

Air Separation Units

Breaking down air
with absolute precision -
and in total safety

Air Separation Units (ASU) for producing Oxygen, Nitrogen and Argon

SIAD Macchine Impianti supplies Air Separation Units to the highest quality standards for the liquid or gaseous production of industrial gases using the cryogenic process with tray or packing technology.

SIAD Macchine Impianti has developed its own design for selecting and sizing the most flexible equipment and technical solutions. Our strong point is our ability to coordinate our clients' requirements with the company's long-standing experience, thus enabling us to provide tailor-made designs based on constant follow-up of project development. This is also made possible by our versatile, expert design team and our network of selected collaborators worldwide.

Complete compliance with local and or international standards.

Tailor-made solutions to meet all production requirements.

Guaranteed continuous supply of Oxygen, Nitrogen and Argon of the highest purity.

**For information:
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Technical characteristics

Air Separation Units (ASUs) with cryogenic technology for producing industrial gases in liquid and gaseous forms.

Services

- Engineering, feasibility studies
- supervised commissioning
- erection, start up and performance test
- remote control.

Engineering and production sites

SIAD MI has 3 engineering centers located in Italy, in China and the United States, alongside the production centers in Italy and China.

ASU FOR OXYGEN, NITROGEN AND ARGON

Production and flow rates	- Oxygen from 500 Nm ³ /h to 110,000 Nm ³ /h (17 - 3,800 MTPD) and above* - Nitrogen from 1,500 Nm ³ /h to 330,000 Nm ³ /h (45 - 9,900 MTPD) and above* - Argon recovery 92% (if Argon production is required by Client)
Purity	- Oxygen 99.95% and beyond - Nitrogen < 1 ppm O ₂ - Argon < 1 ppm O ₂

NITROGEN GENERATION UNITS

Production and flow rates	- Nitrogen from 350 Nm ³ /h to 150,000 Nm ³ /h (10.5 - 4,500 MTPD) and above*
Purity	- up to < 1 ppm O ₂ in Nitrogen

*Nm³/h = @ 0°C and 1.013 bar(a) - * Cold Box dimension shall be evaluated to confirm feasibility*



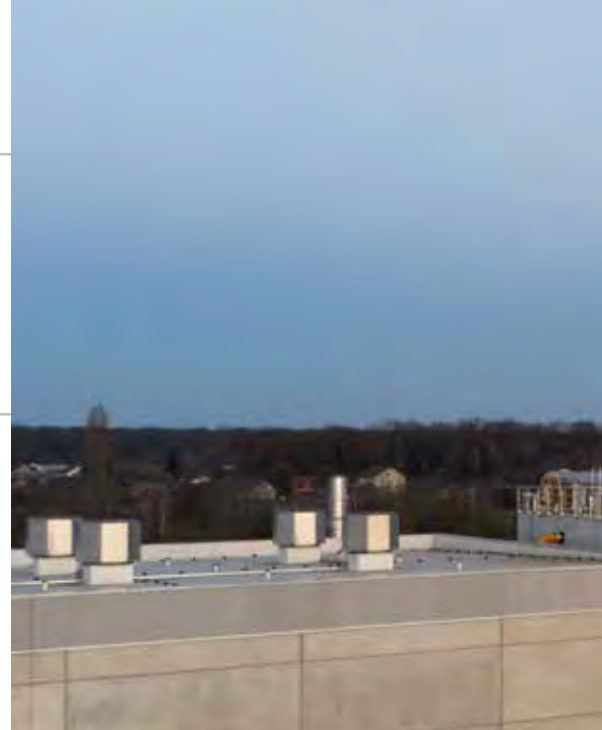
Air separation method

The plant performs cryogenic air separation, through low temperature distillation. Characteristics of this method:

- high purity products
- high recovery ratio
- low power consumption
- multi-duty operation
- production of products in gaseous and liquid forms
- simultaneous production of more than one product.



Smart Liquid 2.0, courtesy of Nippon Gases Norway



FOCUS ON

SIAD Macchine Impianti chooses Porto Marghera, Venice (Italy) as the location for its new plant with fabrication capacity for large scale Air Separation Units (up to 3,000 - 4,000 MTPD) and Small Scale LNG plants.

This new site will enhance several key attributes:

- Can serve global customers across full range of air separation and Small Scale LNG units
- Adriatic sea location has direct ship/barge loading, allowing quick access to the EMEA and Americas markets
- Elimination of road transport to reduce logistics costs
- Expanded capability to support customers, including modularization requirements.

MERCHANT PLANTS

We have created dedicated lines of standard products to answer to the flexibility and efficiency needs of gas companies. Customized solutions are also available on the bases of clients requirements.

STANDARD PLANTS FOR THE PRODUCTION OF OXYGEN AND NITROGEN											
Model		SL 30		SL 50		SL 90		SL 130		SL 190	
Running mode**	Unit	LOX	LIN	LOX	LIN	LOX	LIN	LOX	LIN	LOX	LIN
DESIGN mode	Nm ³ /h	330	600	600	1,000	1,015	1,600	1,563	2,315	2,510	3,015
	MTPD	11.0	18.0	21.0	30.0	35.0	48.0	54.0	69.0	86.0	90.0
MAX LIN mode	Nm ³ /h	285	685	390	1,245	940	1,685	1,400	2,510	1,550	4,130
	MTPD	10.0	20.5	13.0	37.0	32.0	50.5	48.0	75.0	53.0	124.0

Nm³/h = @ 0°C and 1.013 bar(a) - ** Additional modes are also available

STANDARD PLANTS FOR THE PRODUCTION OF OXYGEN, NITROGEN AND ARGON													
Model		SL+A 100						SL+A 180					
Running mode***	unit	LOX	LIN	LAR	Tot. Liq.	GAN	GOX	LOX	LIN	LAR	Tot. Liq.	GAN	GOX
MAX LOX mode	Nm ³ /h	2,725	100	95	2,920	5,400	-	4,620	150	168	4,938	10,500	-
	MTPD	93.4	3.0	4.1	100.4	161.9	-	158.3	4.5	7.2	170.0	314.8	-
MAX LIN mode	Nm ³ /h	100	3,430	45	3,575	-	1,800	150	5,520	95	5,765	-	3,500
	MTPD	3.4	102.8	1.9	108.2	-	61.7	5.1	165.5	4.1	174.7	-	119.9

Nm³/h = @ 0°C and 1.013 bar(a) - *** Intermediate modes are also available

Notes

- Productions and Electric Energy consumption are referred to standard conditions: P=1.013 bar(a), T=+22 °C, R.H. = 50%
- Purity: LOX ≥99.6%, LIN O₂ ≤2 ppm, LAR O₂ ≤2.0 ppm & N₂ ≤2.0 ppm
- GAN is suitable for external future nitrogen liquefier as expansion unit and/or pipeline; GOX is suitable for external use in pipeline as upgrade
- Storage: LOX 0.05 bar(g) @ -182.6°C; LIN 1 bar(g) @ -189.5°C; LAR 0.3 bar(g) @ -183.4°C



Courtesy of Oxy, Croatia

Automatic control system

Advanced PLC based automation:

- providing maximum effectiveness of the plant (optimization);
- automatic monitoring of normal operation mode (without operator supervision);
- automatic data logging (archives for diagnostics);
- guarantees safety and reliability of the equipment;
- tele-control of the plants from producer's side.

FOCUS ON

For the start-up of the system and the gear change, our automatic control system **"A.L.C.E."** performs a fixed sequence of actions, intervening remotely and automatically on the same variables accessible to the operator.

Our **MPC** system regulates the production of the system based on a predicted future parameter. Plus, for example, it also regulates production based on the presence of solar energy or the cost of energy.

Easy installation

Plants are shipped in modular section for easy and low cost installation. The equipment is installed as enlarged modules, which are then connected during installation on site with the minimum number of interfaces on pre-fabricated foundations. As a consequence, there is a reduction in the cost of installing and commissioning. An option is available for commissioning test, start-up and performance test, performed on site under the careful supervision and responsibility of SIAD Macchine Impianti's expert site engineers.

APPLICATIONS

- Cement
- Chemical
- Clean and Transition Energy
- Electronics
- Energy and Power Generation
- Exploration and Production
- Food & Beverage
- Glass
- Industrial Gases Industry
- Metal Production
- Oxy-combustion
- Petrochemical
- Pulp and Paper
- Refinery

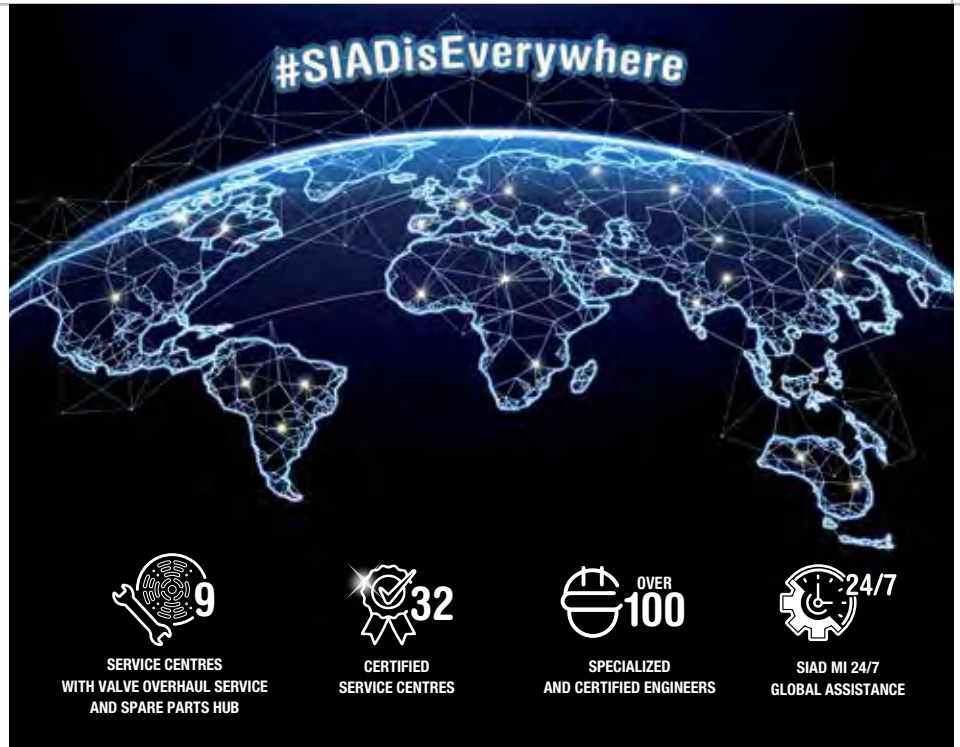
Innovation has always been in our DNA: currently we can offer plants suitable for the production of **ultrapure** gases (for applications in the electronics field) and plants to support new technologies for clean and transition energy, such as oxygen and nitrogen production plants suitable for the production of **blue and green ammonia** and oxygen plants suitable for the production of **blue hydrogen** and **oxy-combustion**.

Global technical support services

Close to you,
wherever you are

- ✓ **Global presence**
Thanks to a worldwide network of owned and certified Service Centres, SIAD MI guarantee a rapid intervention to support your compressors and plants across all five continents.
- ✓ **Highly specialized technicians**
More than 100 certified technicians ensure the highest quality service assistance to customers throughout the world.
- ✓ **Constant updating and advanced technology**
SIAD MI technical staff periodically train the Service Centres through dedicated training courses which include the award of specific certifications. Thanks to the latest generation of tools, the Service Centres ensure advanced, timely and efficient assistance.
- ✓ **Continuous assistance**
SIAD MI 24/7 Global Assistance is the service that operates 24 hours a day, every day of the year, dedicated to managing the requests from SIAD MI's customers worldwide.

For information:
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AIR SEPARATION UNITS: SMART AND ALWAYS CONNECTED

As with all SIAD MI compressors and plants, even ASUs, they can be continuously monitored through the SIADMI4U platform.

It is a remote monitoring and diagnostics system that allows you to view, analyze and manage, in real time, through a smartphone or PC, all the operating parameters of a compressor or a plant.

Watch the video on
YouTube



The SIAD Group

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Industrial Gases



LPG and Natural Gas

Healthcare

Industrial Gases

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