

Fire Suppression  
Product Catalogue



**JSG Industrial Systems**  
quality industry solutions

Lubrication  
Management  
Systems

Material  
Dispensing  
Management  
Systems

Hose & Cable  
Management  
Systems

Diesel & Fluid  
Management  
Systems

Fire  
Suppression  
Systems

Onboard  
Weighing  
Systems

Flow  
Measurement  
Systems

General  
Lubrication  
& Exhaust  
Extraction

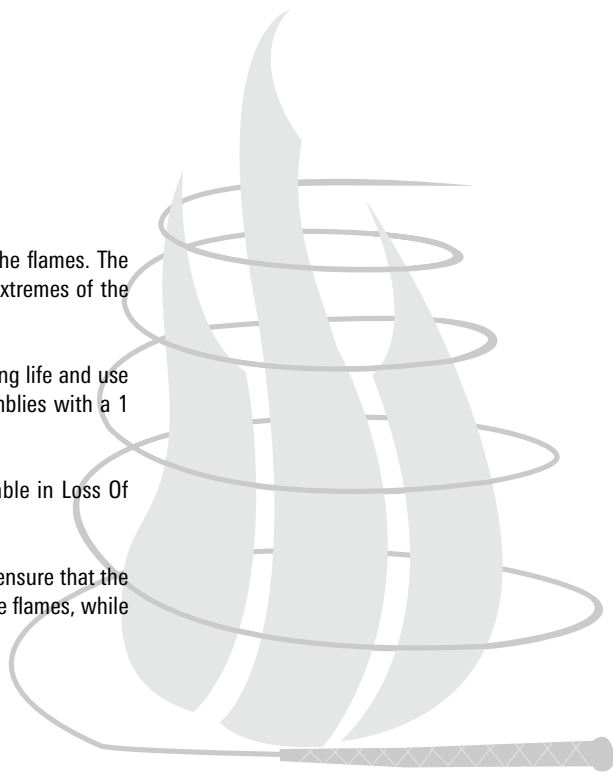


Introducing the new MUSTER range of fire systems designed to round-up and control the flames. The new MUSTER range of fire suppression equipment was introduced by JSG to suit the extremes of the Australian mining industry.

MUSTER fire suppression systems have stainless steel cylinders for a long reliable working life and use the JSG designed MUSTER, compact, self setting, stainless steel actuation valve assemblies with a 1/4" BSPF thread.

Designed for interchangeability and reliability, the Muster Actuation Valves are available in Loss Of Pressure, Rise Of Pressure and Dual Actuation.

Whatever the style of system actuation, the use of MUSTER Fire System equipment will ensure that the system will operate as designed and to its full potential of rounding up and controlling the flames, while also protecting machinery and personnel.



## CONTENTS

<i>Introduction</i> Fire Suppression Systems	<b>3</b>
The Foam Fire Suppression Systems for Light, Medium & Heavy Vehicles	<b>4</b>
Typical Haul Truck Layout	<b>6</b>
Cylinder Assembly	<b>8</b>
Cylinder Valve Assembly	<b>9</b>
Detection and Automation Actuation System	<b>10</b>
Remote Manual Actuation	<b>12</b>
Discharge System	<b>13</b>
System Design and The Risk Assessment Procedure	<b>15</b>
Service Log	<b>17</b>
Material Safety Data Sheets	<b>18</b>
Accreditation	<b>19</b>

# Introduction - Fire Suppression Systems

Heavy, mobile and stationary equipment represents a substantial investment for any business. Due to often heavy demands placed on equipment performance, a significant consideration for any operation today is the damage and potential loss of life or equipment resulting from the ever-present risk of fire. Reality is that occasionally machines catch fire, and consideration must be given to the costs of machine replacement, lost production and these costs may be nothing compared to the loss of life.

While there are a few common causes, it is worthwhile considering the options available to protect your investment in the case of such an event. The installation of a fire suppression system has now become an essential part of a company's overall risk management plan in order to minimise the risk to both operator and equipment.

JSG Industrial Systems now market the new MUSTER range of Fire Suppression Systems with automatic detection and actuation, is a fully engineered system designed for environments where world leading performance is consistently demanded.

At the centre of the system is a comprehensive risk assessment procedure that requires active customer involvement to ascertain the potential risk's area's to ensure the MUSTER Fire Suppression system is designed to meet your specific risk's. It also contains a full service log to ensure that the correct service is carried out to maintain the integrity of the fire system.

## The MUSTER Fire Suppression Range offers:

- A fully engineered design system to ensure correct specification of system requirements
- A new range of single acting, LOP & ROP valves along with the updated dual actuation valve to ensure reliability
- Stainless steel detection line with propellant core – for ROP detection
- Pressurised 6mm thermoplastic sensor tubing – for LOP detection
- A heat sensitive detector enclosed in a brass housing & specially designed fittings for prevention of leakage that encompass stainless steel tube as used by the ADF – for LOP detection
- Smaller compact contamination resistant LOP manual remote actuator
- Flexible siphon tubes to allow either vertical or horizontal mounting
- Stainless steel cylinders incorporating pressure relief valve
- New design heavy duty mounting brackets
- New design Alarm panel compliant to AS 5062 with Voltage - protection IP65 housing
- Liquid filled gauges with stainless steel housing
- Designed for ease of installation
- Ease of maintenance
- ETI Systems are fully compliant to AS5062 as a fully Engineered System
- Muster LOP System detection components are compliant to AS1851 - 2005

All system design and installation is carried out by trained and qualified personnel. Every system design begins with a thorough risk assessment of the equipment to be protected to ensure that all fuel and Ignition sources are identified and assessed for protection, the end result of which is a more effective management of fire risks. It is a requirement of JSG Industrial Systems for our system houses (distributors) personnel before they design, install or service the fire systems that they are trained and must pass competency tests to verify this capability to deliver the correct design, installation and service.

AS 5062 makes the risk management process mandatory in designing a fire system and that states that the handover of a compliant fire system must include a copy of the Risk Assessment, the Design Documents, The Certificate of Completion, The Service Program and drawing and/or photographic record of the installation. If you have a fire system installed with AS 5062 and do not have these documents then your installation does not comply.

Name	Qualification	Phone	Mobile	Email

JSG Risk assessment sheets

# The Foam Fire Suppression Systems For Light, Medium & Heavy Vehicles

The MUSTER Heavy Equipment Foam Fire Suppression System (HES) is a specialist foam-based fire suppression system designed to suit all heavy mobile and stationary equipment including mining haul trucks, draglines, dozers, shovels, excavators, loaders, harvesters, generators, road transport vehicles and industrial equipment.

The system is based around a loss of pressure or rise of pressure detection and actuation system that allows the flexibility to design a system that meets individual risk assessment requirements whilst simultaneously taking advantage of the benefits of fast, effective fire detection.

## Features

The robust and reliable Heavy Equipment System offers a flexible configuration based on the particular requirements of each individual application. Features of the system include:

- Stainless steel cylinder valve
- High foam capacities and flow rates, and full flexibility in nozzle layout, to best suit each application
- Automatic and manual operation and choice in quantity and location of manual actuators
- Comprehensive risk assessment and design procedures to select the best option for each identified risk
- Engine shutdown capabilities integrated into alarm system including variable engine shutdown times of 6, 12 or 24 seconds for added safety
- Flexibility in the selection of tank size
- Flexible in design to fit individual customer requirements
- A number of different levels of protection, dependant on requirements, from simple suppression only systems with manual actuation through to fully automatic engine shutdown and cab monitoring protection systems
- Discharge time designed to provide a wide factor of safety – 50 seconds being the minimum discharge time
- Positive pressure actuation via propellant expansion – ROP only
- A proven risk control procedure – double redundancy – ROP only
- “Fail-safe” 6mm thermoplastic sensor tubing stable to 100°C or an ADF accepted heat sensing system utilising full stainless tubing & fittings – LOP only
- Choice of flexible hoses and or stainless steel tube for ease of installation
- Choice of 12v or 24v alarm module
- A full bill of materials detailing what you will receive in your ETI Fire Suppression System

## Typical Applications

### Heavy Equipment System

The Heavy Equipment System (HES) has increased cylinder capacity for longer discharges and more nozzles. The HES system been designed to allow configurations to suit applications in a range of industries including:

- Surface and underground mining equipment including draglines, haul trucks, dozers and shovels
- Construction equipment including bulldozers, excavators, graders, generators and compressors
- Forestry and agricultural equipment including loggers, loaders, harvesters and tractors
- Aircraft ground support vehicles
- Industrial equipment
- Road transport including prime movers
- Oil and gas applications including platforms and rigs
- Boats and general marine
- Railway equipment and locomotives



Heavy Equipment System

# The Foam Fire Suppression Systems For Light, Medium & Heavy Vehicles (Contd)

## Typical Applications (contd)

### Medium Equipment System

The Medium Equipment System (MES) has a thirty litre cylinder introduced for medium size equipment (MES) designs. It has increased capacity for longer discharges or more nozzles. It can also be configured for 1¼" or 1½" BSP ported valves fitted as an option to the ½" BSP dual valve.

The medium Equipment System has been designed to allow configurations to suit applications in a range of industries including:

- Agricultural equipment
- Buses
- Small to medium size construction equipment
- Forklifts
- Medium size commercial vehicles



Medium Equipment System

### Light Equipment System

The Light Equipment System (LES) has been designed to allow the designer to fit smaller systems to smaller machines where space is limited such as four wheel drive vehicles. It is supplied in stainless steel for light weight. It uses a specially designed compact ½" BSP dual valve.

The LES system is designed to suit applications in a range of industries including:

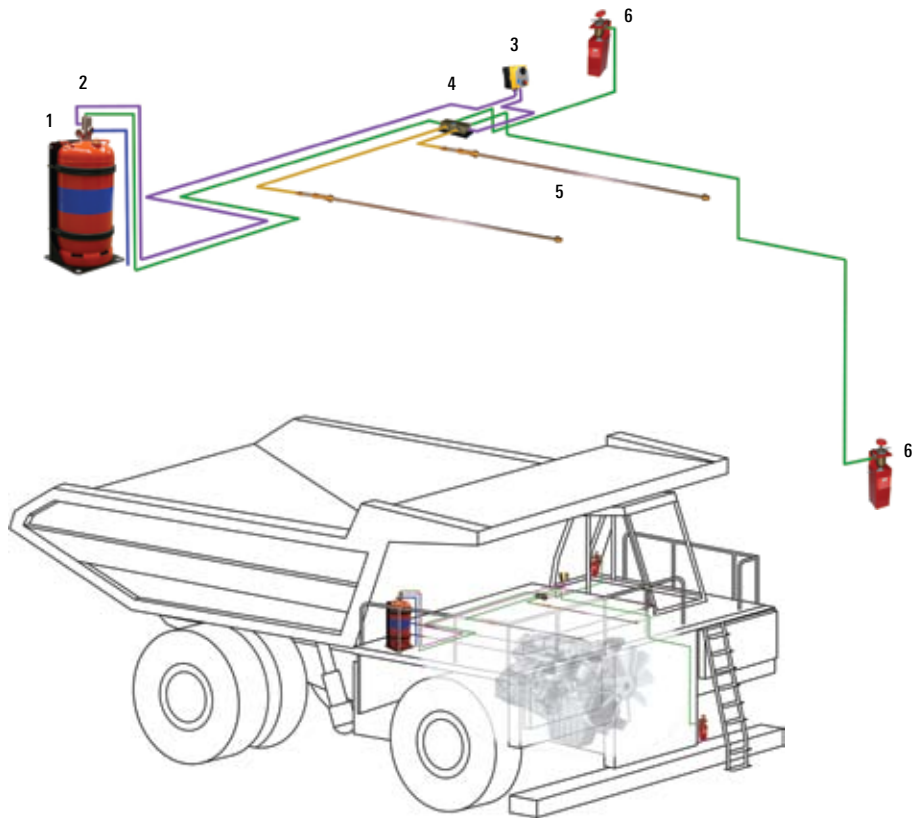
- 4WD vehicles for mine sites
- Agricultural equipment
- Turbo charged 4WDs
- Medium commercial vehicles
- Small Buses



Light Equipment System

# Typical Haul Truck Layout

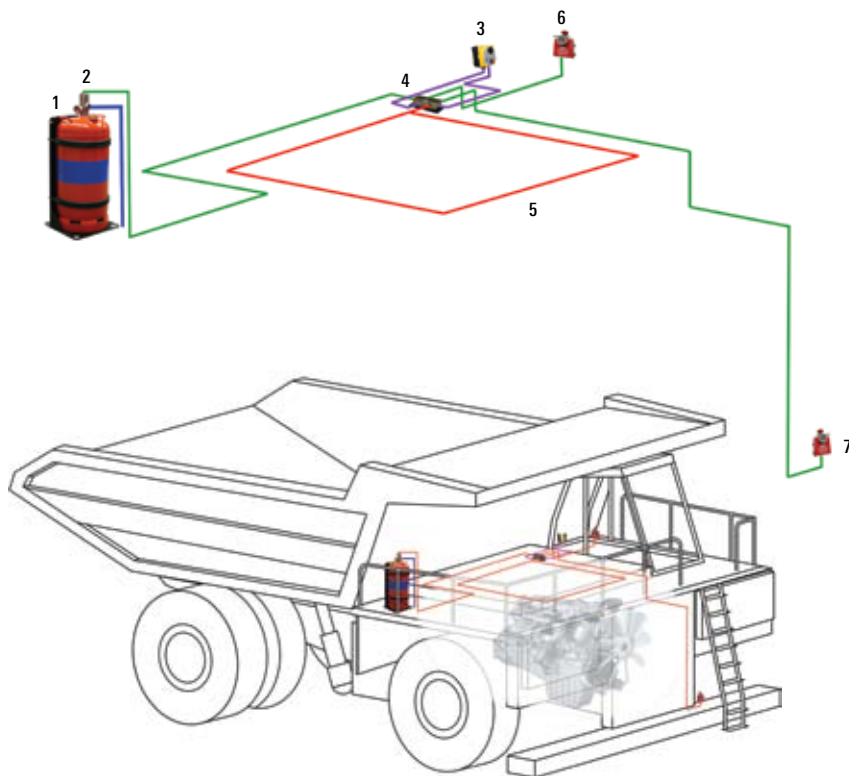
## ROP Detection, Alarm and Actuation



### ROP Parts Description

- 1 31-CYLSET32SSXX
- 2 31-VALVE20ROPASSY
- 3 31-AWASKITMUS
- 4 31-DMANSH
- 5 31-SENSXX
- 6 31-REMOTEB

## LOP (Low Oil Pressure) Detection, Alarm and Actuation

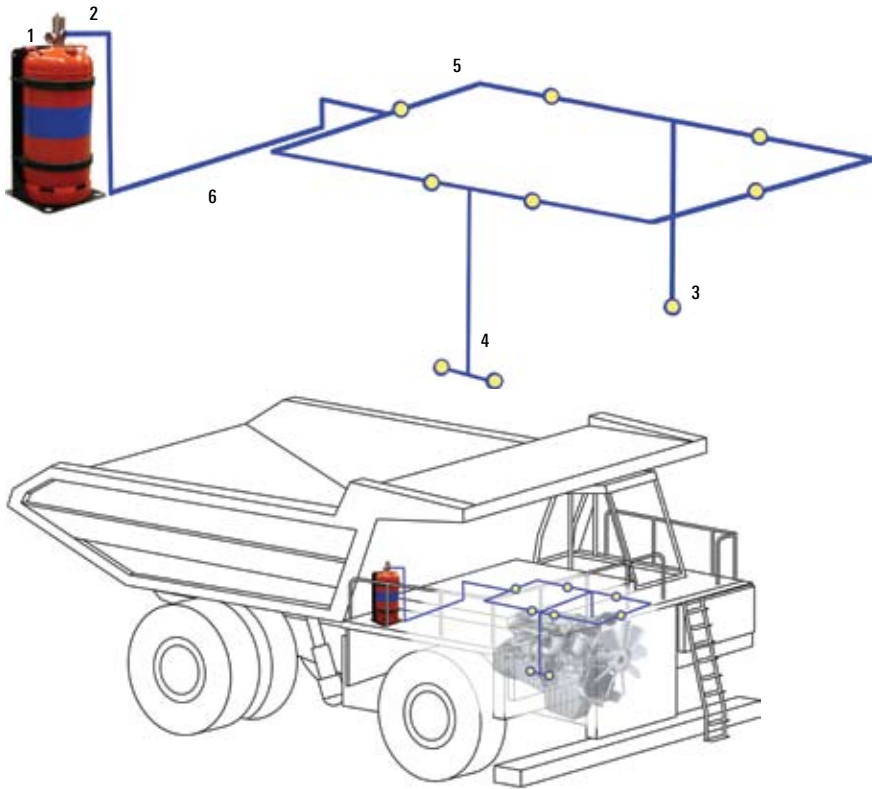


### LOP Parts Description

- 1 31-CYLSET32SSXXX
- 2 31-VALVE32LOPASSY
- 3 31-AWASKITMUS
- 4 31-DMANLOP
- 5 31-SENSLOP
- 6 31-REMOTELI-MUS
- 7 31-REMOTEL-MUS

# Typical Haul Truck Layout

## Foam Discharge System



### Foam Discharge Parts Description

- 1** Cylinder
- 2** Cylinder Actuation Valve
- 3** Spray nozzle
- 4** Branch line
- 5** Ring main
- 6** Delivery hose



Spraying of foam on engine

# Cylinder Assembly

## Cylinder Assembly Features

- Cylinders are manufactured in Stainless Steel and externally powder coated
- Each cylinder incorporates a filler plug and a safety relief valve
- Cylinder assemblies use flexible pick-up tubes to allow the cylinders to be mounted either vertically or horizontally
- Heavy duty welded carbon steel cylinder brackets have been designed to integrate with the cylinder to minimize space usage. The robust base plate has been designed for compactness and provides the smallest footprint possible
- Vibration eliminators (part number 31-VEASSY34) are available for applications where cylinder assemblies are subject to continuous movement or vibration
- Optional weld mounting (part number (31-VEWMT60) is available for ease of installation
- The Cylinder Sets "31-CYLSETSSXXX & 31-CYLSET32SSXXX" incorporate the cylinder, suction hose, Safety Relieve Valve, Filler Plug & mounting bracket.

**Note: The type of Valve required, Vibration Eliminators and the Foam is to be ordered separately.**

## Cylinder Capacities

Part No.	Brand	Neck Ring Outlet	Effective Capacity	Total Volume	Water Contained	AFFF 6% Contain	Cylinder Diameter
31-CYLSETSSLES	ETI	½" BSPF	11.5 litres	15 litres	10.7 litres	0.8 litres	190 mm
31-CYLSETSS045	ETI	1 ½" BSPM	35 litres	45 litres	32.9 litres	2.2 litres	370 mm
31-CYLSETSS065	ETI	1 ½" BSPM	50 litres	65 litres	47.0 litres	3.0 litres	370 mm
31-CYLSETSS106	ETI	1 ½" BSPM	85 litres	106 litres	79.9 litres	5.1 litres	370 mm
31-CYLSET32SS030	MUSTER	1 ¼" BSPM	20 litres	30 litres	18.5 litres	1.5 litres	300 mm
31-CYLSET32SS045	MUSTER	1 ¼" BSPM	35 litres	45 litres	32.9 litres	2.2 litres	370 mm
31-CYLSET32SS065	MUSTER	1 ¼" BSPM	50 litres	65 litres	47.0 litres	3.0 litres	370 mm
31-CYLSET32SS106	MUSTER	1 ¼" BSPM	85 litres	106 litres	79.9 litres	5.1 litres	370 mm
31-TESTCHGKIT	ETI	Recharge kit - Nitrogen regulator					



**MUSTER**  
FIRE SUPPRESSION SYSTEMS

## Compliance

The cylinders are design registered with WorkCover NSW for use as fire agent cylinder and are manufactured to AS2470 and also to meet European CE safety certification requirements.

Note: Please specify when ordering if CE certification is required.

# Cylinder Valve Assembly

## Cylinder Valve Assembly Features:

- The range of cylinder valves assemblies have been increased to provide more flexibility to enable a standardisation program to be established with the users.
- The high flow Mark I brass ROP valve (31-VALVEASSY25) with its 1" outlet remains in the range where users require above standard flow rates to the nozzles.
- The patent Pending Dual Actuation Valve (ROP or LOP) range has had upgrades to meet the changing market demands. With the relief valve now part of the Cylinder Assembly, the burst disc on the valve is no longer present. With the removal of the Burst Disc it has allowed upgrading of the valve spool assembly. It is now available in both 1 ¼" & 1 ½" BSPF thread sizes.
- The new addition to the range is the MUSTER range of Cylinder/Valve assemblies. These MUSTER cylinder valves are of Stainless Steel construction, compact in design, fully self setting and in 1 ¼" BSPF allowing for interchange ability. They are individually designed for either an ROP application or LOP application.
- All Cylinder Valve assemblies come with Gauges with Stainless Steel bodies.

Part No.	Brand	Description	Thread	Outlet
31-VALVE32RASSY	MUSTER	ROP S\S Valve Assembly	1 ¼" BSPF	20mm
31-VALVE32LASSY	MUSTER	LOP S\S Valve Assembly	1 ¼" BSPF	20mm
31-VALVE32DASSY	MUSTER	S\S Dual LOP or ROP Actuation Valve Assembly	1 ¼" BSPF	20mm
31-VALVEASSY25	ETI	ROP Brass Valve Assembly	1 ½" BSPF	25mm
31-VALVE38DLASSY	ETI	S\S Dual LOP or ROP Actuation Valve Assembly	1 ½" BSPF	20mm
31-VALVE15DASSY	ETI	S\S Dual LOP or ROP Actuation Valve Assembly	½" BSPM	13mm
31-VALVE15LASSY	MUSTER	LOP S\S Valve Assembly	½" BSPM	13mm
31-TESTTAG		Date Test Tag - Metal		
31-SECRING		Metal Split Security Ring For Tag		
31-SECTIE		Security Tie		



31-VALVE32RASSY



31-VALVE32LASSY



31-VALVE32DASSY

# Detection and Automation Actuation System

The Heavy Vehicle Foam Fire Suppression System has been designed to work automatically or manually from remote actuation points and offers several options for vehicle fire risk protection dependant on requirements: either a loss of pressure detection and automatic actuation system (LOP) or a rise of pressure detection and actuation system (ROP).

## 1. Rise of Pressure Detection and Automatic Actuation (ROP)

In the event of a fire, the system will automatically activate via the use of two fire detectors/actuators.

The detectors are made from 12.7mm stainless steel and can be shaped to fit the intended environment above the fire hazard.

The detectors come complete with filter assembly (31-DPFILTER) and check valve (31-CHECKVALVE) for connection to a manifold. These detectors/actuators contain a chemical core that, when a sustained temperature of over 175 degrees Celsius is reached, it automatically sends a pressure pulse through the actuation system to the cylinder valve, via the check valve manifold, to release the foam. At the same time, a pressure switch mounted on the manifold trips and notifies the alarm panel, thereby alerting the operator.

As this product is subject to a specific expiry time, replacement tubes containing the chemical are made available. These replacement tubes do not come with the filter assembly or the check valve.

ROP Sensor Tube Material Safety data sheets can be supplied on request.

Part No.	Brand	Description	Length (M)	Replacement Tube
31-SENS1.0	ETI	ROP Sensor Tube Assembly	1.0	31-SENS1.0
31-SENS1.5	ETI	ROP Sensor Tube Assembly	1.5	31-SENS1.5
31-SENS2.0	ETI	ROP Sensor Tube Assembly	2.0	31-SENS2.0



ROP Sensor Tube Assembly

## 2. Loss of Pressure Detection and Automatic Actuation (LOP)

LOP Automatic actuation is the more common form of Fire Suppression Actuation mainly due to confidence in the concept and the lower cost, however if not installed to ensure zero leakage is achieved it can occasionally result in systems actuating when no fire present. To address this concern an alternative MUSTER LOP system is now also available.

### 2.1 Using Thermoplastic Tubing as Sensor

Under the standard LOP system, loss of pressure sensing is made of 6mm thermoplastic tubing and is stable to 100°C. The tubing is strategically positioned above areas identified in the risk assessment as being fire risk and requiring fire detection. The tubing is pressurised and when the tubing is exposed to fire the rapid elevation in temperature causes the material to plasticize and rupture. The resulting sudden release of pressure to the actuation circuit then acts to open the actuation valve and release the foam mix. The pressure drop in the system then sets off the fire alarm.

Components required to make a Standard LOP System

Part No.	Brand	Description
31-LOP003	ETI	LOP Tube Fitting 6mm Straight x 1/4" BSPM
31-LOP005	ETI	LOP Tube Fitting 6mm Tube Tee
31-LOP017	ETI	LOP Termination Brass 6mm x 1/4" BSPF
31-NF0026	ETI	Brass Plug – 1/4" BSP
31-SENSLOP	ETI	LOP Fire Sensor Tube - Red
31-LOP007	ETI	LOP Termination Brass 6mm x 1/8" BSPF
31-BPLUG	ETI	Brass Plug - 1/8" BSP



31-SENSLOP

### 2.2 Components required to make the LES LOP System

Part No.	Brand	Description
31-REMOTELE12V		Electrical Solenoid Remote Actuator 12VDC
31-TOG SWITCH		12VDC Toggle switch with protective cover



31-REMOTELE12V

31-TOG SWITCH

For small vehicles where space is a premium, an manual electrical LOP actuation is used. This consists of a Toggle Switch & and a normally closed 12VDC or 24VDC solenoid valve. By turning on the toggle switch it opens the solenoid valve and creating a loss of pressure and thereby activating the fire system. The Toggle switch comes with a cover to prevent the accidental switching on of the system.

# Detection and Automation Actuation System

## 2.3 Using heat sensitive capsule as sensor

The new LOP MUSTER sensing system now being offered is based on an LOP concept used by the Australian Defence Force & the components are compliant to AS1851-2005. This new LOP system entails the use of heat capsule sensor encased in a solid brass housing designed to take special leak proof brass connectors and fittings fitted over standard 8mm Stainless Steel tube. The combination of all these components eliminate the possibility of leakage and therefore premature actuation. The system is actuated through a rise in temperature causing the heat capsule sensor to release pressure in the system and actuate the valve.

Components required to make the new MUSTER LOP System

Part No.	Brand	Description
37-100141	MUSTER	Heat Capsule Detector, Brass Housing, Connectors, 141° C - AS1851-2005
37-100652	MUSTER	Stainless Steel Tube Tee with S/S Fittings for 8mm Tube
37-100723	MUSTER	Stainless Steel Tube Elbow with S/S Fittings for 8mm Tube
37-100532	MUSTER	Stainless Steel Plug 8mm
37-100287	MUSTER	Stainless Steel Tube Connector – 8mm
37-100834	MUSTER	Stainless Steel Nipple 8mm x 7/16" JIC
37-100468	MUSTER	Stainless Steel Tube 8mm x 2M Lengths



37-100141



Heat capsule detector installation

Replacement Spares for the Muster LOP System

Part No.	Brand	Description
37-100926	MUSTER	Brass 8mm Nut Assembly, includes Nut, O-ring & Ferrule
37-100943	MUSTER	Stainless Steel 8mm Nut Assembly, includes Nut, O-ring & Ferrule
37-1009578	MUSTER	Pack of 10 O-Rings for 8mm Tube



37-100652



37-100926

## 3. Infrared Optical Sensing

The 31-SENSEOPTIC is a new advanced alarm and system controller which uses the UL listed triple Infra Red Optical Fire Detection system. This type of system is recommended where high pressure oil fires are known to occur, such as large open decked spaces where it is not feasible to use the normal range of fire detectors. The optical detection system allows fast fire detection across a broad area so that equipment shutdown and fire system actuation can reliably occur.

Part No.	Brand	Description
31-SENSEOPTIC	ETI	Infrared Flame Detector



31-SENSEOPTIC

## 4. Actuation Manifold

The Actuation Manifold receives the ROP or LOP pressure change caused by either the Automatic sensing or manual actuation activating. On receiving this pressure change from either function directs the pressure change to the valve on the cylinder causing the valve to open & discharge. The pressure switch converts the pressure change into an electrical signal that activates the alarm panel.

When installing an ROP system check valves at the Actuation manifold must be used.

Part No.	Brand	Description
31-CHECKVALVE	ETI	Check Valve for ROP 1/4" BSP x 7/16" JIC
31-DMANSH	ETI	Manifold ROP Short – 4 Inlet Port
31-DMANLG	ETI	Manifold ROP Long – 6 Inlet Port
31-DMANLOP	ETI	Manifold LOP with 2 x 1/8" BSP
31-NF0026	ETI	Plug – 1/4" BSPT



31-CHECKVALVE



31-DMANSH

Note: the 31-CHECKVALVE is supplied when ordering the ROP Sensor Tube Assembly

# Remote Manual Actuation

Two options are available for the remote activation of the ETI Foam Fire Suppression System – rise of pressure remote actuation and loss of pressure remote actuation.

## Rise of Pressure Remote Manual Actuation

The ROP remote manual actuator is a high capacity carbon dioxide cylinder sealed with a frangible seal. Strategically fitted around the machine, the remote manual actuator is activated, when required, by removing the safety pin and firmly hitting the Strike Knob. This action acts to release the carbon dioxide under pressure. In turn, this pressure actuates the release valve on the foam cylinder, activating the system, while simultaneously triggering the fire alarm.

### Features:

- High capacity, multi-purpose actuator
- Suitable for surface or concealed mounting
- Complies to AS2469 2005/AS 2470 1998
- Cylinder life: five (5) years
- CO2 charge: 150g net
- Cylinder materials: cold rolled carbon steel
- System warranty: 3 years
- Contains pressure relief device, refer MSDS



31-REMOTEMUS

Part No.	Brand	Description
31-REMOTEMUS	MUSTER	Remote ROP Actuator Kit
31-RPCYLC02	ETI	CO2 Cylinder
31-REMCOPRING	ETI	Remote Actuator Copper Seal
31-SECTIE		Security Tie

## Loss of Pressure Remote Manual Actuation

The LOP remote manual actuator is a multipurpose actuator designed to be strategically fitted around a machine determined to require protection. The remote LOP manual actuator is activated by removing the safety pin and firmly hitting the Strike Knob. This action acts to vent the built-up pressure in the detection circuit to atmosphere, simultaneously allowing the cylinder valve to open and activate the system. This function also acts to trigger the system alarm.

### Features:

- Suitable for surface or concealed mounting
- Simple strike knob operation with Pull Pin
- Robust steel construction
- Sintered Bronze filter (31-FILTERSIN06) & Dust protector to prevent ingress of contamination.



31-REMOTELIMUS

Part No.	Brand	Description
31-REMOTELIMUS	MUSTER	Remote LOP Actuator Kit with Indicator
31-REMOTELMUS	MUSTER	Remote LOP Actuator Kit no Indicator
31-SECTIE		Security Tie

# Discharge System

Once activated either through automatic detection, or via a remote manual actuator, the Aqueous Film Forming Foam (AFFF) is dispensed through a series of standard brass nozzles strategically positioned at a discharge rate of 3.2 litres per minute.

## Discharge System Installations include:

- Either flame resistant red fire hose that meets the requirements of SAE 100R1AT and flame resistance designation US MSHA2G152/1 and LOBA (note: this hose is designed for continuous operation in temperatures from -40°C to +125°C) or 12.7mm stainless steel tubing for areas where intense fire exposure may be experienced. Note that the tubing can be shaped to suit the working environment
- Brass Nozzles with Blow Off caps secured with wire lanyard
- Nominal 60° & 120° spray angle
- Nominal Distances for 60° nozzles 700mm to 1100mm
- Nominal Distances for 120° nozzles is 235mm to 700mm

Part No.	Brand	Description
31-RFS-04		Fire Hose SWB Red – ¼" I.D.
31-RFS-08		Fire Hose SWB Red – ½" I.D.
31-RFS-12		Fire Hose SWB Red – ¾" I.D.
31-DPSST12/2/AN		Stainless Steel Tube 12mm OD x 2M Long Annealed
31-NOZCAPBRASSY60	ETI	Brass Nozzle & Cap Assembly 60°
31-NOZCAPBRASSY120	ETI	Brass Nozzle & Cap Assembly 120°
31-NOZES90	ETI	Brass Nozzle Mount – Single End 90°
31-NOZESS	ETI	Brass Nozzle Mount – Single End Straight
31-NOZETW	ETI	Brass Nozzle Mount – Twin End 90° & 45°
31-NOZIS90	ETI	Brass Nozzle Mount – Single Inline 90°
31-NOZISS	ETI	Brass Nozzle Mount – Single Inline Straight
31-NOZITW	ETI	Brass Nozzle Mount – Twin Inline 90° & 45°
31-NF0016	ETI	Brass Main Tee 1 1/16" JIC x 3/4" JIC including Mounting Bracket
31-NF0006	ETI	Brass Flare Tee 3/4" JIC Male
31-NF0030	ETI	Anodise inline discharge tee
31-NOZITWFSS	ETI	Brass twin nozzle Assy c/w mount bracket



31-NOZITW



31-NOZCAPBRASSY60

## Fire Alarm and Engine Shutdown

### High Current (HC) Fire Alarm & Engine Shutdown

ETI's high current "System Status Indicating Panel" – "Alarm Panel" has the same functionality as the standard model with some additional features, the engine shutdown contacts are rated at 30 Amperes. This allows the option of wiring the ignition system of the machine protected, through the alarm shutdown contacts. In effect this mandates that the machine may only operate if the alarm panel does not have a shutdown indication. There is also a second 30 Ampere relay provided. On actual shutdown, this will provide a voltage at 30 Amps capacity for a timed period of one minute. This has been provided in case there has been any shutdown equipment or functions provided that need to be energised at time of shutdown.

### Features:

- Designed to AS5062 Standards
- Robust High Temperature, Poly Butylene Terephthalate (PBT) case
- Waterproof Protection Structure designed to meet IP67 rating
- Reset and test function
- Power indicator
- Audio and visual indication on fire detection
- Low pressure cylinder monitor (optional)
- Engine shutdown contacts
- Shutdown delay capability is variable. Choice of 6, 12 or 24 second delay to shutdown
- Shutdown reset function
- Alarm panel can operate from 12VDC or 24VDC.
- Panels are robust and compact
- Key reset feature on 31-ALMPNRESET
- Engine shutdown contacts rated at 30 Amperes in 31-ALMASPNHC
- Second 30 Ampere delay provided in 31-ALMASPNHC



31-AWASKITMUS



31-ALMPNRESET



31-ALMASPNHC

## Discharge System (Contd)

Part No.	Model	Description
31-AWASKITMUS	MUSTER	Alarm Panel Kit - AS5062 - No bracket
31-AWASKITRESET	MUSTER	Alarm Panel Kit with Plug Reset - AS5062 & bracket
31-APALASSY2BAR	ETI	Pressure Switch Assembly (2 BAR)
31-APALASSY9BAR	ETI	Pressure Switch Assembly (9 BAR)
31-APCABLE	ETI	Alarm Cable - Silicon rubber, Heat resistance
31-ALMPN	MUSTER	Alarm Panel only, no Pressure Switches or Cable – AS5062
31-ALMPNMUS	MUSTER	Alarm Panel only, no Pressure Switches or Cable – AS5062
31-ALMPNRESET	MUSTER	Alarm Panel with Reset plug only, no Pressure Switches or Cable – AS5062
31-ALMASPNHC	MUSTER	Alarm panel for high current only & bracket - AS5062

### Functions:

- On = GREEN LED
- Alarm = RED LED with audible pulsating buzzer. Engine shutdown occurs after specified time period and ENGINE SHUTDOWN LED illuminates
- Cylinder low pressure option = CYLINDER PRESSURE LOW LED illuminates with an audible pulsating buzzer
- Panel test = the panel may be tested by pressing and holding the RED TEST switch for 5 seconds until the alarms activate
- Wiring connections as per instruction manual

## Foam

Why use Foam? Fire fighting theory proposes that for fire to continue, it must maintain the fundamental components of Heat, Oxygen and Fuel. If any one of these components is reduced adequately or eliminated, then fire will not continue. It follows therefore that fire fighting agents are specifically designed to control or eliminate one or more of these key components.

The ETI Foam Fire Suppression System utilises high grade AFFF at a 6% concentrate. AFFF is the leading agent used to fight large Class B (fuels and oils) flammable liquid fires and is used throughout the world typically in oil refineries, oil tank storage facilities, fuel depots and mobile applications. With a 94% water composition, AFFF is also effective in controlling both Class A fires (normal combustibles, wood, plastic, paper etc.) and Class B fires (Fuels, Oils, etc.).

Foam concentrate material data safety sheets are available on request.

Part No.	Description	Size	To Suit Cylinder Size
31-CFOAM0.8	Foam Concentrate	0.8 Litres	LES 015
31-CFOAM1.5	Foam Concentrate	1.5 Litres	MES 030
31-CFOAM2.2	Foam Concentrate	2.2 Litres	045
31-CFOAM3.0	Foam Concentrate	3.0 Litres	065
31-CFOAM5.1	Foam Concentrate	5.1 Litres	106
31-CFOAM20	Foam Concentrate	Bulk 20 Litres	
31-CFOAM200	Foam Concentrate	Bulk 200 Litres	



31-CFOAM 3.0

### Aqueous Film Forming Foam (AFFF) offers several advantages in the control of fires:

- When applied to fires, foams form a film on top of the fuel surface. This process creates an effective vapour seal, denying any oxygen supply to the fuel surface
- As the concentrate is mixed with 94% water, the foam solution is able to provide a strong cooling effect and, in doing so, becomes a critical factor in stabilising the suppression performance. The cooling effect also aids in preventing re-ignition
- Foams are able to flow under gravity to follow and cover fuel spills
- The use of foam avoids powder compaction problems that are commonly associated with Dry Chemical Powder (DCP) systems due to vibration and does not pose a respiratory hazard
- Longer discharge times are possible using foam
- Foams are not hazardous to personnel and equipment can be serviced on site
- Extensive field testing has shown that AFFF is highly effective in extinguishing Class A & Class B fires while being Environmentally friendly. AFFF is biodegradable and has a negligible impact for nutrient loading.



Discharged foam on engine

# System Design And The Risk Assessment Procedure

Risk management has become far more sophisticated in recent times as companies face the challenge of managing vast investments in capital equipment, as well as their human resources. Fire events, although low in probability, are often offset by catastrophic outcomes. As such, the JSG approach is to partner with clients to investigate the "Big Picture" concept of fire prevention and suppression, and by utilising a comprehensive risk assessment procedure, follow a process whereby clients can, in real terms, reduce the risk of loss.

These preventative measures take the lead in the process to achieve the age old philosophy: Prevention is better than cure. Fire risk assessments and audits are carried out to identify any areas which need to be addressed in order to create a safer work environment and comply with necessary fire legislations. The Fire Suppression System assesses all fire related risks and produces a full, comprehensive and itemised report which will include any remedial work to your existing equipment. While prevention of many identified causes can be effected under a good management program, they cannot be entirely eliminated. It is at this point, if the risk is still considered unacceptable, the JSG fire system provides effective fire control to achieve the final risk reduction outcome.

The recommended approach is for the client to appoint a committee. This committee should bring to the table all the expertise and experience that allows it to identify hazards and risks, the committee rates these risks on a pre determined scale and then agrees on suitable control measures to achieve the required level of protection.



Risk Assessment sheets

## Step 1: A Fire Protection Committee is formed

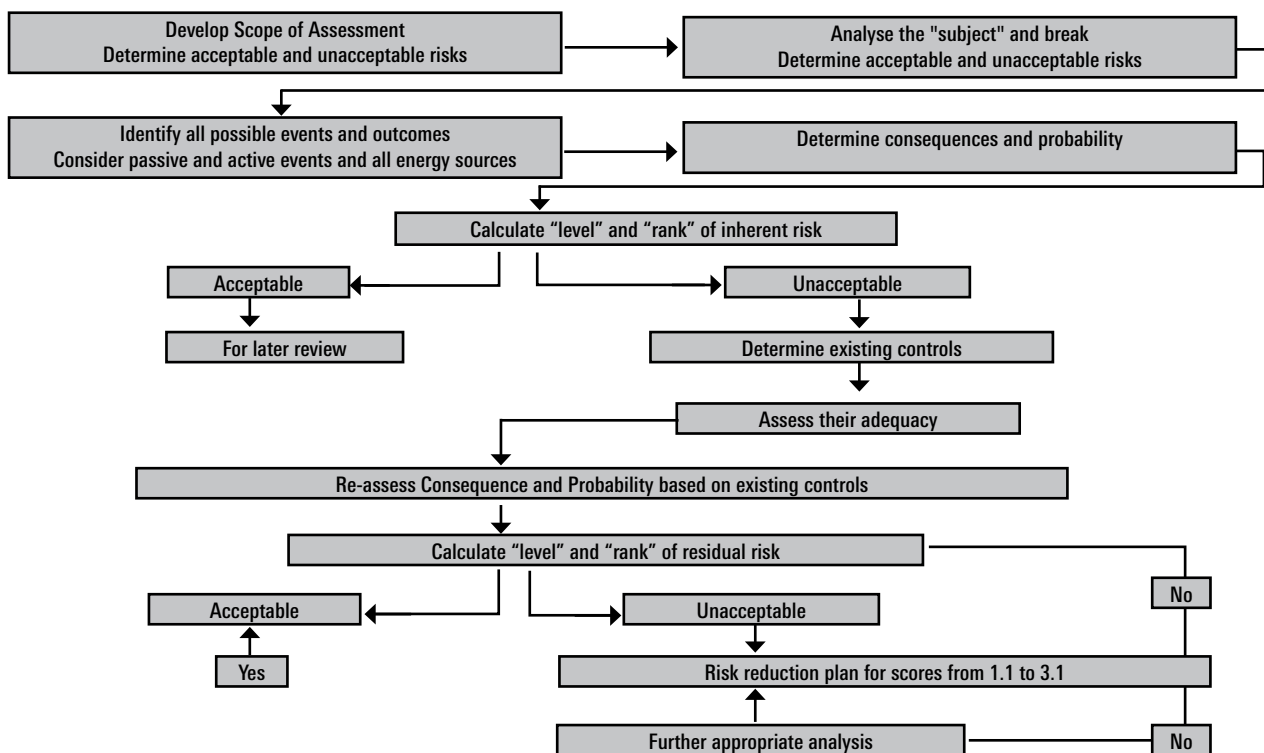
The following recommended risk assessment procedure is in accordance with AS5062-3006.

- The committee is comprised of the equipment owner's key personnel and the JSG representative.
- The committee is charged with determining 'acceptable' and 'unacceptable' risks. Those deemed unacceptable are further discussed with a view to implementing control measures designed to reduce each

The following flow chart (see page 16) outlines the Risk Assessment processes, the rating requirements, as well as a review and a record system. Note that any installations will only be considered compliant if the client invokes the full risk assessment procedure, as determined by the Risk Assessment process. JSG and its authorised distributor may agree to install to a customer requested design and specification, but can not be held responsible for design performance.

# System Design And The Risk Assessment Procedure (Contd)

## Risk Assessment Procedure Flow Chart



## Step 2: Documenting and Rating each Fire Risk

The committee is responsible for identifying all hazards and risks related to each piece of equipment and then rating each risk based on probability against consequence. This is termed the Weighted Risk Assessment Criteria (WRAC)

Probability	Consequence			
	Catastrophic	Critical	Marginal	Negligible
Frequent	1.1	1.3	1.6	3.6
Probable	1.2	1.5	2.4	3.7
Occasional	1.4	2.2	3.3	4.1
Remote	2.1	2.3	3.4	4.2
Improbable	3.1	3.2	3.5	4.3
Risk Score	HIGH	MODERATE HIGH	MODERATE LOW	LOW

The WRAC guidelines table defines risk ratings from 1.1 to 4.3 (1.1 being the highest and potentially the most catastrophic). Each machine or vehicle is assessed for fire risk based on these guidelines Example: The committee identifies one of the major causes of fire is the failure of hydraulic hoses in the engine bay area due to deterioration from aging in the vicinity of turbo charged diesels that present a high temperature ignition source of fuels and oils.

This is given a rating of CRITICAL vs PROBABLE, resulting in an unacceptable level of RED 1.5. The committee implements a control measure where the hydraulic hoses are changed, at predetermined maintenance intervals, before they fail, respecting the known reliable life expectancy of those components. This process moves the probability to REMOTE and the risk is now reduced to a rating of YELLOW 2.3. This risk figure, although greatly improved, is still unacceptable and an engine bay fire suppression system should be considered as part of these control measures. It is agreed that an effective fire suppression system would likely extinguish such a fire with minimal damage.

This now moves the consequence to MARGINAL which, when considered with REMOTE, gives a rating of GREEN 3.4. Negligible consequence ratings range from BLUE 4.1 to Low.

The above example shows that, while preventative maintenance is worthwhile in reducing associated fire risks, the backup of a fire system is still needed to get the desired fire rating.

To maintain the Fire System's integrity, and comply with AS5062-2006, regular servicing must be maintained and a Service Log is to be kept. The Service Log consists of an Inspection Schedule form and a Testing Schedule form. The forms are supplied with the fire system and are generated by the design program.

## Inspection Schedule Forms

### Daily Service Check

A simple set of daily inspections are to be done. This form shown is generated by the design program and details these simple inspections. These may be done by the operator as part of a daily pre-start check or by maintenance personnel depending on customer preferences. The form is a simple daily sign off record as in the example below.



### Periodic Inspection

This is referred to in AS5062-2006 as the six monthly inspections because that is the MAXIMUM interval it may be performed. From experience JSG recommends that this period of inspection must be shortened where operating conditions indicate. As a result of this the JSG service procedure requires the customer to indicate what service conditions the machine works in, to set the maximum intervals between services. To assist in this process JSG provides a qualitative guide which instructs what service interval minimum would be appropriate, *see extract below from the design guide*.

SERVICE INTERVALS	
THE SERVICE INTERVAL MUST NOW BE SET AFTER CONSIDERING THE WORKING CONDITIONS. AS 5062 REQUIRES A MAXIMUM SIX MONTHLY SERVICE INSPECTION AND TEST. ETI SERVICE RULES REQUIRE THIS BE SHORTENED IN INTERVAL WHERE SERVICE CONDITIONS INDICATE THAT THIS NECESSARY. PLEASE REFER TO THE GUIDE BELOW. N.B. THIS DOES NOT EXCLUDE THE TWELVE MONTH SERVICE WHICH REMAINS MANDATORY.	
GUIDELINES TO RECOMMENDED MAXIMUM INTERVAL BETWEEN PERIODIC SERVICE	
WORKING CONDITIONS. Refer also to design records	Max Interval
Working hours less than 2 hours per day and working conditions clean with negligible dust, grime and oil contamination.	6 Months
Working hours up to 4 hours per day or working conditions with moderate dust, grime and oil contamination.	3 Months
Working hours up to 8 hours per day or working conditions with substantial dust, grime and oil contamination.	2 Months
Working hours up to 24 hours per day or working conditions with excessive dust, grime and oil contamination.	1 Month
<b>PERIODIC MAXIMUM SERVICE INTERVAL SELECTED FOR THIS MACHINE (MONTHS)</b>	<b>1</b>

## Annual Inspection and Test

### Annual testing schedules

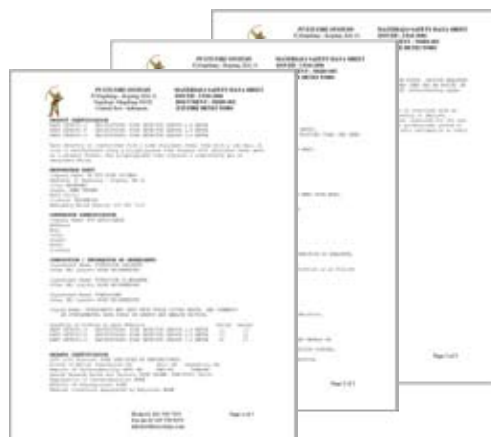
This procedure meets and exceeds the Periodic inspection and therefore may substitute it when it is done. It is a similar procedure to the Periodic service with additional inspections and tests added and, most noteworthy, there is a full actuation and discharge test. This provides the opportunity to do the required internal inspections in the foam cylinders required by the standard AS 2030.1-1999. It also allows for the foam system valve to be stripped and inspected. The valve must have new seals fitted. Re-lubricate and check function before being re-fitted.

On the right are examples of the standard forms for annual inspection, test and servicing which are generated in the design program.



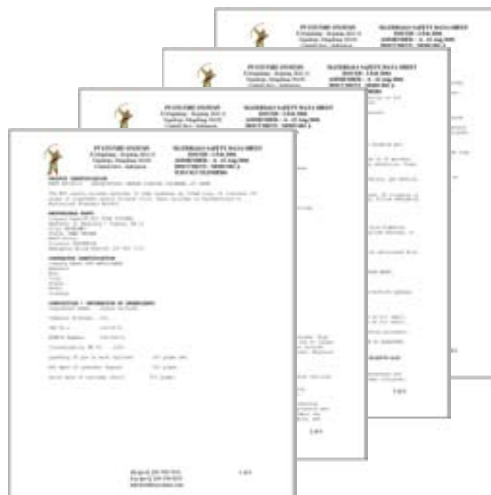
## ETI Fire Detectors

Each detector is constructed from a 12mm stainless steel tube with a 1mm wall. A core is manufactured using a polypropylene tube wrapped with stainless steel mesh as a primary filter. The polypropylene tube contains a combustible mix as described in the M.S.D.S.



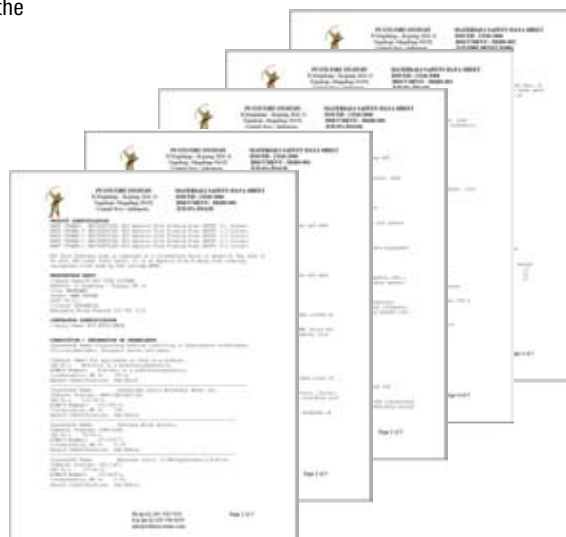
## ETI CO2

The ETI carbon dioxide cylinder is 51mm diameter by 200mm long. It contains 150 grams of liquefied Carbon Dioxide (CO2). The CO2 in the cylinder is used to activate the fire system.



## ETI Foam

ETI fire fighting foam is supplied as a concentrate which is mixed at the rate of 6% with 94% clean fresh water. It is an Aqueous Film Forming Foam commonly recognized world wide by the acronym AFFF.



Each of these Material Safety Data Sheets are available online at the following link [http://www.jsgindustrial.com/matused\\_datasheet.html](http://www.jsgindustrial.com/matused_datasheet.html)

ETI/Muster is tested and approved by Inspection Services Body (ISB) for compliance to AS5062. KAN is the Indonesian Testing Authority and have approved I.S.B as a testing body. KAN is recognised by N.A.T.A and therefore product meets all requirements of Australian Standards AS5062.

Copies of the below can be viewed on the JSG website [www.jsgindustrial.com/fire.html](http://www.jsgindustrial.com/fire.html)



Additional information about mutual recognition arrangements can also be found on the web sites of IAC (<http://www.iac.org>), APLAC (<http://www.aplac.org>), EA (<http://www.european-accreditation.org>) and IAAC (<http://www.iaac.org>).

Further details about NATA accreditation of laboratories, inspection bodies and RVPs, and NATA's mutual recognition arrangements are available from Dr Helen Liddy, International Relations Manager (ph: +61 3 9529 1033; fax: +61 3 9529 4159) or by visiting NATA's internet web site at <http://www.nata.gov.au>. Please also see NATA Information Paper No. 3, (Guide to Use of NATA's IIRA Network), available from the "publications" page of NATA's web site.

**National Association of Testing Authorities, Australia**



**Mutual Recognition Arrangements**

The National Association of Testing Authorities, Australia (NATA) is recognised by the Australian government as the national authority for accreditation of laboratories and inspection bodies. Formal agreements also exist between NATA and the national laboratory accreditation bodies listed in the attached table. NATA's Mutual Recognition Arrangement (MRA) Network, for recognition of test and calibration reports from accredited laboratories, and between NATA and some of the national inspection body and reference material producer (RMP) accreditation bodies, also as listed in the attached table, for recognition of inspection reports from accredited inspection bodies, and of reference material certificates from accredited RMPs.

Under the mutual recognition arrangements between accreditation bodies, each organisation recognises the equivalence of accreditations granted by its overseas counterparts, and provides the equivalence of such accreditations, covered by each scope of recognition, within its own economy. This reduces the need for re-testing, re-calibration or re-inspection of products or re-certification of reference materials in an importing economy and saves time and money for exporters. Before entering into such arrangements, accreditation bodies have the responsibility to thoroughly evaluate each other's systems of accreditations. These arrangements also include mechanisms to ensure that test, calibration and inspection reports, and reference material certificates, covered by the arrangement, carry the same degree of accuracy and credibility on an ongoing basis.

Each NATA-accredited laboratory, inspection body and RMP is recognised for its technical competence to perform specific tests, measurements, or inspections, or certification of specific reference materials. For those specific tests, measurements, inspections or certifications, for which it is accredited, the accredited organisation is entitled to place the appropriate NATA endorsement on its reports, details of which are listed in the Second Schedule of NATA's Rules (July 2000), copies of which can be obtained from the NATA web site. Each NATA-endorsed report must be signed by a person recognised by NATA as an approved signatory.

Accreditation is granted only after detailed assessment and regular reassessments of the technical competence of the laboratory, inspection body or RMP and its staff against defined technical and management system criteria. NATA assessments are carried out by teams that include independent technical experts.

For recognition of reports and certificates issued by laboratories, inspection bodies or RMPs accredited by NATA's overseas mutual recognition partners, reports and certificates received from overseas accredited organisations must bear the accreditation mark ("endorsement") of one of the accreditation bodies listed in the attached table.

While NATA promotes that the endorsed reports and certificates issued by organisations accredited by its MRA partners are equivalent to NATA-endorsed reports, NATA is not able to compel a regulator or other client to accept the overseas reports or certificates. To meet Australian regulatory requirements the overseas organisation must be accredited for the test, calibration or inspection procedure prescribed by the Australian regulator.

The attached table includes the web site details for each of NATA's MRA partners. These web sites can be checked for details of accredited organisations, and for the accreditation mark of each accreditation body. NATA does not itself maintain a list of organisations accredited by its MRA partners.

Page 2 of 9

Issue Date: 6/09 Page 1 of 9

#### Sydney

Unit 1, 21 Amour Street Revesby NSW 2212  
PO Box 4126 Milperra DC NSW 1891  
Ph: (02) 9914 8720 Fax: (02) 9914 8798  
Email: [jsgindustrial@jsg.com.au](mailto:jsgindustrial@jsg.com.au)

#### Melbourne

6/407 Canterbury Rd Surrey Hills VIC 3127  
Ph: (03) 8809 1300 Fax: (03) 8809 1333  
Email: [jsgvic@jsg.com.au](mailto:jsgvic@jsg.com.au)

#### Brisbane

Unit 1/20 Lancashire St Acacia Ridge QLD 4110  
Ph: (07) 3273 3433 Fax: (07) 3273 3369  
Email: [jsgqld@jsg.com.au](mailto:jsgqld@jsg.com.au)

#### Perth

Unit 4/11 Townsend St Malaga WA 6090  
Ph: (08) 9248 7311 Fax: (08) 9248 9817  
Email: [jsgwa@jsg.com.au](mailto:jsgwa@jsg.com.au)

#### Cessnock

Level 1/426 Macdonalds Rd Pokolbin NSW 2325  
Mobile: 0447 277 755  
Email: [jsghv@jsg.com.au](mailto:jsghv@jsg.com.au)

#### Adelaide

Suite 2, 7 Divett Street Port Adelaide SA 5015  
PO Box 479 Welland SA 5007  
Mobile: 0448 730 886  
Email: [jsgsa@jsg.com.au](mailto:jsgsa@jsg.com.au)

#### Mackay

2/40 Evans Ave PO BOX 3374  
North Mackay QLD 4740 Technical Support  
Mobile: 0428 277 671 Fax: (07) 4953 3959  
Email: [techcq@jsg.com.au](mailto:techcq@jsg.com.au)

#### Townsville

Level 1, 1/5 Woolcock St Hyde Park Townsville QLD 4810  
Mobile: 0419 021 892 Fax: (07) 4724 5951  
Email: [jsgfnq@jsg.com.au](mailto:jsgfnq@jsg.com.au)

#### Cannonvale

29 Jones Rd Cannonvale QLD 4802  
Mobile: 0448 022 886 Fax: (07) 4946 5466  
Email: [salescq@jsg.com.au](mailto:salescq@jsg.com.au)

#### Indonesia

Talavera Office Park, 28th floor  
Jl. TB. Simatupang Kav. 22-26 Jakarta 12430 Indonesia  
Ph: (62-21) 7599 9910 Fax: (62-21) 7599 9977  
Email: [support@jsgindustrial.co.id](mailto:support@jsgindustrial.co.id)

Your authorised JSG distributor:

Lubrication  
Management  
Systems

Material  
Dispensing  
Management  
Systems

Hose & Cable  
Management  
Systems

Diesel & Fluid  
Management  
Systems

Fire  
Suppression  
Systems

Onboard  
Weighing  
Systems

Flow  
Measurement  
Systems

General  
Lubrication  
& Exhaust  
Extraction

Technical data specifications & photographs contained in this brochure were correct at time of printing. Pictures shown are for illustration purposes only. Technical information, specifications & products shown maybe subject to change without prior notice. (Errors & omissions excepted). **WARNING:** For sale & proper use consult instructions, the supplier or JSG. Contact your nearest JSG Industrial Systems P/L distributor for latest information.

Unit 1, 21 Amour St Revesby 2212 Australia  
**T:** +61 2 9914 8720 **F:** +61 2 9914 8798  
**E:** [jsgindustrial@jsg.com.au](mailto:jsgindustrial@jsg.com.au)  
**W:** [www.jsgindustrial.com](http://www.jsgindustrial.com)

