



N2 Oxygen Reduction System

FIRE PREVENTION



FULL PREVENTION:

“THE DEPLETION OF OXYGEN”

The fire protection industry has gone through an evolutionary technology process during the last four decades. During my professional career I had the pleasure and the privilege of being among the first to introduce these outstanding developments to the Italian fire fighting industry. The guiding theme for these developments has been the protection of people, buildings and goods in the most effective manner. Until recently, our focus was to discover a fire as quickly as possible and to extinguish it effectively. Technological progress, careful and meticulous studies during these decades made it possible to greatly reduce the risk of fires in general. However, a new method, based on the depletion of Oxygen, has opened completely new venues for us. We are now able to create fully protected environments and to completely eliminate the fire hazard by changing the atmosphere within a building by allowing full access to people at the same time. It is a revolution that finally, after decades of refining and re-inventing fire extinguishing technology again and again, the same maybe obsolete in many cases.

Thanks to a radical change of perspective, we now eliminate the possibility of a fire to get started instead of thinking about how to fight the fire.

Ing. Leonardo Corbo



OVER 60 YEARS OF SOPHISTICATION

ISOLCELL: FROM PIONEER TO INTERNATIONAL TECHNOLOGY LEADER

We were the first in Europe who developed and applied a technique that allowed generating a Controlled Atmosphere within a building. In 1958 we started studying these technologies and shortly after we created the first plants with a controlled atmosphere for preserving food. From here it was the logical consequence to extend the field of usage into various industries where a controlled atmosphere was of advantage to the quality of goods and the process of manufacturing, from pharmaceuticals to chemicals, from plastic moulding to oenology or laser cutting. But also for fire prevention or the conservation of artistic heritage. In the field of Controlled Atmosphere Isolcell is acknowledged to be the world leader. As part of an industrial group that owns “Finanziaria Unterland”, Isolcell S.p.A. is being represented around the globe by a network of accredited distributors and resellers. Needless to say that we are ISO 9001 Bureau Veritas certified Company and our range of products and systems naturally comply with the strictest European and International Directives.

We offer to our customers highly customized and reliable solutions based on state of the art technologies.

A NATURAL AFFINITY TO IMPROVEMENT AND EVOLUTION.

Our story is closely linked to development of controlled atmosphere technologies. Our experience is our capital for steady improvements and for the creation of innovative technologies. Our solutions reflect the demands of the market and are reference for new technological standards.



The '50s/'60s

1958

Formation of Isolcell's first head office in Bolzano, Italy. In Trentino Alto Adige the first storages (cells) with controlled atmosphere for apples and pears were created. The very first gastight storages were fitted with bituminized aluminum foil, glued onto polystyrene panels. Isolcell introduces the technology for the manual Volumetric Analysis of O₂ and CO₂ by the ORSAT method. In 1960, absolute tightness of the refrigeration cells is being achieved by the revolutionary method of using polyester resin reinforced with fiberglass.



1961

Isolcell presents exclusively the first adsorber for "carbon dioxide in diethanolamine" automatically regenerated by applying heat, produced by Hall Thermotank, UK. Two years later we start manufacturing the adsorber under license. The strong demand for our products encourages us to focus on exports, and to conquer country by country throughout Europe. In 1963 we developed the first CO₂ adsorber based on a solution of potassium carbonate.

1965

In partnership with "Sulzer, Switzerland", the first adsorber for CO₂ in Regenerated cold active carbons is being developed. This machine revolutionizes the CO₂ adsorption technology, its principal is still the basis for modern and up-to-date scrubbers.

1969

Isolcell designs DEOXO, a combustion catalytic converter for decreasing the O₂ content in the fruit conservation cells.

The '70s

1970

We refine our catalytic technology by increasing its efficiency and we create an open cycle propane combustion, ISOGEN. With this technology we are the first in Italy producing pre fabricated steel-polyurethane-panels for the quick and easy erection of cold stores with controlled atmosphere. Simultaneously we develop an innovative acrylic resin with unique characteristics, high elasticity, mechanical resistance, and easy to apply to achieve gas impermeability. Isolcoat is a well recognized and highly demanded sealant, even today.

1972

Isolcell develops the first state of the art ultrasonic paramagnetic analyser for accurate measuring of oxygen and carbon dioxide. Isolcell introduces automation of A.C. plants by the use of electro mechanical programming boards. The head quarter moves from Bolzano to Laives, our current location.

1978

We are the first in Europe using a low oxygen level atmosphere to disinfect food without using chemicals. This method will evolve to become the world's standard for ecological disinfections.



Isolcell
Italia

The '80s

1980

Isolcell introduces the first combustion generator applied with a decarbonizer downstream of the combustion process of its ISOGEN nitrogen generators thus being able to produce nitrogen without carbon dioxide residues. This evolutionary feature is an inherent part of all machines from now on and as of its appreciation by customers world wide it will last to end of the 90's.

1982

In the USA a new technology based on the principal of molecular separation of the air has been discovered. Isolcell are the first to introduce this revolutionary technology to Europe and creates the first N₂ separator for molecular filtration by using a hollow fiber nitrogen generator. Isolcell are the first to introduce the ULO (ultra low oxygen) method for the fruit conservation market. Compared to the classic refrigeration conservation extremely low levels of Oxygen now triple the shelf life of fresh fruit in cold storages. With the introduction of Personal Computers Isolcell are the first to monitor, control and to manage A.C. plants fully electronically. After the appearance of the first publications about the effect of ethylene gas on the aging process of fruit and vegetables Isolcell starts producing its own range of chemical scrubbers and catalytic ethylene generators.

1984

We are the first in the world to utilize the Controlled Atmosphere Technologies in the fresh fruit maritime transport industry. Isolcell starts producing the first molecular sieve nitrogen generators with PSA (Pressure Swing Adsorption) technology.

Isolcell
Italia
ATMOSFERE CONTROLLATE E GENERATE

The '90s

1990

The outstanding success of our PSA systems encourages us to re-design our product line making it modular and scalable. For the innovative system of regenerating carbon dioxide adsorbers with nitrogen we get a patent granted. The State Monopoly chooses our technique and builds the first plant for disinfecting tobacco environmentally friendly by eliminating tobacco infesting parasites without the use of chemicals.

1994

Another patent is being granted. Isolcell introduces the first low pressure and low energy consuming VSA (Vacuum Swing Adsorption) system. We enter the wine industry by proposing our nitrogen generators.

1998

The new oxygen adsorber "Adox" is being developed and patented. It is the evolution of the VSA, a system that until today is unbeaten in its energy efficiency. Wherever the oxygen level needs to be lowered in conjunction with maximum efficiency "Adox" is the preferred solution.



The 2000s

2000

We extend the range of our ethylene adsorbers by developing "DEOXYL L.E." (Low Energy) in order to achieve maximum energy efficiency and to reduce the amount of heat in the fruit storage cells.

2001

For the archeological museum in Bolzano (Ötzi), Isolcell develops the concept for the "full protection of historical and artistic discoveries" and the first show room with protective atmosphere emerges. Beside the control of temperature, relative humidity and residual oxygen the content of dust and bacterial charge within the show room can be reduced.

2003

In the field of fruit conservation Isolcell introduces and patents the concept of DCA (Dynamic Controlled Atmosphere) by assessing fluorescence emissions, the spontaneous emission of light. We are selected to be the worldwide exclusive partner of the Canadian Government for supplying this technology. For the removal of CO2 the IS, Intelligent Scrubber, line is being developed. Thus providing more performance and the ability of maintaining so far unthinkable low levels of atmosphere within the DCA storage. The Industry Division is born. Further active carbon scrubbers are being developed.

2005

With the establishment of the "Fire Prevention Division" a new area of application has been entered. The N2 Firefighter system, a modular range of nitrogen generators, provides the most efficient oxygen depletion method for protecting the environment, people and property from fire.



CONTROLLED ATMOSPHERE SINCE 1958

2009

After four years, going through tough certification processes, the N2 Firefighter Technology is being recognized and certified according to the European Regulations. Isolcell is being acknowledged as a certified manufacturer and Installer for fire prevention and security systems.

2012

Isolcell revolutionizes the fruit conservation market again by introducing ECO, a high efficiency carbon dioxide adsorber. Compared to previous generations it reduces the energy consumption by 50%, its efficiency defines new standards in the market. At the same time we lodge another patent, with the "staggered counters operation method" that allows partitioning within the PSA technology we reduce substantially the power consumption and achieve an improved flow of nitrogen.

2013

GEN2ION, an innovative low oxygen paint system that guarantees considerable reductions of costs of painting and improves the treated surface significantly is being improved further.

2015

Isolcell introduces DAN2TE (Dynamic Atmosphere Nitrogen Treatment Equipment) to disinfect and conserve historical artwork.

2016

New upgraded ADOX® N2 ORS line launched: multibanking, modular and programmable, specifically developed for fire prevention purposes.

2018

Isolcell introduces new technologies exclusively developed and dedicated in compliance with the VdS Directive for Oxygen Reduction Fire Prevention system. On that occasion we presented the new brand: N2 Oxygen Reduction System.



CONTROLLED ATMOSPHERE SINCE 1958





Isolcell

ISOLCELL

PREVENTION IS BETTER THAN BEING SORRY

All traditional fire fighting technologies or methods have the same problem in common, they are being used once the damage has occurred already. Whatever media is in use, foam, water mist, sprinklers, gas or water they are being activated or used after a fire has been detected. With the common and known methods fire is being fought only reactively. Often the damage caused by the extinguishing media is worse than the damage caused by the fire itself. Furthermore, there are many applications such as Data Centers, Server Rooms, Cold Stores, Paper Mills and many more where the usage of water or gas would be fatal in its consequence.

Whenever electricity comes into play the usage of water could end in a total disaster. Huge storages like cold store could not be flooded from a gas reservoir for example.

Isolcell aims to provide the optimal solution for most of the above-mentioned applications to ensure absolute security by simply making the development of a fire impossible.

COMPLETELY ELIMINATING THE FIRE HAZARD AND SAFEGUARDING PEOPLE, BUILDINGS AND IT'S CONTENT IS POSSIBLE WITH ISOLCELL'S N2 OXYGEN REDUCTION SYSTEM.

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N₂ OXYGEN REDUCTION SYSTEM





FIRE PREVENTION DIVISION

N2 OXYGEN REDUCTION SYSTEM

Treating and controlling the atmosphere has been our business for over 60 years. New techniques have been developed, outstanding innovations have paved our way.

The experience gained in over 60 years has inspired us to develop the N2 Oxygen Reduction System which enables us to generate and to control an atmosphere in which a fire cannot get started.

N2 ORS monitors, and through a natural filtration process, changes the ration of gases normally present in the air we breathe, thus creating a perpetually self-extinguishing atmosphere. As no chemicals or other artificial additives are being added in this process this prevention method is absolutely environmentally friendly and safe to human beings. Therefore you may call it: "Green technology".



- **ONLY TECHNOLOGY THAT PREVENTS A FIRE TO GET STARTED PROTECTION 24/7/365**
- **NO AESTHETIC DISTURBANCES INSIDE THE PROTECTED AREA**
- **ENVIRONMENTALLY SUSTAINABLE**
- **SIMPLE INSTALLATION EVEN IN ENVIRONMENTS SUBJECT TO STRONG REGULATION RESTRAINS**
- **VERY LOW ENERGY CONSUMPTION**
- **MANAGEMENT AND MAINTENANCE FRIENDLY**
- **EASY INTEGRATION TO EXISTING FIRE PANELS AND/OR BUILDING MANAGEMENT SYSTEMS**

“PREVENTION” THE BETTER METHOD

All traditional and known fire-fighting methods have got one thing in common: they are passive and react only once the fire has started and the damage has occurred. What the fire has not managed to destroy, huge amounts of water applied by hoses or by sprinkler systems will do. Gas extinguishing systems also depend on the fire to have started before they can be activated. The release of the gas with extreme high pressures can cause structural damages to the building or to the protecting worth equipment, the extinguishing media used can probably cause environmental damages or produce health and life threatening circumstances. Malfunction of the extinguishing system can

threaten people, cause loss of production, loss of clients and subsequently loss of the business. Therefore: “Prevention” is the better method. It is always active, it does not need to react.

The **N2 ORS** completely eliminates the fear of fire, as the environment created does not allow a fire to get started from the very beginning.

PREMISES IRREMEDIABLY
DAMAGED

...

**THE PROBLEM
IS AVOIDABLE THANKS
TO THE METHOD**

N₂ ORS



Examples of fires protected
with traditional extinguishing
systems: the environment has
not been safeguarded.



N² OXYGEN REDUCTION SYSTEM

**HIGHLY RELIABLE,
FLEXIBLE,
SCALABLE AND
SUITABLE FOR:**

COOL STORES

AUTOMATED HIGH BAY WAREHOUSES

AMBIENT TEMPERATURE WAREHOUSES

LIBRARIES AND ARCHIVES

MUSEUMS

DATA CENTERS

SERVER ROOMS

PETROCHEMICAL AND
PHARMACEUTICAL INDUSTRY
HOSPITALS ETC...

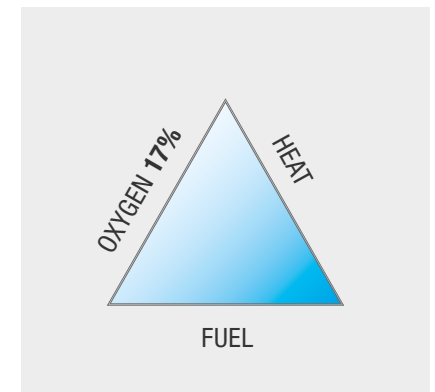
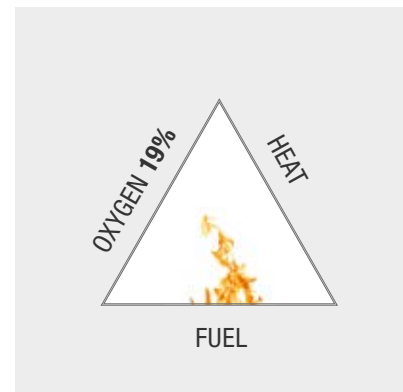
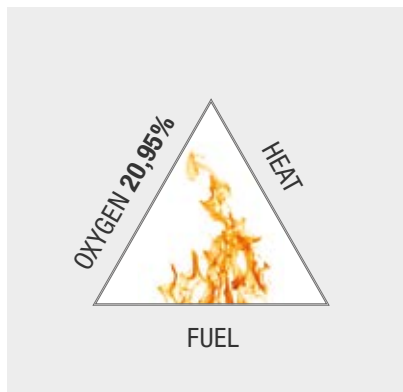
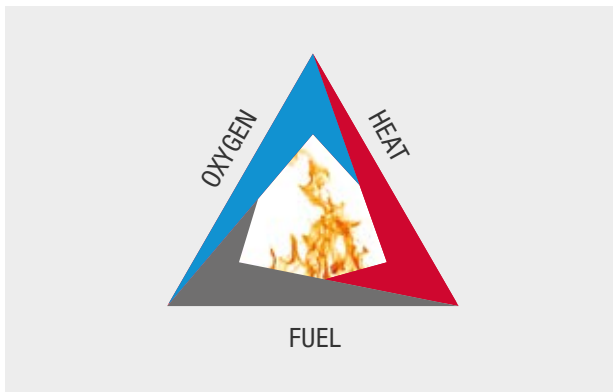
CONCEPT

THE GENERATED AND CONTROLLED ATMOSPHERE MAKES A FIRE IMPOSSIBLE



For a fire to ignite three elements are needed: Heat, combustibles and an oxidizing agent, usually oxygen. When these elements are present and in the right mixture a natural fire will occur. A fire can be prevented or extinguished by removing any one of these elements. Once a fire has started, the exothermic chain reaction sustains the fire and allows it to continue until or unless at least one of the elements of the fire is blocked. Traditional fire fighting methods either deny the burning fire the oxygen it needs or they lower the temperature of the fuel below the ignition point or by creating a barrier of inert gases thus attacking the chemical reaction responsible for the fire.

WITH THE “N2 ORS” WE ACTIVELY PREVENT THE COMBUSTION PROCESS TO GET STARTED BY UNINTERRUPTEDLY REDUCING THE AMOUNT OF OXYGEN.

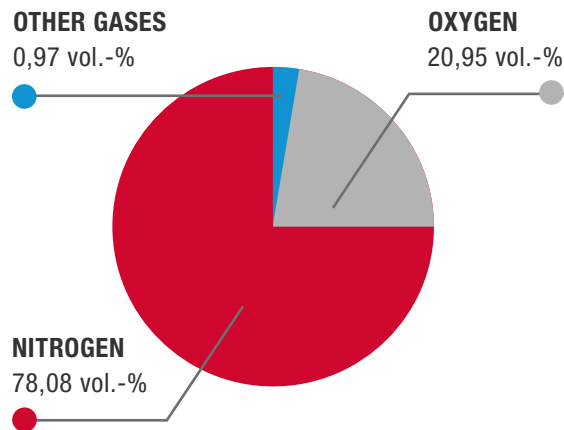


THE METHOD

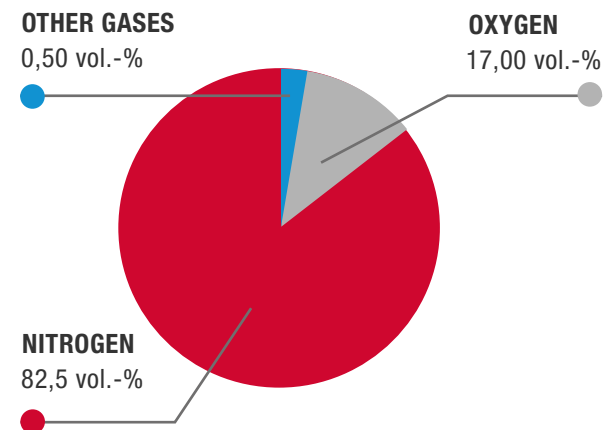
FIRE PREVENTION, ECOLOGICALLY,
ECONOMICALLY AND EFFICIENTLY

PERFECT PROTECTION OF YOUR PREMISES BY “N2 OXYGEN REDUCTION SYSTEM” IN THE MOST ENVIRONMENTALLY FRIENDLY WAY.

When we talk about the air we breath we often and falsely talk about oxygen. In fact, the air we breath consists of 78,08 Vol.% of nitrogen und only 20,95 Vol.% of oxygen (0,93 Vol.% Argon and 0,04 Vol.% CO₂). This ratio between nitrogen and oxygen is the same all over the world, high up in the mountains or low down at the sea. The food every fire needs to burn is the oxygen supplied by nature. By modifying the atmosphere and changing the ration between these to ingredients N2 ORS denies the fire enough “food” to get established. The changed ratio has got the equivalent effect to human beings as a stay in high altitude or when travelling by plane as the lower air pressure drives the molecules apart and the amount of oxygen inhaled with every breath is less than in lower atmospheres.

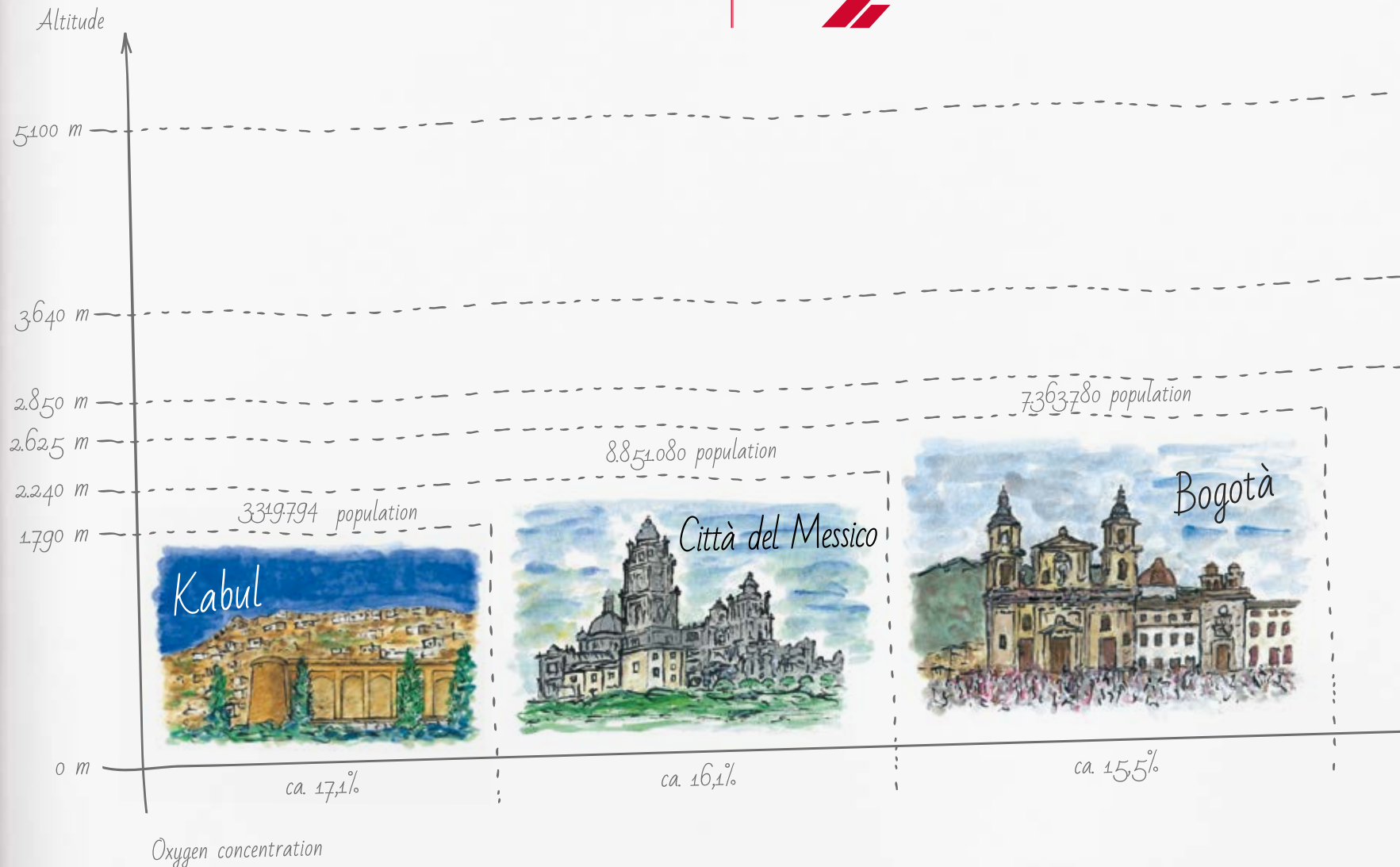


**N₂ OXYGEN
REDUCTION
SYSTEM**
ATMOSPHERE



ATMOSPHERE

N₂ OXYGEN
REDUCTION
SYSTEM





Airplane

3.1 billion

(45% of the world's population)

30.000 population

La Rinconada



845480 population

La Paz



2.239.191 population

Quito

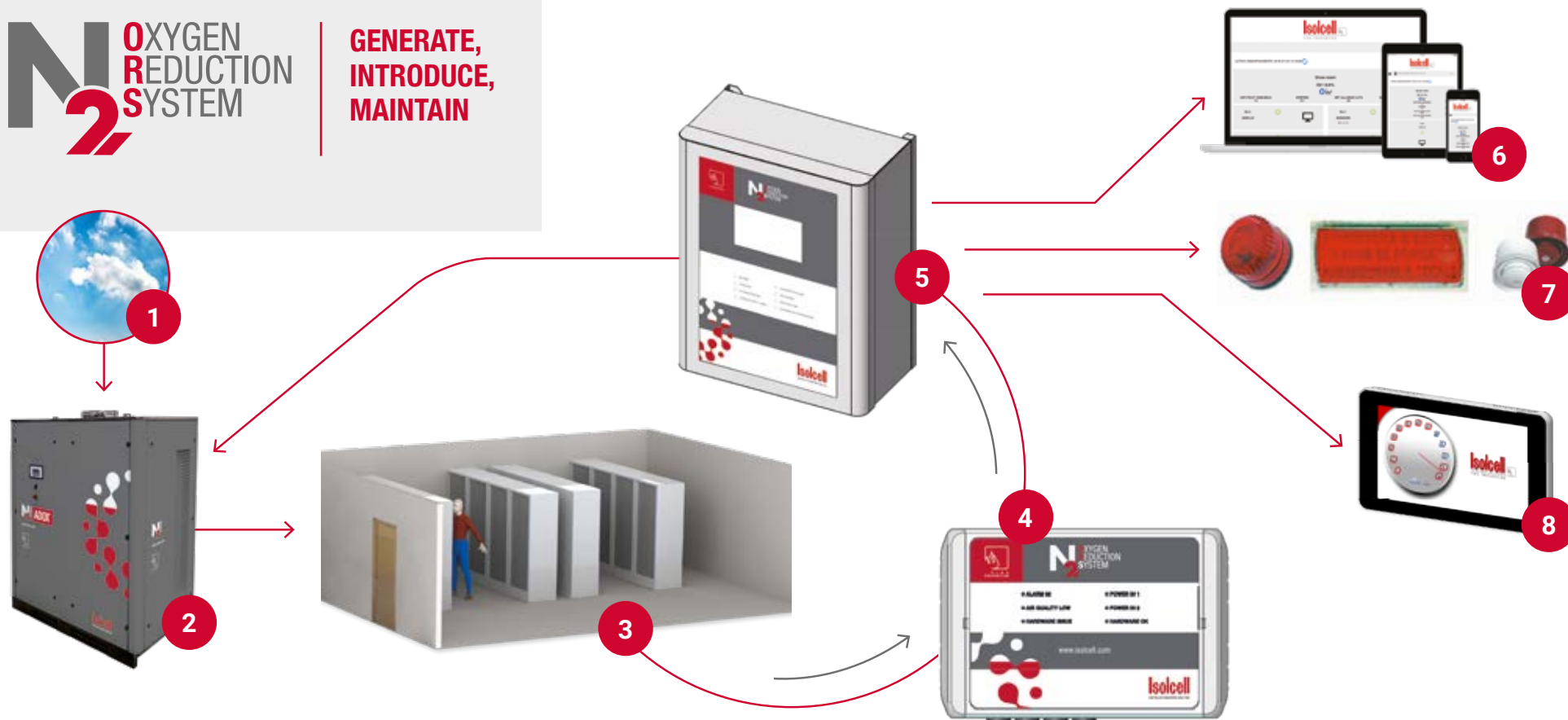


ca. 15,1%

ca. 13,6%

ca. 11,5%

Source: IATA - Worldometers



- | | | | |
|--------------|------------------|--------------------|-------------------|
| 1 Atmosphere | 3 Protected area | 5 Control unit CIE | 7 Alarm devices |
| 2 Adox® | 4 Oxygen sensor | 6 Communication | 8 Digital display |

TYPE SYSTEM

THE N2 ORS



DISPLAY
Digital remote



**OPTION 1
N2 ORS**
Detection suction and
measurement



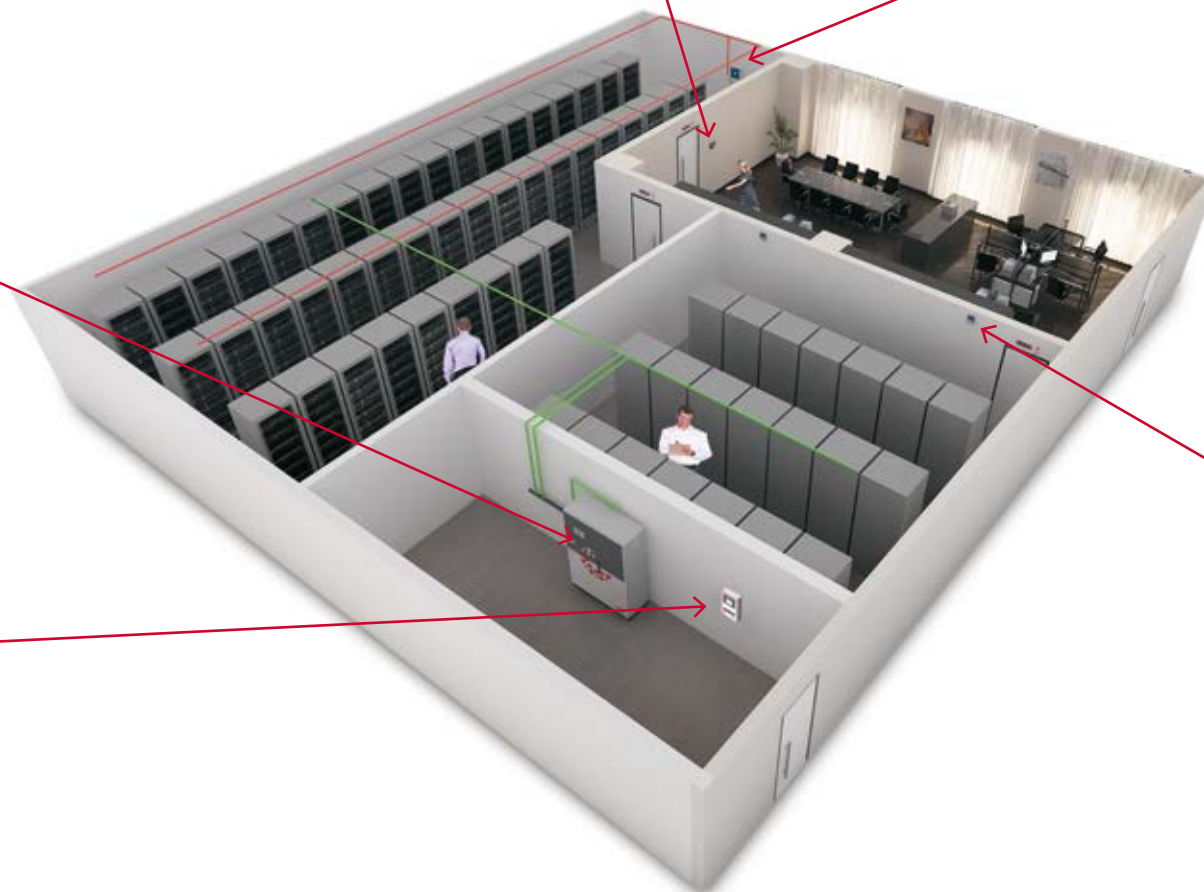
**OPTION 2
N2 ORS**
Point detector and
measuring method

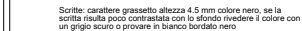


ADOX®
Self-extinguishing
atmosphere generator



N2 ORS
Control unit Multiplex

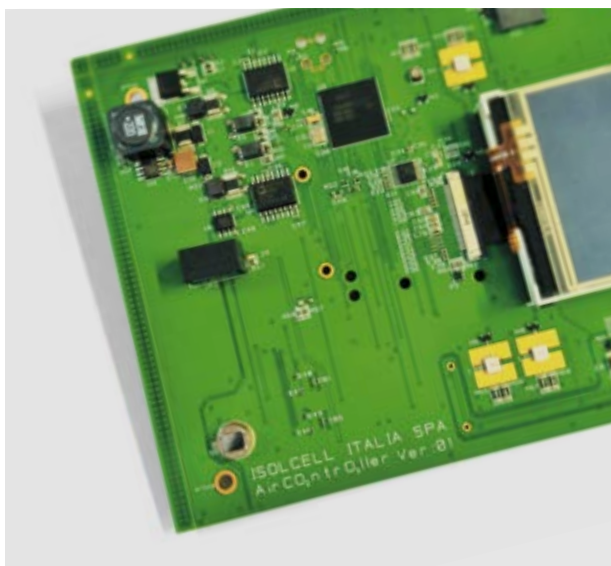




TECHNOLOGY

MADE BY ISOLCELL

All components of our N2 ORS have been designed, developed and manufactured by Isolcell. We are the only certified company in Italy that designs and installs complete oxygen depletion fire prevention plants.

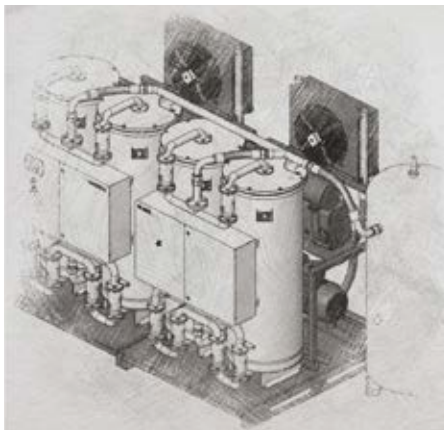




PLUG & PLAY

Using special self-generating filters, with the **ADOX® N2 ORS**, Isolcell has developed a modular system for gaining nitrogen in a most ecological and very low energy consuming process. The ratio between O2 and N2 in the air of the area to be protected is being changed without using additives. The result is “air”, odorless, colorless clean and fresh, except it does not allow a fire to develop.

ADOX®, a patented system, was designed for heavy duty usage (24/7/365) being extremely moderate in energy consumption at the same time, thus being benchmark in its economy for nitrogen a self-producers.



- **LONG-LIFE**
- **HIGH ENERGY EFFICIENCY**
- **MINIMUM WEAR AND MAINTENANCE FRIENDLY**



Patent N. EP0880903-A1

NEW ADOX® N2ORS LINE

MODULAR SYSTEM ENSURING GREATER SECURITY

New upgraded ADOX® N2ORS line launch: multibanking, modular and programmable, specifically developed for fire prevention purposes whose peculiarities are a world record in terms of energy efficiency, improved ergonomics, high configurability and last but not least the significant reduction of TCO (Total Cost of Ownership), achieved thanks to an accurate planning and to the selection of the best components with very low maintenance. On top of the economical and ecological advantages provided, ADOX® N2ORS is fully modular and can be enhanced even after commissioning or when the requirement has changed. Due to its modular design ISOLCELL'S ADOX® Swing Adsorption Generators cater for planned or even for unforeseen changes and gives you the greatest flexibility possible.

GREAT FLEXIBILITY

SIZE DOESN'T MATTER, WE PROTECT FROM THE SMALLEST REPOSITORY
TO THE LARGEST VOLUMES



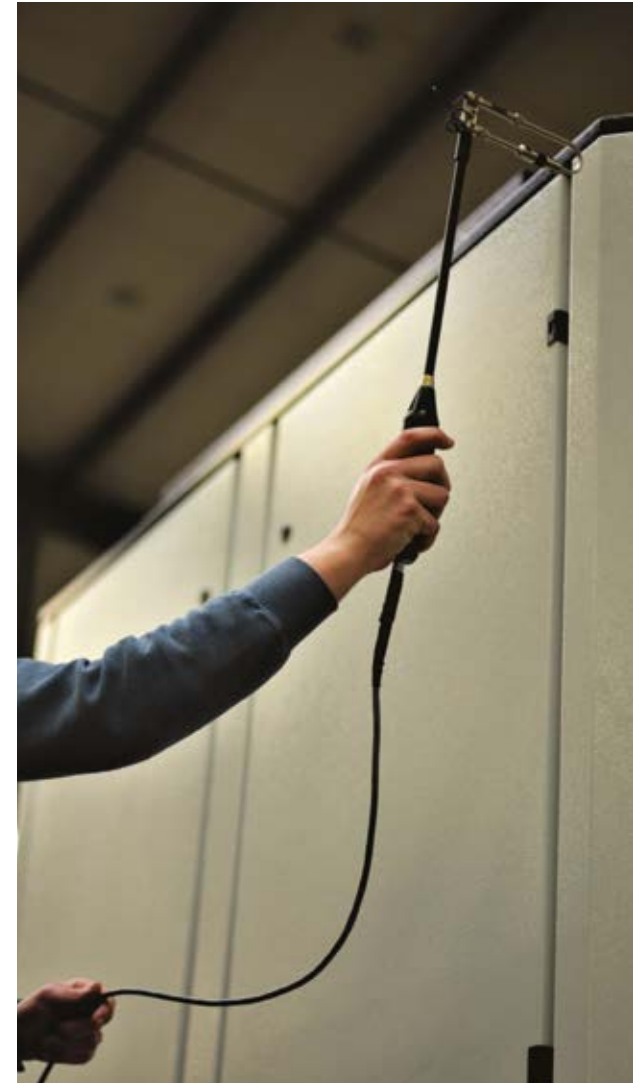
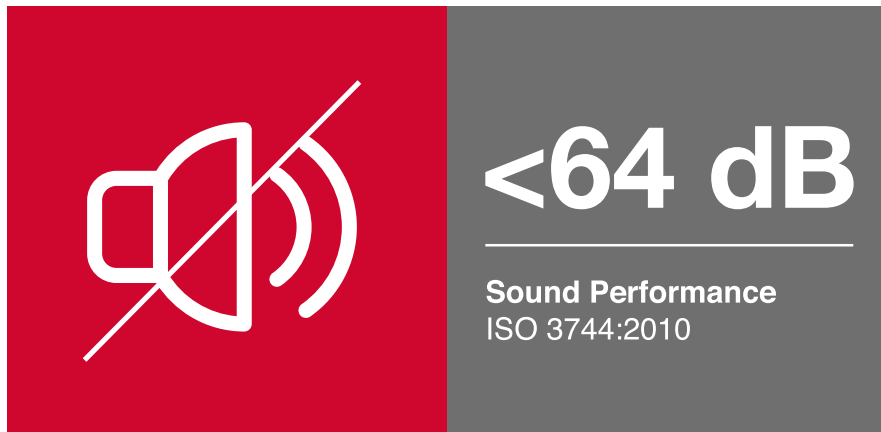
SOUNDPROOFING OF THE NEW ADOX[®] N2 ORS LINE

HIGH SOUND PERFORMANCE OPTIMIZATION.

The new upgraded ADOX N2 ORS has been designed in order to reduce drastically the noise level.

ONLY < 64 DB certified according to ISO 3744:2010

This amazing result has been achieved thanks to an accurate designing, planning and selection of the best components and high performance sound proof cabinet.





NEW CUSTOMIZABLE N2 ORS DIGITAL DISPLAY

THE REMOTE VISUALISATION MODULE

The Remote Visualisation Module is an electronic device that shows Oxygen and other accessory parameters concerning the protected area and it is placed at every entrance of protected area(s). It allows to enable/disable O2 protection level in the selected area as well as see fault messages given by the main Control Unit of the Oxygen Reduction System. Moreover it is possible to choose different layout designs:



N2 OXYGEN REDUCTION SYSTEM WEBSERVER:

ACCESS TO THE SYSTEM WITHOUT BEING PRESENT AT SITE

The new N2 ORS WebServer designed and developed by Isolcell is a control systems dedicated to data collection and remote control, monitoring, diagnostic of the installed Oxygen Reduction Fire Prevention plant.

The N2 ORS WebServer removes all the restrictions related to distance between the user and the system.
The remote control access is possibile using a Computer, Smartphone or Tablet.



VIRTUAL GRID

VARIABLE PITCH

Traditionally the oxygen is being measured in an area by using one or many point detectors, in some cases decentralized aspirating detectors are being used too. These detectors are logically put together in groups and each group represents an average value measured by the single detectors. From all group values together a new average is being calculated and displayed.

ISOLCELL's aim is to be as accurate as possible and to attain perfection. For that reason ISOLCELL has developed the Virtual Grid methodology. With the help of a pipe system air is being aspirated from various heights within the protected area and even from the nucleus of the building. The aspirated air is being lead to oxygen devices that are equipped with 3 individual optical sensors. This method ensures that the air from each point of analysis is being sensed by the same detectors and the precise value of oxygen is displayed. A further advantage is the long lifetime of the optical sensors especially as electrochemical sensors tend to deteriorate quickly.

BENEFITS

- N2 BEING INJECTED ONLY WHERE NEEDED RESULTS IN REDUCTION OF ENERGY CONSUMPTION
- HOMOGENEOUS DISTRIBUTION OF SELF-EXTINGUISHING ATMOSPHERE



N2 OXYGEN REDUCTION SYSTEM ADVANTAGES

- PROTECTED PREMISES ARE SAFE 24/7/365
- THE FIRE HAZARD IS COMPLETELY ELIMINATED
- NO CONSEQUENTIAL DAMAGES DUE TO FALSE ALARM
- NO CONSEQUENTIAL DAMAGES CAUSED BY HISTORICAL EXTINGUISHING AGENTS
- PREVENTION METHOD IS ENVIRONMENTALLY SAFE, NON-TOXIC, NON-POLLUTING, NON-RESIDUAL
- EASE OF INSTALLATION AND COST EFFECTIVE COMPARED TO STANDARD EXTINGUISHING METHODS
- DUE TO N2 OXYGEN REDUCTION SYSTEM TECHNOLOGY NO NEGATIVE AESTHETIC IMPACT TO THE BUILDING
- EASY PROTECTION EVEN IN AREAS DIFFICULT TO REACH OR SUBJECT TO STRONG REGULATION RESTRAINS
- CAN EASILY BE INTEGRATED WITH MAIN FIRE PANEL OR BUILDING MANAGEMENT SYSTEMS
- N2 OXYGEN REDUCTION SYSTEM IS MAINTENANCE FRIENDLY
- NO ADDITIONAL SPACE REQUIRED FOR TANKS, GAS CYLINDERS ETC.
- PROTECTIVE ATMOSPHERE SLOWS DOWN THE DEGRADING PROCESS OF CERTAIN MATERIALS
- N2 OXYGEN REDUCTION SYSTEM PROTECTS OBJECT OF ALL SIZES, FROM MINIATURE TO GIANT DIMENSIONS
- THE N2 OXYGEN REDUCTION SYSTEM FIRE PREVENTION METHOD IS SAFE TO HUMANS, THE AMOUNT OF OXYGEN AVAILABLE WITHIN THE PROTECTED AREA IS SIMILAR TO THE AMOUNT OF OXYGEN PROVIDED BY NATURE IN HIGHER ALTITUDES

STANDARDS AND REGULATIONS

OXYGEN REDUCTION SYSTEMS (ORS) ARE CATEGORIZED AS SAFETY SYSTEMS AND THEREFORE THEY MUST BE DESIGNED, PLANNED, BUILT, INSTALLED, COMMISSIONED, AND MAINTAINED ACCORDING SPECIFIC APPLICABLE REGULATIONS.

Isolcell is currently the only Italian company that has obtained the certifications required to supply compliant ORS systems:

ÖNORM F 3073: Planning, engineering, assembly, commissioning and servicing of oxygen reduction systems;

ÖNORM F 3007: Oxygen reduction system;

ÖNORM F 3008: Oxygen reduction system - CIE UNIT control unit;

TRVB S 155: Engineering, installation and operation requirements for oxygen reduction systems using nitrogen in buildings from a fire prevention technology standpoint;

BSI PAS 95: 2011: Hypoxic fire prevention systems for occupiable spaces;

EN 16750: 2017: The Company Isolcell has already applied for European Standard certification for Fixed firefighting systems - Oxygen reduction systems - Design, installation, planning and maintenance;

Italian Ministerial Circular: (Protocol no. 0007059 of 21 May 2012); Consolidated Law, Decree of 3 August 2015 Approval of technical standards for fire prevention, pursuant to article 15 of Italian Legislative Decree 139 of 8 March 2006, published on 20 August 2015 in the Italian Official Gazette;

CCS: Conformity Certification Services Q-Plus Product Verification Scheme For Fire Prevention (Oxygen Reduction Systems);

VdS: The Company Isolcell has already applied for certification for the purposes of Directive VdS 3527 for Interting and Oxygen Reduction Systems – Planning and Installation;

System qualification test n. 168/C: Qualification tests on the control and fire-fighting system, performed at the laboratory authorized by Italian Ministry of Interior;

ISO 20338: 2019: Oxygen reduction systems for fire prevention-Design, installation, planning and maintenance;

IEC EN 61508: Safety Integrity Level (SIL-3).





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www.fire-protection.com.au

A company from
südtirol

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