



A Cryogenic Industries Company

# **COSMODYNE**

## **PACKAGED PLANTS**

### **PINE 4**

## **PRODUCT CATALOGUE**

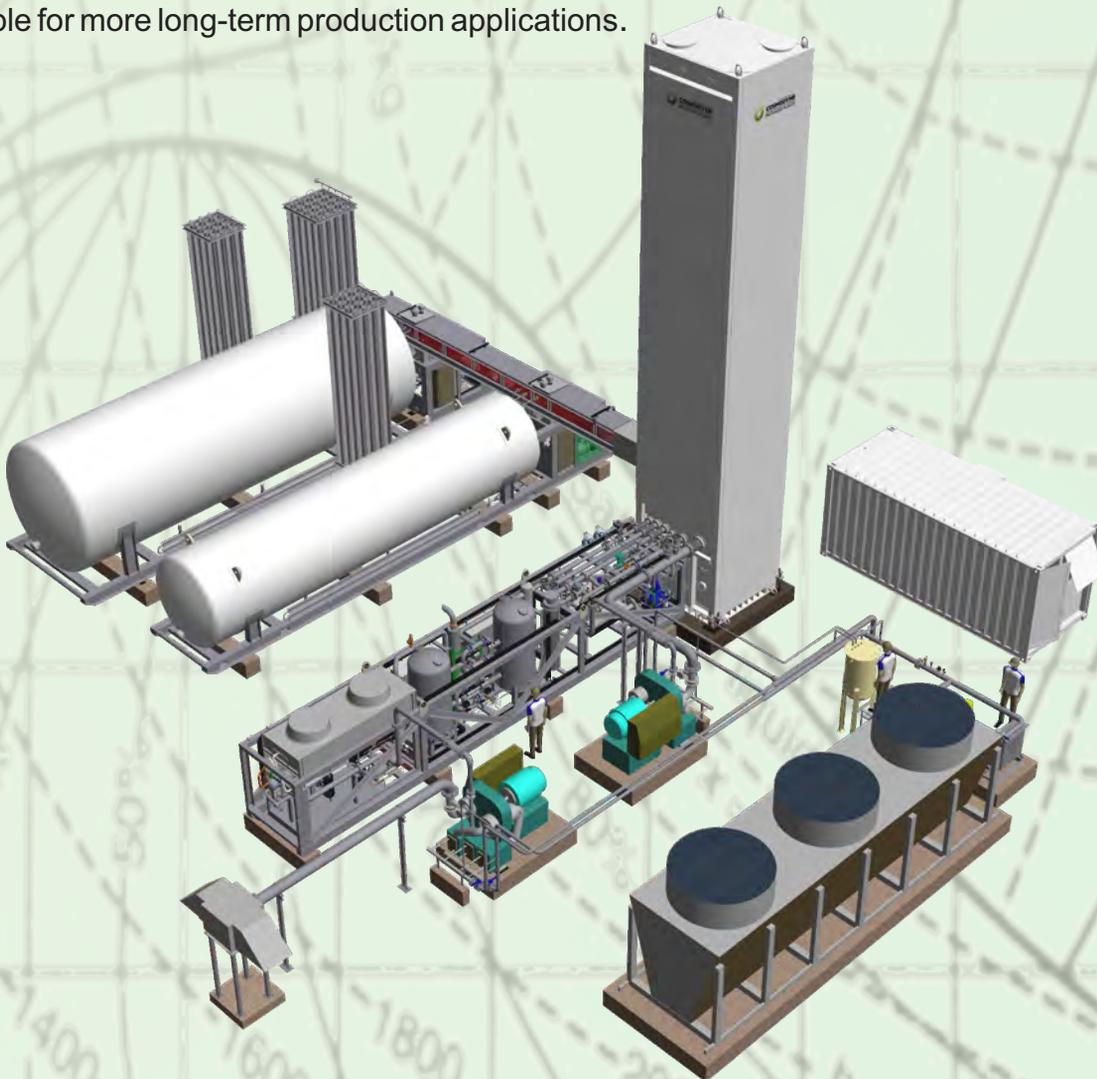
### **PLANTS 7- 30 ton/day**

The new benchmark for **high purity liquid Nitrogen generation.**

The Nitrogen only alternative to the Spruce range. The Pine is designed to maximise Nitrogen purity and recovery. The Pine plants are designed specifically to meet the challenge of ever-increasing global power and fuel costs while maintaining the high reliability and mobility of a modular design that is container shippable.

This innovative plant is built to meet the highest industrial gas safety and quality standards to ensure flawless and reliable performance under the most severe operating conditions. Designed to produce up to 1 ppm O<sub>2</sub> in liquid Nitrogen.

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



For enquires please contact: [www.cosmodynepackagedplants.com](http://www.cosmodynepackagedplants.com)

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Senior Engineer / Sales : Rohit Batarakhaye | Email: [batar@cosmodyne.com](mailto:batar@cosmodyne.com) | Cell: (+91) 942-919-8210

# PINE4

**PINE4-7**  
AIR COOLED  
CENTRIFUGAL



**PINE4-8**  
AIR COOLED  
DRY SCREW



**PINE4-13**  
AIR COOLED  
CENTRIFUGAL



**PINE4-13 & 20**  
GLYCOL COOLED  
CENTRIFUGAL



**PINE4-30**  
WATER COOLED  
CENTRIFUGAL



# PINE 4 PERFORMANCE



5 3 2 1 0 1 2 3 4 5

Barometric Press	14.7	psia	Nitrogen purity up to 1ppm Oxygen in Nitrogen
Dry bulb	26	°C	Nm <sup>3</sup> /hr defined at 0°C 1 Atms
RH, %	70	%	
Wet Bulb	22.72	°C	
Cooling water	29	°C	

Model	PINE4-7	PINE4-8	PINE4-13	PINE4-16	PINE4-20	PINE4-30	
LIQUID N <sub>2</sub>	6.9	8.0	13.5	16.1	20.9	30.1	Metric ton/day
LIQUID N <sub>2</sub>	230	267	449	537	697	1003	Nm <sup>3</sup> /hr
PRODUCT PRESSURE	4.5	5	5	5	5	5	Bara
PRODUCT TEMPERATURE	-188	-188	-188	-188	-188	-188	°C
OPERATING POWER	376	426	619	696.0	891.9	1124	KW
SPECIFIC POWER	1.64	1.60	1.38	1.30	1.28	1.12	Kwh/Nm <sup>3</sup>
N <sub>2</sub> LIQUID PURITY	5ppm O <sub>2</sub> in N <sub>2</sub>						

## Standard Equipment and Features

- High-performance ACD, low power loss 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 inter-connecting 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
- Siemens S7 PLC Fully automatic digital process-control system with PC Based HMI
- Cold box and warm end lighting included

## Options and Accessories

- CE compliance
- Factory cold performance Test
- 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

# PINE EQUIPMENT PICTURES



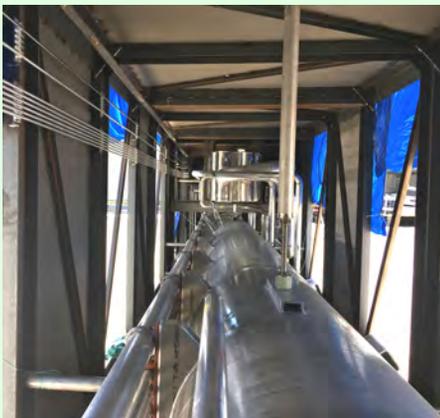
BRAZED AL HEAT EXCHANGER AND PIPING



COLD BOX GROUND LEVEL  
 VALVES AND INSTRUMENT  
 VALVES



CANNED CRYOGENIC VALVES



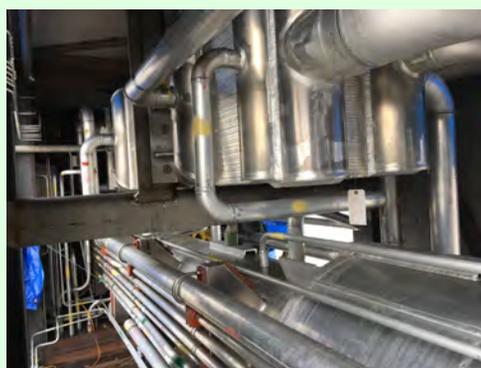
COLD BOX SHIPPED PRE-  
 FABRICATED AND INSULATED  
 WITH PERLITE, NO FIELD ACCESS



COLD BOX AND WARM END SHIP  
 INSIDE 45 FOOT ISO CONTAINERS, COMPLETE  
 WITH ALL PIPING, INSTRUMENT,  
 ELECTRICAL AND INSTRUMENTATION



SIMPLE AND LOW COST CIVILS



ANALYSER PANEL



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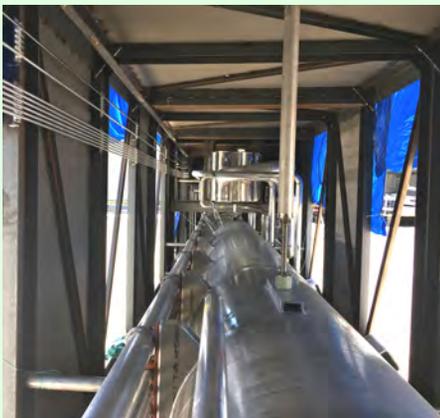
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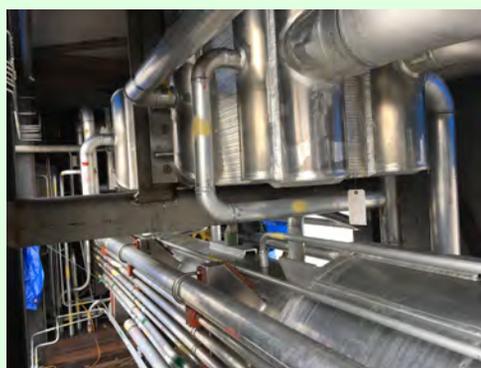
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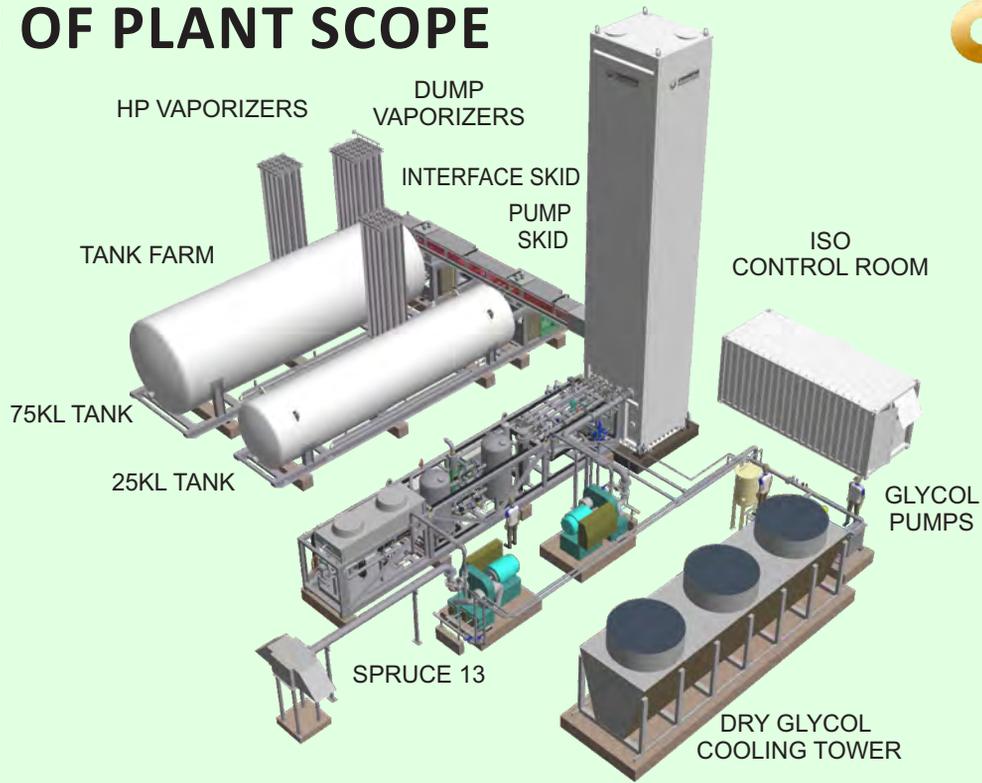
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# BALANCE OF PLANT SCOPE



POWER DISTRIBUTION MCC  
 SITE POWER DISTRIBUTION INSIDE  
 A MODIFIED AND AIR CONDITIONED ISO CONTAINER

PREFABRICATED AND CONTAINER SHIPABLE  
 BUILDING DESIGNED FOR PLANT



SHIPABLE ISO CONTAINER CONTROL ROOM  
 AIR CONDITIONING AND INSTALLED ANALYSERS WITH LIGHTING, POWER,  
 SOUND PROOF DOORS AND CLADDING



GLYCOL TO AIR DRY COOLING TOWER  
 WITH PUMPS AND CONTROL, EXPANSION TANK

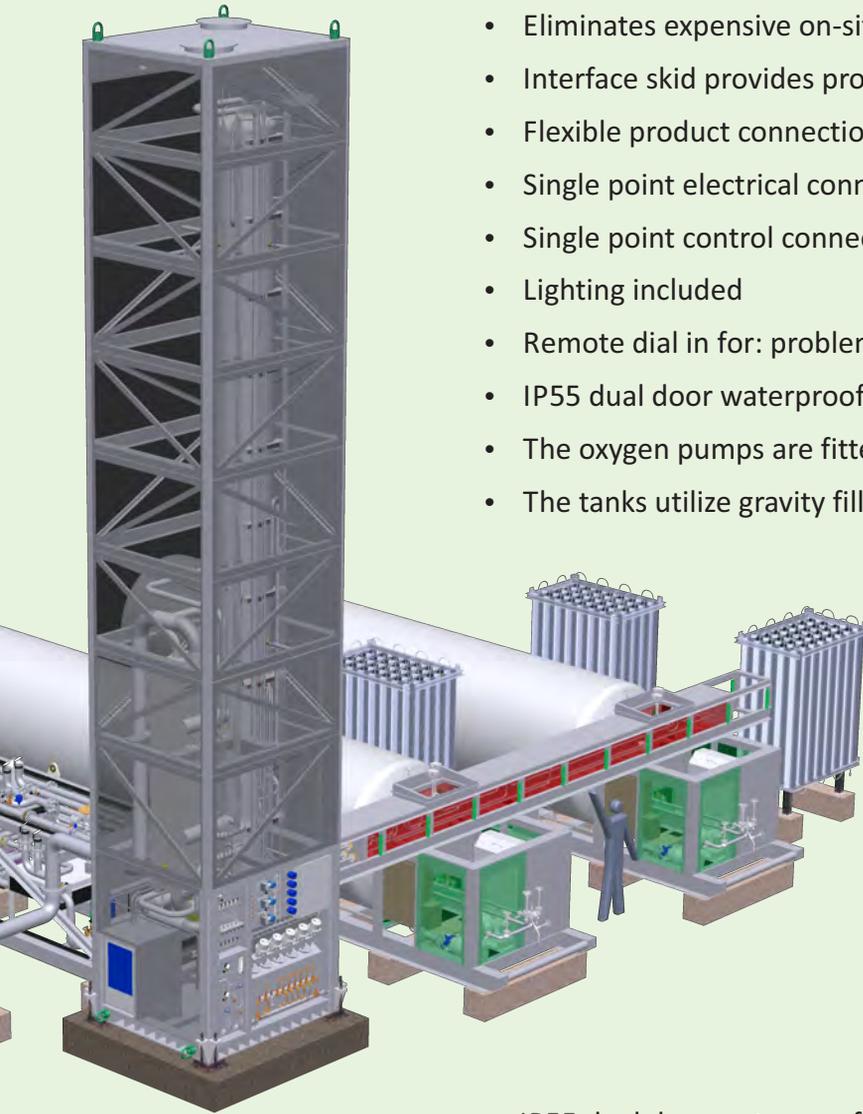
# TANK FARM

## PRODUCT HANDLING AND STORAGE SOLUTION

Cosmodyne Packaged Plants offers a liquid storage, pumping and cylinder filling solutions. The innovative, skid-mounted system is engineered for the safe and efficient storage of liquid Oxygen and liquid Nitrogen in low pressure horizontal tanks. The package facilitates remote process monitoring, automatic pump cool-down and loss of prime protection, inventory control, liquid pump transfer to road tankers, high pressure pumping and vaporization for cylinder filling, as well as off specification liquid disposal.

### Efficient, versatile, moveable, safe, cost-effective

- Safe shipping and rapid deployment / relocation
- Ships in standard 45 foot high-cube containers
- Eliminates expensive on-site engineering and labor
- Interface skid provides product piping insulation
- Flexible product connections to all the skids
- Single point electrical connection
- Single point control connection
- Lighting included
- Remote dial in for: problem solving , quality control ,production trending
- IP55 dual door waterproof enclosures Easy access for equipment maintenance
- The oxygen pumps are fitted with Stainless Steel 6mm blast shields
- The tanks utilize gravity filling with vapor return lines to the plant, minimize losses



- IP55 dual door waterproof enclosures
- PLC automatic cool down and loss of prime detection for all pumps
- VFD control for the transfer pumps
- Rigorous testing at the point of manufacture
- Flawless and rapid commissioning in challenging or remote locations
- Independent control from main ASU plant PLC HMI
- Each Tank has a Touch screen HMI
- Safety as a priority, the system includes safety and vent valves
- Easy access for equipment maintenance
- The oxygen pumps are fitted with Stainless Steel 6mm blast shields
- The tanks utilize gravity filling with vapor return lines to the plant, minimize losses

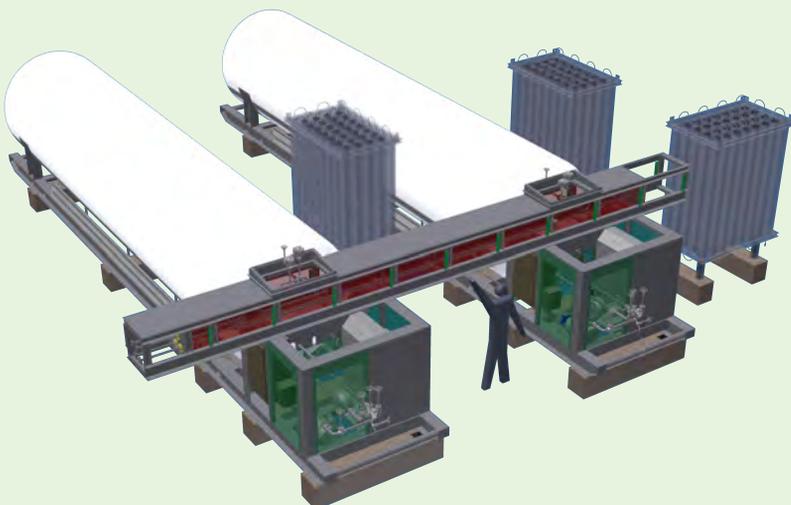


# TANK FARM



## CUSTOMIZABLE SCOPE:

- A interface skid to tie all components together, for one or two tanks , transfer pumping skid, high pressure pump, HP vaporizer for cylinder filling and a dump vaporizer
- 25 /50 /75/ 100 m3 vacuum + perlite insulated horizontal type storage tank designed to ASME sec. VIII div. I Ed.2010 with "U" stamp certification. PED as a option
- ACD transfer pumps with VFD controls for road tanker or VIE filling
- ACD P2K cylinder-filling pump for cylinder filling features a vertical pump with a dual wrist-pin bearing design, allowing higher rod loading and greater drive-end life. Vacuum jacket at cold end minimizes the losses
- Customizable Vaporisers for Customer pipeline backup or HP Cylinder filling requirements
- A state of the art Siemens PLC Control System with HMI touch-screen Electrical and PLC panels
- Tank has a pressure build-up coil to allow for pressure decants from the tank if necessary
- A VFD transport pumps
- Insulated Pump suction lines with aluminum weather-proof jacketing
- Independent liquid feed lines are provided to all pumps, facilitating separate operation of the Transfer pump and Cylinder Filling pump
- Interface between the plant PLC and the tank PLC system so that both systems can be viewed from either location
- The PLC includes the automatic cool down protection, loss of prime on both pumps as well as the tank level and pressure indication
- HMI screen incorporate a sun shield for easy viewing in bright environments
- The design includes safe disposal of liquid from safety and vent valves
- Easy access for equipment maintenance





**C**osmodyne is a world leader in the design and manufacture of air-separation plants SINCE 1977, Each Cosmodyne system is designed and built to rigorous standards of quality and workmanship developed from nearly a half century of experience. From proposal to installation, our sales, engineering, manufacturing and field service personnel continually demonstrate our commitment to customer satisfaction.



This commitment does not end with delivery – our field service staff are ready to serve you

**24 hours a day**, wherever you are. With over 450 functioning plants around the world we continue to set the industry standard for design, manufacture, sales and field-service.



Cosmodyne offers a wide range of plants under 300 metric ton/day. This brochure covers the smaller plants under 31 metric ton per day. Please contact us for any requirement over 31 metric ton/day



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