

SPRUCE Series

Cryogenic Air Separation Plants

Liquid Oxygen and Nitrogen Production

Product Information



Cosmodyne has been a world leader in the design and manufacture of modular air separation plants since 1958 with over 470 plants operating around the world.

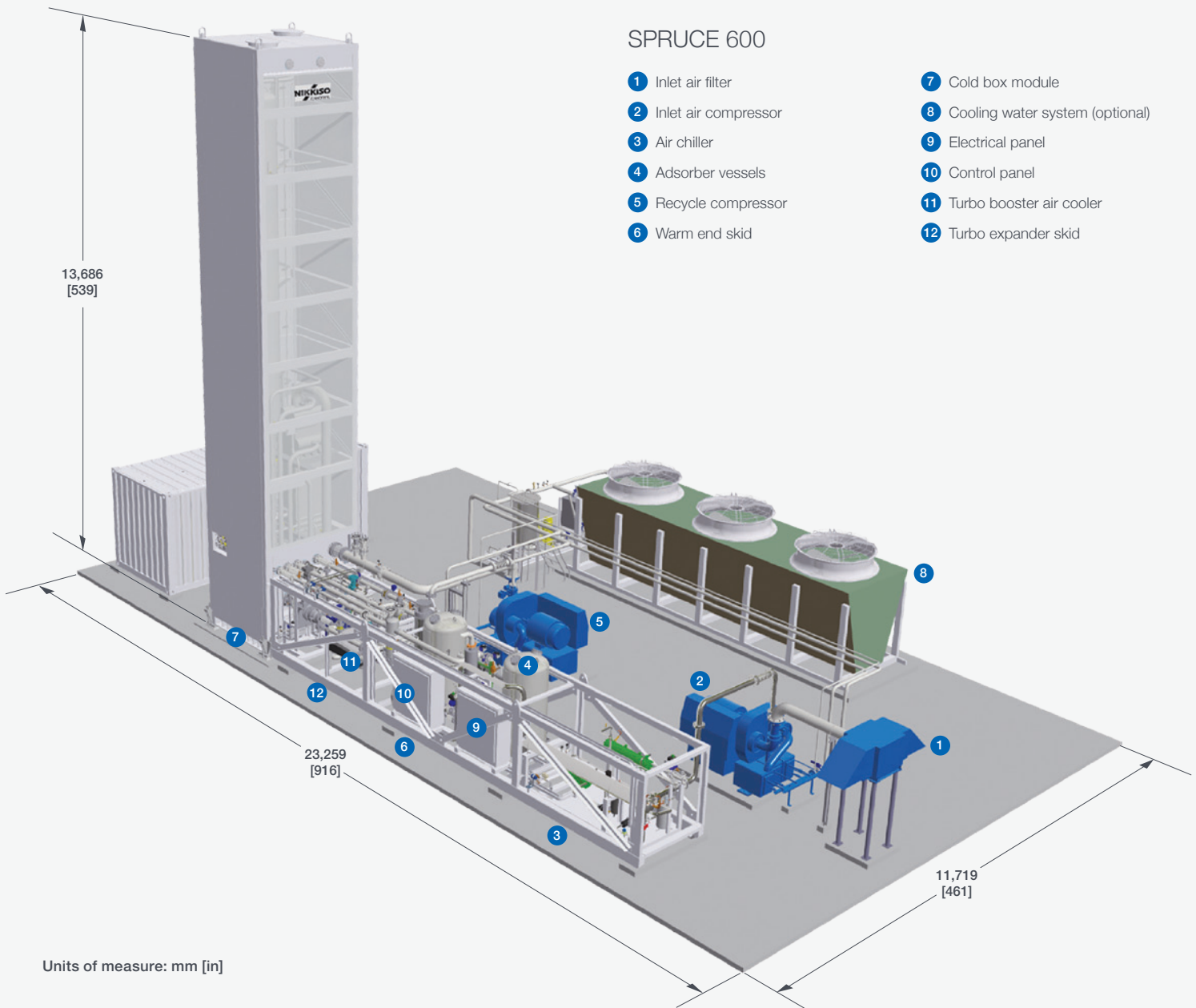
Each Cosmodyne system is designed and built to rigorous standards of quality and workmanship developed from more than fifty years of specific experience. We continue to set the industry standard for design, engineering manufacture, sales support and field-service.

Cosmodyne offers a wide range of plants under 300 metric ton/day. This brochure covers the smaller container ship-able SPRUCE Oxygen, Nitrogen plants. The plant can be installed and commissioned in one week after arriving on site.

The comprehensive scope of supply includes three pre-assembled modules and all necessary interconnecting materials. Plant modules include feed air compressor, air treatment module, and cold box module. The air treatment module contains the air chiller, air purifier with dual bed adsorption system, regeneration/thaw heater, turbo expander system and aftercoolers, preassembled into a single module.

Structurally ideal for emerging markets and remote locations, the high efficiency of the Spruce plants makes it equally suitable for more long-term production applications.

The Plant comes in sizes from 7 MTPD to 20 MTPD.



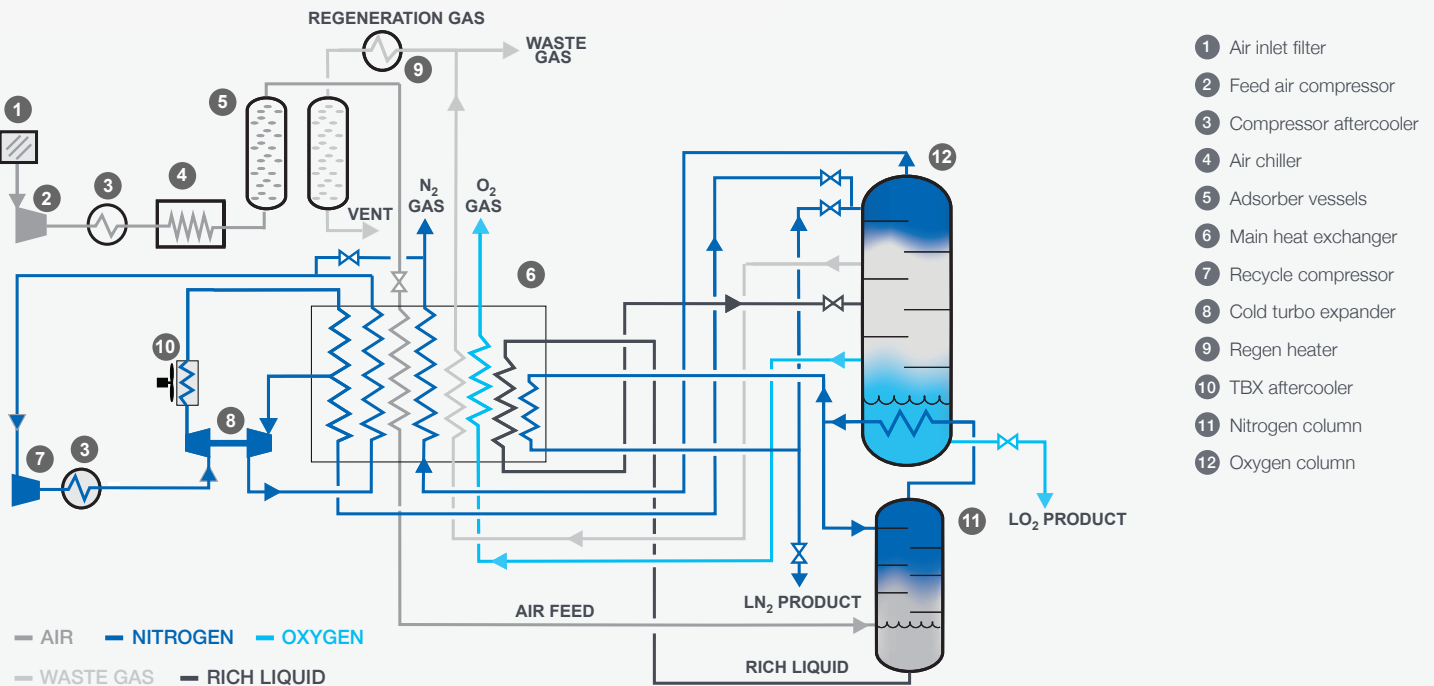
Performance Specifications

Plant Model	Spruce 200		Spruce 500		Spruce 600		
	MAX LOX	MAX LIN	MAX LOX	MAX LIN	MAX LOX	MAX LIN	
Production							
Liquid Nitrogen	Nm ³ /hr	0	203	97	500	60	629
	MTPD	0.0	6.1	2.9	15	1.8	18.9
Liquid Oxygen	Nm ³ /hr	195	9	382	14	519	12
	MTPD	6.7	0.3	13.1	0.5	17.8	0.4
Total Liquids	Nm ³ /hr	195	212	479	514	579	641
	MTPD	6.7	6.4	16.0	15.5	19.6	19.3
Oxygen Gas	Nm ³ /hr	0	131	0	277	0	479
	MTPD	0.0	4.4	0	9.5	0.0	16.4
Nitrogen Gas	Nm ³ /hr	-	-	-	-	1000	467
	MTPD	-	-	-	-	30	14
Product Purity							
Oxygen	% O ₂		99.6		99.6		99.6
Nitrogen	% N ₂		99.9		99.9		-
	PPM O ₂		-		-		5
Pressure							
Nitrogen	barg		4.8		4.8		4.8
Oxygen	barg		0.55		0.55		0.55
Power							
	kW	381	381	696	696.1	893.6	893.6
Specific Power	kWh/Nm ³	1.95	1.80	1.45	1.36	1.54	1.39

NOTES:

1. Performance is based on STP (26 °C, 70% RH, Sea Level, Cooling water 29 °C)
2. Nm³ is measured at 1.0 Atmospheres and 0 °C
3. Nitrogen purity to 1ppm O₂ in N₂ possible with more column trays (cold box ships as bulk break)
4. Liquid N₂ subcooled to -188°C

Simplified Process Flow Diagram



SPRUCE Series

Standard Equipment and Features

- High-performance roller element bearing turbo expander, with cartridge-style rotating element for easy removal and installation. Roller element bearings allow excellent loss-of-power protection for rundown: ideal for unreliable power
- Proven TSA air pre-purification system
- Efficient, reliable oil free centrifugal or dry screw compressors
- Choice of 50 or 60 Hz power systems
- Ships as three standard ISO containers to minimize transportation expense
- Complete with all interconnecting piping and electrical systems, ready for installation
- State of the art control system designed to allow unattended night-shift operation, enabling remote optimization, problem solving and remote start-up as well as unattended startup
- Cold box and warm end lighting included

Options and Accessories

- CE compliance
- Factory cold performance Test
- Air cooled Glycol cooling towers
- Integrated cylinder filling system
- ISO container Control Room
- Integrated product storage, high pressure pumping and transfer system
- Air cooled, evaporative water cooled or dry glycol cooling tower cooled

Services

- On-site or in-factory operator training
- Installation and commissioning assistance
- Extended warranty package
- Service package



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