OXYGEN & NITROGEN PLANTS

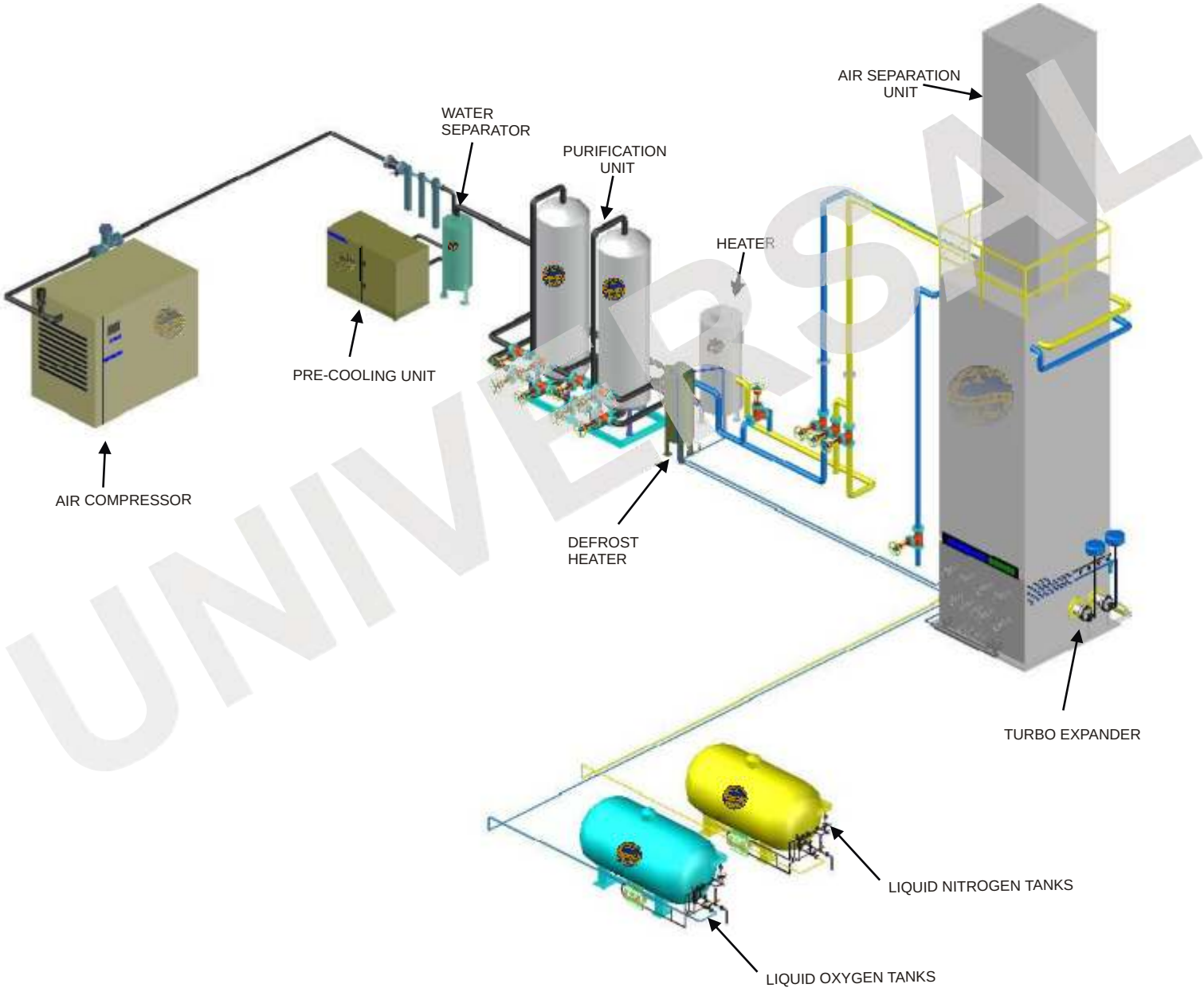
IN TECHNICAL COLLABORATION WITH

ING L&A BOSCHI OF ITALY

LIQUID OXYGEN/NITROGEN PLANT UBTL SERIES
(CAPACITY 30 Nm3 /hr to 500 Nm3/hr)

Convenience Stability & Energy-saving are our devotion & pursuit

3D VIEW
LIQUID OXYGEN PLANT-UBTL SERIES



Company profile

Universal in Collaboration with **ING.L.A. BOSCHI Italy SINCE 1930** manufactures & suppliers Premium Quality low pressure Air separationplants of all sizes ranging from 30m3/hour to 50,000m3/hour.

Universal is a certified ISO 9001:2000 organization and the latest achievement includes the successful approval for CE Certification which makes our company the first in Asia to certified for Cryogenic Pressure vessel ,Plant machinery exports to Europe and USA.We have success in the low Pressure plants as it is the technology of today and the future.We have manufactured over 300 plants since last 23 years since 1985 at New Delhi and supplied to over 40 countries world wide.

PROCESS DESCRIPTION

Air compressor-low pressure

Air is compressed at a low pressure of 5-7 Bar.Air can be compressed at such low pressure by trouble free rotary compressor (screw / centrifugal type advanced technology is employed in lieu of old bulky piston compr-essor.)

Pre-cooling System

The second stage of the process uses a low pressure refrigerant for pre-cooling the processed air to temperature around 12 deg C before it enters the purifier.

Purification of air by purifier

The air enters a purifier consisting of twin molecular sieve driers,working alternatively. The molecular sieve remove the carbon dioxide & moisture from the process air before the air enters air separation unit.

Cryogenic cooling of air by turbo expander

The air has to be cooled to sub - zero temperature for liquification & the cryogenic refrigeration & the cooling is provided by highly efficient turbo expander which cools the air to temperature almost below -165deg C to -170 deg C.

Separation if liquid air into oxygen nitrogen by air separation column

Oil free, moisture free & carbon dioxide free air enters into low pressure plate fin type heat exchanger where the air is cooled below sub-zero temp by air expansion process in the turbo expander. Due to the excellent the-rmal efficiency we can achieve a temperature difference delta T as low as 2 deg C at the warm end of these exchangers.

Air gets liquified when it enters the air separation column & gets separated into oxygen nitrogen by process of rectification

Oxygen is available at the outlet of the ASU at a purity of 99.6%.

Nitrogen is also available at the outlet as a second product at purity of 99.99% upto 3ppm simultaneously without loss of oxygen product.

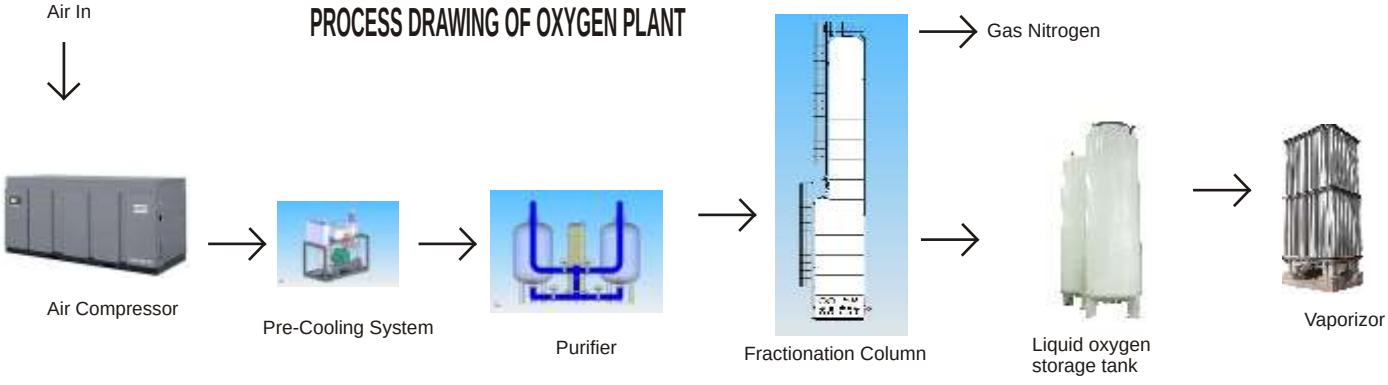
Compression of oxygen filling in the cylinder

The final product in the form compressed oxygen/nitrogen goes to the high pressure oxygen cylinder at 150 Bar or upto higher as required.

Or for pipe line supply or captive consumption.

Or for liquid plants to fills in cryogenic liquid tanks.

PROCESS DRAWING OF OXYGEN PLANT



ADVANTAGES OF OXYGEN PLANT UBTL SERIES

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*High purity.

*Quick start-up after tripping and shut down.

*Supply of liquid oxygen /nitrogen to tank.

*Easy operation.

*Automatic change over of molecular sieve available as option

*Long operation period.

*Remote control available.

*Very low power consumption

*Byproduct: nitrogen 99.999% upto ppm.

Client from Austraila

Client from U.K.

Basic Principle

We are supplying low pressure plants manufactured by us with the following main components:

1.Low pressure Rotary compressor or Oil free piston air compressors.

2.Low pressure driers.

3.Low pressure refrigerant drier.

4.Turbo expander.

5.Low pressure air separation unit.

COMPONENTS OF OXYGEN PLANT

Rotary Screw Type

Stationary Compressor

Centrifugal Type

Rotary Screw Type

The air separation plant is a plant recovering oxygen and nitrogen from air simultaneously. It advance low pressure technology process of Boschi Italy using Rotary screw compressor (or low oil free piston compressor) and turbo expanders. The feed air entering the Molecular Sieve purification system employed to remove the moisture and Co2 from the process air. The air is liquefied by cryogenic cooling using latest plate and fin high efficiency heat exchangers and turbo expanders.The liquid air separates into oxygen nitrogen and inert gases in the air separation column.

AIR COMPRESSOR

A good air compressor with good quality is crucial to oxygen and nitrogen plant in its reliability maintenance,compressing capacity,product quality and efficiency. The discharge pressure of air compressor for air separation plant is usually with in 1.0Bar,so there exists a wide selection of Atlas copco rotary screw type and oil flooded ,oil free screw type , Centrifugal type and Rotary screw type.

The selection of air compressor is subject to the size of the oxygen plant.Usually for a small-scale nitrogen plant ,oil-free screw type is enough.An oil-free piston type compressor is also good option if very robust compressor is required for worse site conditions.

For a larger and medium - scale oxygen/nitrogen plant ,there should be equipped a centrifugal air compressor. It functions stably with low operating cost, but the investment is usually very large .Beside, a centrifugal compressor needs a self-cleaning air filter.

COMPONENTS OF OXYGEN PLANT

1. Elektronikon

Automatic electronic control and monitoring of the compressor optimizes the operation for efficiency, reliability and ease of maintenance.

2. Fan

Low speed radial fan provides a high cooling air flow at extremely low noise levels.

3. Integral coolers

Compact coolers dimensioned to ensure ideal running temperatures under all conditions and are easy to clean.

4. Multi-stage oil separator

Three-stage oil separation process yields a 2 ppm oil carry-over for minimum contamination and maintenance.

5. Air inlet filter

Heavy-duty, multi-stage inlet filter offers particle removal down to 1 micron. Large element surface for long lifetime and minimal pressure drop.

6. Drive arrangement

Gear driven for optimal energy efficiency and minimal maintenance. Utilizes flexible coupling for reduction of starting torque loads on compressor components.

7. Motor

High efficiency, totally enclosed fan-cooled (TEFC), IP55, class F electrical motor is flanged and permanently aligned with the compressor to ensure continuous, trouble-free operation.

COMPONENTS OF OXYGEN PLANT

8. Element

Atlas Copco's patented screw element provides optimal energy efficiency and outstanding reliability.

9. Integrated dryer (optional)

The Full Feature version includes either an integrated refrigerant or heatless desiccant dryer, for minimum installation cost and floor space requirement.

10. Integrated filters (optional)

The Full Feature version can include integrated filters to remove particulates and oil carryover. Filtration is provided in accordance with ISO 8573-1, with a choice of either class 1 or class 2 to protect against contamination of finished product.

11. Integrated oil-water separator (optional)

The fully automatic optional oil-water separator separates the oil-water condensate without the use of costly activated carbon. The condensate exceeds EPA requirements so it can be deposited directly into the drainage system.

12. Dryer bypass (optional)

The dryer bypass, which is conveniently piped to the edge of the canopy, enables the compressor to operate even when the dryer requires maintenance.

PRE-COOLER SYSTEM

The Pre-cooler equipped in the oxygen/nitrogen plant is provided by professional manufacturer .It is skid mounted with main equipments imported .Function of pre -cooling system is to cool down the compressed air to 5~8℃, and to discharge the condensed water.

COMPONENTS OF OXYGEN PLANT

Expansion turbine

Gas bearing expansion turbine

PURIFYING SYSTEM

Purifying system is for secondary removal of moisture carbon dioxide and most of the hydrocarbons that would disturb processing. It works on double-layers of molecule sieve and alumina adsorption.

Through reasonable structure design, the service life and adsorption performance are both strengthened,and thus to ensure a continuos performance of the fractional column.

Regarding the shift ,there are generally two types of purifier. automatic shift controlled by PLC, and manual shift.Regarding the structure,there are also two types; skid-mounted type and separate-structure type.The skid-mounted purifier is easy to install and move, but the cost is relatively high. The separate-structure type is always installed at work site with low cost.

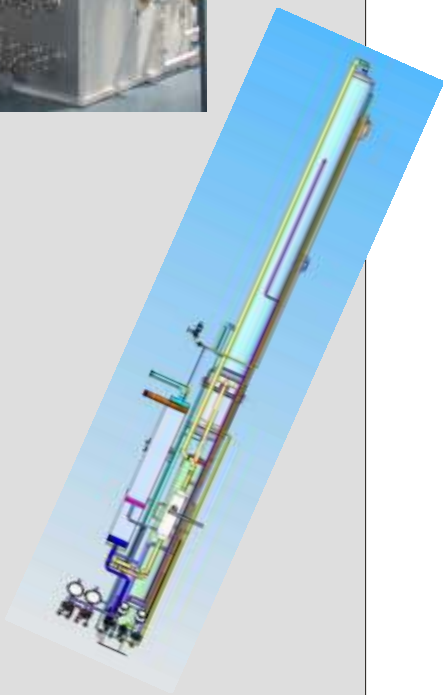
Selection of purifying system is subject to the scale and the investment of the oxygen/nitrogen plant by the customer.

EXPANSION TURBINE

A oxygen/nitrogen plant always works on process of back flow expansion turbine when there is a need of expand capacity larger than 3000m3/h.Small capacity plants having air flow from 300Nm3 to 3000m3/h, its is often equipped gas-bearing expansion turbine.

The turbine is to increase the flow rate of the compressed gas through a nozzle ;mean while, the speeded gas drives the wheel & output power through the rotor.During this process,both the pressure and temperature of gas lowered down, thus to provide cold capacity. In modern air separation plant, the cold capacity by turbine takes about more than 90% of entire cold capacity needed.

COMPONENTS OF OXYGEN PLANT



Fractionation column

Fractionation column is the key part of the entire plant, where separation of oxygen/nitrogen is carried out through heat transfer by very highly efficient plate and fin tube exchangers current being used by all the leading manufactures in the world like Linde, Air Liquide air products USA.

Based on different processes, there are mainly two types of fractionation column single stage column and double stage column.

The fractionation column designed and manufactured by us has a superior systematic performance, flexibility and stability. The purity and recovery both have been equivalent with the most advanced international technologies. We equip plate-fin type heat exchanger and full aluminum structure to main part of internal components of the cold box, which is close sealed and filled in gas to preserve pressure. Thus the cold loss caused by heat in leak is reduced to large extent. Cold box below 6000Nm3/h can be assembled within our workshop, which could reduce work load at customer's work site and supplied as a packaged unit.

Plate & Fin type exchanger

COMPONENTS OF OXYGEN PLANT

INSTRUMENT-CONTROL SYSTEM

Instrument-control system,the window of the whole plant,could reflect all the information of the plant during its operation. A common instrument -control system is equipped with side by cabinet and digital display together to reveal those parameters as pressure, temperature and flow rate.It is easy to operate,and the cost is relatively little.

Centrailized control system is equipped with PLC or DCS from siemens for the function of display, operation, adjusting, memorizing, recording, alarming, interlock, start-up and shut down. In the computer, there are displays of main menu, process flow, parameter list, alarm and history trend. Network control of multi-computer is also achievable.

As fast development of internet,based on DCS & PLC,the network could connect the control system at customer's end together with the manufacture's office for observation and supervision. Thus, if there in any problem in operating the plant, we would be able to offers a help hand in time, providing solution or technical support.Selection of control system depends finally on the requirement of the customer.

ANALYSIS CABINET

Analysis cabinet is to quicken the response speed,improve precision protect the analytical instruments, convenient check out and offer standard gas.

The Components of analytical gas can be collocated according to customer's requirement as follow:

Micro oxygen ,micro moisture CO2,and other components of high- purity nitrogen(such as H2,CO,CH4----)

COMPONENTS OF OXYGEN PLANT

LIQUID OXYGEN STORAGE TANK

The cryogenic storage tank works on vaccum and power heat-insulation with operating pressure of 8Bar and 16Bar. Leading models as 5m3, 10m3, 20m3,30m3,50m3,100m3.

If there is large quantity of liquid to be stored. it is recommended to equip power insulation cryogenic storage tank.Its operating pressure varies from atomospheric pressure to 8Bar or even higher. Its capacity varies from 200m3 to 1000m3.

Selection of storage tank is subject to the requirement of the customers.

VAPORIZER

Based on the difference of working condition ,there are two types of vaporizer atomspheric vaporizer and water-shower vaporizer.

Atomospheric vaporizer :It make use of heat capacity of nature convection air to vaporize liquid by aluminum alloys fin tube , which is used in high ambient occasion and need not any additional power and annex equipments. Its technics is simple; no any operation expense. If the condition is available,had better to use air temperature vaporizer.

Water bath vaporizer:It is made of stainless steel or purple copper tube, which is dip in water to heat water by steam or electric heat tube. The heated water vaporize by exchanging heat with liquid inside tube. it is fit for the north of low ambient temperature. Its technics is quite complex to atomospheric vaporizer and need operation expense.

Introduction

Introducing BOSCHI Italy UBTL Series (Liquid Oxygen Series)

The world standard in packed cryogenic air separation plants.

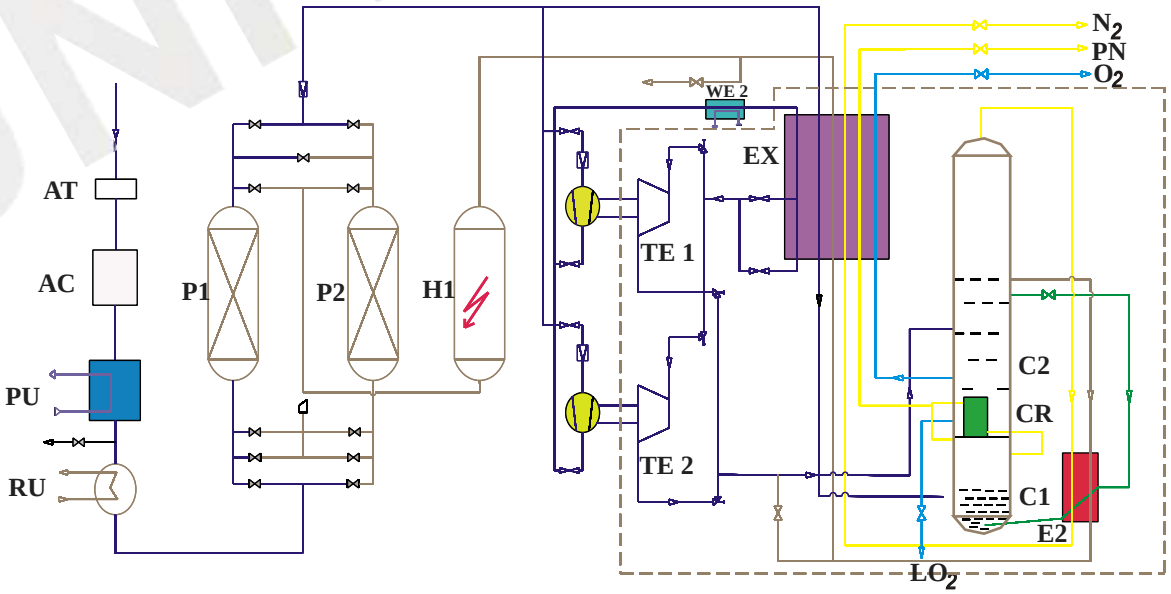
UBTL series plants are designed and built to meet the most severe operating conditions. Regular inspection and performance testing actual operating conditions is a pre requisite at our factory to assure highest quality.

Some of the advantages of UBTL series are:-

-Minimization of transportation & handling expenses.

-Rapid on- site installation & commissioning within 2 days.

Over 300 air separation plants are working produced by universal in collaboration with ING L.&A.BOSCHI all over the world.



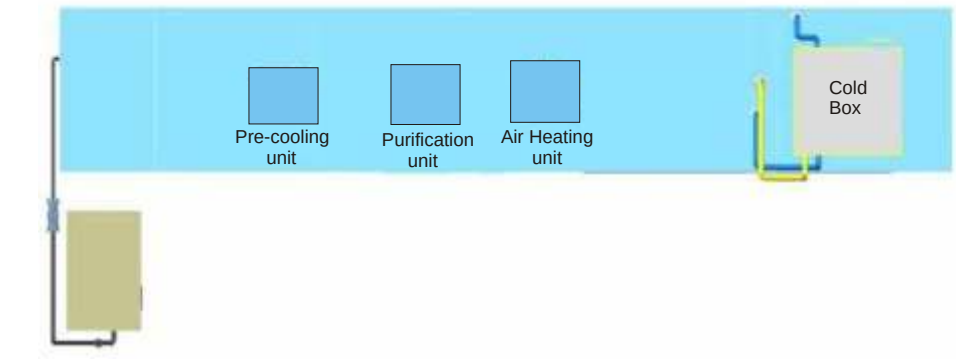
AI	AIR FILTER	H	HEATER	CR	CONDENSOR REBOILER
AC	AIR COMPRESSOR	EX	MAIN HEAT EXCHANGER	C2	LOW PRESSURE COLUMN
PC	PRE-COOLING UNIT	TE1/2	TURBO EXPANDER		
PU	PURIFICATION UNIT	E2	SUB COOLER		
P1/2	TOWER1/TOWER 2	C1	COLUMN		

Technical Specifications

Production	UBTL 50	UBTL 100	UBTL 150	UBTL 200	UBTL 300	UBTL 400	UBTL 500
Mode 1 : Liquid Oxygen (Nm3/hr)	50	100	150	200	300	400	500
Liquid oxygen (L/hr)	59	118	176	235	352	469	586
Mode 2 : Liquid Nitrogen (Nm3/hr)	50	100	150	200	300	400	500
Liquid Nitrogen (L/hr)	73	145	218	290	435	578	724
Purity							
Liquid Oxygen (%)	99.6	99.6	99.6	99.6	99.6	99.6	99.6
Liquid Nitrogen (%)	99.99	99.99	99.99	99.99	99.99	99.99	99.99

*Indicative : End specifications are as per actual offer.

Note:-
1.)No water required for cooling the air compressor, air cooled type rotary air compressor is used.
2.)Skid mounted can option.
3.)I.S.O. frame available.
4.)Containerized option available.



Plan view

UNIVERSAL

ING. L. & A. BOSCHI
IMPIANTI LIQUEFAZIONE E PRODUZIONE GAS TECNICI

OXYGEN & NITROGEN PLANTS

IN TECHNICAL COLLABORATION WITH

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