



N2 Oxygen Reduction System®

FIRE PREVENTION





Over 60 years of sophistication

ISOLCELL: FROM PIONEER TO INTERNATIONAL TECHNOLOGY LEADER

Isolcell is an ISO 9001-certified public limited company founded in Bolzano in 1958, when we began production of the very first gas-tight cold storage units. Our focus subsequently shifted from atmosphere maintenance to atmosphere generation and control.

One of our strengths is that we are able to implement the entire process of system creation from start to finish, because the design and production are undertaken directly by us at our main site.

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.



N₂ OXYGEN REDUCTION SYSTEM



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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.



PREVENT FIRES ACTIVELY 24/7





Our innovative role in fire prevention

With the creation of the fire-prevention division in 2005, Isolcell was one of the first Italian companies in the fire-fighting and fire-protection sector to talk about **prevention in the pure sense**. Until that time, the sector focused only on fire-suppression technologies, which were intended to reduce response times as much as possible and thus limit the associated damage.

The technology that we have developed, however, makes it impossible for a fire to develop in a protected environment. In other words, it avoids the damage created by the fire and by suppression systems, protecting people and property.

Because of the specific characteristics of our systems and our solutions, we alone are able to boast unparalleled reliability and safety. This is also demonstrated by the fact that, with our **N2 ORS® system**, we were the first company to obtain certifications such as ÖNORM, UNI EN 16750, IEC 61508 and ISO 20338.

**THE N2 ORS® ELIMINATES THE FEAR OF FIRE,
AS THE ENVIRONMENT CREATED DOES NOT ALLOW A FIRE
TO GET STARTED FROM THE VERY BEGINNING.**



BENEFITS OF THE OXYGEN-DEPLETION METHODOLOGY

Ignition prevention

- ✓ Eliminates the risk of fire
- ✓ Zero false alarms
- ✓ Constant protection (24/7)

Complete protection

- ✓ No damage caused by extinguishing agents
- ✓ No residue
- ✓ Adaptable oxygen concentration (according to the material to be protected)

Continuous protection

- ✓ Business continuity
- ✓ No false activation
- ✓ No manual activation necessary

Ecosustainability of the system

- ✓ Natural
- ✓ Environment-friendly
- ✓ Tolerable for people

THE ADDITIONAL ADVANTAGES OF OUR N2 ORS® SYSTEM

Precision

- Accuracy of the virtual grid
- Greater adaptability in relation to the area to be protected

Safety

- Regulated and certified system
- Redundancy of the system
- Greater safety in oxygen measurement
- Fitted with self-diagnostic tools

Simplicity

- Plug & play installation
- Easily reprogrammable
- System visible by remote

Versatility

- Also adaptable in areas subject to regulatory constraints
- Can be produced for any risk class
- Can be integrated into pre-existing systems

Flexibility

- Extensive customisation options
- Minimally invasive in the area to be protected
- Silent

Economy

- Lower management and maintenance costs
- Limited energy consumption

Fire triangle concept

THE GENERATED AND CONTROLLED ATMOSPHERE MAKES A FIRE IMPOSSIBLE

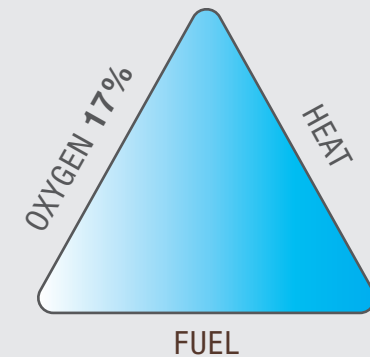
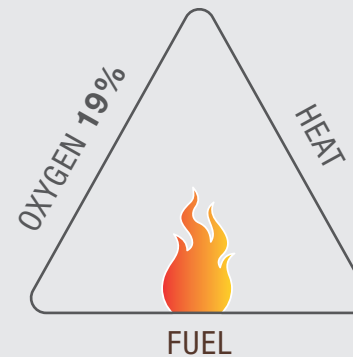
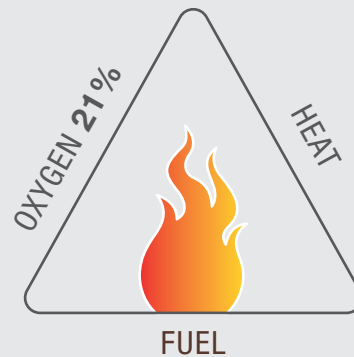
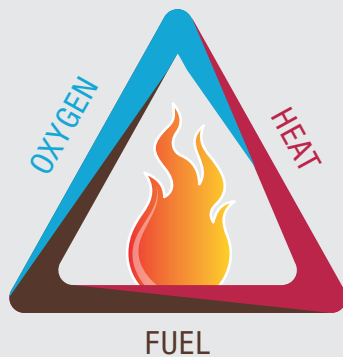
The atmosphere that we breathe is made up primarily of a mixture of nitrogen and oxygen. While nitrogen (present at a percentage of 78.08%) is an inert, gas, oxygen (20.95%) is the natural fuel in any combustion process. The simultaneous presence of:

- a combustible material
- a sufficient percentage of fuel in the surrounding atmosphere
- adequate energy

makes it possible to trigger and maintain a combustion process.

THESE THREE FACTORS - COMBUSTIBLE MATERIAL, FUEL AND ENERGY - UNEQUIVOCALLY ILLUSTRATE AND DEFINE THE FIRE TRIANGLE FOR EACH COMBUSTION PROCESS.

Fire-fighting techniques are based on interrupting at least one side of the fire triangle. In general, the more quickly a technique is able to eliminate at least one of the three factors that create and feed a fire the more effective that technique is.

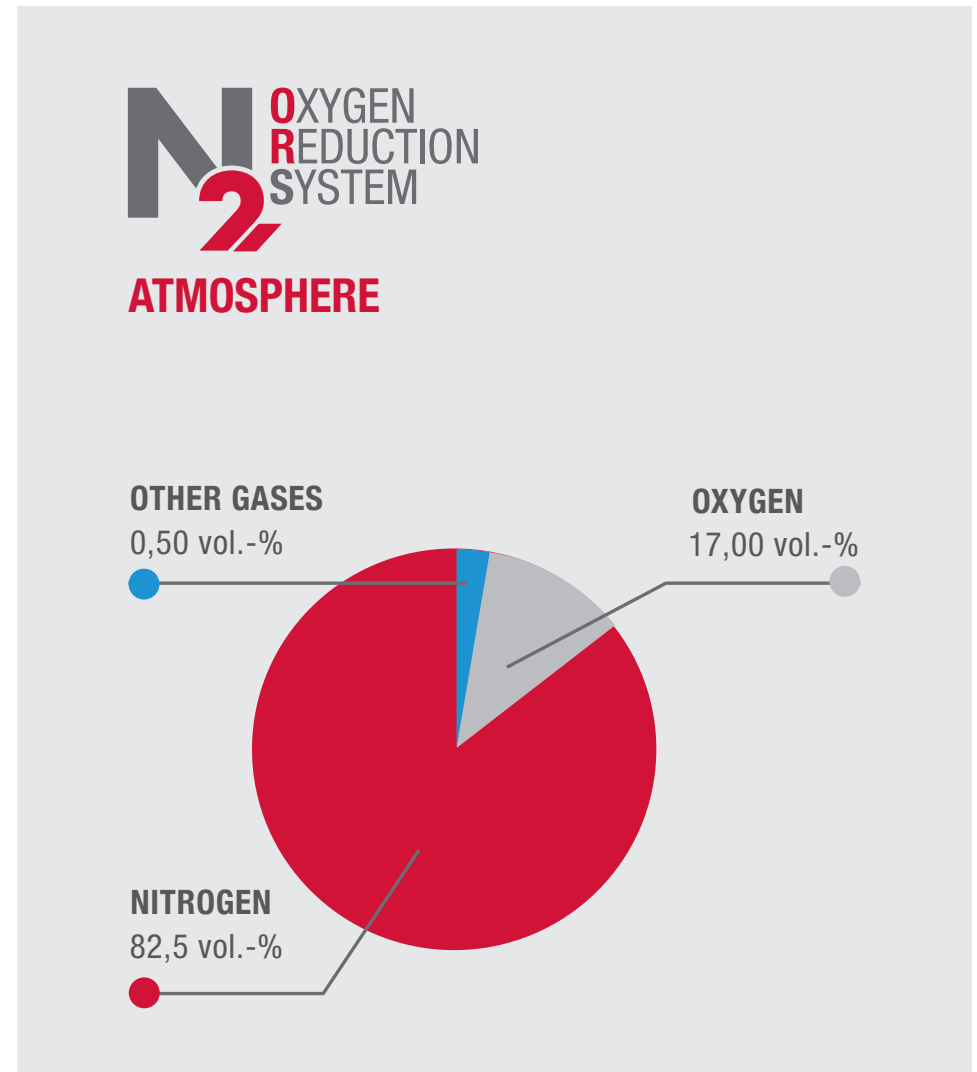
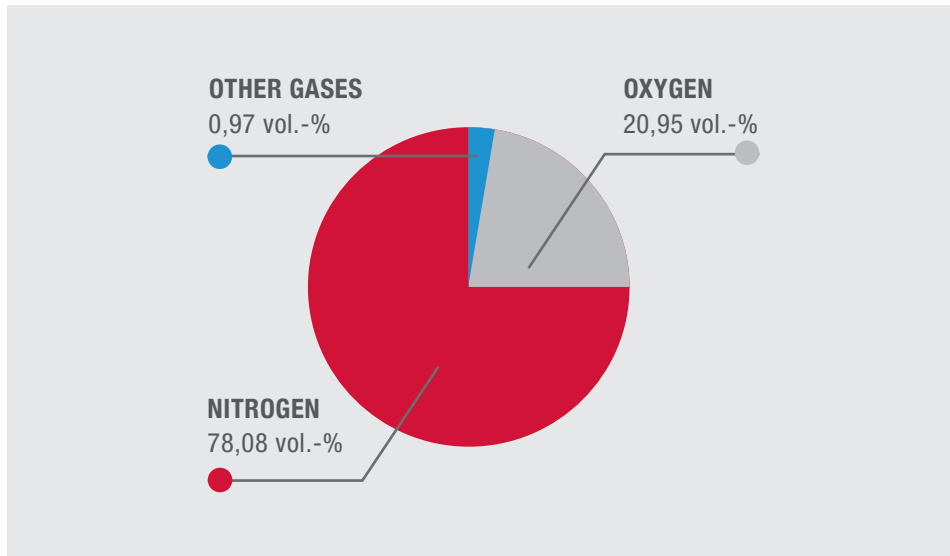


The method

FIRE PREVENTION, ECOLOGICAL, ECONOMIC AND EFFICIENT

The principle of fire prevention through reduced oxygen involves maintaining an atmosphere with a reduced oxygen level compared to the standard level in the rooms to be protected: in other words, we change the proportions of oxygen and nitrogen by introducing a mixture richer in nitrogen and poorer in oxygen into the area to be protected.

This therefore creates what we call a 'oxygen-reduced atmosphere', namely an atmosphere that inhibits the combustion process while remaining natural and tolerable for the human body.



Oxygen-reduced atmospheres and humans

When we talk about the air we breathe we often and falsely talk about oxygen. In fact, the air we breathe 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.

Up to certain limits, the lowering of the oxygen levels can be sustained by healthy people: the literature equates the effects perceived to those caused by changes in altitude.

Altitude	Oxygen under isobaric conditions	Atmospheric pressure		Oxygen pressure		Time of useful consciousness
metres	%	mmHg	hPa	mmHg	hPa	
0	20.9	760.0	1013.2	158.8	211.7	No limit
500	19.7	716.0	954.6	149.6	199.5	
1000	18.5	673.8	898.3	140.8	187.7	
1500	17.4	634.0	845.3	132.5	176.7	NO LIMIT
2000	16.4	596.0	794.6	124.6	166.1	
2500	15.4	560.0	746.6	117.0	156.0	
3000	14.5	525.8	701.0	109.9	146.5	
3500	13.6	493.0	657.3	103.0	137.3	
4000	12.7	462.0	616.0	96.6	128.8	
4500	11.9	432.6	576.8	90.4	120.5	
5000	11.1	404.8	539.7	84.6	112.8	
5500	10.4	378.6	504.8	79.1	105.5	>30 min.
6000	9.7	353.6	471.4	73.9	98.5	
6500	9.1	330.0	440.0	69.0	92.0	
7000	8.5	307.8	410.4	64.3	87.7	3-5 min.
10500	5.0	183.0	244.0	38.2	50.9	Approx. 1 min.
12900	3.4	123.5	164.7	25.8	34.4	15-30 sec.

Source: Consensus Document, UIAA Medical Commission, Vol: 15, Work in Hypoxic Conditions. Intended for Physicians, Occupational Health and Safety Advisors, Interested Non-medical Persons.

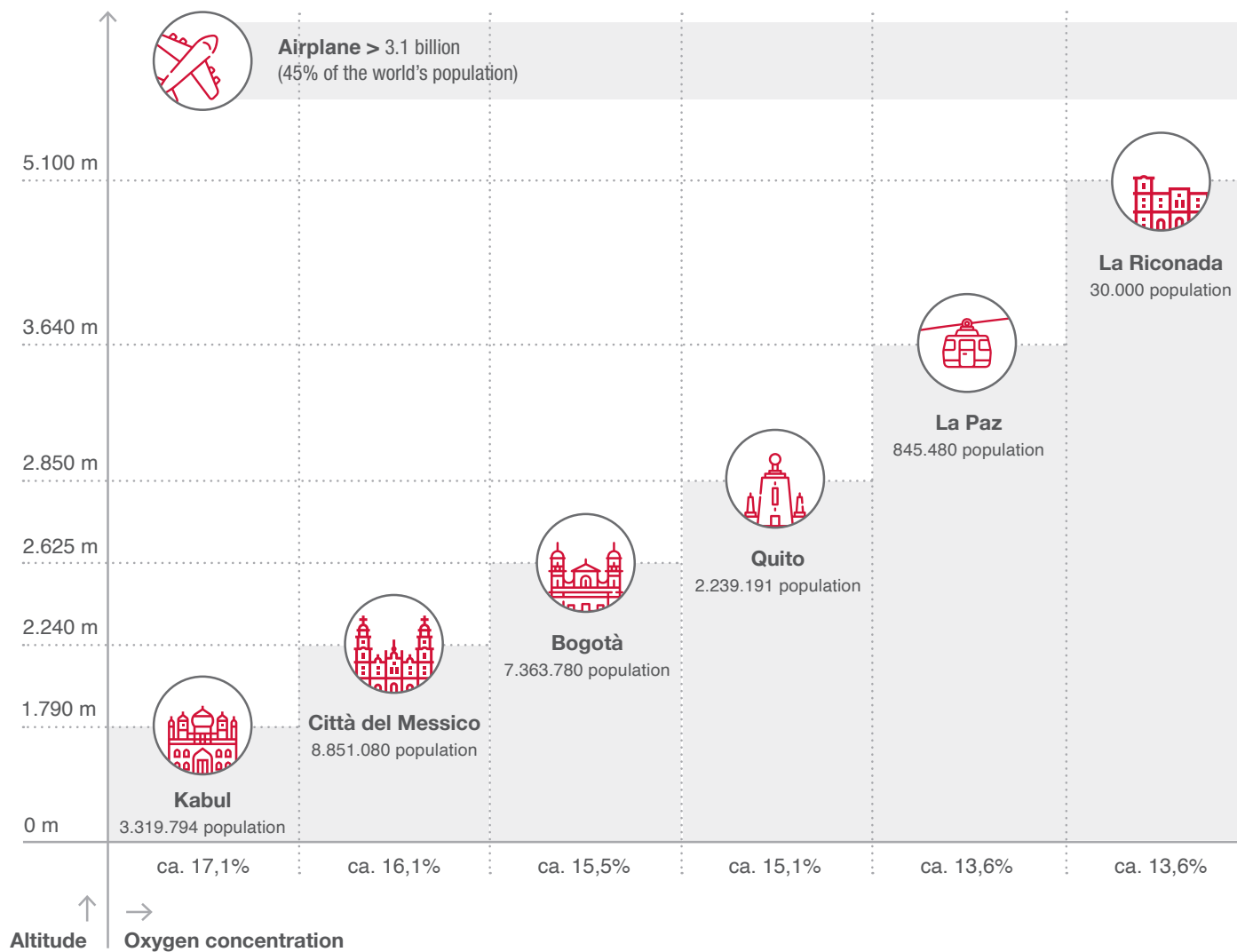


Diagram of perceived oxygen concentration in various world capitals located at altitude, with corresponding numbers of inhabitants (©Isolcell).



Archive photo, N2 ORS® System installed in Italy.

Cold chain logistics

The oxygen reduction system is the best solution to protect temperature-controlled warehouses, such as freezing, deep freezing or refrigerated warehouses.

The temperature-controlled environments, needing high-air permeability requirements, makes the oxygen reduction methodology easy to apply, with sometimes minimal system sizing due limited air leaks.

Furthermore, the traditional technologies of fire suppression systems are difficult to apply and, in any case, not of optimal effectiveness, where the temperatures in the protected are below 0 degrees.

RECOMMENDED TECHNOLOGY FOR THESE APPLICATIONS: ADOX®.

Cold storages

Refrigerated warehouses



Archive photo, N2 ORS® System installed in Denmark.

Logistic

The oxygen reduction fire prevention system is the ideal solution for automated warehouses. ORS methodology allows to no longer have to worry about fire risk, eliminating the consequences that could occur. Furthermore, nowadays, more and more companies decide to concentrate their production and storage in a single plant, to optimize management costs. Therefore, the need for total protection is even more essential.

EXAMPLE OF A REFERENCE PROJECT

A worldwide well-known biopharmaceutical company operating in scientific research has chosen the ISOLCELL oxygen reduction fire prevention system to protect its intensive warehouse, providing a fire prevention system that eliminates fires risks.

RECOMMENDED TECHNOLOGY FOR THESE APPLICATIONS: ADOX®.

**Automated intensive
warehouses**

Food warehouses

**HBW
(High-bay warehouses)**

**Storage of hazardous
materials**

**ASRS warehouses (Automated
Storage Retrieval System)**

Paper mills



Archive photo, N2 ORS® System installed in Italy.

IT, Data centers & substations

A fire, in a data center can have serious consequences, such as websites not running, the inability to receive and send email for thousands of users and companies, e-commerce sites and public services becoming inactive for hours and the significant economic damage due to the disruption. Gas extinguishing systems, traditionally used in data centers, only provide passive protection, and come to action only once a fire has started. Extreme high pressures when the extinguishing gas is being released, re-ignition after gas release, as of leaky premises, are just a few of the risks that inevitable every data center operator runs. Each of these risks can lead to the total loss of data, loss of clients and subsequently loss of the business. According to the article *Clean Agents Fire Protection for Computer Rooms* by Mark I. Robin, the economic damage caused by a blackout of a computer network can exceed one million dollars for each hour of downtime. Now more than ever, given the ever-increasing offer of cloud-based services, it is vital to eliminate fire risk. Fortunately, technological evolution has overcome a number of technical hurdles, making it now possible to permanently protect these spaces from fire hazards, by relying on the N2 Oxygen Reduction System® method.

RECOMMENDED TECHNOLOGY FOR THESE APPLICATIONS: ADOX®, NIMOS E ISOSEP.

Data Center

IT rooms

Switch rooms

Electrical substations

Server rooms

Server farm

Etc.



Archive photo, N2 ORS® System installed in Ireland.

Archiving

Archives of all kind can perfectly be protected by ISOLCELL's N2 ORS® method as the risk of fire can be eliminated completely. Sensitive documents, irreplaceable artefacts, paintings and collections or precious materials that contribute to our global heritage are absolutely safe once the oxygen depletion system is in place.

A large hospital in Italy has decided in favour of Adox N2 Oxygen Reduction System® in order to protect and preserve infinitely health records and medical documents. The archive has got a size of 1000m2 and the shelf lengths holding these documents has got an impressive length of 25 Kilometres.

RECOMMENDED TECHNOLOGY FOR THESE APPLICATIONS: ADOX®, NIMOS E ISOSEP.

Paper archives

Museums

Libraries

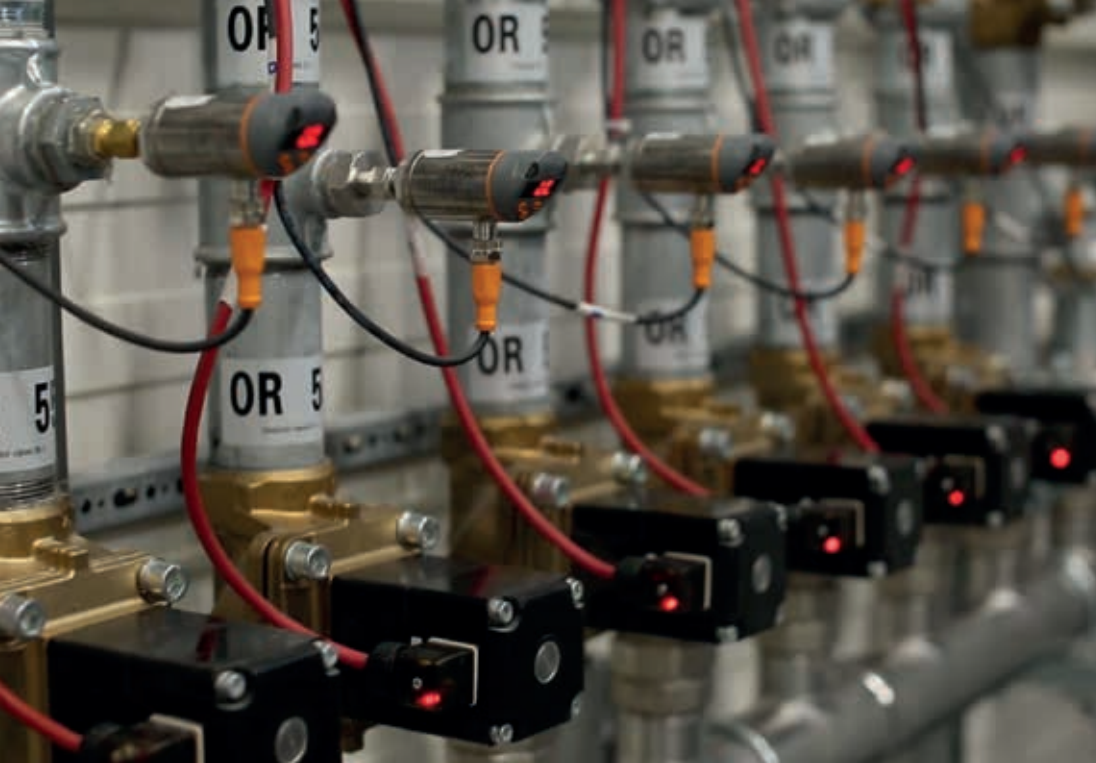
Vaults/Treasuries

Film and data archives

Hospitals storage

Etc.





Functioning principle

N2 ORS® IN FOUR SIMPLE STEPS

The N2 ORS® system is based on the use of a system made up of electrical machines that, based on the principles of molecular separation using special **self-regenerating filters**, modify the proportions of oxygen and nitrogen in the area treated, produce the **oxygen-reduced atmosphere** and distribute this through the sequential application of the following **four phases**:

1. GENERATE

This phase involves the generation of the oxygen-reduced atmosphere. All of our technologies for producing oxygen-reduced atmospheres are green systems in the true sense of the word: they use only the air from the surrounding environment, without the addition of chemical substances or additives.

2. RELEASE

The atmosphere created is released into the area to be protected using a distribution network.

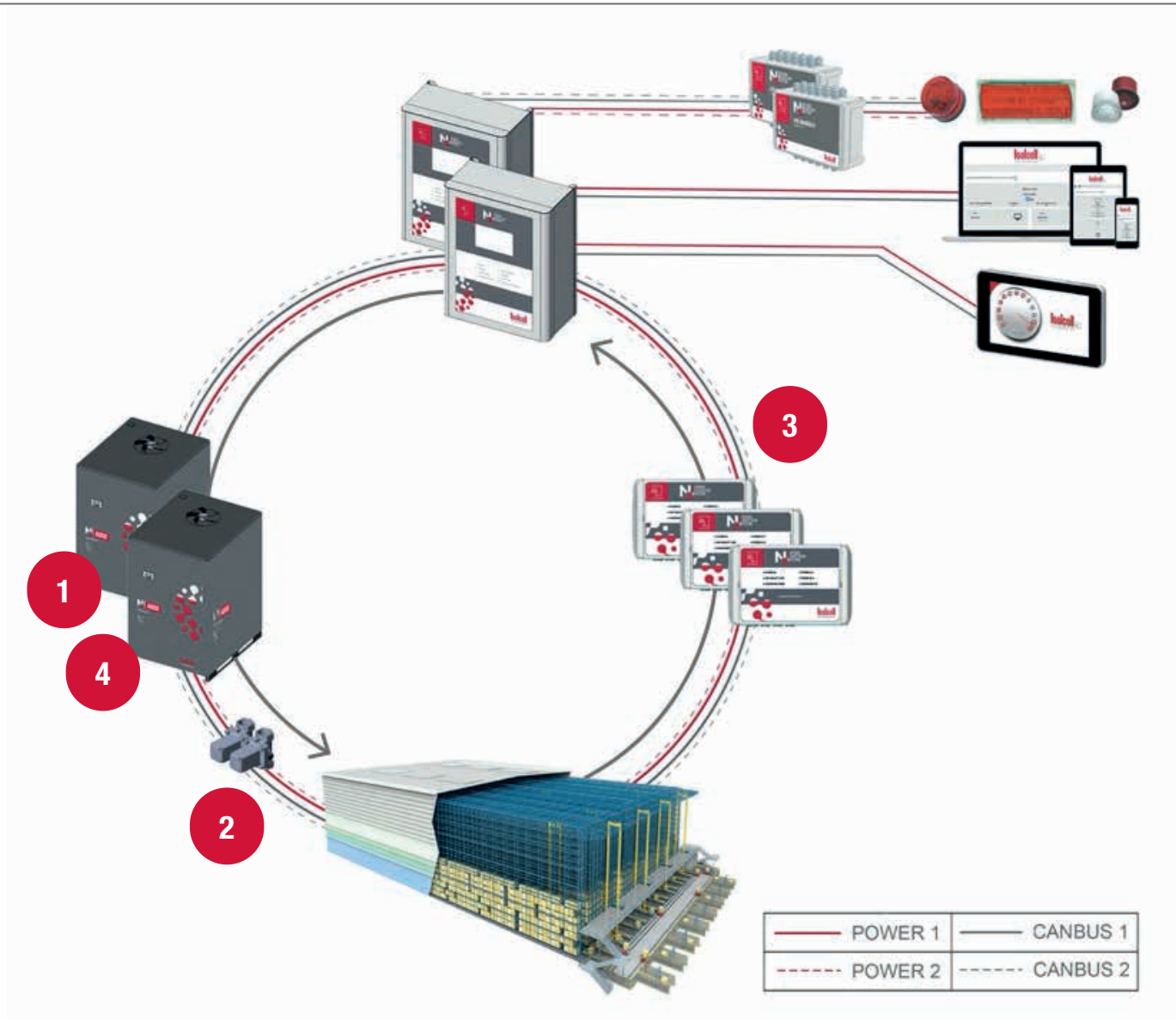
3. MONITOR

Using a special system called a 'virtual grid', a series of oxygen sensors analyse all of the protected area and relay the results to the control panel, so that the atmosphere is constantly analysed and monitored.

4. MAINTAIN

When an oxygen value other than the level desired is detected, the control panel activates the generators of the oxygen-reduced atmosphere for the period required to restore the defined values.

Thanks to the virtual grid and the rotation system, which is made possible because of the modularity of the generators, the system is able to optimise energy consumption and operating costs: in fact, the equipment alternates cyclically, thus limiting the hours of operation and reducing wear and maintenance.



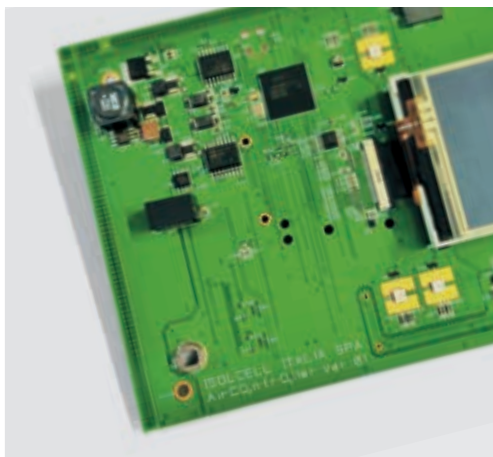
Technology

MADE BY ISOLCELL

Thanks to the experience of over 60 years in the generated and controlled atmosphere, we are able to offer to our customers highly customized, innovative solutions and oxygen reduction systems certified according to existing general requirements.

FROM DESIGN TO PRODUCTION

Our goal is to produce quality and reliable products, which is a prerequisite when it comes to safety systems.

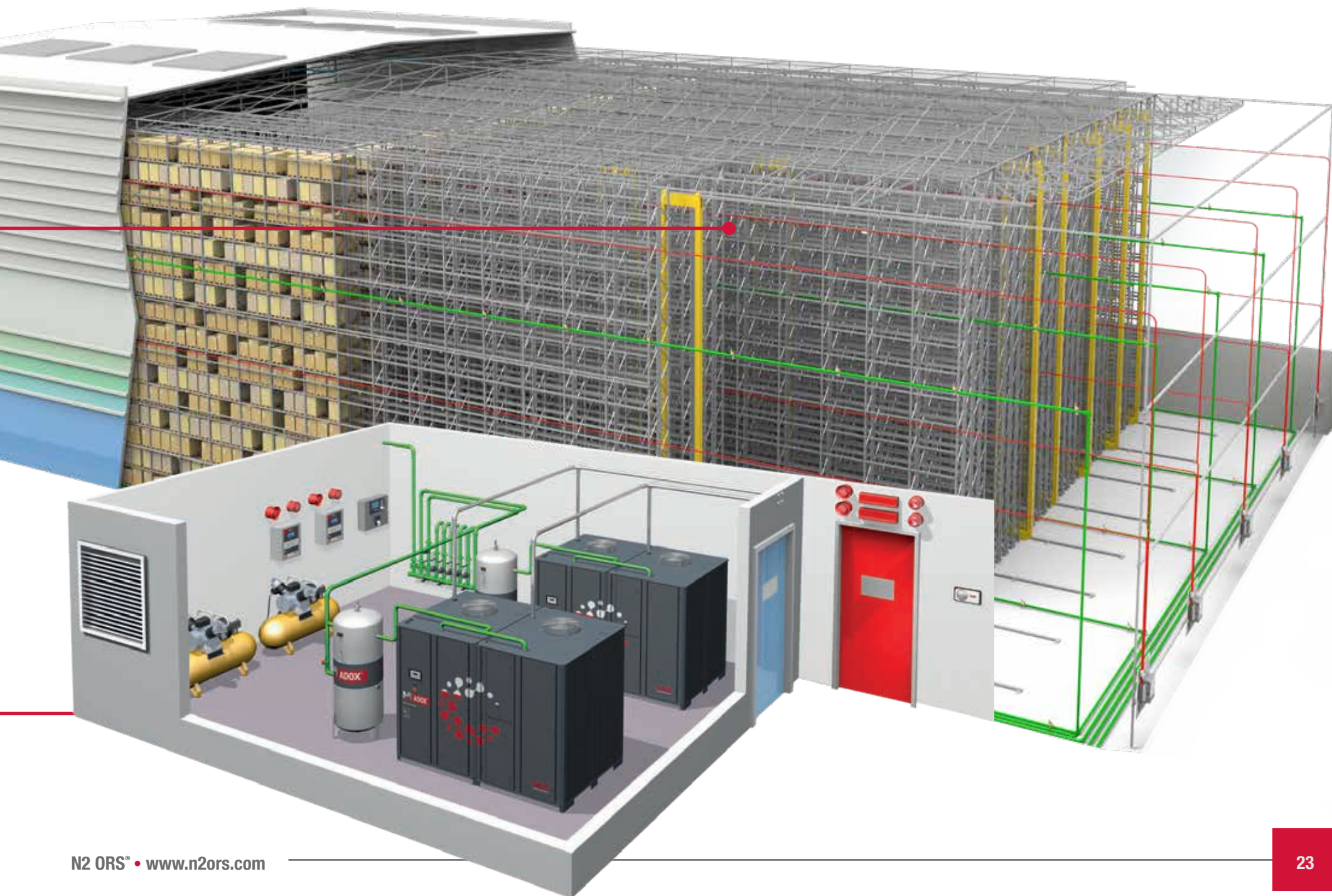


Protected area



Machinery room







Control indicating Equipment (CIE) N2 ORS®

THE HEART OF THE SYSTEM

The **N2 ORS® control panel** is the unit that manages the entire system. The panel manages sampling from the virtual grid, ordering the activation and/or deactivation of the integrated and interfaced equipment making up the system, according to scheduled intervention plans.

It also manages all control systems to avoid the undesired formation of under-oxygenated atmospheres (compared to atmospheric values) in environments adjacent to the areas to be protected, along with shut-off procedures when the pre-set oxygen concentration thresholds are reached, and activation of alarms when needed.

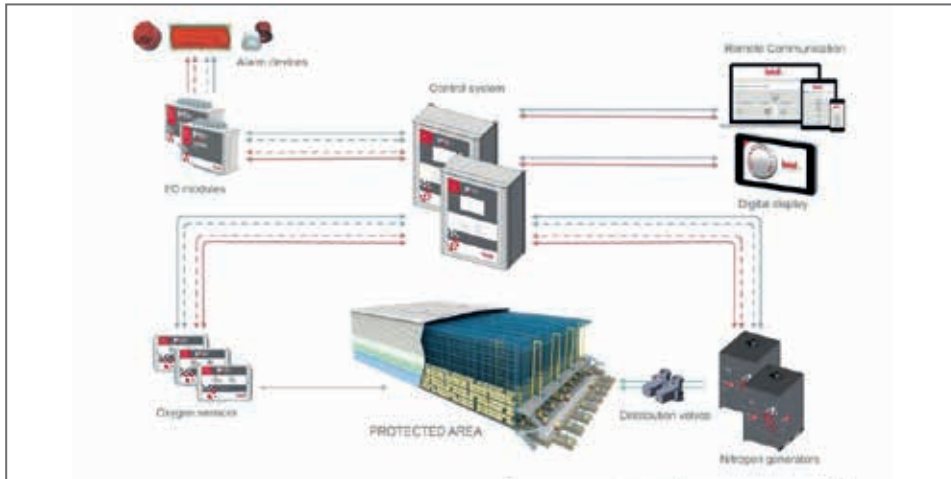
Given the importance of the control panel in fire-prevention systems operating using oxygen-depletion methodologies, it is regulated by specific requirements that impose a series of characteristics associated with self-diagnostics and redundancy, and **with a dual power supply** to guarantee operation of the system for at least 24 hours, even where the primary electricity supply is absent.



Oxygen Sensors N2 ORS®

OXYGEN ANALYSIS FOR SMALL AND LARGE ENVIRONMENTS

The oxygen content in the protected area is measured, based on the reference standards, using the Isolcell N2 ORS® variable-step virtual grid. Analysis ensures that a possible failure in an individual measurement element does not influence the results of the overall measurement operations. Indeed, the most recent reference standard (ISO 20338:2019, which in this case differs, for example, from the European standard EN 16750:2020) states that the oxygen concentration must be measured continuously by each detector, at least once a minute, and that the response times must be documented. Furthermore, it should be noted that the entire system remains operational while at least one sensor remains functional, namely 20% of sensors. On the basis of such detailed specifications, we have developed a highly reliable measurement instrument. **Each of our systems is in fact equipped with three individual sensors, supported by reciprocal measurement diagnostics with a triplicated architecture with majority redundancy.** This means that the values measured are processed using a 2oo3 (two-out-of-three) voting design, thus providing a precise and unequivocal value and a high level of safety, as can be seen from the fact that even our oxygen sensors are IEC 61508:2010-certified with the significant reliability level of SIL-3.



Electrical system and supply

HIGH-REDUNDANCY FEATURES

In the N2 ORS® system, the interoperability of the equipment (connection between the control panel, sensors, generators, valves, warning devices, etc.) is provided through protocol-based data exchange. This requires **particular attention during the design phase to verify the transmission parameters**, in order to avoid possible reflections, interference and random failures. The system is based on a **dual closed-loop connection**. The routing of the cables is designed in such a way that only a single part of the loop can be damaged: indeed, for each of the two branches in a single loop, the routing of the cables is differentiated from the routing of the other branch. This means that any damage to one of the two branches does not affect the other. **The power supply is also made up of a dual-loop connection**. The operating principle is identical to the system used for data transmission. Furthermore, the power supply system has two sources: the primary power supply from the public mains network and the **back-up supply** provided by power packs. If the primary power supply is not available, the back-up supply starts up automatically. When the primary supply is once again available, **it automatically takes over from the back-up system**.



System synoptic diagram

REMOTE OXYGEN REDUCTION SYSTEM

The **system synoptics operate via web** with an IP address and **transform the data from the control panel** into intuitive graphics that be read immediately.

The specific operating conditions of the system (normal condition, fault condition, alarm condition, etc.), including the corresponding switching operations, will be recorded, and saved so that they can be displayed.

The synoptic makes it possible to:

- display events originating from the control panel
- verify that the entire system is operating correctly
- display any alerts and alarms
- query operating types

The virtual grid

PATENT No.: EP 2 522 402 A1

The variable-pitch virtual grid is another strength of our N2 ORS® system and forms an integral part. We have designed and patented it through relentless research and development work carried out over more than sixty years in the generated and controlled atmosphere sector.

The virtual grid makes it possible to optimise the resources used throughout the process of generating and distributing oxygen-reduced atmospheres. This grid enables a 'virtual' subdivision of the area to be protected into sections determined in the design phase, so that the oxygen-reduced atmosphere can first be analysed and then released.

Our customised analysis takes into account not only the standards that regulate analysis and release, but also a range of factors such as atmospheric parameters and the clearances and openings required for the passage of people and goods.

On the basis of the resulting mapping, pipes are laid for analysis and release, with the sampling and distribution points having a variable pitch: closer together in the perimeter area and further apart in the central area.

STRENGTHS OF THE VIRTUAL GRID

1. Precise identification of the intervention area:

- ✓ Optimises energy consumption and machine wear
- ✓ Improves the mixing of inert gas with oxygen

2. Speed of response:

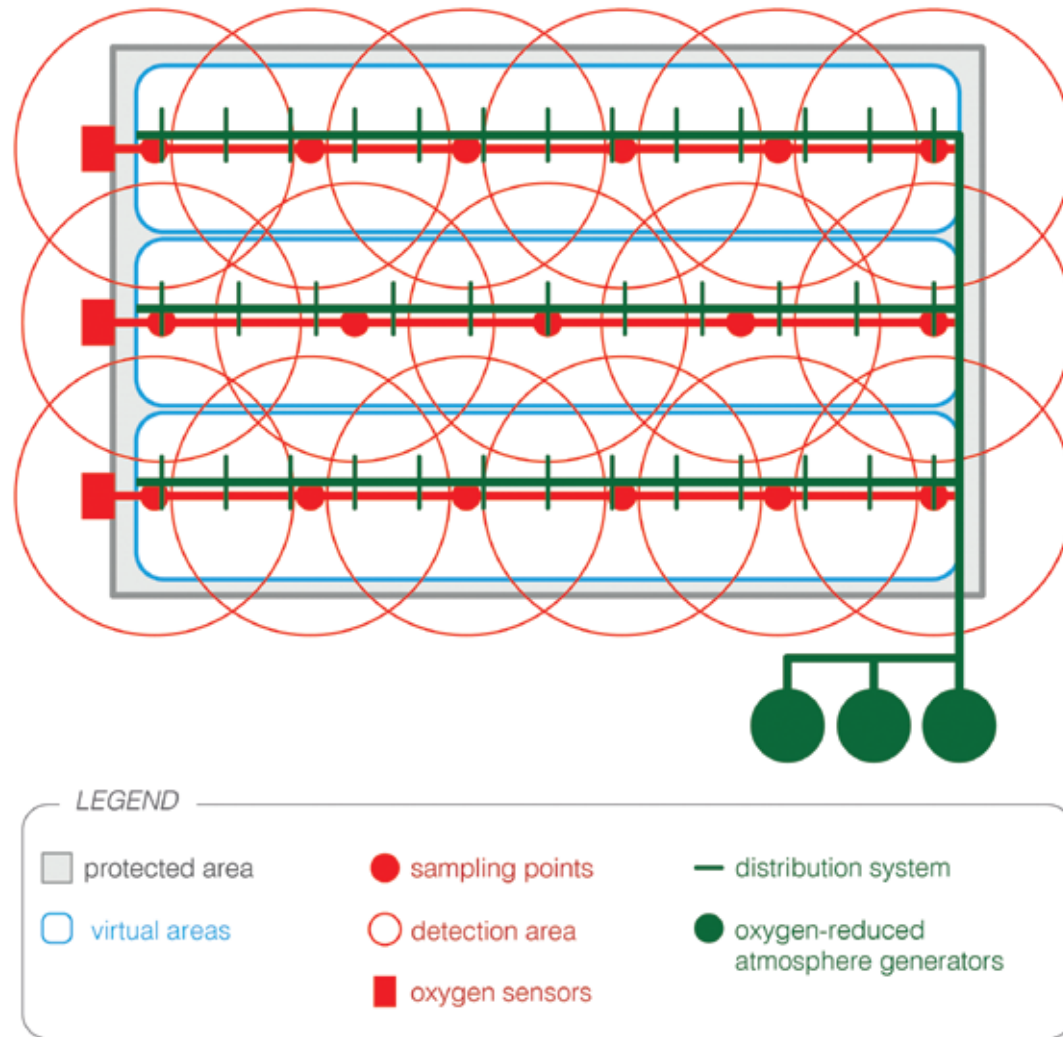
- ✓ Avoids the spread of oxygen detected throughout the entire area
- ✓ Avoids the presence of non-uniform areas

3. Continuous analysis of the atmosphere:

- ✓ Facilitates the detection of any critical points, enabling intervention in individual areas
- ✓ Reduces the quantity of oxygen-reduced atmosphere to be released into the atmosphere

4. Preconfigured for integration of the early-warning aspirating smoke-detection (ASD) system

- ✓ Using this sampling system, the ASD system required under the current reference standards can be easily integrated



Oxygen-reduced air generators

ISOLCELL CAN PRODUCE ALL EXISTING TECHNOLOGIES FOR CREATING AN OXYGEN-REDUCED ATMOSPHERE

The generation of the oxygen-reduced atmosphere through molecular separation is carried out from nitrogen generators with MEMBRANE technology of the **ISOSEP series**, nitrogen generators with PSA (Pressure Swing Absorption) technology of the **NIMOS series** or VPSA (Vacuum Pressure Swing Absorption) technology of the **ADOX® series**.



ISOSEP Series SYSTEM USING MEMBRANE TECHNOLOGY

ISOSEP systems (membrane technology) are appropriate for use in small spaces and can also be connected inside the area to be protected.

However, they have higher energy consumption, but the ratio of consumption/supply of oxygen-reduced air and environment to be protected justifies their application.



NIMOS Series

SYSTEM USING PSA TECHNOLOGY

NIMOS systems applying PSA technology use machinery that is installed in a designated room. Separation of the molecules requires high-pressure compressed air, as with membrane technology, and this entails increased energy consumption.

However, this technology can be indicated when a compressed-air system is already present or when the position where these machines are installed is very far away from the area to be protected.



**THE QUIETEST
IN THE CLASS**



ADOX® Series

EVOLUTION OF THE VPSA TECHNOLOGY

ADOX® systems (VPSA technology) are the most high-performance: these are modular systems developed specifically for fire prevention using oxygen reduction and guarantee greater safety, because they operate on the basis of redundancy. Thanks to its exclusive technology, ADOX® is able to operate at low pressure, significantly reducing energy consumption and wear.

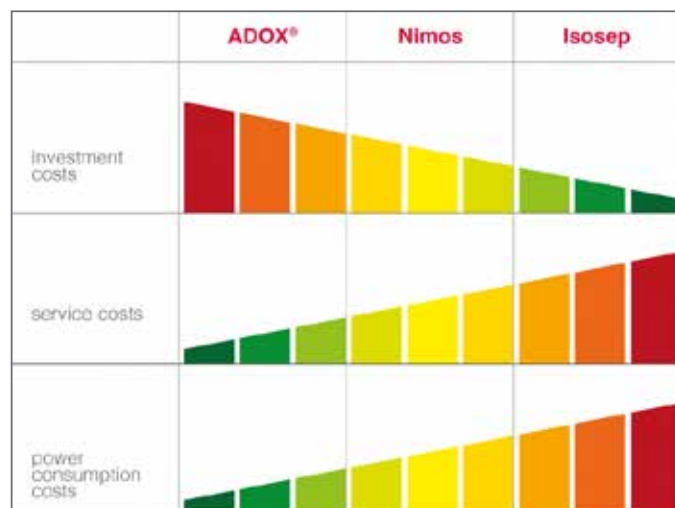
This system is suitable for protecting medium-sized and large environments, optimising operating costs and achieving a saving of up to 60% compared to previous technologies.

Characteristics of the ADOX® system

PATENT No. EP0880903-A1

Unlike high-pressure systems (PSA or membrane), which require a series of elements necessary for the compressed-air chain, ADOX® systems operate using low pressure and thus **consume less energy** compared to the two other technologies and **require less maintenance**.

Furthermore, they are **ready to use (plug & play)** because they contain within them everything they need to operate.

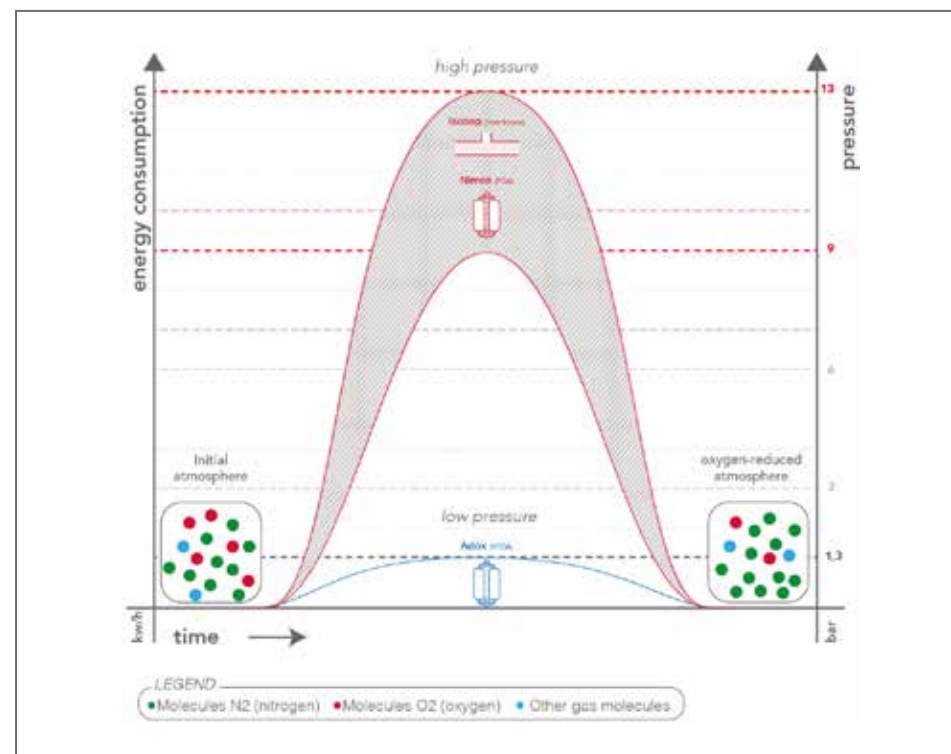


Comparison table of the costs of the three technologies.

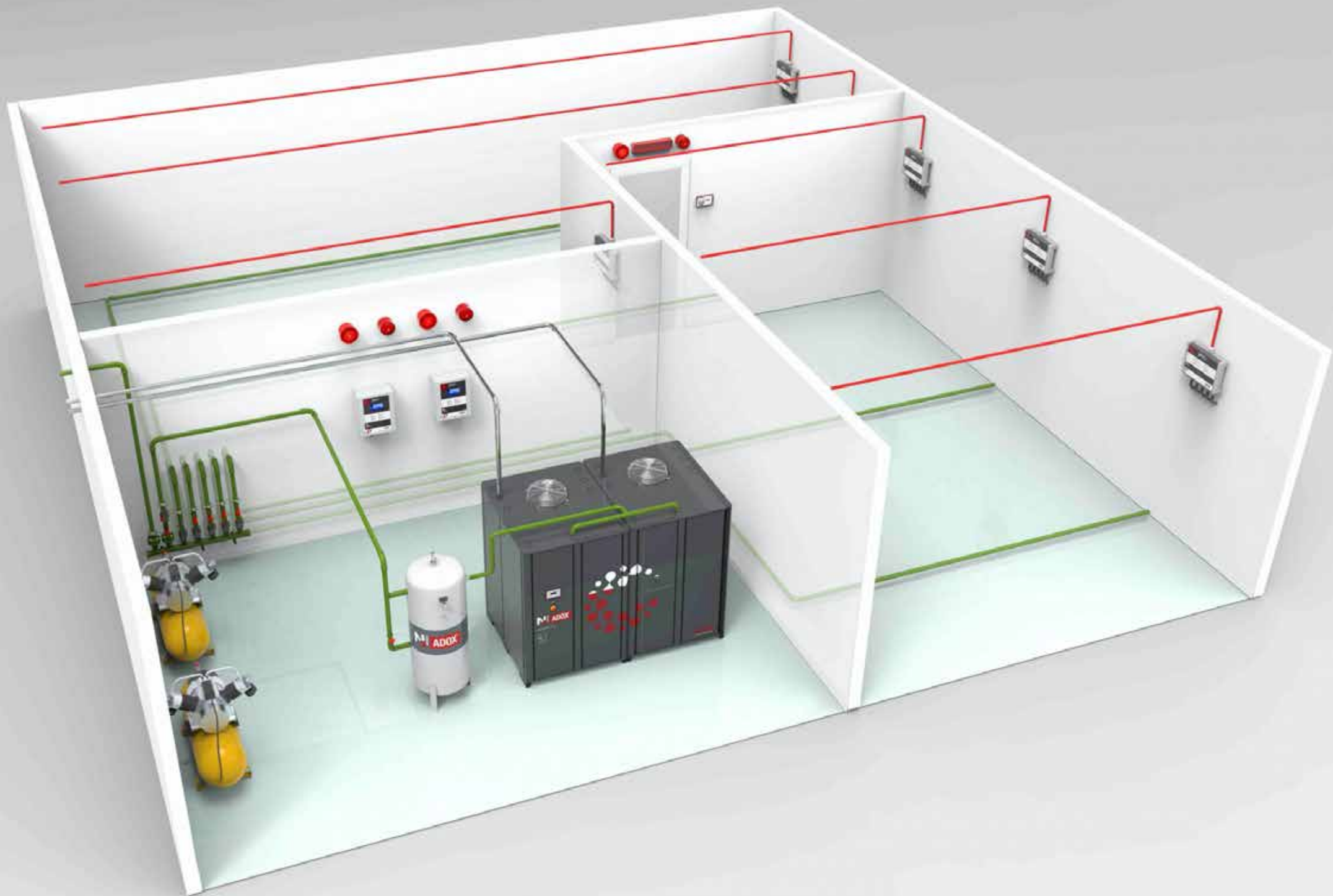
MORE PERFORMANCE

The ADOX® series is the most performing: it is a modular system developed specifically for oxygen reduction fire prevention in order to guarantee greater safety, since **it works with a redundancy logic**.

Thanks to its exclusive technology, ADOX® is able to work at low pressure, significantly reducing energy consumption and wear.



Differences in the molecular separation process.





MODULARITY

ADOX® generators of oxygen-reduced atmospheres are characterised by their **modular composition**. This means that their production capacity can be increased at any time simply through the addition of further modules. Improving the production capacity of these systems **achieves a better optimisation of work cycles and energy consumption** and, because of the redundancy system, more safety.

REDUNDANCY

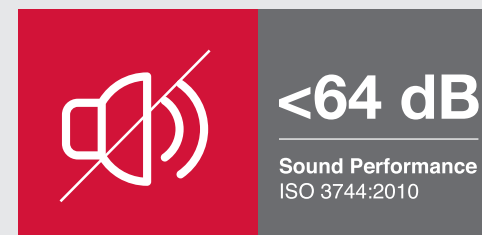
The modularity of the ADOX® N2 ORS® oxygen adsorbers is based on a system of redundancy: this means that the generator will continue to operate even if a module fails, **guaranteeing that the oxygen-reduced atmosphere can be maintained**.

Because of this characteristic, we have achieved safety class **SIL 3**.



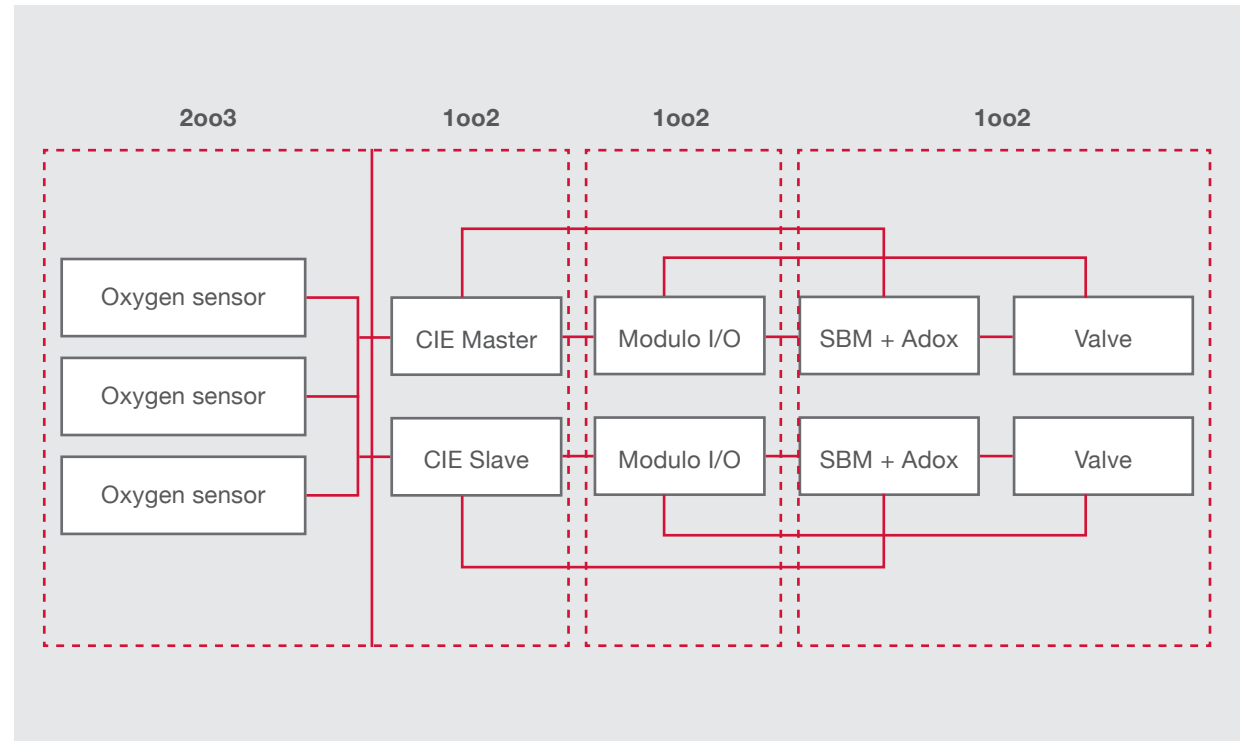
THE QUIETEST IN THE CLASS

To improve the working environment, we have also worked on the system's **acoustic insulation**, developing the **sound-proof cabinet**, providing shielding for the adsorber produced by combining materials of the highest quality. This solution has resulted in a significant reduction in noise, from 90 to < 64 dB(A) (measurements of sound power taken and certified according to the ISO 3744:2010 standard), thus obtaining the lowest level of noise in the category.



SIL (Safety Integrity Level)

In the safety sector, products and systems must be certified on the basis of the IEC 61508:2010 standard. This standard essentially defines aspects such as the content of the company quality system in terms of the Functional Safety Management System (FSMS). The IEC 61508:2010 standard introduces the concept of Safety Integrity Level (SIL), a quantitative unit of measurement certified to establish the integrity level of electrical, electronic and programmable electronic safety-related systems over their entire life cycle, from analysis to production and finally operation. It defines four SIL levels, from SIL1 to SIL4: the greater the SIL, the lower the probability that the system will be subject to dangerous failures that compromise the required safety function. The SIL is therefore a measure of the reliability of the safety system and is obtained only through the 'proven-in-use' method, based on the degree of reliability and low error rate of a minimum number of systems that are installed and operational. To ensure that a system achieves a particular SIL class, each element linked to a given safety function must comply with the requirements determined for that SIL class: if even one of the elements linked to a safety function were to be classified as a lower SIL class, the entire system would be classified under the SIL class achieved by that element.



ORS systems are broken down into the following safety-related elements, with each being assigned a given SIL level:

- Oxygen sensor
- Control system
- I/O module
- Oxygen-reduced atmosphere generator
- Distribution valve

An analysis of the reliability of plant units,

mechanisms or systems with safety implications (namely those that present risks for people, the environment and property) is required more and more often, for example by the recent ISO 20338:2019 standard.

This is therefore an effective and internationally recognised method of guaranteeing and demonstrating the safety level of an ORS system.

Standards & normatives

HOW WE MAKE OUR SYSTEM SAFE

On the basis of the applicable legislative provisions, all companies are required to comply with the general principles for prevention in relation to health and safety. In this area, one fundamental aspect is the functional safety of the products themselves, especially if used in safety applications. Our objective is to create high quality, reliable products, an essential requirement when dealing with safety systems. For this reason, we rely on the evaluation and certification of our products and systems by independent third parties.

Thanks to characteristics such as reliability, safety and exclusivity, we are in fact currently the only company to hold a series of recognitions, namely approvals and certifications such as the following:

EN 16750:2020 • Fixed firefighting systems - oxygen reduction systems – Design, installation, planning and maintenance
ISO 20338:2019 • Oxygen reduction systems for fire prevention – Design, installation, planning and maintenance
ÖNORM F 3007:2009 • Oxygen reduction system
ÖNORM F 3008:2010 • Control panels -oxygen reduction systems
ÖNORM F 3073:2010 • Planning, design, installation, commissioning and maintenance of oxygen reduction systems
TRVB S 155 • Engineering, installation and operation requirements for oxygen reduction systems using nitrogen in buildings from a fire prevention technology standpoint
EN 50104:2010 Electrical apparatus for the detection and measurement of oxygen – Performance requirements and test methods



PED 2014/68/EU: Compliance of the **N2 System** according to the provisions of the Directive

BSI PAS 95:2011: Hypoxic air fire prevention system – Specification

N168C: System qualification tests

IEC EN 61508:2010: Functional Safety of Electrical / Electronic / Programmable Electronic Safety-related Systems (E/E/PE, or E/E/PES)



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.

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.



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.

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®.

2019

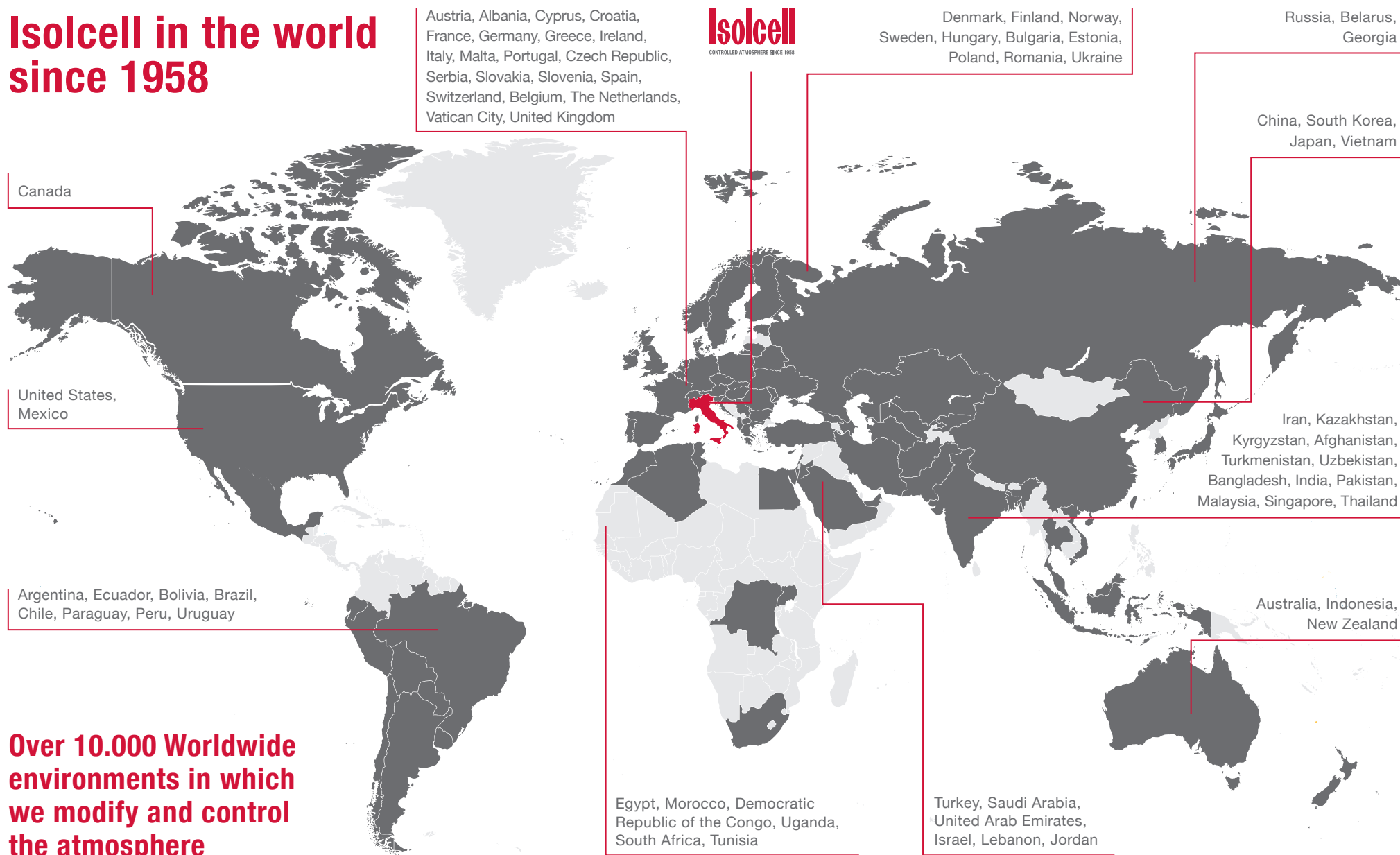
We update the ADOX® machines, developing special high sound-proof cabinet which leads to a significant noise reduction from 90 to < 64 dB(A) (certified ISO 3744:2010)

2020

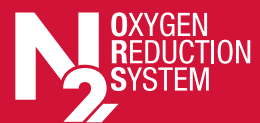
TÜV certifies our oxygen sensors, control panel, ADOX® machines, distribution valves and I / O modules with a safety level SIL-3 IEC 61508



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Over 10.000 Worldwide environments in which we modify and control the atmosphere



**Scan the QR-code
to view some examples
of N2 ORS® installed**

Isolcell

CONTROLLED ATMOSPHERE SINCE 1958

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