



**LYOMAC®**

**Freeze dryer and Auto loading system**

Reliable, innovative solution for Pharma and Bio industry

**冷冻干燥设备和自动进出系统方案**

为生物和制药工业提供专业解决方案



**LYOMAC®**

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**凇马真空冷冻干燥机**

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## 公司简介

浙江凛马制药设备有限公司（原上海凛马机械科技有限公司）是专业致力于为生物制药，营养品等行业提供高品质冷冻干燥设备和技术服务的厂家。

公司从 2009 年成立以来，已经为超过十五个国家的生物制药，营养品公司提供了满足 FDA 和 GMP 的项目。同时公司建立了完善的海内外售后服务团队。

公司拥有专业的设计，生产和制造队伍，配备了先进的加工，验证和检测设备。这是凛马公司能提供高精度，高稳定性设备的基础。

凛马最宝贵的财富是我们的团队，秉承‘为生物和医药工业提供最专业冻干解决方案’的理念。公司持续将研发和满足法规相结合开发最新产品，专利数量逐年增加，同时开发了西林瓶和托盘原料的自动进出料系统。为制药工业的无人化，无菌控制提供了满足不同的客户的技术方案。

## Company profile

LYOMAC was founded in 2009, as a leading supplier to provide state of art, innovative and reliable freeze-drying solutions for biological, pharmaceutical and nutraceutical industry. During the past decade, Lyomac has built freeze drying system in more than 15 countries. Most of them compliance with cGMP, GAMP5 and FDA.

Lyomac has advanced, modern tools and facilities to fabric freeze dryer and automation systems. Which is a base to provide high reliable and precision products, we understand it increase safety for high tech material to be well processed for our users.

The most value for Lyomac is whole team, with commitment of 'Best freeze drying solution for bio and pharma industry'. We are constantly develop innovative technology for customized demand.





## 产品范围 | Production Scope

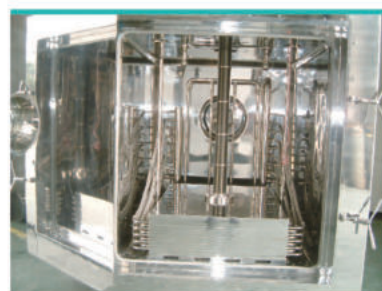
### ► Freeze dryer 冷冻干燥设备

凛马公司为制药，生物，诊断试剂以及营养品行业提供完整的冻干解决方案，特别是在西林瓶制剂的产品冻干。

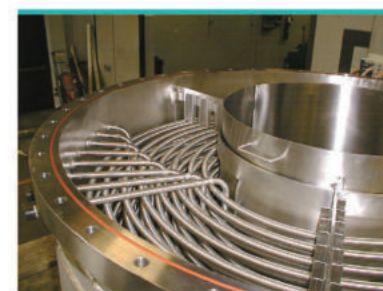
凛马的特点在于工程项目均能满足 GMP 和 GAMP5 法规的文件，安装服务和配件供应。

我们的产品包含了标准和定制的冻干设备，自动装料系统。

Lyomac supplies freeze drying equipment to the pharmaceutical, biotechnology, diagnostic and nutrient markets. A particular product strength is supplying large custom lyophilization systems for the production of parenteral and veterinary pharmaceuticals. Lyomac provides complete project support from design specifications through engineering, fabrication, GMP and GAMP 5 documentation packages, installation, service, and parts. Lyomac product line of lyophilization process equipment includes a broad range of standard and custom freeze dryers, autoloading systems



► Vacuum Chamber  
真空干燥箱



► Ice Condenser  
冷凝器 / 冷阱



► Refrigeration system  
制冷系统



► Vacuum system  
真空系统



► Pneumatic and Hydraulic  
气动和液压系统



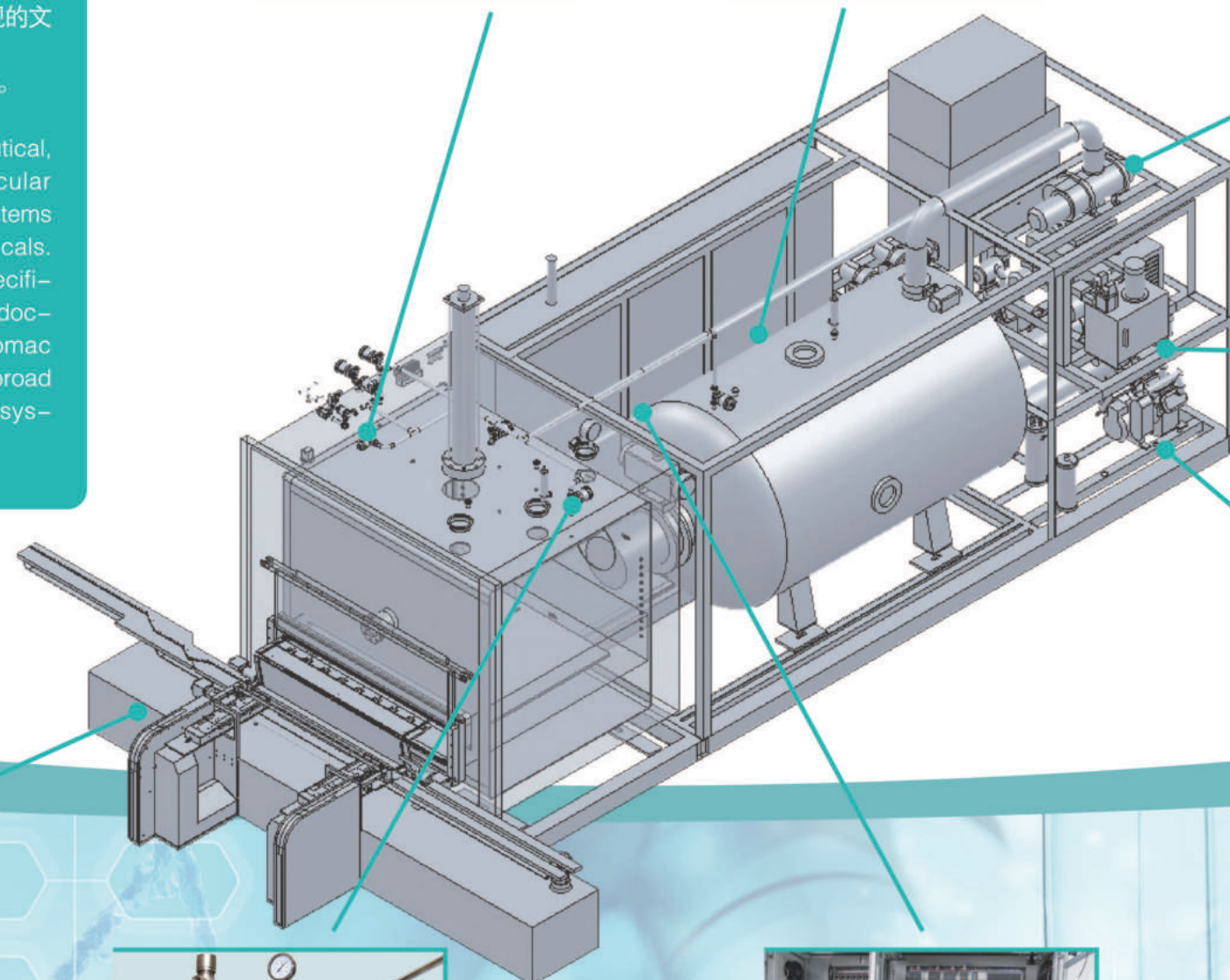
► Auto loading system  
自动进出料系统



► Steam SIP system  
蒸汽灭菌系统



► SCADA control system  
SCADA 控制系统





▶ Laboratory freeze dryer 实验型冷冻干燥机



实验冻干机主要是为了生物，药品原料，营养品等冻干产品的工艺研发，小试生产，最大产量达到12L的干燥量，可以根据客户需求设计不同的制冷温度需求，其特点是：

- ◆无配套要求，只需要配电即可
- ◆外配电脑控制scada系统，数据采集可靠
- ◆使用低噪音设计，便于办公室使用
- ◆面板不锈钢设计，无菌室可用
- ◆可配置压塞，共晶点测试，清洗和灭菌系统

Laboratory freeze dryer is developed for biotech, pharmaceutical and other industry R&D. Drying capacity up to 12 Liters, more customized design according to user's requirement, with features of :

- ◆Less utility, just need electrical plug in to use
- ◆Build with computer SCADA system, precise data report will be record
- ◆Low noise running, easy use at office
- ◆Optional to build with stainless steel panle, sterile room allowed to install.
- ◆Optional to be with stoppering, eutectic detector, CIP and SIP system

▶ Pilot freeze dryer 中试型冷冻干燥机



本系列冻干机主要是为了满足中试生产的需求，最大干燥量可以达到150L，可以满足大多数注射西林瓶，原料类产品的冻干。符合cGMP和FDA法规，并且配备不同可选装置，主要特点是：

- ◆整体设计，安装和使用都方便
- ◆全自动负压压塞
- ◆全自动冻干，灭菌和清洗
- ◆无人化电脑操作，存储工艺可达千条以上，符合GAMP法规
- ◆隔板平整度小于1mm,温差小于1℃
- ◆布局可按照客户要求实现整体或者分体设计，采用环保制冷剂，整机满足环保要求，节省按装空间

The pilot model freeze dryer with drying capacity up to 150 Liters, cover most demand for vial or other material commercial production, compliance with cGMP and FDA, More optional systems available, main features are:

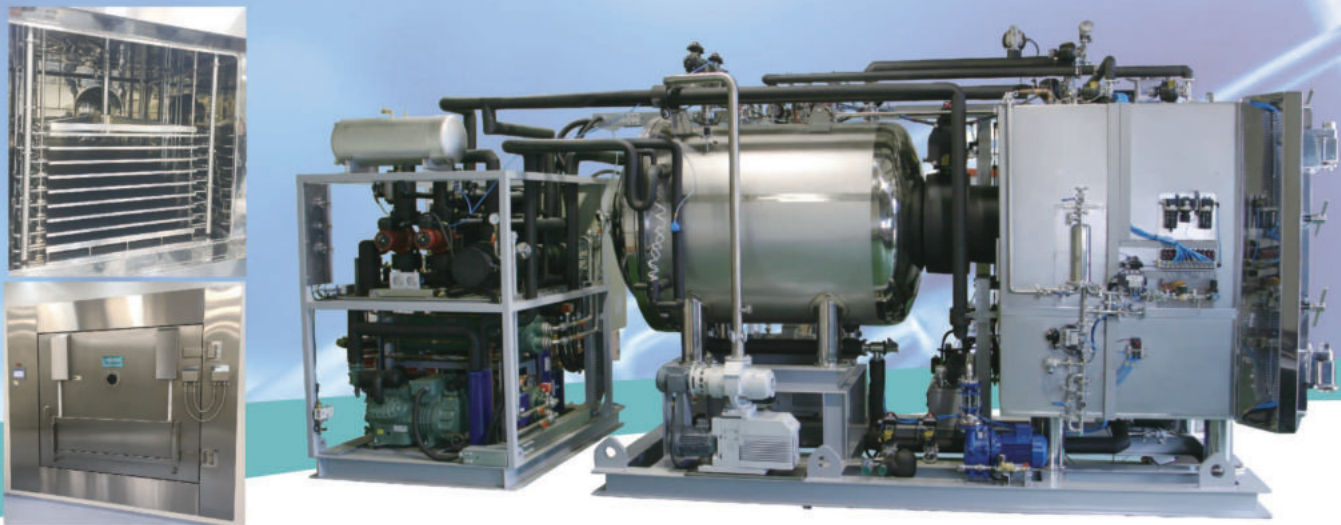
- ◆Integrated design, compact and easy install
- ◆Automatic shelf stoppering under vacuum
- ◆Automatic control for freeze drying, SIP and CIP
- ◆Scada control system compliance with GAMP regulation and save up to thousand recipes
- ◆Shelf flatness less than 1.0mm, temperature uniformity less than 1℃
- ◆Environment friendly refrigerant
- ◆Flexible arrangement design, suit user's plant layout,thus space saved

Model 型号	LYOPRO-0.2	LYOPRO-0.4	LYOPRO-0.6
Drying capacity(Liter) 干燥量	4	8	12
Shelf area(㎡) 板层面积	0.24	0.40	0.60
Shelf size(L*W*H)(mm) 板层尺寸	400*300*13	450*300*13	500*300*13
Usable shelf No 板层数量	2	3	4
Vial loading quantity 西林瓶装量	φ 16	1660	2460
	φ 22	500	1300
Inter-Shelf distance (mm) 板层间距	75	75	75
Shelf ultimate cooling temperature(℃) 板层极限温度	-40	-40	-50
Condenser ultimate cooling temperature(℃) 冷凝器极限温度	-50	-50	-70
Ultimate vacuum(Pa) 极限真空	≤0.03	≤0.03	≤0.03
Installation dimension(L*W*H)(mm) 安装尺寸	1400*900*1800	1400*900*1900	1500*1200*1900
Weight(Kg) 重量	300	500	800
Power(KW) 电功率	4.0	5.0	8.0

Model 型号	LYOPRO-1.0	LYOPRO-2.0	LYOPRO-3.0	LYOPRO-5.0	LYOPRO-7.5
Drying capacity(Liter) 干燥量	20	40	60	100	150
Shelf area(㎡) 板层面积	1.08	2.16	3.24	5.40	7.56
Shelf size(L*W*H)(mm) 板层尺寸	600*450*20	900*600*20	900*600*20	1200*900*20	1200*900*20
Usable shelf No 板层数量	4	4	6	5	7
Vial loading quantity 西林瓶装量	φ 16	4400	9000	14000	20000
	φ 22	2200	4500	7500	10000
Inter-Shelf distance (mm)板层间距	90	90	90	90	90
Shelf ultimate cooling temperature(℃) 板层极限温度	-55	-55	-55	-55	-55
Condenser ultimate cooling temperature(℃) 冷凝器极限温度	-75	-75	-75	-75	-75
Ultimate vacuum(Pa) 极限真空	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Installation dimension(L*W*H)(mm) 安装尺寸	3000*1400*2200	3200*1500*2200	4000*1500*2200	4500*1750*2200	5000*1750*2400
Weight(Kg) 重量	2000	3500	4500	7500	8500
Power(KW) 电功率	18	22.0	28.0	40.0	52



► Industrial freeze dryer 生产冻干机



本系列冻干机主要是为了满足批量生产的需求，最大干燥量可以达到1,000L，可以满足大多数注射西林瓶，原料类产品的冻干。符合cGMP和FDA法规，并且配备不同可选装置，主要特点是：

- ◆全自动负压压塞
- ◆全自动冻干，灭菌和清洗
- ◆无人化电脑操作，存储工艺可达千条以上，符合GAMP法规
- ◆隔板平整度小于1mm,温差小于1度
- ◆配备节能控制功能
- ◆设备制冷工质符合环保要求
- ◆布局可按照客户要求实现整体或者分体设计，节省安装空间

The industrial model freeze dryer with drying capacity up to 1,000 Liters, cover most demand for vial or other material commercial production,compliance with cGMP and FDA. More optional systems available, main features are:

- ◆Automatic shelf stoppering under vacuum
- ◆Automactic control for freeze drying, SIP and CIP
- ◆Scada control system compliance with GAMP regulation and save up to thousand recipes
- ◆Shelf flatness less than 1.0mm, temperature uniformity less than 1 °C
- ◆Energy saving control system by control compressor and vacuum pump
- ◆Environment friendly refrigerant
- ◆Flexible arrangement design, suit user's plant layout,thus space saved

Model 型号	LYOPRO-10.0	LYOPRO-13.0	LYOPRO-16.0	LYOPRO-20.0	LYOPRO-25.0	LYOPRO-30.0	LYOPRO-40.0	LYOPRO-50.0
Ice capacity ( Kg ) 捕冰量	200	260	320	400	500	600	800	1000
Shelf area( m² ) 板层面积	9.72	12.96	15.84	19.80	24.75	30.00	42.00	49.50
Shelf size ( L*W ) (mm) 板层尺寸	1200*900	1200*1200	1200*1200	1500*1200	1500*1500	2000*1500	2000*1500	2200*1500
Useable Shelf No 板层数量	9	9	11	11	11	10	14	15
Vial loading quantity 西林瓶数量	φ 16 φ 22	40000	56000	68000	80000	100000	120000	200000
		20000	28000	34000	40000	50000	60000	100000
Inter. Shelf distance 板层间距(mm)	100	100	100	100	100	100	90	90
Shelf ultimate cooling temperature(℃) 板层极限温度	-55	-55	-55	-55	-55	-55	-55	-55
Condenser ultimate cooling temperature(℃) 冷凝器极限温度	-75	-75	-75	-75	-75	-75	-75	-75
Ultimate vacuum(Pa) 极限真空	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0	≤1.0
Installation dimension ( L*W*H ) (mm) 安装尺寸	6000*1750*3800	6800*2000*3800	6800*2000*4200	7500*2000*4200	7200*3000*4200	7600*3000*4200	7600*3200*4500	9600*2300*4700
Weight(Kg) 重量	10000	12500	15000	17500	20000	25000	30000	35000
Power(KW) 电功率	63.0	77.5	91.5	120.0	135.0	147.0	179.0	215.0



## ► Free dryer Auto loader 冻干机自动进出料系统

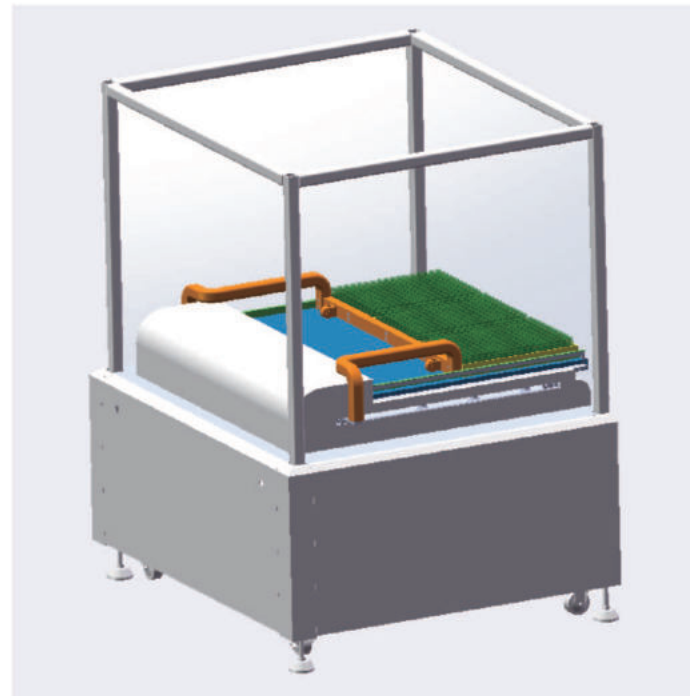
凛马公司提供两套自动进出料系统的解决方案。AGV小车系统和固定式推拉设计

AGV小车方案主要为小型冻干和既有车间开发，能实现整盘西林瓶的推拉，该设计特点是：

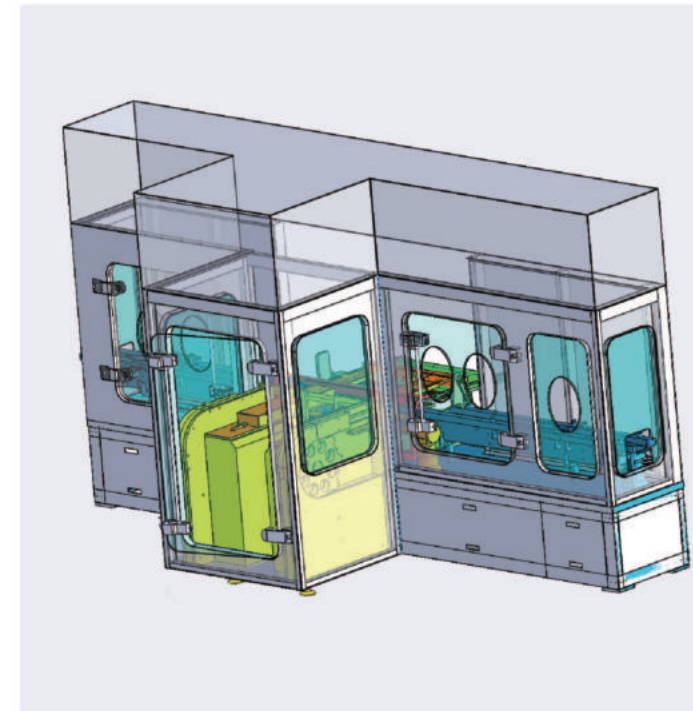
- ◆ 成本低，交货快
- ◆ 维护简便，易损件少
- ◆ 同时搭配不同冻干机，灵活性高
- ◆ 西林瓶范围2-100ml，最大速度达到400VPM
- ◆ 可以搭配O-Rabs, C-Rabs和LAF
- ◆ 进瓶装置可以搭配自动入托机
- ◆ 触摸屏控制，操作便捷

全自动固定式进出系统是按排进出设计，配合输送带和冻干机进行全自动进出。主要特点是：

- ◆ 配合冻干机设计稳定性高
- ◆ 西林瓶范围2-100ml，最大速度达到600VPM
- ◆ 可以搭配O-Rabs, C-Rabs, 隔离器和LAF
- ◆ 和冻干机自动通讯，自动化控制程度高
- ◆ 触摸屏控制，操作便捷
- ◆ 占地较小，维护方便



► AGV auto loader  
AGV 自动装料小车



► Auto row by row loader  
自动按排进出系统

Lyomac Provide both AGV and positioned/fixed row by row auto loader to meet different requirements

**A**GV system are designed for trays push and pull through freeze dryer, designed with semi or full-auto system by tray loader. It's features with:

- ◆ Lower cost and short delivery period
- ◆ Less maintenance without build changing and worn parts
- ◆ Can adapt to multi freeze dryers, more flexible use
- ◆ Vial range 2-100ml, Maximum speed up to 400 VPM.
- ◆ O-Rabs/C-Rabs,LAF is allowed to build up.
- ◆ Infeed station can equip with auto tray loader (optional)
- ◆ User friendly control interface

**A**uto loader with fixed Row-by Row loading system by build with infeed conveyor and freeze dryer on position. With features of :

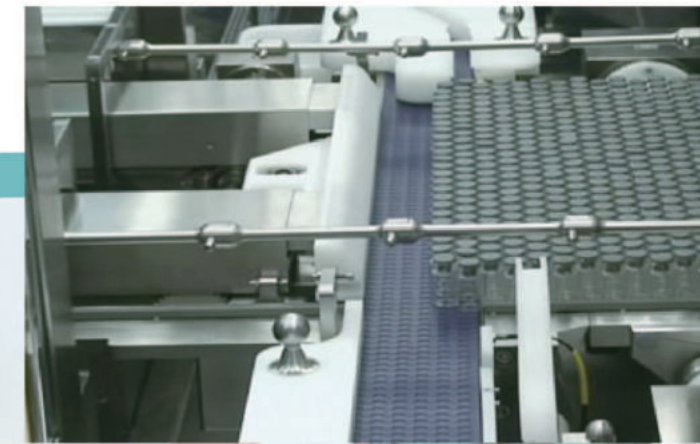
- ◆ Build and designed with freeze dryer, more reliable and higher efficiency
- ◆ Vial range 2-100ml, Maximum speed up to 600 VPM.
- ◆ Isolator,O-Rabs/C-Rabs,LAF is allowed to build up.
- ◆ More automation control by communication with freeze dryer
- ◆ User friendly control interface
- ◆ Less land occupation on clean room , easy access for service



► Vial conveys from filler  
缓冲输送带



► Connect between filler to shelf  
输送带和冻干机对接桥



► Push&Pull mechanism  
西林瓶进出机构



► Rabs/isolator  
屏障 / 隔离系统



► Optional systems on freeze dryer 冻干机可选系统方案



► External CIP water tank  
外置清洗水罐

凛马公司为不同用户提供不同需求的可选配置，应用于西林瓶或者托盘原料的生产工艺，满足GMP法规和实现高效稳定的自动化生产需求。

Lyomac provide more optional system to meet different application, by vial or API process

Not just by meet GMP regulation, we also considering reliability and fully automation in long term running



► SIP system  
在位灭菌系统

► Hydraulic stoppering system  
隔板液压压塞升降装置



► Oil Free vacuum pump system  
无油干式真空泵



► Screw compressor  
螺杆机组



► Sub door (Pizza door) system  
小门机构



► Chamber & Condenser isolation valve  
干燥箱体和冷凝器真空隔离阀





# 为什么选择凛马? Why with Lyomac?

- ◆理解GMP理念并融合进整个生产全流程
- ◆Understand GMP conception and forged into whole production process
- ◆我们拥有设计，生产，服务和验证的专业团队
- ◆Professional team with design, production, validation and service
- ◆拥有完善的现代化的生产条件及验证设备
- ◆Advanced, state of art production and validation facility
- ◆满足个性化URS需求，并且快速响应交货
- ◆Dedicated to providings solution for various requirement, and with short delivery time
- ◆周到的服务，直到产品验证和培训结束，并且终身服务
- ◆Complete service package, from installation, validation and training. Life time support
- ◆在全球15个以上国家安装设备，项目管理团队经验丰富
- ◆Experience accumulated at more than 15 countries, well organized project management

▶ Working flow chart 工作流程图

