HYPOXIC AIR FIRE PREVENTION SYSTEM

TECHNICAL SPECIFICATION

Created By – Vimal Fire Controls Pvt. Ltd.

Introduction:

Hypoxic Air Fire Prevention System is a revolutionary fire prevention technology. It has the unique ability to create a breathable oxygen-reduced (hypoxic) environment which prevents flame ignition and at the same time, is safe and health for human occupants.
Unmatched Fire Safety: prevents fire proactively instead of suppressing it after it had started.
Environment Friendly: uses natural air as its resources no chemical or gases are involved.

Specification for Hypoxic Fire Prevention System

Description	Technical Details
The Hypoxic Air Venting technology is used to prevent fire.	The system should provide high quality sterile atmosphere, safe and breathable fire preventative environment.
Air Output Details	Hypoxic Air only. 100 % Assured not less than 10 % Oxygen Air Output
Standard and Guidelines	UL67377 Oxygen Reduction Fire Prevention system units., BSI PAS 95:2011- Hypoxic air fire prevention system
Demo and Acceptability	Vendor to assure for Live Demo of the technology using a Mobile Van
NBC Guideline reference	Clause 6.5.2 (b)
Technical Parameters	
EPA / SNAP acceptability Letter	To be provided (100 % environmental Friendly)
ODP	0
GWP	0 - AS NORMAL AMBIENT AIR IS USED
ATMOSPHERIC LIFETIME (for Agent , is any)	Nil
Nitrogen Injection System	Not acceptable
High pressure Piping	Not acceptable
Special Features	No distribution Nozzle, No expensive refilling, small footprint, Plug and play, No pressurised cylinder, No false discharge and no discharge failures, Multiple Fire hazards can be protected with just one system.
Stability after 100% breakdown of Main as well as Redundant Power	Hypoxic condition to remain stable for 3-6 hours even in a case of a total power failure or blackout. (This shall depend on Leakage and provided the room integration is maintained)
The system shall maintain a safe environment	Corresponding to a level of 13.5% to 16 % O2 - Site Adjustable

Redundancy and reserve in capacity	Required to be provided atleast @ 30 %
Method of Operation	The Fire protected room is constantly measured with the effective O2-Level with high quality dedicated stand- alone continuous oxygen monitoring system based on optical oxygen sensors that use Fluorescence quenching by Oxygen technology for detection of oxygen specifically in hypoxic environments. The Oxygen monitoring system should regulate the O2- level by switching the generator ON and OFF depending on the preset O2 Level and on the actual need for hypoxic air.
Principal of Operation	Hypoxic generators operate by filtering a part of the oxygen from ambient air and providing fresh oxygen- reduced (Hypoxic) air for ventilation. There will be slight positive pressure inside the protected room and hypoxic air will leak out. The positive pressure will keep out dust and other impurities, while constant hypoxic ventilation will remove gaseous products that might be generated by the stored materials.
Air ventilation	The air condition system used in this room must be of a split type or a close-loop system without any fresh air intake. All ventilation will be provided by Hypoxic Air venting system.
Inward Leak rate	The System shall be designed to with an inward leakage of max 30% per day.
Air Flow Characteristics	The flow of the hypoxic air will be adjusted to maintain a level of oxygen in the internal atmosphere between 13.5.0% and 15.5%. Hypoxic flow to be shut down at 15.0% O2 and automatically resume when a level of 15.5% is detected. This shall provide a good margin for safety in the event excessive access creates leakage. The environment inside the Fire Protected room should be safe for a long term exposure.
Connections	The system needs to be connected to the room sensor and the power supply and connected with the tubes to the rooms and the duct leading the oxygen enriched air outside.
Level Settings	Adjustable on site between any values from 13.5% to 17 % O2 as may be required
Level Setting Facilities	Low Level , Cut off Level , High Level and Restart Level
Zone Indications	Green , Red , Yellow

Compressor Power Supply	Not to exceed 400 Volts / 50Hz / 3- Phase with slow fuses.
Generator Power Supply	The generator including control unit not to exceed 220 Volt / 50 Hz
MOC for tubing / piping	Simple PVC, PPC or similar tubes, ABS or metal pipes.
Piping of the enriched air outlet (It has to lead directly outside the building, ideally up to the roof level to avoid any increase of the danger of fire. The oxygen enriched airflow has to be taken outside the machine room when the generator is operating the installation of this piping has to be done by the vendor.)	ABS, PPA, PVC, metal or similar pipes. No High Pressure Piping should required
Machine Room Characteristics	The machine room must be well ventilated and the ambient room air temperature inside should not exceed 30 degree Celsius and shouldn't go below 5 degree Celsius. The system should be protected from excessive moisture and dust.
Technical Particulars of Individual Components	
A : Control Panel	Control Panel should be provided with touch screen
	The Central automatic control panel to monitor the hazard area will provide alarm for “High” and “Low” oxygen levels and “generate faults” alarm for loss of power.
	The control panel will be installed inside a metal cabinet either close to the generators or optionally remotely located.
	Dry contacts will be provided for transmitting an alarm signal to the main building panel. The control panel will be installed inside a metal cabinet either close to the generators or optionally remotely located.
	The control panel is equipped with a colour touch screen and with a removable microchip that stores systems performance data over one year or a defined period of time.
	The chip should be removable type and the data transmitted to a computer for analysis.
A.1 Control Panel Data and Features	This monitor (of Oxygen Analyser or Control Unit) will also provide the following data:
	Temperature measurement

	Relative humidity measurement
	Pressure measurement
	Oxygen measurement
	CO2 measurement (Monitoring of carbon dioxide level will allow providing sufficient ventilation of the room with hypoxic air when needed).
	Absolute humidity (calculated)
	Dew point (calculated)
	Relay output (alarm functions, safety chain)
	Safety relay with forcibly guided contacts according to EN61810-1, IEC61810-3, EN50205, EN45545
	Buzzer output (alarm functions)
	RS485 MODBUS interface
A.2 Communication	Should be Capable to communicate with any building management system installed on site by means of Modbus RTU or other specified system. Standard communication protocol proposed is MODBUS over TCP/IP or MODBUS over RS485. The control panel should have an Ethernet port for optional connection to internet or a computer or for a secure remote monitoring if requested.
A.3 General Setting Screen required in the Hypoxic Air Venting system	The “room info” screen should display all relevant system parameters.
	The “main screen” should display information about the Fire protected room.
	The display to show the whole parameter set for the room.
	The screen should show the system messages and have possibility to set runtime user.
	The screen should shows the whole Parameter set for the Modbus devices. The Parameter are password protected (manufacturer level)
	The display should show the alarm message (accessible by clicking on an alarm symbol)
	The controller has to be a smart device that provides highest safety and security level and option to equip

	the Controller with a remote monitoring via internet.
	The screen should display symbol & explanations and functional diagram with an option to click on it to open a bigger view
	Temperature Data information
A.4 Password Protection	The Parameters should be password protected, with higher and lower level. minimum 2 level Security is Compulsory
A.5 O2 % log	The screen should show the continuous logged O2 value (Approximate 6 months to 1 Year)
A.6 Maintenance Data	Maintenance warning Pop up; every hour; if the working hours are > = as maintenance warning hours.
	Maintenance overdue warning Pop up; every hour; if the working hours are > = than maintenance overdue warning hours.
B: Membrane / Filter & Generator	Membrane generator should be provided as applicable for the proposed model
	Multistage filtration consisting of a fine coalescing filter (1mu), a coarse coalescing filter (0,01mu), a bed type activated carbon absorber and a dust carry-over filter (1mu).
	The unit should be fitted with (integrated) moisture alarm. It should shut down the generator before the membrane gets damaged by a failing or incorrect air dryer.
C: Compressor Specification	Appropriate Screw compressor, including refrigerant dryer, type: Alup or equivalent
	Connection 400V / 50 Hz 3 Phase
	Compressor is mounted on appropriate buffer vessel as per design
	Touch screen control panel for monitoring and controlling
	Oxygen analysers (Two / Three / Five) to be provided depending on the room size
	One door display for oxygen % monitoring before entry.
	Compressor maintenance: Exchange of filters at a frequency of six months
D: Oxygen Analyzer	High quality dedicated stand-alone continuous oxygen monitoring system for the detection of oxygen content specifically in hypoxic environments.

	Protected compartments will be equipped with Swiss made, Optical oxygen sensors that use Fluorescence Quenching by Oxygen technology.
	Aluminium enclosure IP65
	Swiss made
	Optional Graphic display with variable backlight
	Easy mountable enclosure
	The protected area has to be equipped with oxygen monitoring units placed on eye level. Each sensor has to be wired directly to the control panel.
	Vendor to include cabling for Oxygen room sensor and display unit
	Display indicating the actual oxygen value measured in the room will be placed next to the entry in to each area, typically on eye level. Each display has to be wired directly to the control panel with its own 4-wire, shielded cable.
E: Maintenance	Hypoxic generator module should be highly reliable passive unit that can work for two years with proper maintenance.
F: Warranty	Hypoxic Generator units should come with a warranty of 2 years for all Parts of the Unit.
G: Manufacturing Facility	Engineered and produced by an ISO9001 certified company
H:Integrator And Installer	Authorised Representative of the Innovator and Manufacturer
I: OEM Authorisation Letter	Authorisation letter from the Original Equipment Manufacturer/OEM approved distributor in India has to be duly submitted along with the bid.