# PYROSHIELD®

## Gaseous Fire Extinguishing System Using Green Technology

Fire Suppression Systems

### Features

- ✓ **No Ozone Depletion Potential**
- ✓ **No Global Warming Potential**
- ✓ **No Atmospheric Life**
- ✓ **No Decomposition Products**
- ✓ **Safe for occupied areas**
- ✓ **Tested on humans**
- ✓ **No fogging when discharged**
- ✓ **Remote storage of agent**
- ✓ **Directional valve system**
- ✓ **Full system approval**

BUREAU VERITAS 1828

SAMSA
SOUTH AFRICAN MARITIME SAFETY AUTHORITY

BSI REGISTERED
UKAS QUALITY MANAGEMENT 003

**FM 60023**

Design Software by VdS

SABS Design Institute AWARDS 2003 ENGINEERING

AST ALIEN SYSTEMS & TECHNOLOGIES

PROUDLY SOUTH AFRICAN

# SYSTEM OVERVIEW

## PRODUCT NAME

PYROSHIELD Fire Suppression System. PYROSHIELD is a registered trademark of AST (Pty) Ltd.

## ENVIRONMENTAL IMPACT

PYROSHIELD agent is a mixture of two naturally occurring gases; nitrogen and argon. As PYROSHIELD agent is derived from gases present in the earth's atmosphere, it exhibits no ozone depleting potential, does not contribute to global warming, nor does it contribute unique chemical species with extended atmospheric lifetimes. Because PYROSHIELD agent is composed of atmospheric gases, it does not pose the problems of toxicity associated with the chemically derived Halon alternative agents.

## PRODUCT DESCRIPTION

The PYROSHIELD Fire Suppression System, manufactured by AST (PTY) LTD, is an engineered system utilising a fixed nozzle agent distribution network. The system is designed and installed in accordance with the National Fire Protection Association (NFPA) Standard 2001, "Clean Agent Fire Extinguishing Systems". When properly designed, the PYROSHIELD system will extinguish surface burning fire in Class A, B, and C hazards by lowering the oxygen content below the level that supports combustion.

The system can be actuated by detection and control equipment for automatic system operation along with providing local and remote manual operation as needed. Accessories are used to provide alarms, ventilation control, door closures, or other auxiliary shutdown or functions.

This document contains an overview of the PYROSHIELD system.

The system is installed and serviced by distributors that are trained by the manufacturer.

**Basic Use** – The PYROSHIELD system is particularly useful for suppressing fires in hazards where an electrically non-conductive medium is essential or desirable; where clean up of other agents present a problem; or where the hazard is normally occupied and requires a non-toxic agent.

The following are typical hazards protected by a PYROSHIELD system: -

Computer rooms
Sub-floors
Tape storage
Telecommunication/Switch-gear
Vaults
Process equipment
All normally occupied or unoccupied electronic areas where equipment is either very sensitive or irreplaceable

**Composition and Materials** – The basic system consists of extinguishing agent stored in high strength alloy steel cylinders. Various types of actuators, either manual or automatic, are available for release of the agent into the hazard area. The agent is distributed and discharged into the hazard area through a network of piping and nozzles. Each nozzle is drilled with a fixed orifice designed to deliver a uniform discharge to the protected area. On large hazards, where two or more cylinders are required, a lightweight specialised manifold assembly is employed. The cylinder(s) is connected to the distribution piping or the manifold by means of a flexible discharge bend and check valve assembly.

**Additional equipment includes** – Control panels, releasing devices, remote manual pull stations, door closures, pressure trips, bells and alarms, and pneumatic switches. All or some are required when designing a total system.

**PYROSHIELD agent** - PYROSHIELD agent is a mixture of two inerting (oxygen diluting) gases: 50% nitrogen, 50% argon. PYROSHIELD gas extinguishes fire by lowering the oxygen content below the level that supports combustion. When PYROSHIELD agent is discharged into a room, it introduces the proper mixture of gases that still allow a person to breathe in a reduced oxygen atmosphere. The normal atmosphere in a room contains 21% oxygen. If the oxygen content is reduced below 15%, most ordinary combustibles will cease to burn. PYROSHIELD will reduce the oxygen content to approximately 12.5%.

**Cylinders** – The cylinders are designed, constructed, tested, and marked in accordance with the EEC Directive 84/525/EEC. In addition the cylinders are inspected and certified by Lloyds Register.

**Cylinder Assembly** – The cylinder assembly is of steel construction with a black standard finish. Each is equipped with a pressure seat-type valve equipped with a removable pressure gauge fitted as standard. The valve is constructed of brass and is attached to the cylinder providing a leak tight seal. Cylinder charging pressure is 200 bar at 15°C. The cylinders are supplied with a maintenance record card, filling certificate/tag and shipping cap attached.
The cap is attached to the threaded collar on the neck of each cylinder to protect the valve while in transit. The cylinder serial number and date of manufacture are stamped near the neck of each cylinder.

**Electric Solenoid/Manual Actuator**-Electric actuation of an agent cylinder is accomplished by an electric solenoid actuator interfaced through a status/lock-off control unit. This actuator can be used in most environments where the ambient temperature range is between (0ºC and 54ºC). For auxiliary or override applications, a manual actuator is installed on the side of the solenoid assembly. Manual actuation is accomplished by pushing the hand lever downwards. The design contains a safety pin, which secures the hand lever in the up position when not in use.

**Pneumatic Actuator** –A pneumatic actuator is fitted as standard to provide a pneumatic means for a remote pressure release from a remote pressure device.

**Detection System** – An AST (PTY) LTD approved Control System is used where an automatic electronic control system is required to actuate the PYROSHIELD system. This control system is used to control a single fixed fire suppression or alarm system based on inputs received from fire detection devices. The detection circuits are configured using cross, counting, independent or priority-zone (counting) concepts.

**Nozzles**-Nozzles are designed to direct the discharge of agent using the stored pressure from the cylinders. Five sizes of nozzles are available. The system design specifies the nozzle and orifice size to be used for proper flow rate and distribution pattern. The nozzle selection depends on the hazard and location to be protected.

**Orifice Assembly** – The orifice assembly is required in the distribution piping to restrict the flow of agent, thus reducing the agent pressure down stream of the orifice plate. The assembly contains a stainless steel orifice plate which is drilled to the specific size hole required based on the hydraulic calculation. The orifice plate provides readily visible orifice identification. The orifice assembly is available in three sizes: 20mm, 30mm and 45mm.

**Pipe and Fittings** – The system manifold must be constructed of special piping and special high-pressure steel fittings. The distribution piping down stream from the orifice assembly must be constructed of a minimum of Schedule 40 piping with class 3000# threaded fittings or welded steel fittings. All fittings must be black or galvanised. All piping must be black or galvanised steel of the following type and grade: ASTM A-106 grade A, B, or C.

**Limitations** – The PYROSHIELD system must be designed and installed within the guidelines of the manufacturer's design, installation, operation, inspection, recharge, and maintenance manual.

**INSTALLATIONS**

All system components and accessories must be installed by personnel trained by the manufacturer. All installations must be performed according to the guidelines stated in the manufacturer's design, installation, operation, inspection, recharge, and maintenance manual.

## AVAILABILITY AND COST

**Availability** – PYROSHIELD Systems are sold and serviced through an international network of independent distributors located in South Africa and some foreign countries.
**Cost**-Cost varies with type of system specified, size, and design.

## PERFORMANCE

PYROSHIELD is an effective fire-extinguishing agent that can be used on many types of fires. PYROSHIELD extinguishing system units are designed for total flooding protection against Class A surface burning, Class B flammable liquid, and Class C fires occurring within an enclosure by lowering the oxygen content below the level that supports combustion.

## PHYSICAL PROPERTIES OF PYROSHIELD

Density
1.41251 Kg/m³ @ 20ºC

Charge pressure (nominal)
185 bar @ 0ºC
205 bar @ 20ºC
240 bar @ 55ºC

Gas density
1.0 (Air = 1)

Molecular weight 33,95

## APPROVAL

PYROSHIELD complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems and EPA Program SNAP, Significant New Alternate Policy.

PYROSHIELD has full international component (BAM & Lloyds), design software (VdS) and system (Bureau Veritas & SAMSA) approvals. Other system approvals are pending. AST (Pty) Ltd is an ISO9001 approved company, registered with BSI.

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