

中国低温装备、工业气体大型企业集团

A large corporation offering a wide range of  
cryogenic equipment and industrial gases in China



四川空分集团  
SASPG



四川空分设备（集团）有限责任公司  
Sichuan Air Separation Plant  
(Group) Co., Ltd.

四川空分设备（集团）有限责任公司  
Sichuan Air Separation Plant (Group) Co., Ltd.

业务电话 (Tel) : (028) 23186011      传真 (Fax) : (028) 27016546  
邮编 (Post Code) : 641400      邮箱 (e-mail) : jtgl@saspg.com  
地址: 四川省成都市简阳市建设中路239号  
Add:239# Jianshezhong Road, Jianyang City, Chengdu City, Sichuan Province, China.

[www.saspg.com](http://www.saspg.com)

[www.saspg.com](http://www.saspg.com)



大道無疆

Great Truth Has No Boundaries





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N<sub>2</sub>

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## To Our Customers 致用户



一切为了用户  
一切为了发展  
单金铭

我们牢牢坚持“一切为了用户，一切为了发展”的企业精神，保证为用户提供性能先进、安全、可靠、技术一流的优质产品和优良的服务。

我们以务实的精神、诚实的劳动，使我们的产品做到质量最好，使我们的服务达到最优，让我们与尊敬的“上帝”一起，携手并肩共同开创美好的明天。

Firmly upholding our corporate culture of "All for Customers, All for Development", we are committed to providing our customers with high-performance, safe, reliable, first-class and high-quality products and excellent services.

With the pragmatic attitude and honest work, we are aiming to manufacture the best products, provide excellent services and join hands with our venerable "Lord" (Customers) to create a bright future.

四川空分设备（集团）有限责任公司  
董事长、党委书记单金铭

Mr. Shan Jinming, Chairman of the Board of Directors  
and Secretary of the Party Committee



中国低温装备、工业气体大型企业集团

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经过五十余年的积累、沉淀，四川空分形成了自己丰厚的底蕴。这底蕴既是四川空分几代人不懈努力的写照，更是我们挥洒汗水与心血的结晶。

After more than 50 years of accumulation and precipitation, SASPG has formed its rich deposits. This is not only a reflection of the unremitting efforts of generations of SASPG people, but also the crystallization of our sweat and hard work.





## Company Profile

### 集团概况

- ☎ 业务电话 (Tel): (028) 23186011
- ☎ 传真 (Fax): (028) 27016546
- 🌐 网站 (Website): [www.saspg.com](http://www.saspg.com)
- ✉ 邮编 (Post Code): 641400
- ✉ 邮箱 (E-mail): [jtgl@saspg.com](mailto:jtgl@saspg.com)
- 📍 地址: 四川省成都市简阳市建设中路 239 号

四川空分设备（集团）有限责任公司位于四川省成都市简阳市，是以低温技术为核心的国家高新技术企业集团，系全国大型一档企业、国家机械行业重点骨干企业、中国深冷设备主要研发制造基地，公司占地近 110 万 m<sup>2</sup>，建筑总面积 30 多万 m<sup>2</sup>。

建厂五十余年来，公司经营稳步发展，现有在职员工 2500 余人，拥有全资及控股子公司 23 个，参股企业 6 个，总资产超过 50 亿元，年销售收入 40 多亿元。

（集团）公司下辖工程、低温设备、工业气体、通用机械和低温技术研究院五大板块。公司专业从事空气分离、天然气液化、低温化工等领域的技术研发、制造及工程总承包服务，设计及制造能力在中国同行业中名列前茅，世界知名。同时，投资建设的气体工厂遍布全国各地，主要从事现场制气及管道供应工业气体，生产空气制品（氧、氮、氩等），真正实现了“东西南北中，处处有川空”。

（集团）公司装备制造和工程服务于钢铁、有色冶金、煤化工、石油化工、能源、电子、航空航天、国防等领域。五十余年来，已取得国家、省市科技奖励 20 余项；获得国家质量金奖等质量荣誉 30 余项；开发出国内首创的产品和技术 60 余项，14 项产品和技术达到国际先进水平，拥有国家有效专利 70 余项，其中发明专利 14 项。

（集团）公司的低温装备和承建的工程项目享誉国内外，已外销至欧洲、美洲、中东、南亚、东南亚、非洲等 30 多个国家和地区，持续为广大用户提供优质的产品和服务。

50  
余年发展

110  
余万平方  
占地面积

70  
余项  
国家专利

40  
余亿  
年销售收入

50  
余亿  
总资产

Sichuan Air Separation Plant (Group) Co., Ltd. (SASPG), located in Jianyang City, Chengdu City, Sichuan Province, is a high-tech corporation in China specializing in cryogenic technology, a large-scale first-class enterprise in China, a key backbone enterprise in China's machinery industry, and a major research, development and manufacturing base of cryogenic equipment in China. It covers an area of nearly 1.1 million m<sup>2</sup> and a total construction area of more than 300,000 m<sup>2</sup>.

Over the past 50 years since its establishment, SASPG has been developing steadily, with more than 2,500 employees, 23 wholly-owned and holding subsidiaries and 6 equity-stock enterprises, with total assets exceeding 5 billion RMB and annual sales revenue exceeding 4 billion RMB.

SASPG has five major sectors: engineering, cryogenic equipment manufacturing, industrial gases, general machinery & equipment and cryogenic technology research institute. It specializes in technical research and development, manufacturing and general contracting services in the fields of air separation, natural gas liquefaction, cryogenic chemical industry, etc. Its design and manufacturing capabilities are among the best in the industry in China and are well known in the world. At the same time, SASPG has invested various gas plants all over China, for on-site production and pipeline supply of industrial gases, and production of air products (such as oxygen, nitrogen, argon, etc.), truly realizing that "SASPG has its presence everywhere and anywhere in China."

SASPG has provided equipment manufacturing and engineering services in iron and steel, non-ferrous metallurgy, coal chemical, petrochemical, energy, electronics, aerospace, national defense and other fields. Over the past 50 years, it has won more than 20 national, provincial or municipal science and technology awards, more than 30 quality honors such as the National Quality Gold Award, and developed more than 60 products and technologies pioneered in China, 14 of which are internationally advanced. SASPG also hold more than 70 valid national patents, including 14 invention patents.

The cryogenic equipment and engineering projects undertaken by SASPG are well-known at home and abroad and have been exported to more than 30 countries or regions such as Europe, America, Middle East, South Asia, Southeast Asia, Africa, and so on. SASPG keeps providing high-quality products and services to various customers.



# Organizational Structure

## 组织架构



# Development History

## 发展历程

### 激情创业 Startup

#### 1966 年 -1999 年

**1966**  
国家经委（66）计机字 035 号文正式批准建设四川空气分离设备厂。  
Sichuan Air Separation Plant Factory was officially approved to be constructed by the State Economic and Trade Commission in 1966.



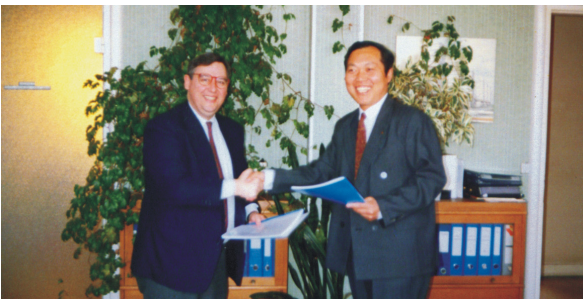
**1981**  
研制高压液氮汽化车，参与我国第一颗同步卫星发射，受到中共中央、国务院、中央军委贺电表彰。  
In 1981, High-pressure LIN vaporization vehicle was researched and developed and used for launching the first domestic communications satellite. The factory was honored by the CPC Central Committee, the State Council and the Central Military Commission.



**1983**  
为胜利油田研制 50 万立方米 / 日天然气液化分离设备，获国家科技进步二等奖，1991 年获国家质量金奖。  
In 1983, 50x10<sup>4</sup>Nm<sup>3</sup>/d natural gas liquefaction and separation plant was developed for Shengli Oil Field, which won the second prize of National Science and Technology Progress Award and the National Quality Gold Award in 1991.



**1991**  
与法国空气液化公司合作签订渭化 40000Nm<sup>3</sup>/h 液氧内压缩空分合同，为当时国内最大空分设备。  
In 1991, in cooperation with Air Liquide, a contract was signed with Weihe Chemical Fertilizer Company for a 40000Nm<sup>3</sup>/h air separation plant with internal liquid oxygen compression process, which was the largest ASU in China at that time.



1991 年 4 月，中华全国总工会授予四川空气分离设备厂全国“五一”劳动奖状。

In April 1991, the ACFTU awarded the Factory the National May 1 Labor Award.







## 变革 Transformation

2001 年 - 2011 年

### 1994

四川川空换热器有限公司采用合作研制的国产第一个大型真空钎焊炉生产铝板翅式换热器，获机械工业部科学技术进步一等奖。

In 1994, using the first large vacuum braze furnace in China, SASPG Heat Exchanger Company produced the aluminum plate fin heat exchanger, which won the first prize of Science and Technology Progress Award of the Ministry of Machinery Industry.



### 1999

为唐山钢铁公司研制当时国内最大的 17000Nm<sup>3</sup>/h 第五代空分设备，连续不间断运行 8 年。

In 1999, the fifth-generation air separation plant with a capacity of 17000Nm<sup>3</sup>/h, the largest one at that time in China, was developed for Tangshan Iron and Steel Company, which had been running continuously for 8 years.



Sichuan Air Separation Plant

### 2001

经上级批准，（集团）公司改制为非国有的股份有限公司，9 月 28 日新公司成立。

In 2001, with the approval of the higher authorities, the company was restructured into a non-state-owned joint stock limited liability company, which was established on September 28.



### 2003

组建濮阳新钢川空气体有限公司，建设 10000Nm<sup>3</sup>/h 空分设备制氧站，行业内首次实现向钢厂直接管道供气。

In 2003, SASPG Liyang Xingang Gases Company Limited was established, and the air separation plant with a capacity of 10000Nm<sup>3</sup>/h was constructed. The direct pipeline gas supply to steel plant was achieved for the first time in the industry.



### 2008

国家能源局主导，四川空分集团开发形成专利技术的大型 LNG 工艺包和板翅式换热器冷箱的设计、制造技术，2010 年 4 月由英国 WP 工程公司提供验证报告，2010 年 5 月通过中海油组织的评审。

In 2008, SASPG developed the patented design and manufacturing technology of large LNG process package and plate fin heat exchanger cold box under the leadership of National Energy Administration (NEA), which was verified by WP Engineering LTD in April 2010, and was accredited by CNOOC in May 2010.



### 2011

在浙江大川公司建设国内行业首个带港池式码头的重型车间，成为（集团）公司出口产品生产基地。

In 2011, Zhejiang Dachuan Company constructed the first heavy-duty workshop with dock wharf in the industry, which becomes the manufacturing base of export products of SASPG.



## 品质发展 Quality Oriented Development

2012 年 - 至今



### 2012

采用拥有的专利技术，开发利用 LNG 冷能的液体空分供中海油宁波 LNG 接收站、中石油唐山 LNG 接收站。

In 2012, by utilizing patented technologies, liquid air separation plants using LNG cold energy were developed for CNOOC Ningbo LNG terminal and CNPC Tangshan LNG terminal.



研制出 120m<sup>3</sup>/1.2MPa 液氢槽车、低温加注系统等系列产品提供给中国文昌航天发射场，并成功用于“长征五号”发射。

In 2012, 120m<sup>3</sup>/1.2MPa liquid hydrogen tanker, cryogenic filling system and other products were developed for Wenchang Satellite Launch Center, which were successfully used for launching of Long March 5.



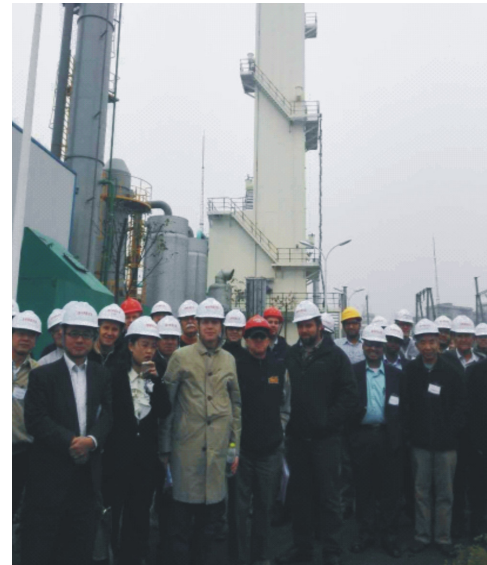
成功为华中科技大学“十二五国家科技支撑项目”——35MW 富氧燃烧碳捕获项目，研发并提供 7000Nm<sup>3</sup>/h 节能低纯氧空分设备。

In 2012, 7000Nm<sup>3</sup>/h power-saving low-purity-oxygen air separation plant was developed and supplied for "the Twelfth Five-Year National Scientific Backing Project" of Huazhong University of Science and Technology - 35MW oxygen-enriched combustion carbon capture project.

### 2012 ~ 2014

研发出带稀有气体全提取的 100,000Nm<sup>3</sup>/h 特大型空分设备，并于 2015 年 7 月签订 100,000Nm<sup>3</sup>/h 空分供货合同。

2012~2014, SASPG researched rare gas full-recovery 100,000Nm<sup>3</sup>/h air separation plant. In July 2015, SASPG signed a 100,000Nm<sup>3</sup>/h air separation plant design and supply contract.



### 2013

开发出国内最大的 200×10<sup>4</sup>Nm<sup>3</sup>/d LNG 设备，采用混合冷剂三级节流液化工艺，配套川空研制的首台 30000m<sup>3</sup>LNG 贮罐，并提供给内蒙古兴圣天然气公司。

In 2013, 200x10<sup>4</sup>Nm<sup>3</sup>/d LNG plant (the largest LNG plant at that time in China) adopting mixed cryogen with a three-stage throttling liquefaction process, together with SASPG's first 30000m<sup>3</sup> LNG storage tank were supplied to Xingsheng Natural Gas Co., Ltd. in Inner Mongolia.



### 2018

宝泰隆 63000Nm<sup>3</sup>/h（氧）装置：我公司首套 60000 等级空分（含氧、氮、氩），于 2018 年 10 月一次性开车成功，性能全面达标并验收！

Baotailoong 63000Nm<sup>3</sup>/h Oxygen Plant, the first 60000-level air separation plant (including oxygen, nitrogen and argon products) developed by SASPG, was successfully started, performance tested and accepted in October 2018!





## SASPG's Vision 川空发展远景

坚持创新驱动再创业

同心同德同力

建设强大川空

成就百年老店

Insist on innovation-driven development

Work with one heart and one mind

Build a competitive SASPG

Achieve Century-old Company



集聚智慧 科技创新  
Gather wisdom for scientific  
and technological innovation

潜心实验  
大胆创新



川空拥有国家有效专利 70 余项，60 多项产品填补了国内空白，已经累计获得国家级、省部级科技进步奖或科技成果奖项 20 余项。

SASPG has more than 70 valid national patents, more than 60 breakthrough products in China and more than 20 national, provincial and ministerial science and technology progress awards or scientific and technological achievement awards.

## R&D/Innovation 研发与创新

70 余项国家专利  
National Patents

20 余项国家级、省部级科技进步奖或科技成果奖  
National, provincial and ministerial science and technology progress / achievement awards



作为机械行业的重点骨干企业，雄厚的技术力量一直是川空集团最核心的竞争优势。川空拥有省级技术中心、低温技术研究院、焊接研究所等研究机构，及多个关键技术实验平台，坚持技术创新，使川空的各项技术一直保持国内领先水平，且在多个领域具备了与国外优秀企业同台竞争的能力。

研究及试验机构  
Research and test institutions

省级技术中心  
Provincial Technology Center

焊接研究所  
Welding Research Institute



低温技术研究院  
Cryogenic Technology Research Institute

关键技术实验平台  
Key Technologies Experiment Platform

The strong technical force has been the core competitive advantage of SASPG. As the key backbone enterprise of the machinery industry, SASPG boasts Provincial Technology Center, Cryogenic Technology Research Institute, Welding Research Institute, and other research and test institutions and several key technology experiment platforms. Insisting on technological innovation, SASPG keeps a leading position in China, and gains the capability to compete with top international companies in many fields.



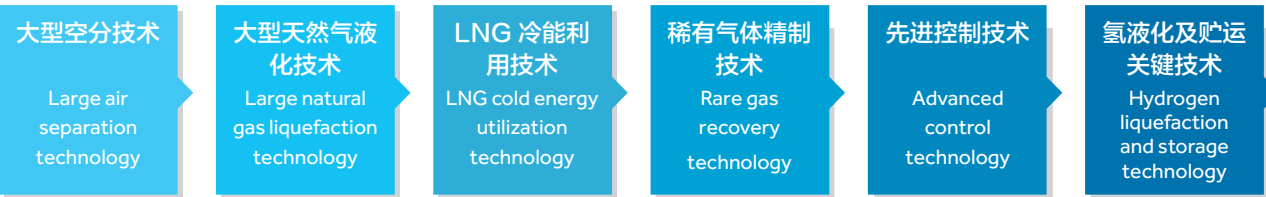


SASPG Cryogenic Technology Research Institute  
四川空分低温技术研究院

四川空分低温技术研究院专注于大型空分技术、大型天然气液化技术、LNG 冷能利用技术、稀有气体精制技术、氢、氦液化及贮运关键技术、先进控制技术等关键技术开发，以及应力分析、传热与流动、流体机械的强度与振动等共性技术研究，拥有多个关键技术实验平台，多项研发成果已转化为工业化产品，取得了可观的社会效益和经济效益。

The Research Institute focuses on the development of key technologies such as large-scale air separation technologies, large-scale natural gas liquefaction technologies, LNG cold energy utilization technologies, rare gas recovery technologies, hydrogen liquefaction, storage and transportation technologies, advanced control technologies, etc. as well as generic technologies in stress analysis, heat transfer and flow, strength and vibration of fluid machinery. It has a number of key technology experimental platforms, and many research and development results have been converted into industrial products, achieving considerable social and economic benefits.

关键技术开发  
Key technology development



Key Technology Experiment Platform  
关键技术实验平台

■ 风洞实验室

风洞实验室拥有行业内唯一的正压通风型板翅式换热器性能测试台位。

Wind Tunnel Laboratory

The Wind Tunnel Laboratory has the only positive pressure ventilated plate-fin heat exchanger performance test bench in the industry.



■ 气体净化技术研究实验室

气体净化技术研究实验室主要研究应用于空分、天然气、稀有气体、高纯气体、各类化工气体等领域中的气体净化技术，掌握各应用领域气体净化的核心数据，为提升现有产品性能和开发新产品提供关键技术支撑。



Gas Purification Technology Research Laboratory

The Gas Purification Technology Research Laboratory mainly studies the gas purification technologies applied in air separation, natural gas, rare gas, high-purity gas, and various chemical gases, owns the core data of gas purification in various application fields, and provides key technical support for improving the performance of existing products and developing new products.

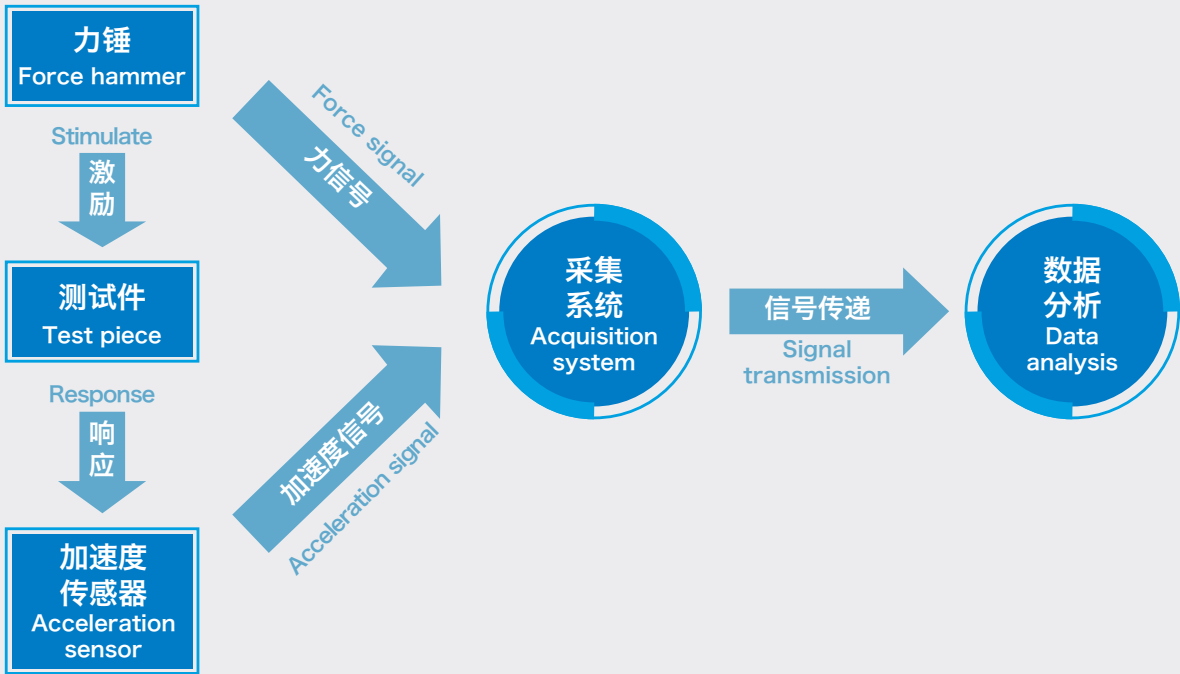


透平机械模态实验室

透平机械模态实验室拥有国内膨胀机行业首套膨胀机叶轮模态实验台位。通过该实验室对膨胀机叶轮的模态进行测试分析，为提升我公司膨胀机整体性能的可靠性和稳定性提供有力的技术支撑。

Turbomachinery Modal Laboratory

The Turbine Machinery Modal Laboratory has the first set of expander impeller modal test bench in China's expander industry. Through the testing and analysis of the modal of the expander impeller in the Laboratory, it provides strong technical support for improving the reliability and stability of the overall performance of the expander in our company.



Exchanges and Cooperation  
交流与合作

● 国际交流合作 International exchange and cooperation



与普莱克斯交流合作  
Exchange and Cooperation with Praxair

交流促进发展 合作推动进步  
Development Promoted by Exchanges,  
Progress Made by Cooperation

公司一贯重视同国内外同行、知名专家等各界朋友的学术交流、技术合作与友好往来，以此激发公司的技术研发人员不断衍生出新的智慧去创新技术，并竭力将科研成果转化为现实生产力，为公司开拓国际市场，增强国际竞争力创造良好条件。

SASPG always attaches great importance to the academic exchanges, technical cooperation and visits between the domestic and foreign counterparts and experts, which not only encourages the research & development personnel to create the new technology but also to transform the research results into real productive forces to lay a solid foundation in its international market expansion and to enhance its international competitiveness.



● 产品推介会 Product Presentation



与法液空副总裁奥达吉友好交流  
Friendly Exchange with Air Liquide Vice President Odagi



产品出口合同洽谈会  
Export Contract Negotiation Meeting



陪同外商客人参观川空集团公司  
Accompanying Foreign Guests to Visit the Factory



产品推介会  
Product Presentation





● 校企合作 University-Industry Cooperation

（集团）公司与国内外 10 余所高校、科研院所多个领域建立了密切的合作关系。主要合作单位有：浙江大学、华中科技大学、西安交通大学、西南交通大学、重庆大学、西南化工研究设计院、中海油能源发展股份有限公司等。（集团）公司通过采用自主创新、合作创新等多种产学研合作方式，致力于公司核心技术的建立与发展，努力提高公司的核心竞争力。

SASPG has established close cooperative relations with more than 10 universities and research institutes at home and abroad in many fields. The main partners include Zhejiang University, Huazhong University of Science And Technology, Xi'an Jiaotong University, Southwest Jiaotong University, Chongqing University, Southwest Chemical Research and Design Institute, CNOOC Energy Development Co., Ltd. SASPG is committed to the establishment and development of its core technology and strives to improve the its core competitiveness by adopting various industry-university-research cooperation including independent innovation and cooperative innovation.



单金铭董事长与华中科技大学校、院领导合影  
Mr. Shan Jinming, Chairman of SASPG with leaders from Huazhong University of Science and Technology.

● 内部技术创新交流 Internal Technological Innovation Exchange

（集团）公司建立了良好的内部技术创新运行机制，通过举办科技大会，开展压力容器 / 压力管道设计培训，听取合理化建议等多种渠道促进内部技术创新交流。

SASPG has established a good internal technological innovation mechanism, such as holding scientific and technological conferences, providing pressure vessel/ pressure pipeline design trainings, and accepting rationalization proposals, which promote the internal technological innovation exchanges.



10-12 万特大型空分开发实战动员会  
100,000-120,000m<sup>3</sup>/h Extra Large Air Separation Plant Development Mobilization Meeting



国家级工程实践教育中心挂牌仪式  
Launching Ceremony of National Engineering Practice Education Center



（集团）公司与西安交大项目合作仪式  
Project Cooperation Ceremony between SASPG and Xi'an Jiaotong University



（集团）公司技术创新动员会  
SASPG Technology Innovation Mobilization Meeting



川空集团科技创新大会颁奖仪式  
SASPG Science and Technology Innovation Award Ceremony



# Fabrication Equipment

## 公司生产装备

公司引进了国际国内先进生产设备，并采用了相当数量的大型精密、先进数控设备和自动焊接设备等先进的加工工艺和技术手段来加强工艺装备力量。

SASPG has strengthened its fabrication capacity through purchasing advanced fabrication facility from home and abroad, such as large-sized precision & advanced digital control machine-tools and equipment and automatic welding machines.



### 部分生产装备

#### Partial production equipment

五轴数控加工中心（进口）	数控火焰切割设备（进口）	6300 封头旋压成套设备（进口）
数控三坐标测量机 GAMMA0102	数控电火花线切割机	4000T 油压机
卧式加工中心 MH-630	数控坐标钻镗床	铝翅片数控成形机
数控车床（进口）	数控万能材料试验机	大型真空钎焊炉

Five-Axis Digital Control Milling Machine (Imported)	Digital Control Lathe (Imported)	Digital Control Coordinate Setting Drilling & Boring Machine
Three-Axis Digital Control Measuring Machine, GAMMA0102	Digital Control Flame Cutter (Imported)	Digital Control Universal Material Testing Machine
Horizontal Machining Center	Digital Control Electric Spark Wire Cutter	6300 Vessel Head Dishing & Flanging Machine (Imported)



碳氢清洗设备（进口）	自动、半自动焊接设备（进口）	叶轮超速试验设备
12M 刨边机（进口）	铝合金自动内外组合纵、环焊接系统（进口）	叶轮钎接设备
3×160T 行车	探伤设备 X 光射线、y 射线	透平膨胀机试车台位
3.4M、2.5M、1.6M 立车	大型退火炉 24000×4500×6000mm	低温泵试车台位
高真空机组	动平衡试验机	

4000 T Hydraulic Press	3×160T Travelling Crane	X-ray/y-ray NDT Equipment
Digital Control Aluminum Fin Forming Machine	3.4 M, 2.5 M & 1.6 M Vertical Lathes	Large-Sized Annealing Furnace,24000x4500x6000 mm
Large-Sized Vacuum Brazing Furnace	High-evacuating Unit	Dynamic Balance Testing Machine
Hydrocarbon Cleaning Machine (Imported)	Automatic & Semi-Automatic Welding Equipment (Imported)	Impeller Over-speed Tester
12 M Edge Planer (Imported)	Aluminum Alloy Internal/External Combination Longitudinal-Circumferential Welding System (Imported)	Impeller Brazing Device
		Turbo-expander Testing Station



Fabrication Equipment  
公司生产装备



直缝等离子焊接系统  
Straight Seam Plasma Welding System



大型数控四棍卷板机  
Large CNC Four - stick Rolling Machine



大型贮槽自动横焊机  
Large-sized Storage Tank Automatic Girth Welding Machine



进口五轴联动数控铣床  
Imported Five-Axis Digital Control Milling Machine



环缝等离子焊接系统  
Circular Seam Plasma Welding System

Quality Assurance  
质量保证

以质量求生存 以技术求发展

Survival through Quality and  
Development through Technology

质量是企业之本，用户满意是我们追求的永恒目标。  
公司坚持“以质量求生存，以技术求发展”的指导方针，  
通过建立、实施、保持和持续改进管理体系，加强质量管理  
和质量检验队伍建设。同时还配备先进的计量、理化、检验和  
试验仪器设备，采用先进的检测技术和方法，为公司质量管理  
和质量检验工作提供有力保障。

Quality is essential to SASPG. Satisfying our customers is our constantly pursuing target. SASPG adheres to the guideline of "Survival through Quality and Development through Technology". Through the establishment, implementation, maintenance and continuous improvement of the management system, SASPG strengthens the construction of quality management and quality inspection team, equips with advanced measuring, physical and chemical, inspection and test equipment, and adopts advanced detection technology and method, which provides a strong guarantee for its quality management and quality inspection.

● 管理体系认证 Management System Certification



● 管理体系保障

公司坚持 GB/T19001 质量管理体系及相关专业管理体系的建立、实施、保持、持续改进和认证，以全面提升公司质量管理水平和质量保证能力。公司取得的认证证书包括：GB/T19001 质量管理体系认证证书；固定式压力容器规则设计许可证；GC1(1)(2)(3) 工业管道设计许可证；压力容器制造许可证（A2 其他高压容器、B4 低温绝热气瓶、C2 汽车罐车）；ASME 授权证书及钢印（U、U2）；承压设备、机械设备、低压电器欧盟 CE 认证。



## Management System Guarantee

SASPG adheres to the establishment, implementation, maintenance, continuous improvement and certification of GB / T19001 quality management system and related professional management system, so as to comprehensively improve the company's quality management level and quality assurance ability. The certificates obtained by the company include: GB / T19001 Quality Management System Certificate; Stationary Pressure Vessel Design License; GC1 (1) (2) (3) Industrial Pipeline Design License; Pressure Vessel Manufacturing License (A2 Other High-Pressure Vessels, B4 Cryogenic Insulated Gas Cylinder, and C2 Tanker); ASME Accreditation Certificate with Stamp (U, U2); Pressure Equipment, Mechanical Equipment, Low-Voltage Electrical Equipment EU CE Certification.

## ● 人力资源保障

公司配备有高素质质量保证体系责任人员及检验、试验、无损检测等专业人员共计 100 余人，为公司质量管理 and 质量检验工作提供人力资源保障。

## Technical Strength Guarantee

The Company is equipped with more than 100 well-educated quality assurance personnel and professional inspection, testing and nondestructive testing personnel, providing human resources guarantee for the company's quality management and quality inspection.

## ● 检测设备及技术保障

公司拥有大量国际、国内先进的计量、理化、检验、试验仪器设备，例如：高频红外碳硫分析仪、冲击试验机、进口数控三坐标测量机、内窥镜，并坚持采用先进的检测方法和技术，为公司产品的检验和试验提供设备和技术保障。



化学分析  
Chemical Analyzing

## Testing Equipment Guarantee

The Company has a large number of international and domestic advanced measurement, physical and chemical, inspection, test instrument and equipment, such as high-frequency infrared carbon sulfur analyzer, impact testing machine, imported CNC coordinate measuring machine, endoscope, and adhere to the use of advanced detection methods and technology, to provide equipment and technical support for the inspection and test of its products.







- 4 4家专业分公司布局低温工程各个领域，提供低温工程优质核心服务。
- 3 创新开发了成套空分设备、天然气成套设备、低温液体贮运设备 3 大系列产品。
- 1 胜利油田国内首套 50 万方 / 天天然气分离装置荣获行业唯一国家质量金奖。

## Engineering Sector 工程板块

四川空分集团工程有限公司（工程板块），深耕于低温装备和低温工程五十余年，是空分和液化天然气成套设备等低温工程产业的领导者，依托领先的低温技术和专业化工程管理能力，为用户提供全面、先进、绿色的低温工程系列服务。

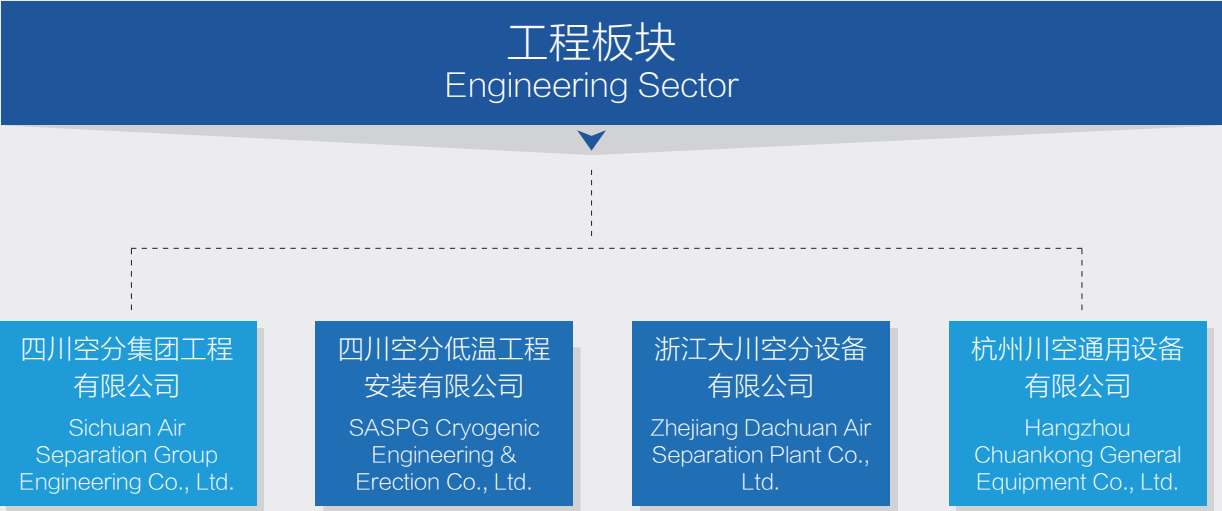
Sichuan Air Separation Group Engineering Co., Ltd. (Engineering Sector) has been deeply engaged in cryogenic equipment and cryogenic engineering for more than 50 years, and is a leader in cryogenic engineering ranging from air separation to liquefied natural gas plant. Relying on the leading cryogenic technology and professional engineering management ability, it provides users with comprehensive, advanced and green cryogenic engineering services.

**55+** 专注低温工程和低温装备服务 55 余年，积累沉淀了丰厚底蕴。  
Focusing on cryogenic engineering and cryogenic equipment service for more than 55 years, with rich experience.

**1000+** 1000 多名员工，创造优质产品和优质服务。  
More than 1000 employees, to create quality products and services.

**24/7/365** 全天候、零距离、全方位服务。  
All-weather, zero-distance, all-round service.

## Organization 组织架构



## Product Introduction 产品简介

**低温工程和低温装备**  
Cryogenic engineering and cryogenic equipment

成套空分装置  
Packaged Air Separation Plant

成套天然气（油田气）液化分离装置  
Packaged Natural Gas (Oilfield Gas) Liquefaction/Separation Plant

低温液体贮运设备  
Cryogenic Liquid Storage and Transportation Equipment

**低温工程服务能力**  
Cryogenic Engineering Services

低温工程总承包服务（EPC）  
EPC for cryogenic engineering

低温工程设计服务  
Cryogenic engineering design service

低温工程咨询服务  
Cryogenic engineering consulting service

低温工程项目管理服务  
Cryogenic engineering project management service

低温工程专业安装服务  
Cryogenic engineering installation service

低温工程大型装备先进制造服务  
Advanced manufacturing services for large scale cryogenic engineering equipment



# Packaged Air Separation Plant

## 成套空分装置

☎ 业务电话 (Tel): (028) 2318 6028 (6370 / 6377)  
☎ 传真 (Fax): (028) 27016892  
✉ 邮箱 (E-mail): gc@saspg.com

- 规整填料、无氢制氩空分流程技术
- 内压缩空分流程技术
- 自增压流程空分技术
- 全液体空分流程技术
- 高纯氮，氧制取流程技术
- 膨胀机制冷氧，氮液化流程技术
- 成套空分装置自动变负荷先进控制技术
- 稀有气体全提取流程技术
- LNG 冷能空分流程技术
- 低纯富氧新型空分技术

- Air separation technology with structured packing, and hydrogen-free argon recovery process
- Air separation technology with internal compression process
- Air separation technology with self-pressurization process
- Air separation technology with full liquid production process
- High purity nitrogen and oxygen production process technology
- Oxygen and nitrogen liquefaction technology with expander refrigeration process
- Advanced control technology of automatic load changing for packaged air separation plant
- Rare gas full extraction process technology
- Air separation technology by LNG cold energy
- New low-purity and oxygen-enriched air separation technology

为用户量身定制最优化工艺流程方案，产品性能先进、成熟、安全、可靠、环保节能。

The product with tailored optimized process is advanced, mature, safe, reliable, environment-friendly and energy-saving.



宝泰隆 63000Nm<sup>3</sup>/h 空分设备  
Baotailong 63000 Nm<sup>3</sup> /h Air Separation Plant



宁波 LNG 冷能空分装置  
Ningbo LNG cold energy air separation plant



广西南国 42000Nm<sup>3</sup>/h 低纯富氧新型空分  
Guangxi Nanguo 42000Nm<sup>3</sup>/h low-purity oxygen-enriched new air separation



邯钢 2X35000Nm<sup>3</sup>/h 稀有气体全提取空分设备  
Handan Iron and Steel 2X35000Nm<sup>3</sup>/h rare gas full extraction air separation plant



Packaged Natural Gas (Oilfield Gas)  
Liquefaction/Separation Plant

成套天然气（油田气）液化分离装置

- 业务电话（Tel）：（028）61682888 -6090/6100
- 传真（Fax）：（028）85065810
- 办公室电话（Office Tel）：（028）61682888-6016
- 邮箱（E-mail）：saspg\_lng@163.com

行业最早从事天然气分离及液化研究的企业；天然气、煤层气、煤制气、焦炉尾气、各类化工尾气、多组分气体液化分离领域的领导者，为用户提供工程总承包、工程设计、工程咨询系列优质服务。其中公司为胜利油田提供的国内首套 50 万方 / 天天然气分离装置荣获行业唯一国家质量金奖和国家科技成果二等奖，拥有国内第一套具有自主知识产权的 200 万方 / 天天然气液化装置的成功业绩。

The Company is the first company in the industry to engage in natural gas separation and liquefaction research; it is a leader in liquefaction and separation of natural gas, coal-bed methane, coal gas, coke oven tail gas, various chemical tail gas and multi-component gas, providing users with a series of high-quality services such as engineering, procurement and construction, engineering design and engineering consulting. The first natural gas separation plant with a capacity of 500000 m<sup>3</sup> per day in Shengli Oilfield has won the only national quality gold award in the industry and the second prize of national scientific and technological achievements. It also successfully developed the first 2 million m<sup>3</sup> / day natural gas liquefaction plant with independent intellectual property rights in China.



云南先锋甲烷深冷分离及液化装置  
Cryogenic methane separation and liquefaction plant in Xianfeng, Yunnan



胜利油田 50 × 10<sup>4</sup>Nm<sup>3</sup>/d 油田气分离装置  
50 × 10<sup>4</sup> Nm<sup>3</sup>/ day oilfield gas separation plant in Shengli Oilfield



33000Nm<sup>3</sup>/h 焦炉煤气甲烷化制 LNG  
33000Nm<sup>3</sup>/h LNG Produced from Coke Oven Gas Methanation



内蒙古兴圣 200 × 10<sup>4</sup>Nm<sup>3</sup>/d 天然气液化装置  
200×10<sup>4</sup>Nm<sup>3</sup>/d Natural Gas Liquefier in Xingsheng, Inner Mongolia



# International Business

## 国际业务

☎ 业务电话 (Tel) : (028) 61682888—6033  
☎ 传 真 (Fax) : (028) 85086027  
✉ 邮 箱 (E-mail) : ie@saspg.com



出口土耳其 42000Nm³/h 空分设备签订仪式  
Signing Ceremony of 42000Nm³/h Air Separation Plant Exported to Turkey

30<sup>+</sup>

自营进出口贸易 30 余年，空分和天然气液化装置严格按照 ASME、AP、CE 认证设计制造，业绩遍布全球。

Engaged in self operated international trade for more than 30 years; air separation and natural gas liquefaction plants are designed and manufactured in accordance with ASME, AP, CE certification; the products are sold all over the world.

80<sup>+</sup>

自营出口空分装置及天然气液化装置累计 80 余台套

More than 80 sets of Self-operated air separation plants and natural gas liquefaction plants have been exported.

25<sup>+</sup>

自营出口业绩遍布土耳其、波兰、埃及、墨西哥等 25 余个国家和地区。

Self-operated products have been exported to more than 25 countries and regions such as Turkey, Poland, Egypt and Mexico.



出口墨西哥 8000Nm³/h 空分冷箱在港口卸货  
8000Nm³/h Air Separation Plant Cold Box Unloading, exported to Mexico

# Cryogenic Engineering & Erection

## 四川空分低温工程安装有限公司

☎ 业务电话 (Tel) : (028) 61682888 -6090/6100  
☎ 传真 (Fax) : (028) 85065810  
☎ 办公室电话 (Office Tel) : (028) 61682888-6016  
✉ 邮箱 (E-mail) : saspg\_lng@163.com



100 万方 LNG 液化冷箱整体吊装现场  
Hoisting of 100x10<sup>4</sup>Nm³/h LNG liquefaction cold box in one piece

四川空分低温工程安装有限公司是机电设备安装工程专业承包一级资质企业，是低温行业最早成立专业施工队伍的公司，是低温工程和低温装备安装专家，以卓越的低温工程专业安装服务能力和品质彰显于全行业。

SASPG Cryogenic Engineering & Erection Co., Ltd. has the first-class professional contracting qualification for mechanical and electrical equipment installation & erection, the earliest professional construction team in cryogenic industry, and the cryogenic engineering and cryogenic equipment installation and erection experts. With excellent professional installation and erection service ability and quality of cryogenic projects, it shows its presence in the whole industry.

35<sup>+</sup>

🏆

35 余年的低温装备和低温工程专业安装服务，能力卓越，品质优良。

More than 35 years of professional installation services of cryogenic equipment and cryogenic projects, with excellent ability and quality.

100%

🛡️

安装的设备一次验收合格率 100%，力创川空精品工程。

The equipment installation and erection is 100% accepted, creating a high-quality image of SASPG.

50<sup>+</sup>

🏆

公司荣获“四川省先进施工企业”、“省质量管理先进企业”、“四川省优秀安装质量奖（蜀安杯）”、“省级重合同守信用企业”等 50 余项荣誉和奖项。

The Company has won more than 50 honors and awards, such as "Sichuan Advanced Construction Enterprise", "Provincial Quality Management Advanced Enterprise", "Sichuan Excellent Installation Quality Award (Shu'an Cup)" and "Provincial Contract Abiding and Trustworthy Enterprise".

700<sup>+</sup>

🔧

专业安装完成 700 余套低温装备和低温工程专业安装服务，完成 330 余套成套空分装置，43 套成套天然气液化装置，50 余套大型低温液体平底槽，280 余套各类空分装置检修和改造升级。

More than 700 sets of cryogenic equipment and cryogenic project have been erected with professional installation services. More than 330 sets of packaged air separation plants, 43 sets of packaged natural gas liquefaction plants, more than 50 sets of large-scale cryogenic liquid flat bottom tanks, and more than 280 sets of various air separation plants have been overhauled and upgraded.





Zhejiang Dachuan Air Separation Plant Co., Ltd.  
Hangzhou Chuankong General Equipment Co., Ltd.

## 浙江大川空分设备有限公司 杭州川空通用设备有限公司

50000

总建筑面积 50000m<sup>2</sup> 带码头的低温工程大型装备先进制造基地。  
Advanced manufacturing base for large-scale cryogenic equipment with wharf, covering a total construction area of 50000m<sup>2</sup>.

20<sup>+</sup>

20 余项专利技术，国家火炬计划项目两项目，多项新产品列为省市首台套产品及技术创新项目。  
More than 20 patented technologies, two national Torch Program projects, and a number of new products are listed as the provincial or municipal pioneer products and technological innovation projects.

30<sup>+</sup>

30 余年空分设备、天然气设备、低温液体贮运设备制造经验和底蕴。  
More than 30 years of experience in manufacturing air separation plant, natural gas plant and cryogenic liquid storage and transportation equipment.

3

公司为浙江省高新技术企业 + 浙江省级技术中心 + 浙江省名牌产品  
The Company is Zhejiang High-tech Enterprise + Zhejiang Provincial Technology Center + Zhejiang Famous Brand.



大川码头 带港池冷箱供货车间  
Dachuan wharf

10

万平方米占地  
x10<sup>4</sup>m<sup>3</sup> Area

75

名中高级职称技术人员  
Technical Personnel with Medium And Senior Professional Titles

1000

余台生产设备  
or More Production Equipment

5

万余吨年生产能力  
x10<sup>4</sup>Tons Annual Production Capacity



30000m<sup>3</sup>LNG 贮槽  
30000m<sup>3</sup>LNG storage tank

## Equipment Manufacturing Sector 设备板块

公司主要从事空分、天然气分离及液化、CO/H<sub>2</sub> 分离、液氮洗等冷箱及高、中、低压铝制板翅式换热器，低温液体（液态氧、氮、氩、二氧化碳、乙烯、液化天然气、液氢等）贮运设备，汽化器、各类透平膨胀机（中、低压增压透平膨胀机、发电膨胀机等）、低温液体泵、仪控设备、高低压成套开关设备等产品的生产和销售。

The Company is mainly engaged in manufacture and sales of cold boxes for air separation plants, natural gas separation and liquefaction plants, CO / H<sub>2</sub> separation plants, and liquid nitrogen washing plants, etc., high, medium and low pressure aluminum plate fin heat exchangers, cryogenic liquid (liquid oxygen, nitrogen, argon, carbon dioxide, ethylene, liquefied natural gas, liquid hydrogen, etc.) storage and transportation equipment, vaporizers, various turbo-expanders (medium and low pressure booster turbine expander, power generation expander, etc.), cryogenic liquid pumps, instrument control equipment, high and low voltage switchgears and other products.



# Cryogenic Liquid Storage and Transportation Equipment and Vaporizers

## 低温液体贮运设备、汽化器

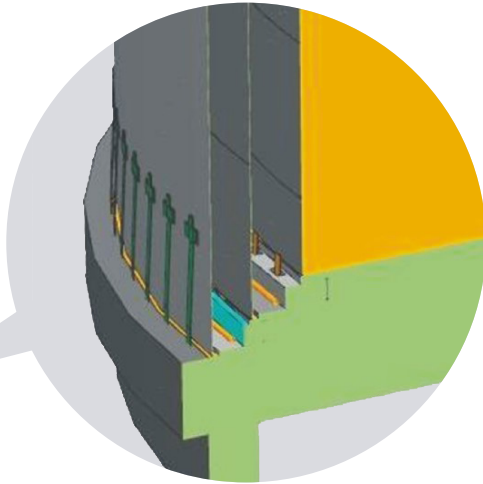
☎ 业务电话 (Tel) : ( 028 ) 23186030  
☎ 传真 (Fax) : 028-23186328  
028-23205117  
✉ 邮箱 (E-mail) : vc@saspg.com  
北京经销处 ( Sales Agency in Beijing )  
电 话 ( Tel ) : 86-10-67532285  
上海经销处 ( Sales Agency in Shanghai )  
电 话 ( Tel ) : 86-21-56036370

### 主要产品

5000-160000m<sup>3</sup> 大型液化天然气 (LNG) 储罐;  
1000-5000m<sup>3</sup>LNG 子母罐;  
300-14000m<sup>3</sup> 低温液体 ( 液氧 / 氮 / 氩 ) 贮槽;  
3-350m<sup>3</sup> 真空绝热低温液体贮槽 ( 真空粉末绝热、高真空多层绝热 );  
0.6~120m<sup>3</sup> 低温液体运输车( 液氧/氮/氩、LNG、乙烯、液氢、液体二氧化碳等 )  
1000-120000Nm<sup>3</sup>/h 水浴式低温液体汽化器;  
100-8000Nm<sup>3</sup>/h 空温式低温液体汽化器;  
低温液体球罐 ; 液氢贮槽 ; I、II、III 类压力容器。

### Main Products

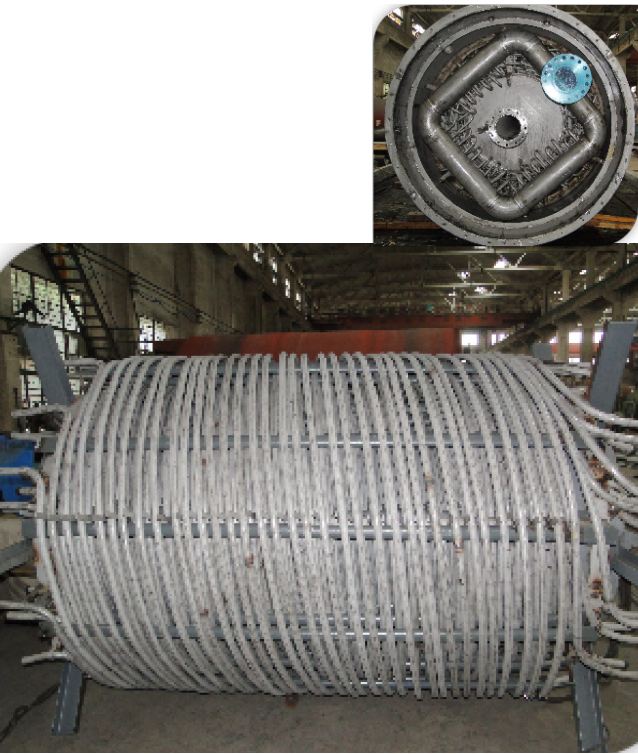
5000-160000m<sup>3</sup> Large LNG storage tanks;  
1000-5000m<sup>3</sup> LNG clustered tanks;  
300-14000m<sup>3</sup> cryogenic liquid (LOX/LIN/LAr) storage tanks;  
3-350m<sup>3</sup> vacuum insulated cryogenic liquid tanks (vacuum powder insulation, high vacuum multilayer insulation);  
0.6 ~ 120m<sup>3</sup> cryogenic liquid transport vehicle (LOX/LIN/LAr, LNG, ethylene, liquid hydrogen, liquid carbon dioxide, etc.)  
1000-120000Nm<sup>3</sup>/h water bath cryogenic liquid vaporizers;  
100-8000Nm<sup>3</sup> / h air heated cryogenic liquid vaporizers;  
Cryogenic liquid spherical tanks; liquid hydrogen storage tanks; class I, II, III pressure vessels.



20000m<sup>3</sup>LNG 三壁金属全容罐  
20000m<sup>3</sup>LNG Three Wall Full Containment Metal Tank



80m<sup>3</sup> 液氢贮槽群  
80m<sup>3</sup> Liquid Hydrogen Cluster Tanks



紧凑水浴式汽化器  
Water-bath Vaporizer



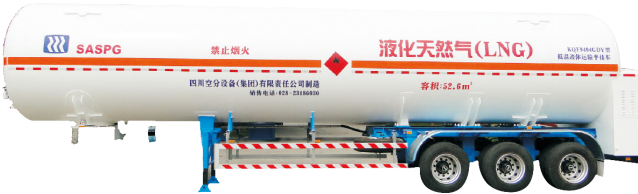
200m<sup>3</sup> 低温液体球型贮槽  
200m<sup>3</sup> Spherical Cryogenic Liquid Tank



LNG 子母罐  
LNG cluster tanks



120m<sup>3</sup> 液氢运输车  
120m<sup>3</sup> Liquid Hydrogen Tanker



52.6m<sup>3</sup>LNG 运输车  
52.6m<sup>3</sup>LNG Tanker



# Aluminum Plate-fin Heat Exchanger and Cold Box

## 铝制板翅式换热器及冷箱

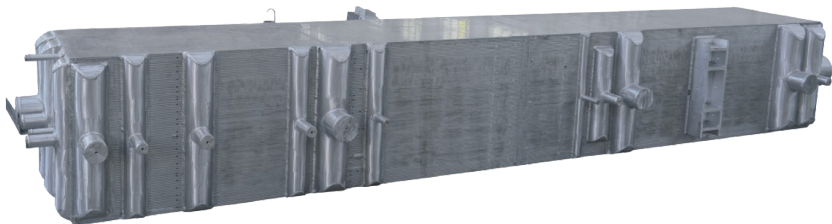
☎ 业务电话 (Tel): (028) 23186328  
☎ 传 真 (Fax): (028) 27016236  
✉ 邮 箱 (E-mail): bs@saspg.com

### 铝制板翅式换热器专业制造厂家

主要产品为铝制板翅式换热器和成套冷箱, 包括 LPG 冷箱、LNG 冷箱、PDH 冷箱、液氮洗冷箱、CO/H<sub>2</sub> 分离提纯冷箱等各类冷箱。可生产最大铝制板翅式换热器芯体尺寸为 10600×1450×1600mm, 设计压力最高可达 13MPa, 年生产能力超过 3000 吨。

### Professional manufacturer of aluminum plate fin heat exchangers

The main products are aluminum plate fin heat exchangers and cold boxes, including LPG cold box, LNG cold box, PDH cold box, liquid nitrogen washing cold box, CO/H<sub>2</sub> separation and purification cold box, etc. The largest aluminum plate fin heat exchanger core size is up to 10600 × 1450 × 1600mm, the maximum design pressure can reach 13Mpa, and the annual production capacity is more than 3000 tons.



煤制合成气制 LNG 主换热器  
(8500×1200×1224mm)  
Main heat exchanger for coal to syngas to LNG plant



泰安 260 万 m<sup>3</sup>/dLNG 冷箱  
2,600,000Nm<sup>3</sup>/d LNG Cold Box in Tai'an

# Turbine Expander and Cryogenic Liquid Pump

## 透平膨胀机、低温液体泵

☎ 业务电话 (Tel): (028) 23186230  
☎ 传 真 (Fax): (028) 27016799  
✉ 邮 箱 (E-mail): dj@saspg.com

### 透平膨胀机 Turbo-expander

	产品类型 Product Type	规模 / 容量 Size / Capacity
透平膨胀机 Expander / Compressor	空分膨胀机 Air Separation Expander	配套十万等级空分设备; For 100000-grade air separation plant;
	液化膨胀机 Liquefaction Expander	配套 600 吨 / 天液化设备; For 600 t/d liquefaction plant;
	天然气膨胀机 Natural Gas Expander	配套 1000 万方 / 天 LPG 处理装置; For 10 million m <sup>3</sup> /day LPG processing plant;
	液体膨胀机 Liquid Expander	配套十万等级空分设备; For 10 million m <sup>3</sup> /day LPG processing plant;
	发电膨胀机 Power Generation Expander	功率 100kw~1500kw; Power 100kw~1500kw;

### 低温液体泵 Cryogenic Liquid Pump

	低温液体泵 Cryogenic Liquid pump		
产品类型 Product Type	离心泵 Centrifugal	活塞泵 Piston	潜液泵 Submersible
规模 / 容量 Size / Capacity	Max. flow 最大流量 120m <sup>3</sup> /h; Max. pressure 最高压力 2MPa;	Max. flow 最大流量 40 m <sup>3</sup> /h; Max. pressure 最高压力 35MPa;	Flow 流量 12 m <sup>3</sup> /h; Head 扬程 250m;



处理量达 93500Nm<sup>3</sup>/h 增压透平膨胀机 (国内最大)  
Booster Turbo-expander with the capacity of 93,500Nm<sup>3</sup>/h Biggest Capacity in China



70-120m<sup>3</sup>/h 无机封潜液转注泵 (LNG、LN2、LAR)  
70-120m<sup>3</sup>/h Submersible Liquid Transfer Pump (LNG, LN2, LAR) Without Mechanical Seal



配套云南先锋 44000 空分液体膨胀发电机组  
Liquid Expander for Yunnan Xianfeng 44000 Air Separation Project



# HV & LV Electric Control System and Instrument Control System

## 高低压电控系统、仪控系统

自动化控制系统包括：过程控制系统、DCS(集散控制系统)、PLC(可编程逻辑控制器)、ESD(紧急停车系统)



Automatic control system includes: process control system, DCS (Distributed Control System), PLC (Programmable Logic Controller) and ESD (Emergency Shutdown System)



低压抽出式开关柜 CKGCS  
Low Voltage Drawable Switchgears CKGCS

# Sichuan Hemispheric Head Manufacturing Co., Ltd.

## 四川半球封头制造有限公司

公司拥有从意大利进口的  $\phi$  6500mm 封头旋压机，800 吨、1200 吨、4000 吨油压机等大型封头成型设备。可整体加工  $\phi$  100- $\phi$  6500mm 标准椭圆封头、浅碟形封头、锥形封头，整体冲压  $\phi$  150- $\phi$  3000mm 球形封头，冲压厚度范围 3mm-150mm，材料包括不锈钢、碳钢、铝合金、铜、钛、镍及镍合金和复合板。同时还可根据客户的不同要求生产非标产品及异型件。



旋压大型锥封头  
Large-sized Spun Conical Vessel Head

业务电话 (Tel) : (028) 23186338  
传 真 (Fax) : (028) 23186341  
邮 箱 (E-mail) : ft@saspg.com

The company has imported from Italy  $\phi$  6500 mm head spinning machine, and 800 tons, 1200 tons, 4000 tons hydraulic presses and other large head forming equipment. It can integrally process  $\phi$  100-6500mm standard elliptical heads, shallow butterfly heads and conical heads, integrally punch  $\phi$  150-3000mm spherical heads with a punching thickness range of 3mm-150mm, and the materials ranging from stainless steel, carbon steel, aluminum alloy, copper, titanium, nickel and nickel alloy, to composite plate. It can also produce non-standard products and special-shaped parts according to different requirements of customers.



空气冷却器  
Air Cooler

# General Machinery & Equipment Sector

## 通机板块

从事设计、制造、销售各类压力容器、大型塔器、空冷器；空分成套设备阀门、航天系统阀门、贮运设备及 LNG 成套设备阀门；活塞式压缩机，共有八种工作介质、七种机型、九种活塞力、八种排气压力；LNG/L-CNG 加注站、LNG 汽化站、高真空绝热管道等。工艺装备精良，并拥有专业工程技术队伍，完善的质保体系，良好的售后服务，为各行业用户提供安全、可靠的产品。

Engaged in the design, manufacture and sales of various pressure vessels, large towers, air coolers; air separation plant valves, aerospace system valves, storage and transportation equipment and LNG plant valves; piston compressors in eight working media, seven models, nine piston forces, and eight discharge pressures; LNG/L-CNG filling stations, LNG vaporization stations, high vacuum insulation pipelines, etc. It has excellent technology and equipment, professional engineering and technical team, perfect quality assurance system and good after-sales service to provide safe and reliable products for users in various industries.



# General Machinery

## 通用机械

☎ 业务电话 (Tel) : (028) 23206220  
✉ 邮 箱 (E-mail) : tj@saspg.com



缓冲罐  
Buffer tank

公司具有 A2、D 类制造资质，并通过 ISO9001 质量管理体系认证。生产的大型塔器整体制造长度达 37m，单台发运重量 160 吨；空冷器从单管束每跨到多管束成跨，从普通工频到变频防爆电机，翅片管长度可达 18 米，包括干空冷、蒸发空冷、复合空冷等多种冷却形式。



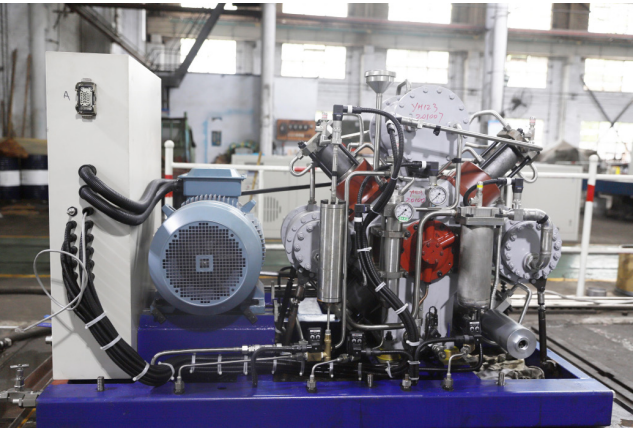
空冷器  
Air cooler

The Company has class A2 and D manufacturing qualifications, and has passed ISO9001 quality management system certification. The overall manufacturing length of the large towers is up to 37m, and the weight of a single unit is up to 160 tons; the air coolers range from single tube bundle to multi tube bundle, from ordinary power frequency to frequency conversion explosion-proof motor, with the length of finned tube up to 18 meters, including dry air cooling, evaporation air cooling, composite air cooling and other cooling form.

# Compressor

## 压缩机

☎ 业务电话 (Tel) : (028) 23186350  
✉ 邮 箱 (E-mail) : tj@saspg.com



(2V-1/350-CK) 高压空压机  
(2V-1/350-CK) high pressure air compressor



MW-2.1/18-201-6.0/12-201 型高压流程液化天然气压缩机  
MW-2.1/18-201-6.0/12-201 High Pressure Process Liquefied Natural Gas Compressor

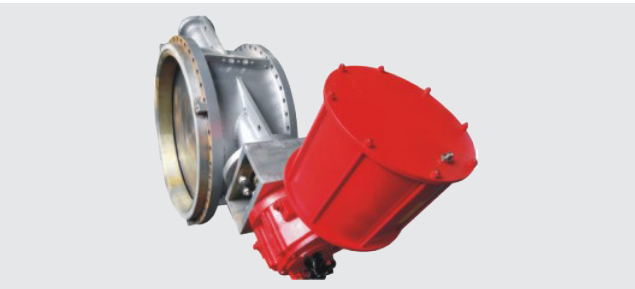
长期致力于活塞式无油润滑压缩机研发，拥有高压差（40MPa）无油润滑核心技术。公司可为用户提供超 300 多种产品，覆盖了空气分离、天然气液化、冶金、医药、集中供氧、气体充瓶、食品、饮料、铝粉、化肥、电子、有机合成等众多行业。

# Valve

## 阀门

☎ 业务电话 (Tel) : (028) 23186185  
✉ 邮 箱 (E-mail) : tj@saspg.com

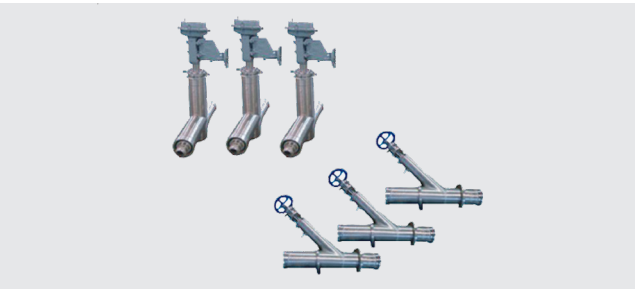
长期致力于深冷阀门研发，现有阀门品种及规格一万个，公称通径达 1200mm，压力达 56MPa，使用温度最低 -270℃，最高 +850℃。有蝶阀、球阀、截止阀、止回阀、薄膜调节阀、减压阀、安全阀、三通切换阀、拉断阀、呼吸阀、紧急切断阀等，及满足 API、ASME、BS、GB、HG、DIN、JIS 等标准及航天系统所需求的特种阀门。



DN1200- 分析筛切换蝶阀  
DN1200-Molecular Sieve Switch-over Butterfly Valve

Committed to piston lube-oil-free compressor research and development, with high pressure difference (40MPa) lube-oil-free core technology. The Company provides more than 300 kinds of products for users, covering air separation, natural gas liquefaction, metallurgy, medicine, centralized oxygen supply, gas bottle filling, food, beverage, aluminum powder, fertilizer, electronics, organic synthesis and many other industries.

Committed to cryogenic valve research and development, with 10000 or more valve varieties and specifications, nominal diameter up to 1200mm, pressure up to 56MPa, working temperature down to - 270℃ , and up to + 850℃ . Butterfly valve, ball valve, globe valve, check valve, diaphragm control valve, pressure reducing valve, safety valve, three-way switching valve, pull-off valve, breathing valve, emergency shut-off valve, etc., as well as special valves meeting the requirements of API, ASME, BS, GB, HG, DIN, JIS and other standards and aerospace system requirements are available.



航天工业专用阀门  
Special Valve for Aerospace Industry



液氢阀  
LH<sub>2</sub> Valve



LNG 撬装阀  
Skid-Mounted LNG Valves



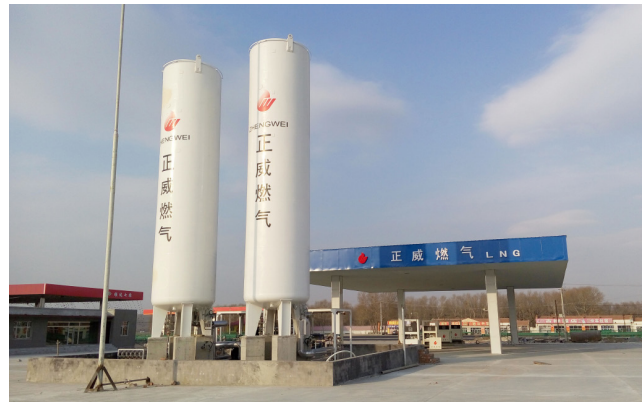
# LNG, LNG/L-CNG Filling Station

## LNG、LNG/L-CNG 加注站

☎ 业务电话 (Tel): (028) 23186526  
✉ 邮箱 (E-mail): tj@saspg.com

2008 年开始设计、制造各类 LNG、LNG/L-CNG 加注站，目前已建成上百座。

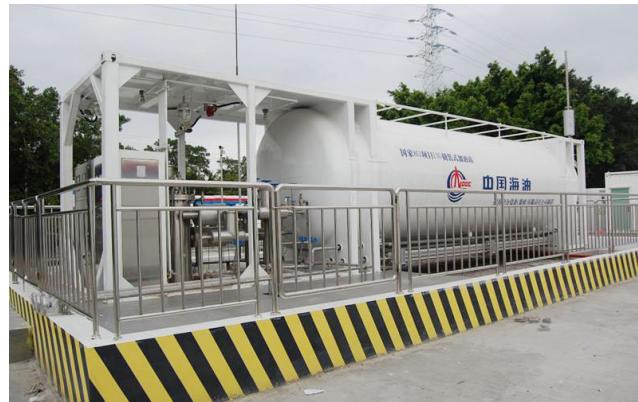
设计、制造的 LNG/L-CNG 加注站具有程序控制稳定可靠，储液残液少，系统冷损小，系统升压缓冷等优点。



天津正威加液站  
Tianjin Zhengwei liquid filling station

Engaged in design and manufacture of various LNG and LNG/L-CNG filling stations, and have built hundreds of them since 2008.

The LNG/L-CNG filling stations designed and manufactured have the advantages of stable and reliable program control, less residual liquid in storage, small cold loss of the system, and slow pressure rise in the system.



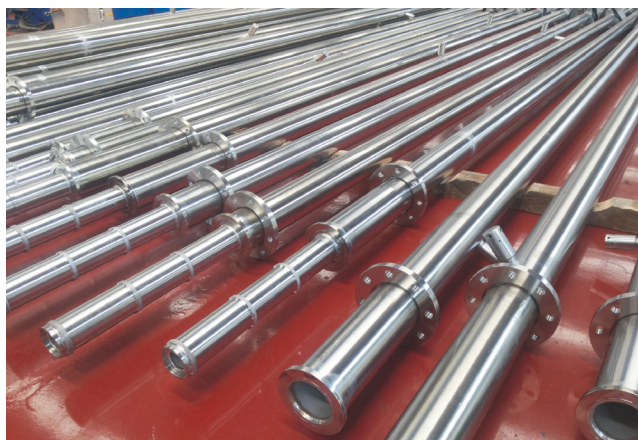
中海深燃撬装站  
CNOOC Shenzhen Fuel skid mounted station

## 高真空绝热管道

### High Vacuum Insulated Piping

高真空绝热管道有 DN15-DN300 等多种规格，适用于空气分离设备、石油气（天然气）液化分离设备、液氢、液氮、液氧、液氩和液化天然气等低温贮运系统。真空管道具有放气率低，真空度保持时间长，维护成本低等优势。

High vacuum insulation pipelines have various specifications, ranging from DN 15 to DN300, suitable for air separation plant, liquefied petroleum gas (natural gas) separation plant, liquid hydrogen, liquid nitrogen, liquid oxygen, liquid argon and liquefied natural gas storage and transportation systems. Vacuum pipelines have the advantages of low leakage rate, long vacuum holding time and low maintenance cost.



高真空绝热管道  
High Vacuum Insulated Piping



## Industrial Gases Sector

### 气体板块

川空集团坚持气体与设备并举，坚持“既卖奶牛，也卖牛奶”的长期经营发展战略，在国内同行业中率先开拓气体市场。

经过多年的发展，川空集团气体生产及经营业务涵盖了现场制气及管道供应工业气体，拓展了医用气体、工业液态气体及瓶装气市场，开展了稀有气体氦、氖、氬、氪的提取工作，同时大力进军 LNG 生产、工业物流及用气领域，并在 LNG 冷能利用空分方面，走在了世界前列。目前公司工业气体供应规模约  $20 \times 10^4 \text{Nm}^3/\text{h}$ ，液态气体产量超过 4000T/D，气体和液体生产及经营企业分布于全国主要经济区。形成了区域化气体、液体运作中心，为不同的客户提供专业化和个性化的管道气体、液体（包括 LNG）及瓶装气供应及运营管理解决方案。

我们在气体业务方面的目标是“安全可靠、运行稳定、低耗环保、优质服务”，致力成为中国工业气体及能源领域的卓越企业。

SASPG adheres to the long-term business development strategy of "selling both dairy cows and milk" and takes the lead in developing the gas market in the industry in China.

After years of development, SASPG gas production and operation business covers on-site gas production and pipeline supply of industrial gases, expands the market of medical gases, industrial liquid gases and bottled gases, develops the recovery of rare gases such as krypton, xenon, neon and helium, and vigorously enters into LNG production, industrial logistics and gas applications, and becomes a pioneer in air separation using LNG cold energy. At present, the industrial gas supply scale is about  $20 \times 10^4 \text{Nm}^3/\text{h}$ , and the liquid gas output is more than 4000T/D. The gas and liquid production and operation are distributed in the main economic regions of China. Regional gas and liquid operation centers have been formed to provide professional and customized pipeline gas, liquid (including LNG) and bottled gas supply and operation solutions for different customers.

Our goal in gas business is "safe and reliable, stable operation, low power consumption and environmental protection, high quality service", and is committed to becoming an outstanding company in industrial gas and energy in China.



# Business scope

## 业务范围

### 01 大型空分管道供气 Large Air Separation Pipeline Gas Supply



专业为冶金、石油化工、煤化工、化肥等行业提供大型管道供气服务  
Specializing in providing large-scale pipeline gas supply services for metallurgy, petrochemical, coal chemical, fertilizer and other industries

### 02 大宗气体 Bulk gas



提供包括氧(液体)、氮(液体)、氩(液体)、医用氧、特种气体等产品服务  
Providing products and services including oxygen (liquid), nitrogen (liquid), argon (liquid), medical oxygen, special gases, etc.

### 03 LNG 清洁能源 LNG clean energy



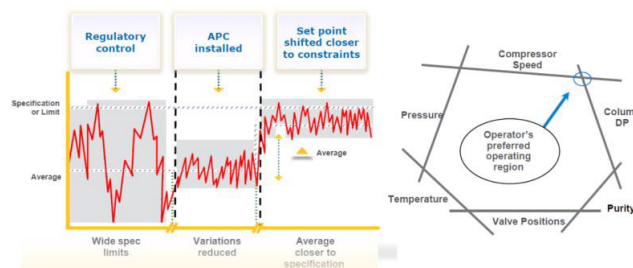
提供天然气加工和大宗 LNG 销售供应服务  
Providing natural gas processing and bulk LNG sales and supply services

### 04 稀有气体 Rare gases



专业为科研、电子、半导体、芯片、光纤等高端客户提供液氦和氦气等稀有气体和特种气体服务  
Specializing in providing high-end customers in areas such as scientific research, electronics, semiconductors, chips and optical fibers with rare and special gas services such as liquid helium and helium.

#### Typical APC Benefits



### 05 气体能源类技术咨询 Technical Consultation on Gas Energy

专业提供工业气体、能源类供应、节能、优化操作等技术服务  
Specializing in providing industrial gas, energy supply, energy saving, optimal operation and other technical services

## Advantages of Gas Business Department

### 气体部优势

气体部总部位于成都市高新区天府四街 OCG 国际中心 A 座 6 楼，总部设立了远程监控中心，利用远程监控智能技术和远程视频监控技术，实现对各气体公司设备运行情况的实时监控。总部专业工程师可通过实时画面进行远程指导，实现专家对空分设备的“远程会诊”，让总部可以即时发现、即时诊断、即时通知、即时决策。

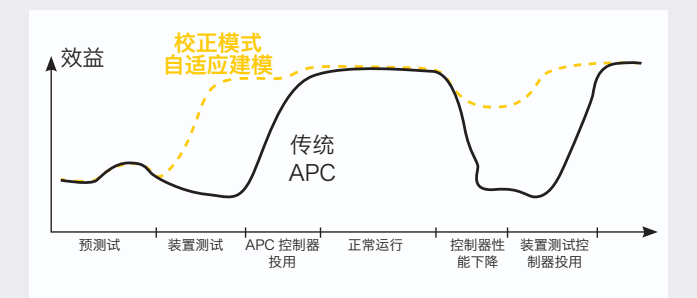
- 我们的优势（先进控制系统 APC）：  
Our Advantages (Advanced Control System APC):

- 1、实现空分装置自动变负荷功能，变负荷范围要求氧气产量在 75%~105% 之间完成变负荷操作
- 2、空分工况在设定产量下（变负荷完成的情况下），保持工况稳定、质量稳定、连续生产
- 3、依据氧气需求进行自动变负荷，系统根据实际生产情况自动完成进塔空气量最小化控制
- 4、自动变负荷过程要保证产品质量、产量以及设备安全运行
- 5、产品纯度卡边控制，产量最优控制

1. Realize automatic turndown of air separation plants, which changes the oxygen output between 75% and 105%.
2. Keep stable, quality and continuous production at the set output of air separation plant (or after turndown)
3. Automatic load change according to oxygen demand, and automatic control to minimize the air flow entering the cold box according to the actual production condition
4. The process of automatic load change shall ensure the product quality, output and safe operation of the plant.
5. Product purity bounder control, optimal output control

The Gas Business Department is headquartered on the 6th floor of Block A, OCG International Center, Tianfu 4th Street, Chengdu High-tech Zone. The headquarter has been equipped with a remote monitoring center, which uses intelligent remote monitoring technology and remote video monitoring technology to realize real-time monitoring of the equipment operation of various subsidiaries and branches. Professional engineers in the Headquarter can conduct remote guidance through real-time screens, thus realizing the "remote diagnosis" of experts on air separation plants. Many operation problems can be found, diagnosed, notified and handled in real time in the Headquarter.

#### 先进控制系统 APC Advanced Control System APC



APC 模型可自适应在线自动校准，模型可在线更新  
APC model can be adaptively calibrated online and the model can be updated online



## Inner Mongolia Xingsheng Natural Gas Co., Ltd. 内蒙古兴圣天然气有限责任公司



内蒙兴圣 200 × 10<sup>4</sup> Nm<sup>3</sup>/d 天然气液化装置  
Inner Mongolia Xingsheng 200 × 10<sup>4</sup> Nm<sup>3</sup>/d  
Natural Gas Liquefaction Plant

内蒙古兴圣天然气有限责任公司的 200 万方天然气液化装置,生产规模可达到日处理原料天然气 200 万方,年产 LNG 产品 50 万吨,使得兴圣天然气公司成为西部生产规模最大的 LNG 生产基地。该装置质量达到国际先进水平,并获得了“改革开放 40 周年机械行业杰出产品”称号。

Inner Mongolia Xingsheng 200 × 10<sup>4</sup> Nm<sup>3</sup>/d Natural Gas Liquefaction Plant of Inner Mongolia Xingsheng Natural Gas Co., Ltd. can process 2 million cubic meters of feed natural gas per day with an annual output of 500,000 tons of LNG products. The project has also made Inner Mongolia Xingsheng Natural Gas Co., Ltd. the largest LNG production base in the west part of China, with product quality reaching the international advanced level. The plant also won the title of "Outstanding Product in Machinery Industry for the 40th Anniversary of Reform and Opening up".

## Tangshan Ruixin Liquefied Gases Co., Ltd. 唐山瑞鑫液化气体有限公司

唐山瑞鑫液化气体有限公司现有目前国内最大的 LNG 冷能利用 723T/D 液体空分装置,利用液化天然气接收站 LNG 外输汽化时释放的冷量来制取低温液体产品,主要产品为高纯液氧、液氮、液氩。公司于 2018 年 11 月取得国家高新技术企业证书,并拥有相应的

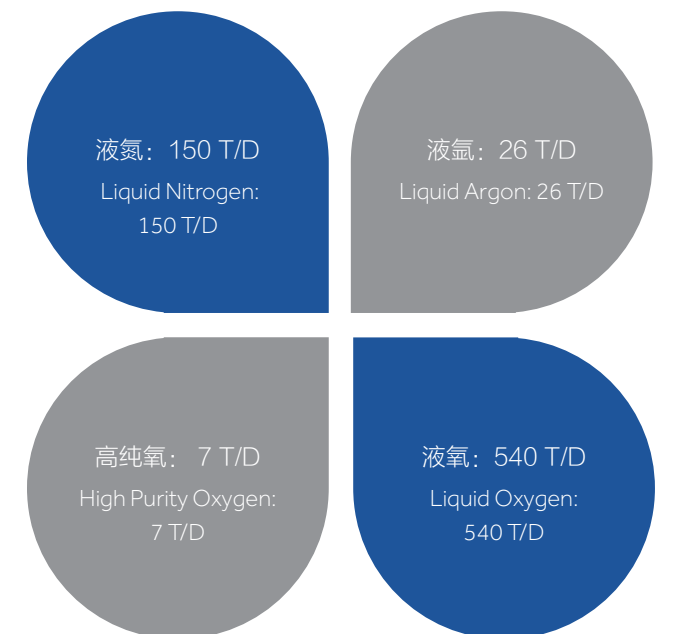
LNG 冷能空分装置的若干授权专利。川空(集团)公司在 LNG 冷能空分领域已经走在国际行业的前列,唐山瑞鑫公司该套冷能空分便是川空(集团)公司 LNG 冷能空分工业化应用的典型代表。

唐山瑞鑫 LNG 冷能空分 :723TPD  
Tangshan Ruixin LNG Cold Energy Air Separation Plant: 723TPD



Tangshan Ruixin Liquefied Gases Co., Ltd. owns LNG cold energy 723T/D liquid air separation plant, the largest one in China which uses the cold energy released during LNG vaporization in LNG terminal to produce cryogenic liquid products, such as high purity liquid oxygen, liquid nitrogen and liquid argon. The Company obtained the National High-tech Enterprise Certificate in November 2018 and has several authorized patents for the corresponding LNG cold energy air separation plant. SASPG has already taken the lead in LNG cold energy air separation. Tangshan Ruixin's cold energy air separation plant is a typical application of SASPG's industrialization of LNG cold energy air separation plant.

### ● 产品规模 Product Scale







图一

图一 长治川空气体有限公司 30000Nm<sup>3</sup>/h 和 20000Nm<sup>3</sup>/h 空分设备及 180TPD 氧氮液化装置  
30,000Nm<sup>3</sup>/h ASU and 20,000Nm<sup>3</sup>/h ASU With 180TPD Liquid Plant (LOX, LIN & Argon) by SASPG CHANGZHI GASES CO., Ltd.



图二

图二 溧阳川空气体有限公司 10000Nm<sup>3</sup>/h 空分设备及 240TPD 氧氮液化装置  
10000Nm<sup>3</sup>/h Air Separation Plant and 240TPD Oxygen and Nitrogen Liquefaction Plant of SASPG Liyang Gases Co., Ltd.



图三

图三 淄博鲁川气体有限公司 16000Nm<sup>3</sup>/h 和 12000Nm<sup>3</sup>/h 空分设备及 105TPD 和 180TPD 氧氮液化装置  
16000Nm<sup>3</sup>/h and 12000Nm<sup>3</sup>/h Air Separation Plants and 105TPD and 180TPD Oxygen and Nitrogen Liquefaction Plants of Zibo Luchuan Gases Co., Ltd.

图四 陕西川空气体有限公司 15000Nm<sup>3</sup>/h 和 6500Nm<sup>3</sup>/h 空分设备  
15000Nm<sup>3</sup>/h and 6500Nm<sup>3</sup>/h Air Separation Plant of SASPG Shanxi Gases Co., Ltd.



图四

图五 二连浩特市兴圣燃气有限公司  
Erenhot Kingsheng Gases Co., Ltd.



图五

图六 中山华南实用气体科技有限公司  
Zhongshan Hua'nán Practical Gas Technology Co. Ltd.



图六

# The BOG Helium Recovery Project in Hangjinqi, Inner Mongolia

## 内蒙古杭锦旗 BOG 提氦项目

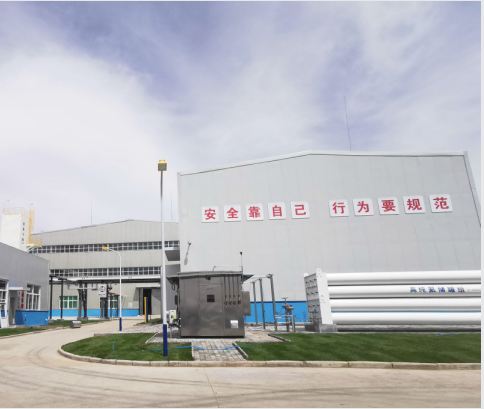
气体部内蒙古 BOG 提氦项目是从液化天然气的闪蒸气（BOG）中提取高纯氦气的最大的关键技术研发及示范工程建设项目，是由川空集团公司自主研发的、我国第一套从液化天然气 BOG 中提氦的装置，获得了国家专利 4 项，申请了国内发明专利 2 项。该项目采用了一系列节能、节水措施，不仅可以直接从大量放散的 BOG 中提取氦气，还可降低液化工厂生产成本，增加产量，对保障国家用氦安全和促进我国天然气提氦工业的发展都具有重大意义。

The BOG helium recovery project in Inner Mongolia by the Gas Business Department is the largest key technology R & D and pilot project for recovering high-purity helium from liquefied natural gas (BOG). It is the first unit to recover helium from liquefied natural gas BOG independently developed by SASPG. It has obtained 4 national patents and 2 domestic invention patents. A series of energy-saving and water-saving measures are adopted in the project, which can not only directly recover helium from a large amount of released BOG, but also reduce the production cost of liquefaction plant and increase the output. It is of great significance to ensure the safety of national helium use and promote the development of China's natural gas helium recovery industry.



4 项国家专利  
(其中发明专利 2 项)

我国规模最大的从大型 LNG 装置的闪蒸气（BOG）中提取高纯氦气的示范项目



BOG 提氦项目施工现场  
BOG Helium Recovery Project Construction Site





聚水扬帆 破浪前行

Strive forward with one heart and mind



聚水扬帆，来自五湖四海的川空人汇聚成四川空分独特的企业文化，它像一股滚滚洪流承载起川空巨轮破浪向前。

SASPG people from all over China gather to form a unique corporate culture, which is like a rolling torrent carrying a gigantic wave going further.



## Core Philosophies 核心理念





# Cultural Activities 文化活动

“力量”来自于不停凝聚  
Strength Comes from Cohesion.

文化助力发展，作为三线建设企业，四川空分的企业文化源远流长。聚水扬帆，来自五湖四海的川空人汇聚成四川空分独特的企业文化，它像一股滚滚洪流承载起川空巨轮破浪向前。团结是气质，诚信是品质，决战决胜是精神，这是企业创新发展的不竭动力。

Culture Stimulates Development, SASPG is a “The Third-Front Movement Enterprise” and its culture has a well-established and long standing history. SASPG people from all over China gather to form a unique corporate culture, which is like a rolling torrent carrying a gigantic wave going further. “UTILITY as the temperament, INTEGRITY as the trait, and TO FIGHT, TO WIN as the spirit” is always the motive force of innovation and development.



劳动托起中国梦  
Labor Hold up Chinese Dream



体育活动及素质拓展  
Sports Activities & Quality Expansion



质量信得过班组颁奖仪式  
Award Ceremony of Reliable Quality Team



庆祝建厂 50 周年  
Celebrating the 50th Anniversary

# Social responsibility 社会责任

川空在自身发展的同时不忘回馈社会，惠及百姓；建广场，搞绿化，促经济，稳就业，支援新农村建设，大力支持教育事业 ..... 川空一直不忘初心，积极承担社会责任，为国家经济发展、绿色环保及教育事业等多方面作出了突出贡献，彰显企业担当。

SASPG always contribute to the society and benefit the people in the course of development. Building squares, greening, promoting economy, stabilizing employment, supporting new rural construction, and vigorously supporting education... SASPG always stay true to the mission and actively undertake its social responsibilities, making outstanding contributions to the country's economic development, environmental protection, education and other aspects.



川空文化广场  
SASPG Cultural Square



在华中科技大学颁发奖学金  
Awarding scholarship at Huazhong University of Science and Technology



支援新农村建设  
Supporting New Rural Construction