

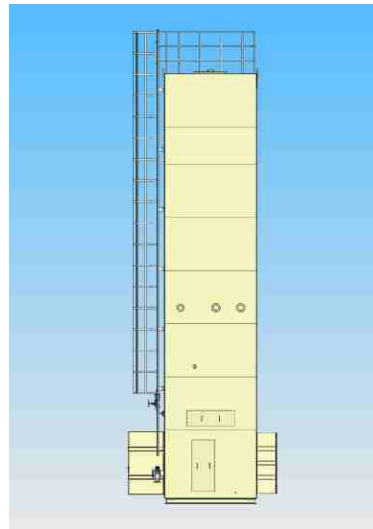
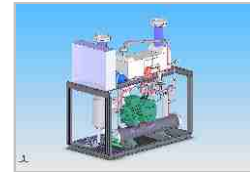


IMPIANTI LIQUEFAZION E PRODUZIONE GAS TECNICI
23 years of Excellence

ARGON AIR SEPARATION PLANTS

LOW OPERATING PRESSURE

40m³/h To 50,000m³/h GOX & GAN



IN TECHNICAL COLLABORATION WITH

ING L & A BOSCHI OF ITALY

www.oxygenplants.com



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23 years of Excellence

CERTIFICATIONS & STANDARDS

CE 

ISO 9001:2000



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Company Profile

*Universal in Collaboration with **ING.L.A. BOSCHI Italy SINCE 1930** manufactures & suppliers Premium Quality low pressure Air separation plants of all sizes ranging from 50m³/hour to 50,000m³/hour including Cryogenic Tonnage gas plants and liquid plants.*



Dr. Boschi (Italy) at New Delhi
Press Conference



OEM supplier from Switzerland

With state of the art designs and technology from Europe, established manufacturing facilities spread out in various locations all over India & Asia and sales located in New Corporate Region (NCR) of Delhi, the Italy based company is dedicated to supplying the latest in Cryogenic Technology constantly striving to improve its products through continuous research and development.

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.



Air Compressor

1. Air Compressor:

Rotary air compressor screw type can be used for smaller size plants upto 500m³/hr & 1000m³/hr. Upto 40000m³/hr. Centrifugal compressor can be used for higher size plants.

Rectification Column



2. Air pre cooling system:

Air separation plants adopts chilling system in all air pre-cooling systems.

3. Air purification system:

This system beds of molecular sieve are used in the air purification system, it remove the Co₂ & moisture for the process air at low-Pressure.

4. Rectification column:

The unit in cold box are all low pressure technology. This unit employs the latest state of the art plate & fin exchanger, condensor and sub-coolers. The column is supplied as a packed unit complete with all the control systems including digital flow-meters, temperature, pressure available with high purity upto 2-3 ppm nitrogen as a second product without loss in oxygen Production.

Air Purification System



5. Turbo-expander:

Turbo - expander is used for giving cooling to the air for the liqefication process and braked by booster, so as to reduce the expanded air volume, stablize the upper columns working condition and reduce power consumption. The turbine expanders have complete trouble free working and long life and reliability.

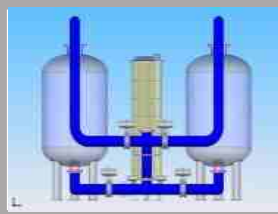
6. Computer control:

All the plants can be configured for automatic operation through a pc this will use a out switching valves of German or Japanese and motorized cryogenic valves on cold box.

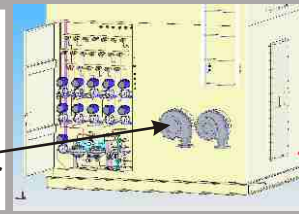
Air Pre-Cooling System



Purifier



Turbo-Expander





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23 years of Excellence



AIR COMPRESSOR PURIFICATION UNIT AIR SEPARATION UNIT CONTROL PANEL

TECHNICAL SPECIFICATION AIR SEPARATION PLANTS

ARGON GAS

Model(O ₂ /N ₂ */Ar)	GO ₂ Capacity M ³ / h	GO ₂ Purity %O ₂	GN ₂ Capacity M ³ / h	GN ₂ Purity	AIR Pressure Bar	O ₂ Cylinder Per Day 0.03Mpa/0.3BAR (150 BAR)*	Power Consumption (KW)	Specific Power per m ³ of gox+gan	Specific Power KWh/m ³ O ₂	Argon** Capacity M ³ / h
UBT-500/500/8	500	99.6	500	99.9%-99.99%-3PPM	7	2000	350	0.35	0.7	8
UBT-1000/1200/30	1000	99.6	1200	99.9%-99.99%-3PPM	6	4000	550	0.25	0.55	30
UBT-2500/2200/70	2500	99.6	2200	99.9%-99.99%-3PPM	5	NA	1250	0.27	0.5	70
UBT-1500/1500/45	1500	99.6	1500	99.9%-99.99%-3PPM	5	NA	825	0.27	0.5	45
UBT-3600/3600/100	3600	99.6	3600	99.9%-99.99%-3PPM	5	NA	1800	0.25	0.5	100
UBT-6000/6000/200	6000	99.6	6000	99.9%-99.99%-3PPM	5	NA	2700	0.26	0.45	200
UBT-10000/18000/380	10000	99.6	18000	99.9%-99.99%-3PPM	5	NA	4800	0.17	0.48	380
UBT-15000/13000/450	15000	99.6	13000	99.9%-99.99%-3PPM	5	NA	7050	0.25	0.47	450
UBT-40000/20000/1500	40000	99.6	20000	99.9%-99.99%-3PPM	5	NA	1600	0.26	0.4	450
UBT-15000/10000	15000	99.6	10000	99.9%-99.99%-3PPM	5	NA	6000	0.25	0.4	OPT.
UBT-18000/15000	18000	99.6	15000	99.9%-99.99%-3PPM	5	NA	7200	0.26	0.4	OPT.
UBT-20000/20000	20000	99.6	20000	99.9%-99.99%-3PPM	5	NA	8000	0.25	0.4	OPT.
UBT-25000/20000	25000	99.6	20000	99.9%-99.99%-3PPM	5	NA	10000	0.26	0.4	OPT.
UBT-30000/25000	30000	99.6	25000	99.9%-99.99%-3PPM	5	NA	11400	0.27	0.38	OPT.
UBT-40000/30000	40000	99.6	30000	99.9%-99.99%-3PPM	5	NA	14400	0.24	0.36	OPT.
UBT-50000	50000	99.6	50000	99.9%-99.99%-3PPM	5	NA	17500	0.22	0.35	OPT.

OPT.:- Optional (as required by buyer Argon attachment can be provided extra)

*CYLINDER CAPACITY FOR CALCULATION PURPOSES IS 6 TO 7 CU METER OR 40-47 LITERS WATER CAPACITY

**Argon gas purity 99.9% & above upto 99.999% or ppm quality.

NOTES:

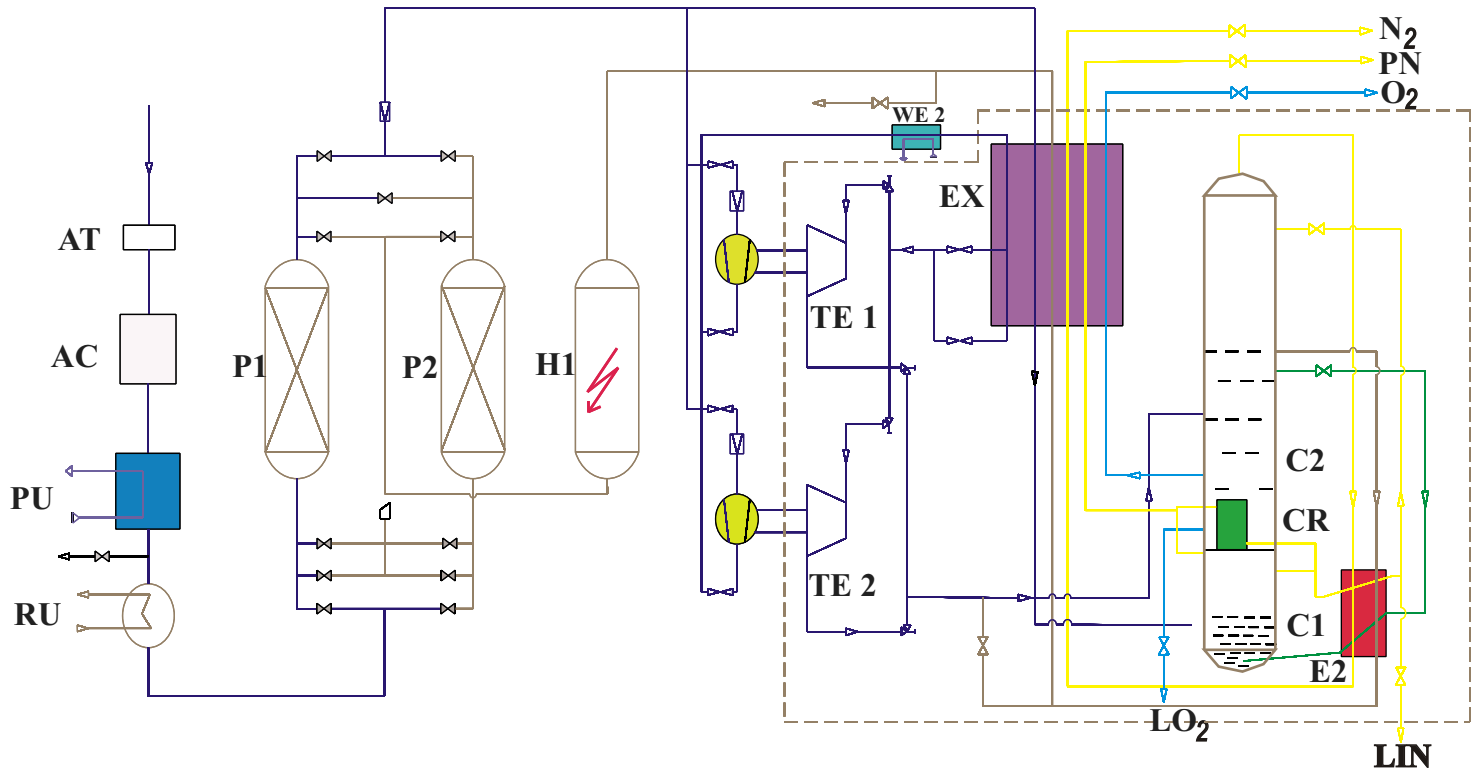
- 1.All the above data is only indicative to enable the buyers to select the model and detailed offer shall be given with the order.
 - 2.The oxygen booster/LO pump depending on model is used for filling oxygen gas in cylinders at 150 bar pressure.
 - 3.Argon can be produced in all plants above 500 m³/hr.
 - 4.Pure nitrogen gas upto 3ppm is available as a second product with out loss of oxygen production.
- All capacities are as per design suction conditions.

Nitrogen gas Pure output can be taken as optional along with liquid oxygen as per requirement.

Plants for Oxygen/Nitrogen/Argon output of any desires/specific requirement of the buyer of 20,000 m³/hr upto 40,000 m³/hr.

VOLTAGE 380-415 AND 50/60 HZ AS SPECIFIED. ALSO VOLTAGE AND FREQUENCY COUNTRY SPECIFIC AS ORDERED. HT MOTORS ABOVE 400 KW OF 10/11 KV.

AIR SEPARATION PLANT FLOW CHART WITH MOLECULAR SIEVE PURIFIER AND BOOSTER AIR EXPANSION



AI	AIR FILTER	H	HEATER	CR	CONDENSOR REBOILER
AC	AIR COMPRESSOR	EX	MAIN HEAT EXCHANGER	C2	LOW PRESSURE COLUMN
PC	PRE-COOLING UNIT	TE 1/2	TURBO EXPANDER		
PU	PURIFICATION UNIT	E2	SUB COOLER		
P1/2	TOWER1/TOWER 2	C1	COLUMN		

Technical Data

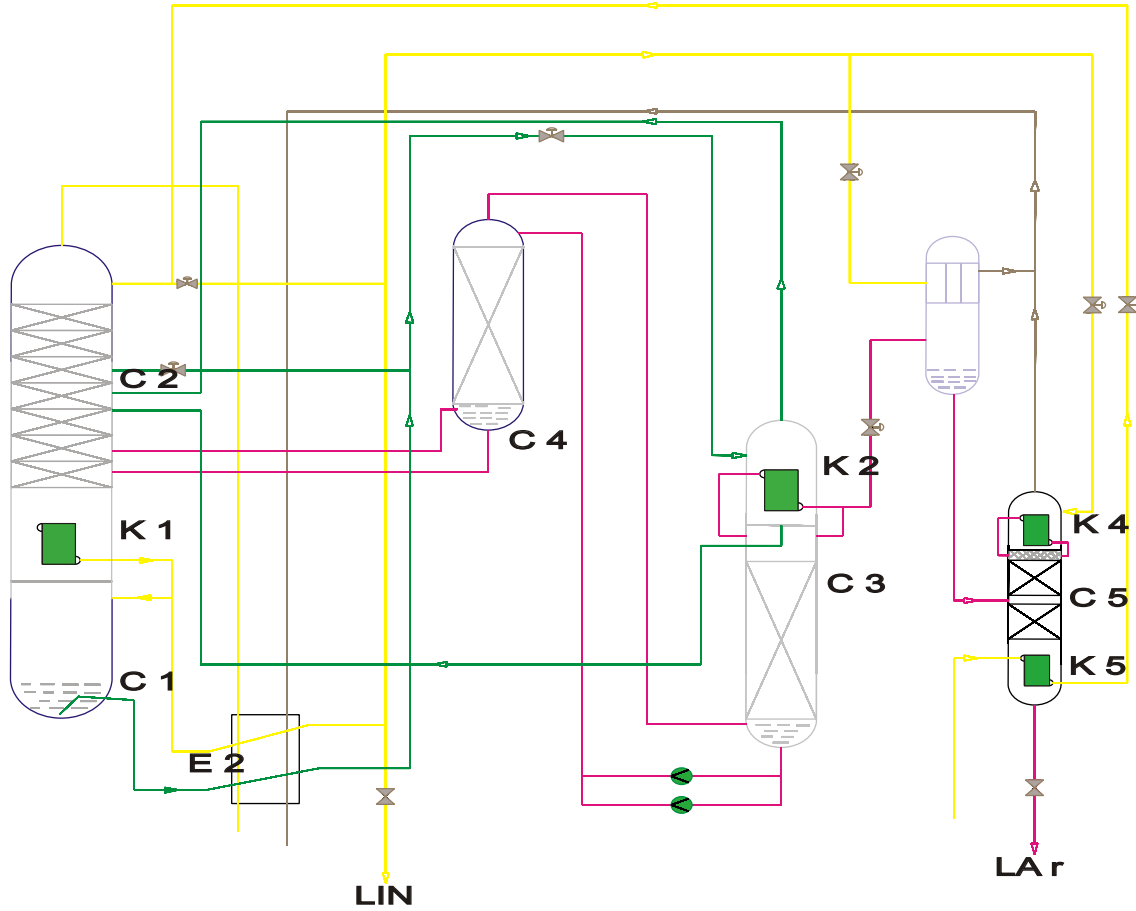
Production	Oxygen	Nitrogen	Argon
Purity	99.6%	99.9%-99.99% or 3ppm	99.5% or 5ppm
Air Pressure	0.7Mpa/7Bar		
Normal operating pressure of plant	0.6 To 0.7Mpa	0.6 To 0.7Mpa	0.6 To 0.7Mpa
Power Consumption for oxygen	0.5 To 0.8 KWh/m	Nil	Negligible



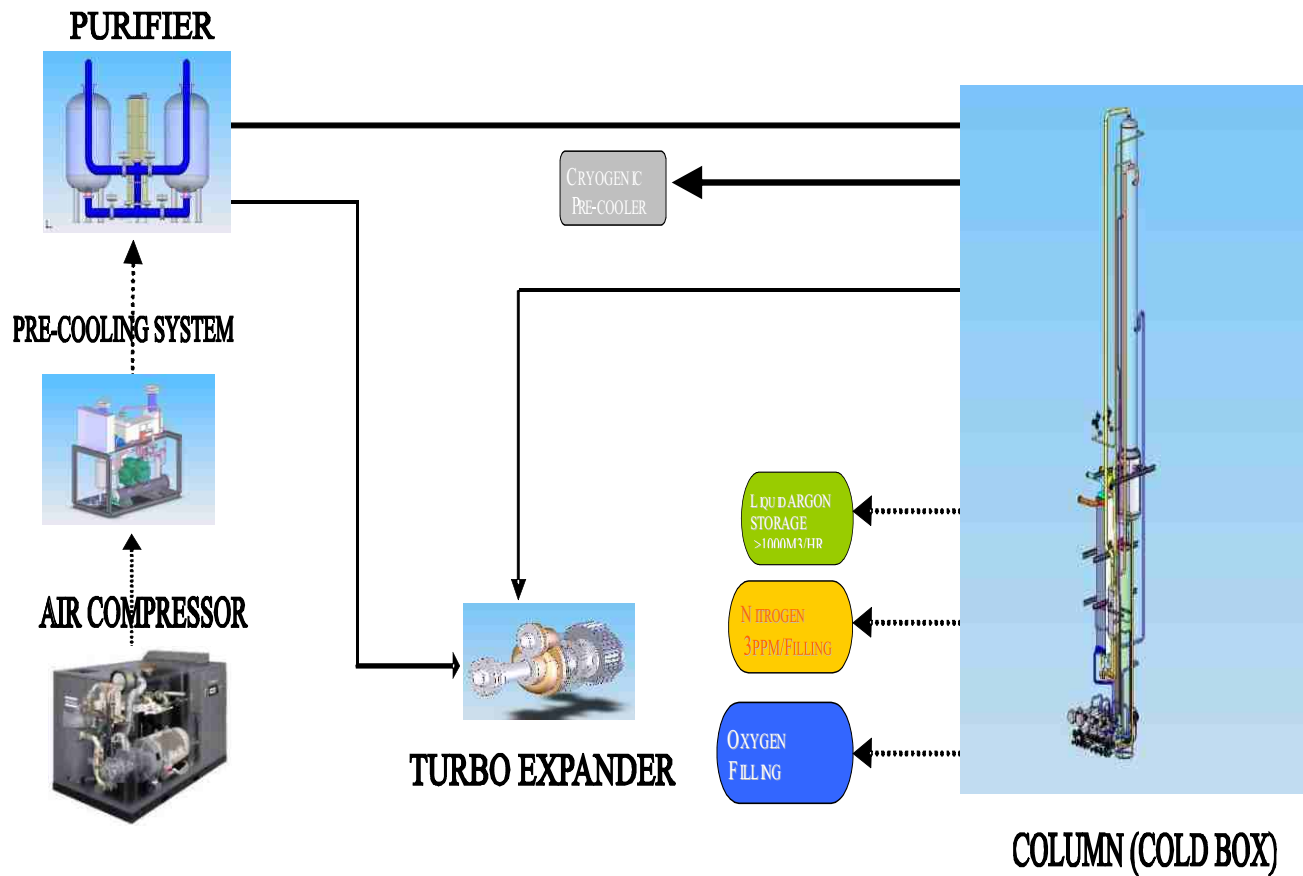
AIR COMPRESSOR

PURIFICATION UNIT SEPARATION UNIT

CONTROL PANEL



E 2	SUBCOOLER	K 4	PURE ARGON CONDENSER
C 1	COLUMN	K 5	PURE ARGON REBOILER
K 1	CONDENSOR REBOILER		
C 2	LOW PRESSURE COLUMN		
C 3/4	ARGON COLUMN		
C 5	PURE ARGON COLUMN		
AP	LIQUID ARGONG PUMP		
K 2	CRUDE ARGON CONDENSER		
K 3	CRUDE ARGON LIQUEFIER		



PROCESS FLOW DIAGRAM

Basic Principle

The air separation plant is a plant recovering oxygen and nitrogen from air simultaneously. It advances 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.



PROCESS DESCRIPTION

1. AIR COMPRESSOR-LOW PRESSURE

Air is compressed at a low pressure of 5-7 bar (0.5-0.7mpa). 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 compressor).

2. 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.

3. PURIFICATION OF AIR BY PURIFIER

The air enters a purifier consisting of twin Molecular Sieve driers, working alternatively. The Molecular Sieves remove the Carbon dioxide & moisture from the process air before the air enters Air Separation Unit.

4. CRYOGENIC COOLING OF AIR BY TURBO (EXPANDER)

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

5. SEPARATION OF LIQUID AIR INTO OXYGEN AND NITROGEN BY AIR SEPARATION COLUMN

Oil free, moisture free and Carbon Dioxide free air enters into low pressure plate fin type Heat exchanger where the air is cooled below sub zero temperatures by air expansion process in the turbo expander. Due to the excellent thermal efficiency we can achieve a temperature difference Δt as low as 2 deg c at the warm end of these exchangers.

Air gets liquefied when it enters the air separation column & gets separated into oxygen & nitrogen by the 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.

6. COMPRESSION OF OXYGEN FILLING IN THE CYLINDER

The final product in the form compressed Oxygen/Nitrogen goes to the high pressure oxygen cylinders at 150 bar or upto higher as required..

Or for pipeline supply or captive consumption

Or for liquid plants to fill in cryogenic liquid tanks.