HPLC	Waters 2695 (Qty. 3), Waters Arc (Qty. 5), Waters H-Class (Qty. 2), Agilent 1260 (Qty. 8) Agilent 1260II DAD (Qty. 7), Agilent 1100 DAD (Qty. 4), Agilent 1260 DAD (Qty. 2), Agilent 1260II VWD (Qty. 5)
NMR	Bruker AVANCE III 400MHz
IR	PE SPECTRUM TWO
UV	Shimadzu UV-2700
Potentiometric Titrimeter	Metrohm 905
Water determination apparatus	Metrohm 852+885 (Qty.1), Mettler Toledo V20S (Qty.1), Mettler Toledo V30S (Qty.1)
Halogen moisture analyzer	Mettler HX204
Specific Rotation	JIAHANG M70 (Qty.1), Mettler-Toledo MP90 (Qty.1)
Ultra Purified Water	Integral-5(Qty.1), Mettler - IQ7000 (Qty.2)
Conductivity meter	Mettler S230
TOC	Shimadzu TOC-L CPH
ICP-MS	Nexlon1000
LC-MS	Agilent 1260II DAD+6125C
Ion chromatograph	DIONEX AQUION RFIC
Malvern particle sizer	Malvern 3000
Clarity detector	SC-4000A
Automatic Polarimeter	PA850
Stability chamber	SHH-SSD-2ST, SHH-500SD-2T

Manufacturing: Shandong Site (Intermediates & DPs)

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Profile

- Located in the Shandong Provincial Hi-tech Park
- Space: 18.5 acre
- Compliant with ISO9001 & high EHS standards for Intermediate; cGMP compliant for DP

Capacity (Intermediates)

- 2 workshops; 30 reactors: 200-3,000 L; total reactor vol.: 60 m^3
- RSM supplier for NCE products
- Delivered 40+ MTs of > 60 products from Phase I to Commercial stage in past 4 yrs

Capacity (Drug Products)

- 1 workshop and QC labs; 3 workshops to be added
- Tablets and capsules production lines (from 5 kg to 100 kg, flexible for project change)
- Bottle and blister two packaging line

Blister packaging line

Bottle packaging line

Tablets and capsules production lines

Building Blocks Enhanced CDMO

PharmaBlock

For fast delivery, reliable & flexible supply chain, better cost control

150K + building blocks

60+ chemical series

20K+ in stock

20K+ delivered within 2 weeks

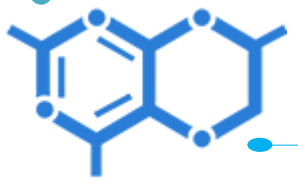
3K+ bulk products supplied over kilo scale

Novelty & Diversity

- Novel and diverse BBs supplied from drug discovery to development

Strong Chemistry for Fast Delivery

- Systematically develop chemistry expertise for core structures
- Strong chemistry accumulated for challenging molecules, and ensure fast delivery



Reliable & Flexible Supply Chain

- Better supply management on BBs as intermediates and RSMs
- Qualified suppliers of raw materials accumulated from BBs synthesis

Better Cost Control

- Increase flexibility to control the cost by optimizing process of BBs
- BB's scale factor to cut down the cost on raw materials

Innovative Technologies Enhanced CDMO

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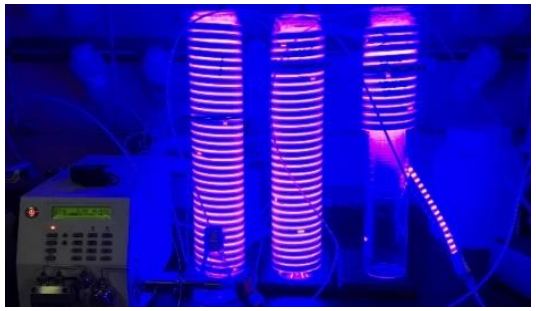
For efficient, green, and safe process and manufacturing

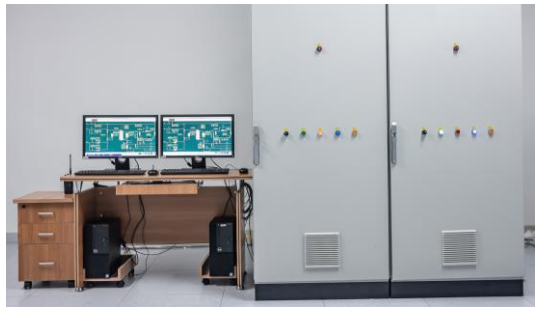
Flow Chemistry

210+ projects
30+ reaction types
kilo~hundred-kilo scale



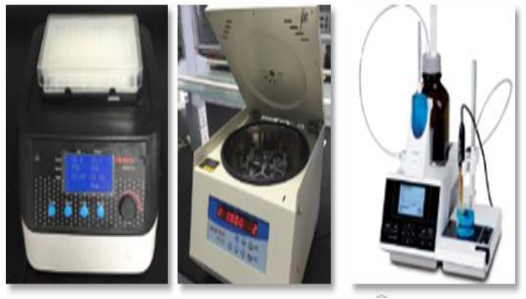
Micropacked Bed Technology

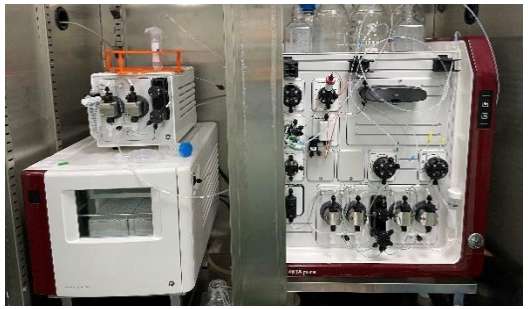
300+ projects
kilo~MT scale
commercial and GMP projects



Catalysis

300+ heterogeneous catalysts
200+ biocatalysis projects
kilo~hundred-kilo scale





Solid State & Crystal Engr.

330+ projects

Quality & Regulatory Excellence

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July 2019
FDA GMP inspection
no Form 483s

Oct 2021
NMPA PAI
no critical/major findings

Clients GMP audits

40+

Regulatory affairs team

10+

DMF, ANDA, IND and NDA submission and approval experiences

40+
IND

7+
NDA/ANDA

10+ regulatory markets including China, US, EU, Japan, etc

NMPA FDA EUROPEAN MEDICINES AGENCY SCIENCE MEDICINES HEALTH pmda

Projects Experience

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GMP Experience

(Since 2019)

50+ projects
65+ batches

API (Clinical)

7 projects
36+ batches

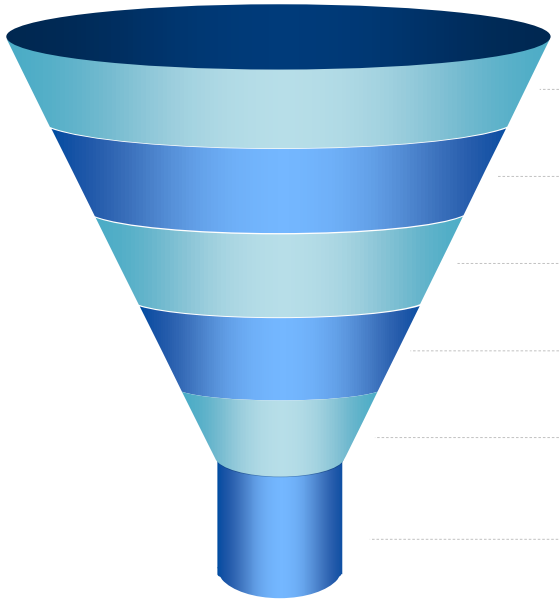
API (Validation)

26+ projects
40+ batches

GMP Intermediates & RSMs (Validation)

Increasing Projects Pipeline

(2021)



Discovery

Pre-clinical

Phase I

Phase II

Phase III

Commercial

10K+ BBs

1430+ Projects
(43 APIs)

45 Projects
(5 APIs)

Focus on our core competencies

Integrated CMC platform

Top notch leadership team

Strong chemistry
& new technologies

Flexible supply chain

Efficient delivery

Reduced risk

Cost saving

Sustainability

Bring customer's molecules to medicines