

# VIDEO SURVEILLANCE FOR EXTREME ENVIRONMENTS



The image features a close-up of a mechanical device, possibly a camera or sensor, with a circular lens in the center. The lens shows a view of a bright, textured surface against a blue sky. The device is mounted on a metallic base with several screws. The word "oxalis" is written in a green, stylized font on the left side of the device. A green horizontal bar is overlaid at the bottom of the image, containing the text "ABOUT OXALIS SECURITY" in white, uppercase letters.

*oxalis*

ABOUT OXALIS SECURITY



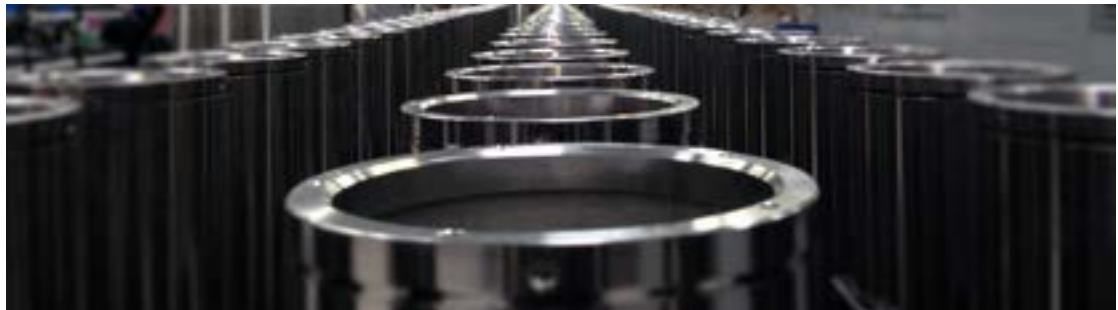
**Oxalis Security, a division of UK based Oxalis Group Ltd**, is a world leading manufacturer of end to end video surveillance and monitoring systems for use in extreme environments, with all products certified, manufactured and distributed from the research, manufacturing and distribution (RMD) headquarters located in the historic town of Stratford upon Avon, United Kingdom. Serving the Oil and Gas, Marine, Power, Process and Renewable Energy sectors in the main, the vast Oxalis product range covers virtually any application, certification jurisdiction and challenging environment. At every step of the requirement, Oxalis Security is able to customise a particular solution to suit exactly the requirements on site for example the incorporation of direct fibre out (DFO) options and complex distribution and control requirements where individually customised transmission panels or camera setups need designing. At the forefront of the portfolio are the flagship Full HD IP camera stations utilising the technology of multiple award winning IP camera module manufacturers in conjunction with Oxalis electronic interfacing.

**Flexibility is our strength.** Whatever our customers require to best fit their application can be accommodated. Adding to this, a wide range of accessories complement the offering such as explosion protected pressurised washer tanks, terminal enclosures, control panels, infra-red lighting units and a huge variety of mounting brackets and fixtures. The manufacturing facility is fully ISO 9001:2008 / 14001 / 18001 / ATEX / IECEx / cLCUs / CUTR / INMETRO compliant to the latest worldwide standards, therefore our customers can be assured of the highest levels of product quality and customer service.



Oxalis is proud of its unique ability to machine all CCTV components from solid using the very latest CAD/CAM systems and only the very best machine tools from Yamazaki. No castings are used as the structural integrity and surface finish of the material can never be absolutely guaranteed, particularly important when machining flame-paths and pressure vessels. Supply chains are minimised, delivery prediction accuracy is improved and overall quality vastly superior.

All design, certification and manufacture takes place in Oxalis Group's new UK facility based in Stratford upon Avon. Lean manufacture, vertical integration and right first time mentality form the cornerstones of every process. UK manufacturing has an impressive provenance of robust, solid engineering; couple that with new age innovation and state of the art technology and you build a future proof entity with stable foundations and a strong platform from which to expand.



**OXALIS "3 LAWS SAFE"**

1. Oxalis equipment must always ensure the safety of individuals and the protection of assets and processes.
2. Oxalis must always exceed its customers' expectations except where such actions would conflict with the first law.
3. Oxalis must protect its own interests as long as such protection does not conflict with the First or Second Laws.





RUGGED RELIABILITY

PTZ CAMERA STATIONS



# XP Series

## Explosion Protected PTZ



Oxalis XP PTZ camera stations are designed for use in designated hazardous areas (Zones 1, 2, 21 and 22) and made from all 316L stainless steel construction for maximum protection against corrosion. The cameras can be specified with 37X optical zoom block module with the facility for ultra low-light sensitivity, analogue-IP hybrid, 1080p network camera, thermal imaging or dual imaging models. The pan and tilt units are fast and accurate with a pre-set positional accuracy of  $<0.1^\circ$ . All except the thermal imaging options can be specified with a wiper and optional washer system. These camera stations are designed to withstand the harshest environments with longevity a key design parameter with very low costs of ownership. All models can be configured and customised to meet the precise criteria of each project and site. Customisation can include supply voltage options, control protocols and direct fibre optic transmission for all technologies.







COMPACT AND COST EFFECTIVE

PTZ CAMERA STATIONS

# XC Series

## Explosion Protected PTZ



Oxalis XC PTZ camera stations are a lower cost compact design for use in designated hazardous areas (Zones 1, 2, 21 and 22) and made from all 316L stainless steel construction for maximum protection against corrosion. The cameras can be specified with an analogue 37X optical zoom camera, analogue-IP hybrid or 1080p network camera. The pan and tilt units are fast and accurate with a pre-set positional accuracy of  $<0.1^\circ$ . All configurations can be specified with a wiper and optional washer system. These camera stations are designed to withstand the harshest environments. They are supplied pre-assembled with conduit tail for connection to an external enclosure for ease of installation.





LET THERE BE LIGHT

PTZ CAMERA STATIONS WITH INTEGRAL IR ILLUMINATOR



# XT Series

## Explosion Protected PTZ With Illuminator



Oxalis XT PTZ camera stations are designed for use in designated hazardous areas (Zones 1, 2, 21 and 22) and made from all 316L stainless steel construction or maximum protection against corrosion. The cameras can be specified with an analogue zoom camera with 37X optical zoom, analogue-IP hybrid or 1080p network camera. The pan and tilt units are fast and accurate with a pre-set positional accuracy of  $<0.1^\circ$ . The XT models have an integral white light or IR illuminator powered internally by the camera's own power supply. By using the latest LED technology 100m range is possible from 9 LEDs consuming very low power. All models can be specified with a wiper and optional washer system. These camera stations are designed to withstand the harshest environments and can be configured and customised to meet the precise criteria of each project and site. Customisation can include supply voltage options, control protocols and direct fibre optic transmission for all technologies.







FOCUS ON THE IMPORTANT THINGS

FIXED CAMERA STATIONS





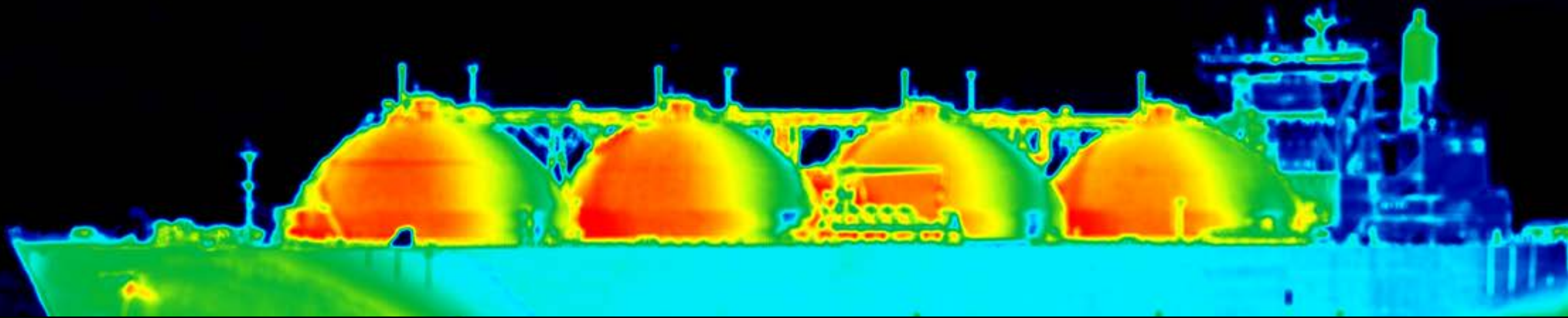
# XF Series

## Explosion Protected Fixed Camera



Oxalis XF fixed camera stations are designed for use in designated hazardous areas (Zones 1, 2, 21 and 22) and made from all 316L stainless steel construction for maximum protection against corrosion. The cameras can be specified with an analogue camera with a varifocal lens, an analogue zoom camera, analogue-IP hybrid, 1080p network camera, thermal imaging or dual imaging models. All except the thermal imaging options can be specified with a wiper and optional washer system. These camera stations are designed to withstand the harshest environments with longevity of life and very low costs of ownership and can be configured and customised to meet the precise criteria of each project and site. Customisation can include supply voltage options, control protocols and direct fibre optic transmission for all technologies.





SEE THE INVISIBLE

THERMAL CAMERA STATIONS



# Thermal Imaging

## Infra Red Camera Stations



Oxalis offer a range of thermal and dual imaging camera stations for use in Zones 1, 2 (gas) and 21, 22 (dust). Thermal cameras can be specified in uncooled microbolometer cores of 336x256 or 640x512 resolution with 17µm pixel pitch or 324x256 with 25µm pixel pitch. Lens options range from 19 to 100mm giving detection ranges in excess of 5km. The dual imaging models have the thermal core with lens options to 50mm and a 36X optical zoom day-night for continued surveillance when conditions change. The images are switched simply via standard control commands by the operator.







PANORAMIC VIEW

DOME CAMERA STATIONS





# XD / SD Series

## Ex and Safe Area Dome Camera Stations



The Oxalis XD explosion protected dome camera is constructed from 316L stainless steel for maximum corrosion protection and certified to Ex d IIB/IIC T6. It features a 1080p full HD IP module with 20X optical zoom. It has continuous rotation pan with a pre-set pan speed of 450o/second with 0.05o accuracy. Oxalis also supply a range of indoor and outdoor safe area dome cameras in analogue or IP formats to suit specification.

The SD40 is a safe area dome camera station for use in marine and industrial applications. Constructed from coated aluminium with a polycarbonate dome for corrosion resistance and clear vision through 360°. It features a 30X optical zoom Sony module and is pre-installed with telemetry for multiple protocols. The SD40 is able to withstand harsh environments with operating temperature range from -20°C to +50°C. A variety of mounting options are available



Safe  
Area



A large container ship with a green hull and red bottom is docked at a port. The ship is heavily loaded with colorful shipping containers (blue, green, red, orange). In the background, several large white gantry cranes are visible against a clear blue sky. The ship's reflection is visible in the calm water in the foreground.

OCEAN PROOF

MARINE AND INDUSTRIAL





## COMPACT PTZ

The SC Series is a PTZ camera station designed for use in safe areas in onshore, offshore, marine and heavy industrial environments. The SC series is constructed from electropolished 316L stainless steel for maximum corrosion protection. The SAC26 is constructed from hard powder coated Aluminium.



## PTZ WITH INTEGRATED IR ILLUMINATOR

The ST40-IP is an full HD-IP explosion-protected PTZ camera station, designed for use in onshore, offshore, marine and heavy industrial environments. It is constructed from electropolished 316L stainless steel for maximum corrosion protection and are fitted as standard with a sunshield, integral wiper and an integral thermostatically controlled heater element.



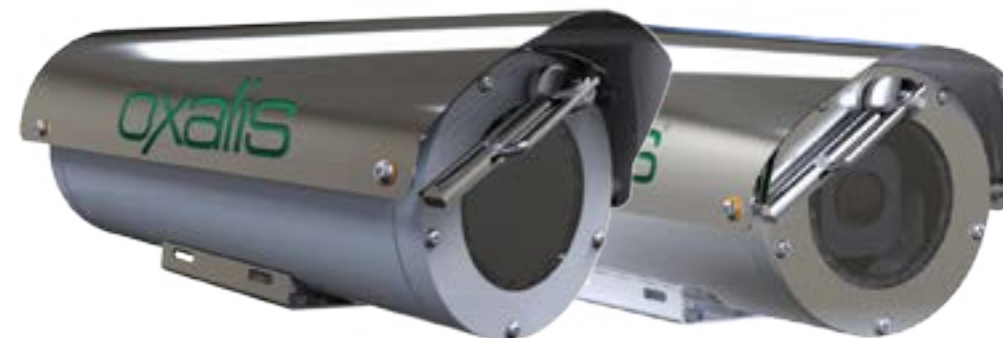
## RV28 PTZ

The RV28 is a 28X optical zoom, safe area, light weight and colour / mono (true day / night) PTZ camera station. Infra-red (IR) and white-light "super-efficient" LED illumination technologies ensure successful operation in poor lighting conditions and total darkness, with the additional benefit of low energy consumption.



## UNIVERSAL PTZ

The SP Series is constructed from electropolished 316L stainless steel for maximum corrosion protection. It is fitted as standard with a sunshield, optional integral wiper and an integral thermostatically controlled heater element. The camera options include: analogue, hybrid and 1080p network options to suit specification.



## FIXED CAMERA STATION

The SF Series is constructed from electropolished 316L stainless steel for maximum corrosion protection, the SAF Series is constructed from Powder Coated Aluminium. Both are fitted as standard with sunshields, integral wiper and integral thermostatically controlled heater element. Within the SF Series options include: analogue, hybrid and 1080p network options to suit specification.



## COASTAL SURVEILLANCE

Oxalis SF1210 is a long range stainless steel camera housing designed for large CCTV zoom lenses and can be specified with a wiper, washer system and equipped with a camera and lens combination to suit client requirement.





ULTIMATE FLEXIBILITY

SPECIALIST AREA CAMERA STATIONS





## CUSTOMISED CAMERA ASSEMBLIES

Oxalis has tested and certified a large variety of different analogue and IP camera modules, media converters, fibre transmitters and other devices which allows a completely unique and bespoke customising ability to assist Oxalis customers design exactly what the site demands.



## THERMAL IMAGING

Oxalis have an extensive range of thermal imaging options for use in both potentially explosive environments and designated safe areas in marine and industrial environments such as ports, vessels, processing facilities and so on. Cameras can be specified to perform specific tasks, an example of which is flare monitoring that can be used in conjunction with iSafe analytics for complex alarm functions.



## LOW TEMPERATURE CAMERA STATIONS

Oxalis manufactures and more importantly certifies a range of fixed and PTZ stainless steel camera stations suitable for use in temperatures down to -60 degrees C. Utilising specialist insulation materials in combination with highly precise and efficient thermostat – heater arrays with dual redundancy for increased safety allows the unit to cope with extreme low temperature conditions.



## CRANE CAMERA STATION

This compact lightweight unit provides explosion proof crane monitoring at its highest levels. The unit has been designed for use in potentially explosive atmospheres and harsh environmental conditions. The CraneCamiP provides full event recording utilizing H.264 encoding maximizing recording space. With capabilities of multi-stream, the CraneCamiP can stream and record with separate encoding methods.



## PRESSURIZED DOMES

Oxalis PTZ Dome Network Cameras are top-of-the-line, high-speed surveillance cameras in a pressurized, marine-grade stainless steel casing. Providing 360° coverage of wide areas and great detail when zooming in, the highly durable, outdoor-ready cameras are ideal for marine, mining, as well as oil and gas environments. They are also applicable indoors in food, medical and clean room manufacturing facilities.



## HDTV NETWORK CAMERAS

The indoor and the outdoor-ready model are day and night HDTV cameras, designed for securing areas where high-quality identification is needed, for example, at passport controls, airports, railway stations and for perimeter surveillance.





FULL INTEGRATION

ANCILLIARIES







## CABLE AND CONDUIT TAILS

### Conduit LTPHC20 and Glands LTP20-M20-EXD

The conduit is constructed from helically wound Galvanised Steel with smooth, black TPE-V coating and the compound filled glands from Nickel Plated Brass. It is designed to accommodate various cable combinations to suit a variety of different camera systems including fibre optic and IP. The various (project specific) cables that can be used inside the conduit are all of the highest quality and conform to European standards.

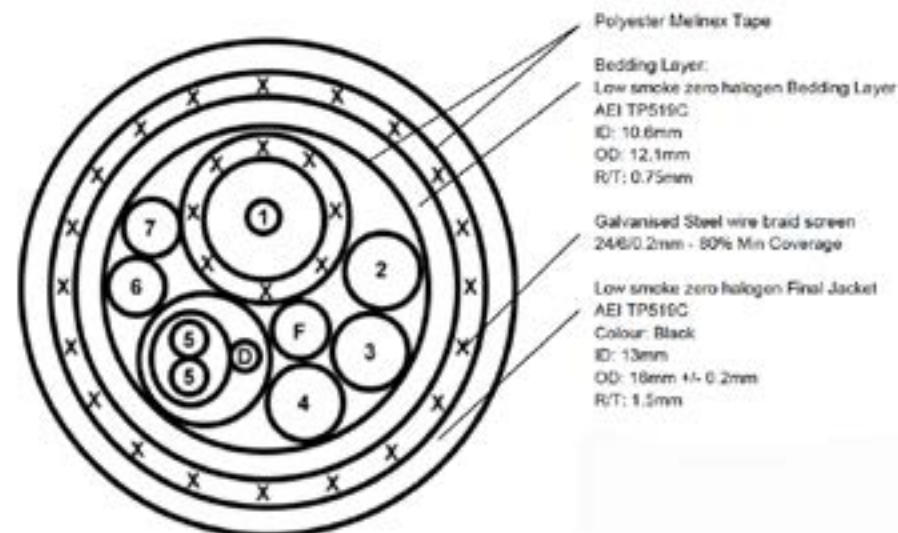
- IP Rating IP66, IP67, IP68 (5 Bar)
- Self Extinguishing and Halogen Free
- Various Internal Cable Options, including Fibre Optics
- Operating Temperature from -60C to +150C (conduit only)
- Oil Resistant Conduit
- Nickel Plated Brass Glands



## WASHER TANKS

The XWP10 pressurised washer tank is designed specifically for use with XF Series fixed camera stations and XC/XP Series explosion-protected camera stations where the integral washer pump has not been specified. The XWP10 can be manually pressurised for a maximum head height in excess of 20 meters and features an ATEX-approved solenoid release valve that can be switched independently or via the integral telemetry receiver card mounted within the camera station station.

Available in 5, 10, and 25 litre capacities, SW Series washer tanks are supplied with 316L stainless steel mounting frames for maximum corrosion protection and a chemical resistant, high density polyethylene tank. Pumps are designed for a 6m head and are supplied, as standard, with a 7m hose.



## MOUNTING BRACKETS

Oxalis manufacture a range of mounting brackets for all camera stations. All cameras can be wall or pole mounted with adapters for adjusting height and angle for fixed camera stations to ensure optimal positioning.

All brackets are constructed from 316L stainless steel for maximum corrosion protection and are machined with compatible mounting points for the camera stations that they are designed to accommodate.

- Electropolished 316L stainless steel construction
- Up to 50kg load
- Onshore, offshore, marine & heavy industrial applications



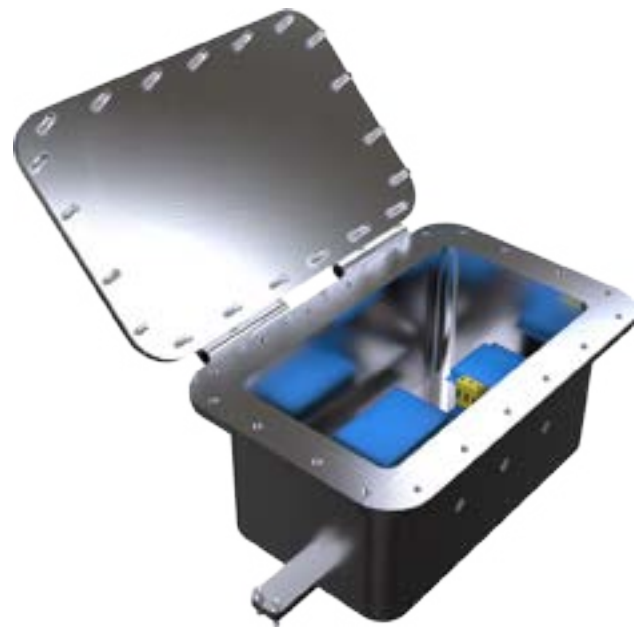


KEEP CONNECTED

TERMINAL & TRANSMISSION ENCLOSURES







## TERMINAL ENCLOSURES

The Oxalis iSTX and iTX ranges of Ex e terminal enclosures are produced in 316L brushed stainless steel as standard with all stainless steel fixings and suitable for on / offshore installations. The range is available in multiple sizes and enclosures are designed to accommodate a selection of approved exe and Exi(a) terminals.

The Oxalis GBox range of Ex e terminal enclosures are produced in heavy duty GRP for maximum corrosion resistance

Enclosures can have entries manufactured in a variety of different sizes. Enclosures offer minimum protection to IP66 and are impact resistant and very durable for the harshest of conditions. Accessories include cable glands, stopping plugs, breather drains, reducers, adaptors plus various lable options.

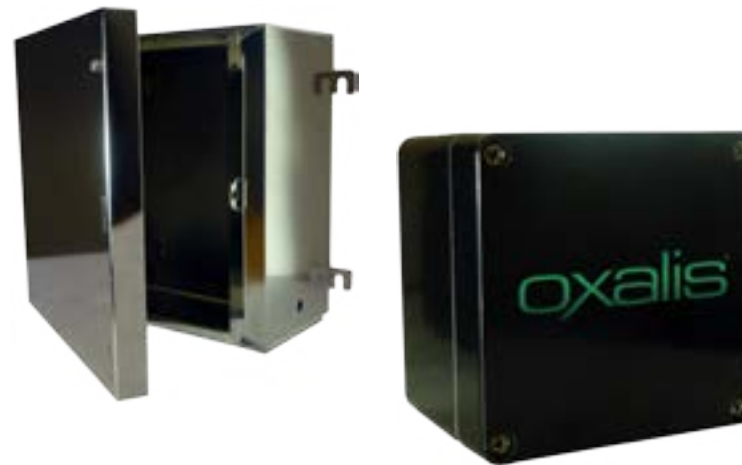


## POWER AND TRANSMISSION PANELS

Oxalis provides an extensive range of explosion proof transmission systems for use with Oxalis camera stations suitable for both onshore and offshore operation.

Transmission panels can be specified to provide the power supply for Oxalis 24VAC camera stations and provide a 10/100Mb Ethernet PCB Media Converter for use with Oxalis IP and hybrid analogue-IP camera stations. Fibre couplers and splicing devices can be specified within this units.

Enclosures are manufactured using die cast marine grade aluminium alloy with less than 0.1% copper and 316 stainless steel.



## TELECOM ENCLOSURES

The Oxalis XB range is manufactured using electro-polished 316L stainless steel for complete corrosion protection. The machined IIC spigot joints arrive complete with a suitably rated gasket providing an ingress protection to IP66/67, gas group IIC protection and wide ranging ambient operation temperatures. All enclosures are designed to be mounted in the traditional format or can be pole / clamp mounted to suit any system environment. Enclosures are certified to contain a wide variety of telecommunication equipment including,

- IP Encoders
- Media converters
- Fibre transmitters
- Fibre couplers and splice trays
- Wifi transmitters
- PSU
- Storage devices
- Near Field Communication options



CONTROL AT YOUR FINGERTIPS

VIDEO MANAGEMENT







## iSAFE VIDEO ANALYTICS

iSafe is an intelligent video analytics solution that automatically provides real-time alerts for zone-based intrusions and other incidents. The solution overcomes real world challenges that can adversely affect video analytics performance, automatically compensating for a range of adverse environmental factors such as variable illumination, shadows and weather events. iSafe is an i-LIDS® approved primary detection system for operational alert use in sterile zone monitoring applications. It is also an i-LIDS® approved event based recording system for sterile zone monitoring applications. The solution is consistently rated as one of the best video analytics security products based on actual field tests, with high rates of accuracy. 4D video analytics from Digital Barriers is a technology designed to provide more effective automated alerting in real world conditions. The software includes a 'reasoning engine' that uses video images to analyse events in terms of both space (height, width and depth) and time. This offers a more accurate analysis of security and safety scenarios, by correlating events with a timeline – in much the same way as a human would interpret scenarios.



## iCOMMAND CONTROL SYSTEM

iCommand is a fully featured video management system and integration platform for IP-based command and control applications. It includes a fully featured control interface for intuitive access to live and recorded video and multiple alarms and sensor inputs – underpinned by a highly scalable network server infrastructure.

The iCommand Suite consists of a range of modular hardware/software products:

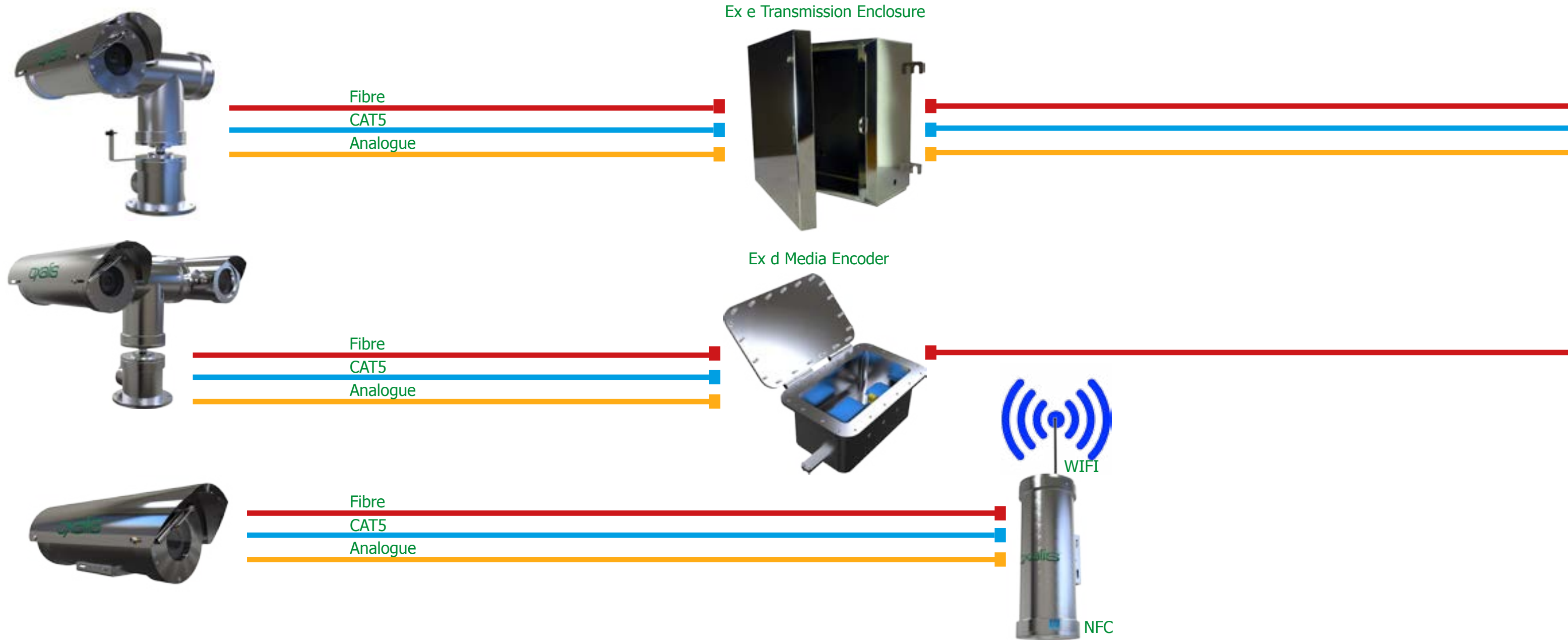
- iCommand Workstation – video control interface for analogue, IP & hybrid security systems
- iCommand NVR – modular video/audio recording system providing seamless recording & playback
- iCommand Management Server – management & administration of iCommand system & IP device communications
- iCommand MultiView – video wall display manager application for displaying live & recorded IP video streams



## HARDWARE

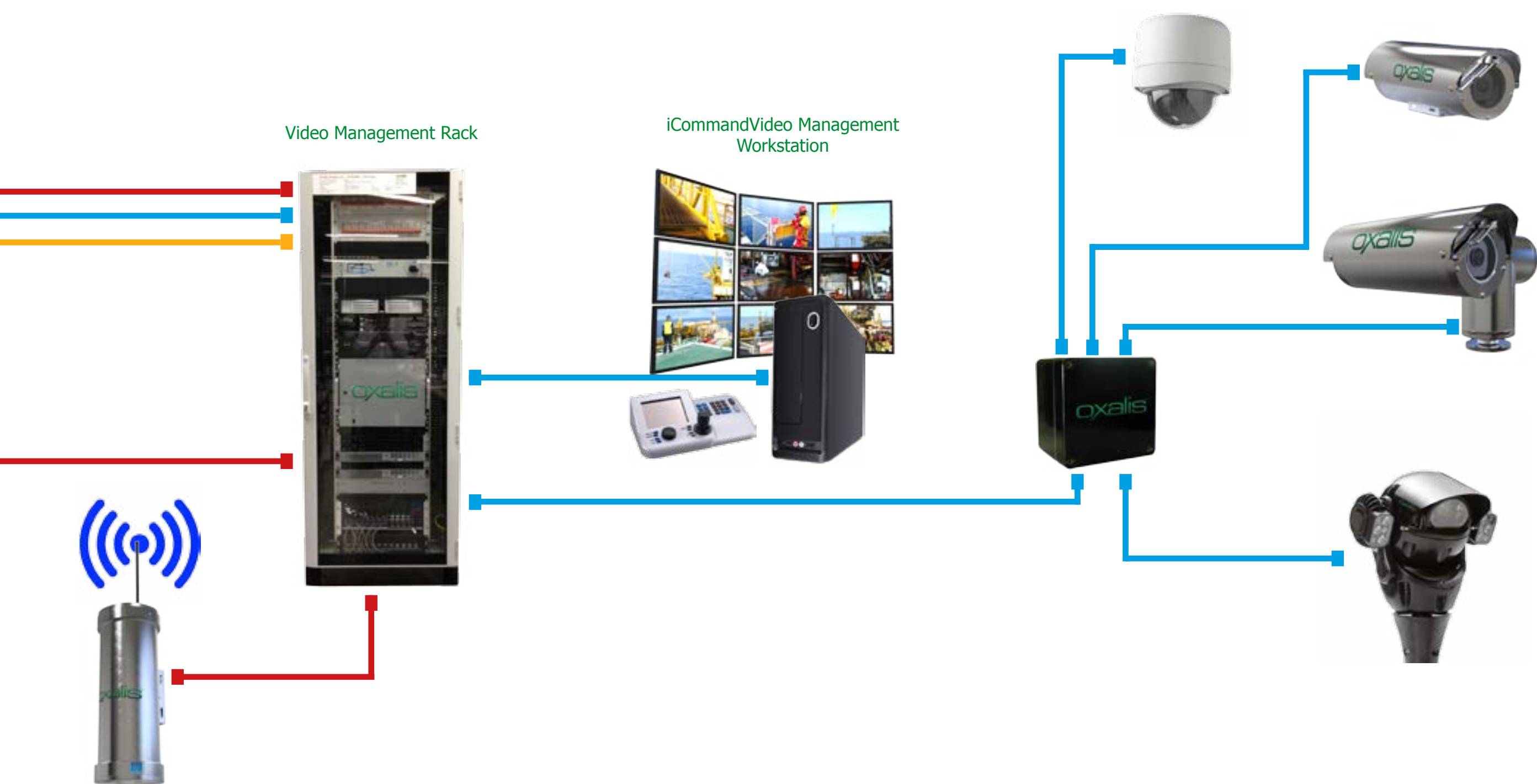
We only use the best brands to integrate our solutions. We deliver extremely capable performance and exceptional value for your mission critical applications with no compromise. Modular design enables you to easily scale for massive data growth with the excellent storage capacity, memory density and I/O capabilities of the servers used in all of our VM server solutions. By using the best brands who have proven track of record of reliability Using well known hardware means that your IT staff will need to spend less time with maintenance and setup as they already know the components

# SYSTEM CAPABILITIES



Oxalis' explosion protected camera stations are available with analogue, IP hybrid or full HD IP and all feature the "Direct Fibre Out" (DFO) option. IP encoding of analogue cameras can be specified within the camera station, in an associated Ex d enclosure or at the equipment rack. However, where functionality is kept within the camera station and encoding or media conversion is not required in a separate enclosure, an Ex e termination enclosure (stainless steel or GRP) can be specified which is certified for electrical connection and fibre interconnectivity only. The switching of the washer function is done via the camera station's integral telemetry receiver therefore no separate site feed is required to the washer tanks.





Industrial and Marine grade camera stations are available with the same flexible configuration as the explosion-protected range, with the options of hard powder coated 6068 aluminium models to compliment the 316L stainless steel models. There is also a range of indoor and outdoor IP dome cameras for general security where the conditions do not warrant the harsh environment products. Oxalis' range covers both day-night, thermal imaging and dual imaging camera stations with the option of Oxalis' in house designed white light or IR illuminators giving up to 100m range whilst running off very low power, meaning the illuminators are powered internally from the telemetry electronics.



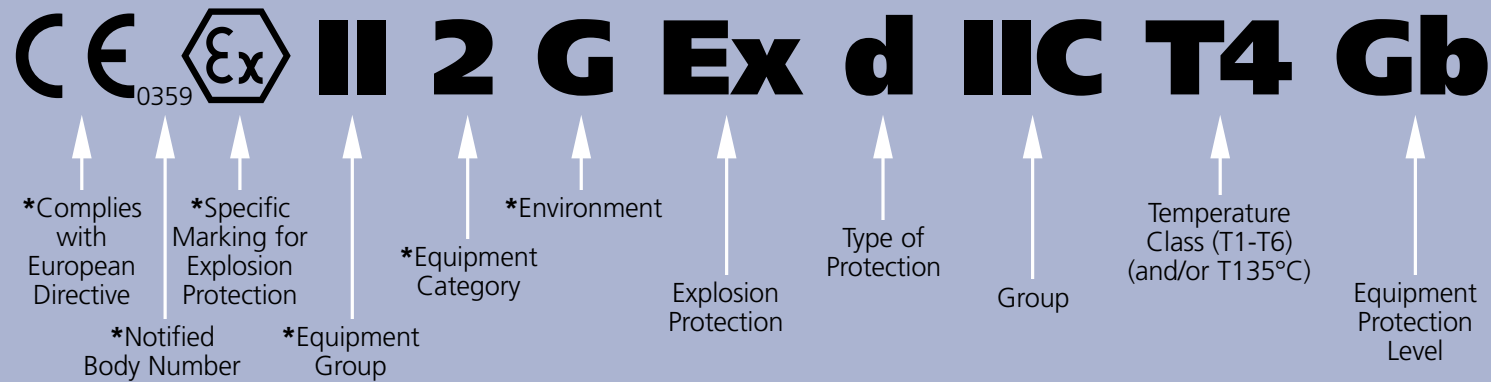
The background of the slide features a large, intense fire or explosion, with bright yellow and orange flames and smoke billowing upwards. A solid green horizontal band is positioned across the middle of the image, containing the text "USEFUL INFORMATION".

## USEFUL INFORMATION





## Typical ATEX and IECEx Marking [\*ATEX only]



## Equipment Group [ATEX and IECEx]

Equipment Group	Equipment Category	EPL	Atmosphere	Protection Level	Required Protection Performance & Operation
I (Mines with firedamp)	M1	Ma	Methane & Dust	Very High	• Two Faults, Remain energised and functioning
I (Mines with firedamp)	M2	Mb	Methane & Dust	High	• Severe normal operation, De-energise in exp. atm.
II (all other areas)	1	a	Gas, Vapour, Mist, Dust	Very High	• Two Faults
II (all other areas)	2	b	Gas, Vapour, Mist, Dust	High	• One Fault
II (all other areas)	3	c	Gas, Vapour, Mist, Dust	Low	• Normal operation

## Zoning Definitions

Gas <small>IEC 60079-10-1</small>	Dust <small>IEC 60079-10-2</small>	Definitions
0		A place in which an explosive atmosphere is continually present
	20	
1		A place in which an explosive atmosphere is likely to occur in normal operation occasionally
	21	
2		A place in which an explosive atmosphere is not likely to occur in normal operation, but if it does only occur for short periods
	22	

## Equipment Categories & Protection Levels

ATEX Category	Equipment Protection Levels	Typical Zone Suitability
1 G	Ga	Equip. suitable for Zones 0,1,2
1 D	Da	Equip. suitable for Zones 20,21,22
2 G	Gb	Equip. suitable for Zones 1,2
2 D	Db	Equip. suitable for Zones 21,22
3 G	Gc	Equip. suitable for Zone 2
3 D	Dc	Equip. suitable for Zone 22

## Protection Concepts [ATEX and IECEx]

Type of Protection	Symbol	Typical IEC EPL	Typical Zone(s)	IEC Standard	Basic concept of protection
<i>Electrical equipment for gases, vapours and mists (G)</i>					
Optical Radiation	Op pr Op sh Op is	Gb Ga Ga	1,2 0,1,2 0,1,2	IEC 60079-28 IEC 60079-28 IEC 60079-28	Inherently safe protected by shutdown
Increased safety Type 'n' (non-sparking)	e nA	Gb Gc	1,2 2	IEC 60079-7 IEC 60079-15	No arcs, sparks or hot surfaces. Enclosure IP54 or better
Flameproof Type 'n' (enclosed break)	d nC	Gb Gc	1,2 2	IEC 60079-1 IEC 60079-15	Contain the explosion, quench the flame
Quartz/sand filled	q	Gb	1,2	IEC 60079-5	Quench the flame
Intrinsic safety	ia	Ga	0,1,2	IEC 60079-11	Limit the energy of sparks and surface temperatures
Intrinsic safety	ib	Gb	1,2	IEC 60079-11	
Intrinsic safety	ic	Gc	2	IEC 60079-11	
Pressurised	px	Gb	1,2	IEC 60079-2	Keep the flammable gas out
Pressurised	py	Gb	1,2	IEC 60079-2	
Pressurised	pz	Gc	2	IEC 60079-2	
Type 'n' (sealing & hermetic sealing)	nC	Gc	2	IEC 60079-15	
Type 'n' (restricted breathing)	nR	Gc	2	IEC 60079-15	
Encapsulation	ma	Ga	0,1,2	IEC 60079-18	
Encapsulation	mb	Gb	1,2	IEC 60079-18	
Encapsulation	mc	Gc	2	IEC 60079-18	
Oil immersion	o	Gb	1,2	IEC 60079-6	
<i>Electrical equipment for combustible dusts (D)</i>					
Enclosure	t	Da	20,21,22	IEC 60079-31	Standard protection for dusts, rugged tight enclosure
Intrinsic safety	iD	Da	20,21,22	IEC 61241-11	Similar to t, but with some relaxations if circuit inside is intrinsically safe
Encapsulation	maD	Da	20,21,22	IEC 61241-18	Protection by encapsulation of incandive parts
	mbD	Db	21,22		
Pressurised	pD	Db	21,22	IEC 61241-2	Protection by pressurisation of enclosure
		Dc	22		
<i>Non-Electrical equipment</i>					
General	-	-	0,1,2	EN 13463-1	Low potential energy
Flow restricted enclosure flameproof enclosure	fr	-	2	EN 13463-2	Relies on tight seals, closely matched joints and tough enclosures to restrict the breathing of the enclosure
	d	-	1,2	EN 13463-3	
Constructional safety	c	-	0,1,2	EN 13463-5	Ignition hazards eliminated by good engineering methods
Control of ignition sources	b	-	0,1,2	EN 13463-6	Control equipment fitted to detect malfunctions
Pressurisation	p	-	1,2	*EN 13463-7 withdrawn & replaced by use of IEC60079-2	Enclosure is purged and pressurised to prevent ignition sources from arising
Liquid immersion	k	-	0,1,2	EN 13463-8	Enclosure uses liquid to prevent contact with explosive atmosphere



## Temperature Classification

Max. Surface Temperature	NEC® 500 CEC®	NEC® 505	IEC - Group II
450° C (842°F)	T1	T1	T1
300° C (572°F)	T2	T2	T2
280° C (536°F)	T2A		
260° C (500°F)	T2B		
230° C (446°F)	T2C		
215° C (419°F)	T2D		
200° C (392°F)	T3	T3	T3
180° C (356°F)	T3A		
165° C (329°F)	T3B		
160° C (320°F)	T3C		
135° C (275°F)	T4	T4	T4
120° C (248°F)	T4A		
100° C (212°F)	T5	T5	T5
85° C (185°F)	T6	T6	T6



Note: For Group I (CENELEC/IEC) applications, electrical apparatus has fixed temperature limits i.e., 150° C and 450°C.

## Useful Standards

Topic	IEC Standard
Area Classification - Gases, Vapours and Mists	IEC 60079-10-1
Area Classification - Combustible Dusts	IEC 60079-10-2
Electrical Equipment Installation	IEC 60079-14
Electrical Equipment Inspection and maintenance	IEC 60079-17
Electrical Equipment Repair and Overhaul	IEC 60079-19

## Groups [ATEX and IECEx]

Group	Environment	Location	Typical Substance
I	Gases, Vapours and Coal Dust	Coal Mining	Methane (Fire damp)
IIA	Gases, Vapours and Mists	Surface and other locations	Methane, Propane etc.
IIB			Ethylene
IIC			Hydrogen, Acetylene etc.
IIIA	Combustible Dusts	Surface and other locations	Combustible flyings
IIIB			Non-conductive
IIIC			Conductive

## Typical NEC® Marking

NEC® 500	NEC® 505
<b>Class I, Division 1, Groups A&amp;B T4</b>	<b>Class I, Zone 0, AEx ia IIC T4</b>
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">↑ Hazard Class</div> <div style="text-align: center;">↑ Area Classification</div> <div style="text-align: center;">↑ Gas Group</div> <div style="text-align: center;">↑ Temperature Class</div> </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">↑ Hazard Class</div> <div style="text-align: center;">↑ Area Classification</div> <div style="text-align: center;">↑ Approved to US Standards</div> <div style="text-align: center;">↑ Protection Concept Code</div> <div style="text-align: center;">↑ Gas Group</div> <div style="text-align: center;">↑ Temperature Class</div> </div>

## Protection Concepts [North America]

Type of Protection	USA		Canada		Basic Concept of Protection	
	NEC® 500	NEC® 505	Existing	New		
	Area Classification	Code	Area Classification	Code		
Increased Safety Non-Incendive	NA Division 2	Zone 1, 2 Zone 2	AEx e AEx n	NA Division 2 Zone 1, 2 Zone 2	Ex e Ex n	No arcs, sparks, or hot surfaces
Flameproof Explosionproof Powder Filled	NA Division 1,2 NA	Zone 1, 2 NA Zone 1, 2	AEx d NA AEx q	NA Division 1,2 NA Zone 1, 2	Ex d NA Ex q	Contain the explosion, prevent flame propagation
Intrinsic Safety	Division 1,2 NA	Zone 0,1,2 Zone 1, 2	AEx ia AEx ib	Division 1,2 NA Zone 0,1,2 Zone 1, 2	Ex ia Ex ib	Limit the spark energy and temperatures
Pressurized (Purged) Encapsulation Oil Immersion	Division 1,2 NA Division 2	Zone 1, 2 Zone 1, 2 Zone 1, 2	AEx p AEx m AEx o	Division 1,2 NA Division 2 Zone 1, 2 Zone 1, 2	Ex p Ex m Ex o	Exclude gas from ignition sources

Note: NEC® Article 501.1 permits the use of zone-rated equipment in Class I Division 2 locations.

## Gas Groups [North America]

Substance:	Hazard Class:	NEC 500:	NEC 505:	Lower Exposure Limit:	Upper Exposure Limit:
Any Gas	Class I				
Acetylene		Group A	IIC	2.3 %	100 %
Hydrogen		Group B	IIC	4 %	77 %
Ethylene		Group C	IIB	2.3 %	36 %
Propane		Group D	IIA	1.7 %	11 %
Methane ( <i>mining</i> )	Group D			4.4 %	17 %
Combustible Metal Dusts	Class II	Group E			
Combustible Carbonaceous Dusts		Group F			
Combustible Dusts not in Group E or F (Flour, Grain, Wood, Plastics, Chemicals)		Group G			
Combustible Fibres and Flyings	Class III				

## International Protection IEC 60529

First Figure Protection against Solids			Second Figure Protection against Liquids		
IP	Test	Comment	IP	Test	Comment
0		No Protection	0		No Protection
1		Protected against solid bodies greater than 50mm diameter (e.g. accidental contact with the hand)	1		Protected against vertically falling drops of water (condensation)
2		Protected against solid bodies greater than 12.5mm diameter (e.g. finger)	2		Protected against drops of water falling up to 15° from the vertical
3		Protected against solid bodies greater than 2.5mm diameter (e.g. tools, wires)	3		Protected against water sprayed up to 60° from the vertical
4		Protected against solid bodies greater than 1.0mm diameter (e.g. thin tools and fine wire)	4		Protected against splashing water from all directions
5		Protected against dust (no harmful deposit) - Dust Proof	5		Protected against jets of water from all directions
6		Completely protected against dusts - Dust Tight	6		Protected against powerful jets of water from all directions
IEC (International Electrotechnical Commission) Publication 60529: Classification of Degrees of Protection Provided by Enclosures provides a system for specifying the enclosures of equipment on the basis of the degree of protection provided by the enclosure. IEC 60529 does not specify degrees of mechanical damage of equipment, risk of explosions, or conditions such as moisture (produced for example by condensation), corrosive vapours, fungus, or vermin.			7		Protected against the effects of temporary immersion in water
			8		Protected against the continuous effects of immersion in water having regard to specific conditions

## NEMA Testing Approximate Equivalent to IPXX

NEMA 1	⇒	IP20
NEMA 2	⇒	IP22
NEMA 3	⇒	IP55
NEMA 3R	⇒	IP24
NEMA 3S	⇒	IP55
NEMA 4 & 4X	⇒	IP66
NEMA 5	⇒	IP53
NEMA 6 & 6P	⇒	IP67 & IP68
NEMA 12 & 12K	⇒	IP54
NEMA 13	⇒	IP54

Do not use to convert IP codes to NEMA ratings

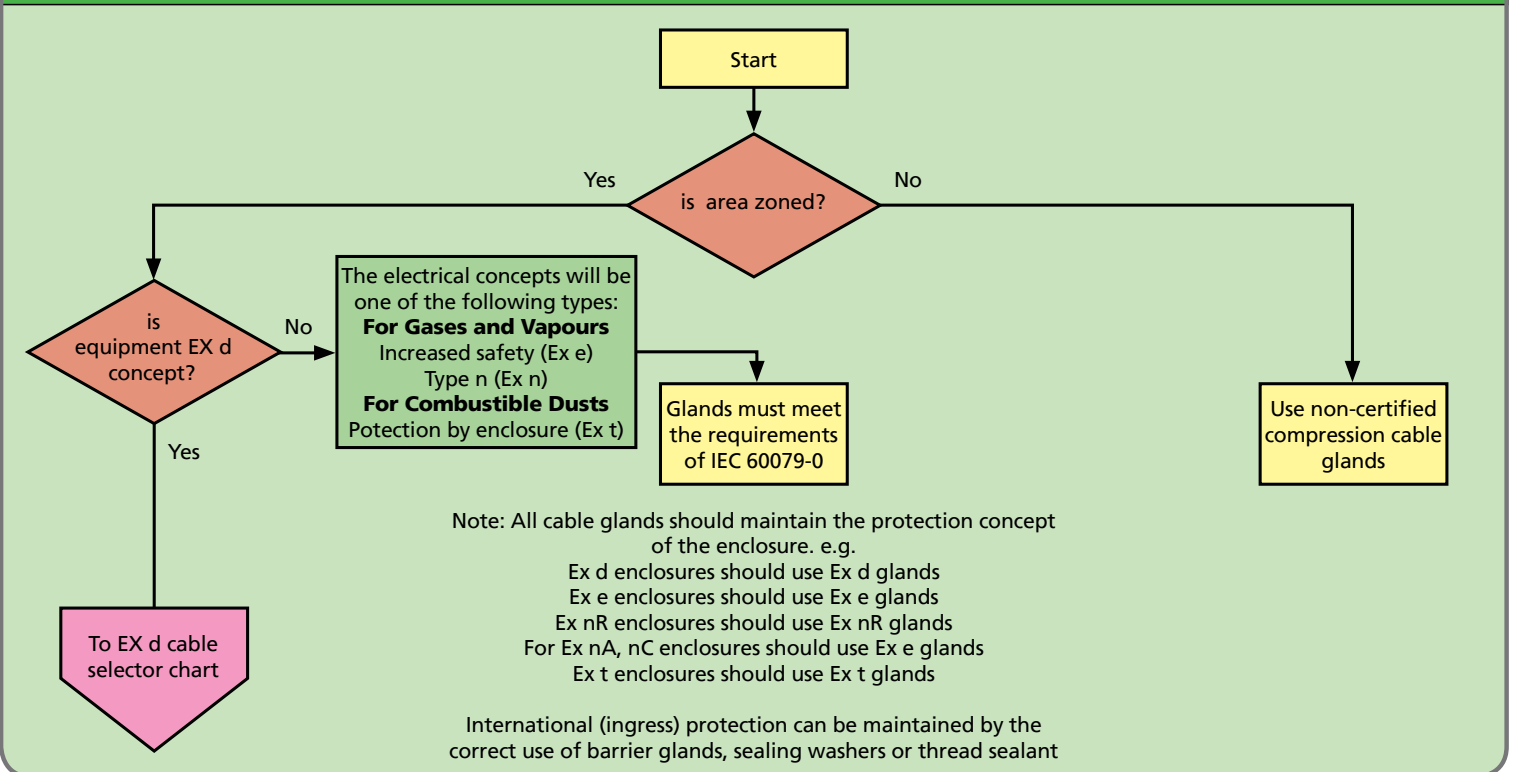
## Cable Glands

Cable glands used on explosion protected (Ex) equipment shall maintain the protection concept of the equipment. e.g.

- Ex d enclosures shall use Ex d cable glands
- Ex e enclosures shall use Ex e cable glands
- Ex nR enclosures shall use Ex nR cable glands
- Ex nA or nC enclosures use Ex e cable glands
- Ex tD enclosures shall use Ex tD cable glands

NB: Non-certified cable glands shall not be used on Ex rated equipment. Intrinsically safe installations can use non-certified cable glands

## Cable Gland Selection Chart





## EX d Selection Chart

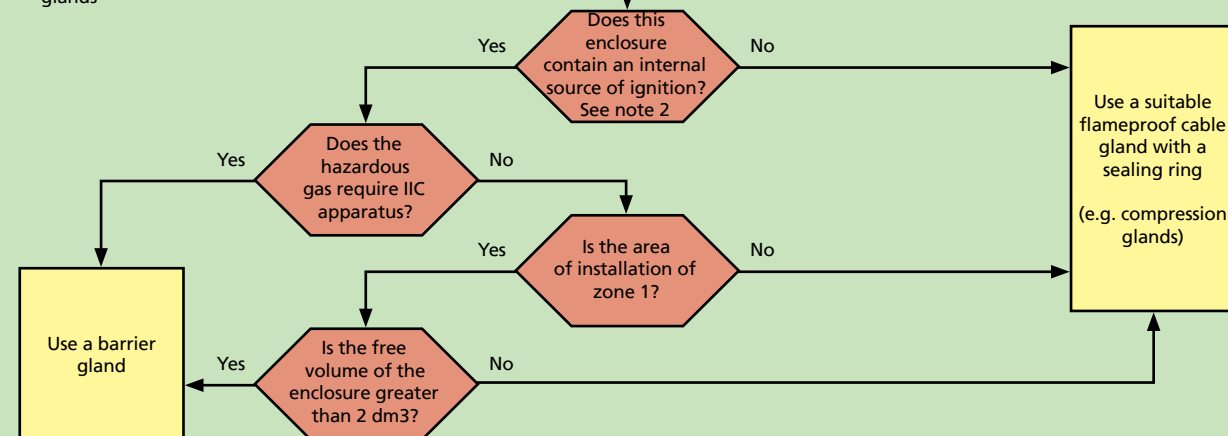
Flow chart in accordance with IEC 60079-14:2008

Note 1: Cables used for fixed wiring in hazardous areas shall be appropriate for the ambient conditions in service. Cables shall be:

- A) Sheathed with thermoplastic, thermo-setting or elastomeric material. They shall be circular, compact, have extruded bedding and fillers, if any shall be non-hygroscopic
- B) Mineral insulated metal sheathed e.g. pyro's
- C) Special e.g. flat cable with appropriate cable glands

From cable gland selector chart  
Ensure cable type is in accordance with the requirements of IEC 60079-14. Refer to note 1

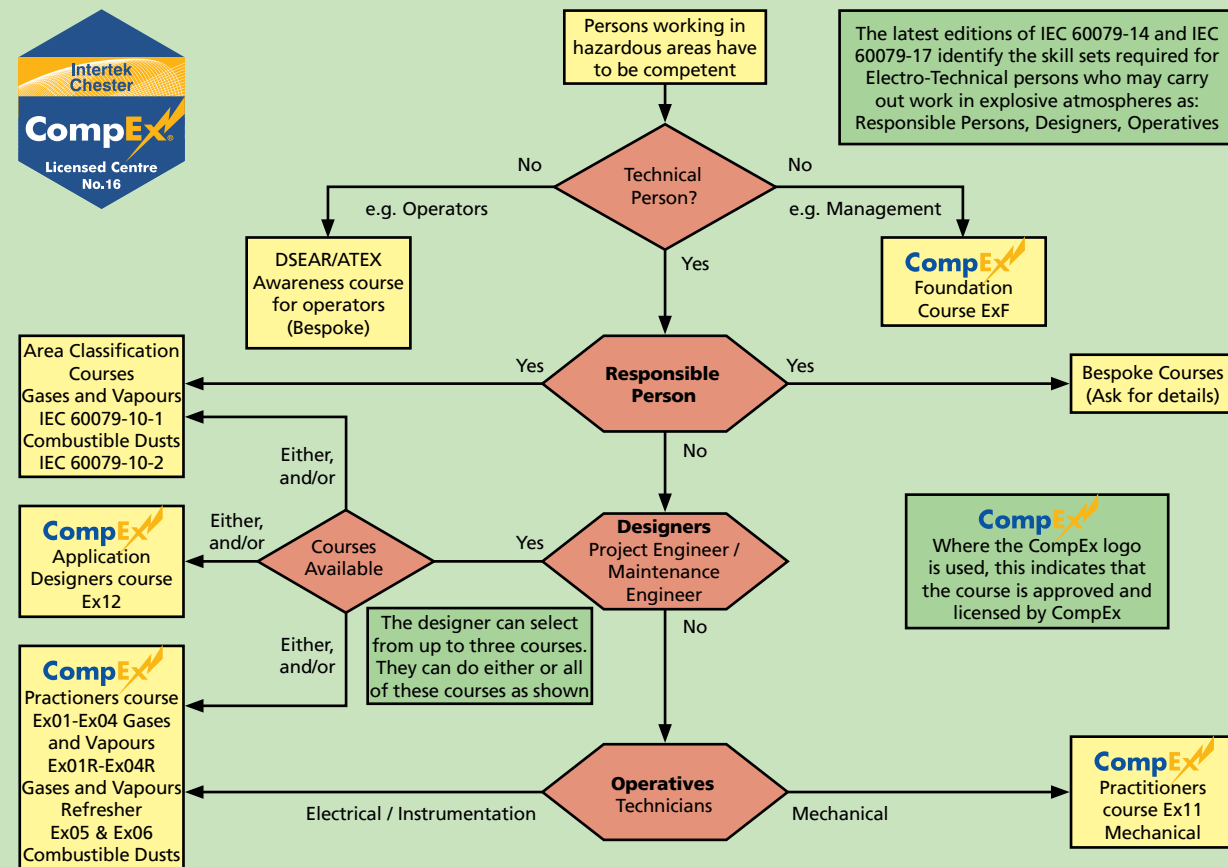
Note 2: Internal sources of ignition include sparks or equipment temperatures occurring in normal operation which can cause ignition. An enclosure containing terminals only or an indirect entry enclosure is not regarded as an internal source of ignition



## Employer's & End User's Obligations [ATEX & DSEAR]

1. Prevent the formation of explosive atmosphere OR avoid the ignition of explosive atmospheres, and control the effects of explosions.
2. Assess explosion risks:
  - Likelihood of explosive atmospheres occurring and their persistence
  - Likelihood that ignition sources are present
  - Scale of the anticipated effects
3. Coordinate the implementation of all measures concerning workers' health and safety.
4. Area classification
5. Mark explosive atmospheres with signs at point of entry
6. 'Explosion Protection Document' shall demonstrate:
  - Explosion risks have been determined and assessed
  - Adequate measures will be taken to comply with Directive 1999/92/EC
  - Places have been classified into zones
  - Places where minimum requirements in Annex II, Part A will apply
  - Workplace and work equipment are designed, operated and maintained properly

## Explosive Atmospheres Training Courses



## ATEX Categories v Zones of Use

Equipment Category ATEX 94/9/EC	Zone of Use	
	Gas, Vapours, & Mist	Dust
Cat 1	Zone 0, 1 & 2	Zone 20, 21 & 22
Cat 2	Zone 1 & 2	Zone 21 & 22
Cat 3	Zone 2	Zone 22

Note: Unless the explosion protection risk assessment states otherwise.

## Additional Market Access: IECEx Scheme

Manufacturers of Ex equipment can obtain certificates of conformity that will be accepted at a national level in all countries that participate in the IECEx Scheme.



A certificate of conformity may be obtained from any certification body accepted into the Scheme. The certificate will attest that (1) the equipment design conforms to relevant IEC Standards and (2) the product is manufactured under a quality plan assessed by an ACB (Accepted Certification Body).

Manufacturers holding certificates of conformity may affix the IECEx Mark of Conformity to equipment that they have verified complies with the certified design.

Intertek is an IECEx Testing Laboratory and has IECEx Accepted Certification Body status. For more information on the IECEx Scheme, visit [www.IECEx.com](http://www.IECEx.com).

# oxalis™

Global Headquarters  
Research, Manufacturing & Distribution Centre

Oxalis Group Ltd  
Oxalis House  
Masons Road  
Stratford-upon-Avon  
Warwickshire  
CV37 9NB  
UK

t: +44 (0)1789 775775  
e: [sales@theoxalisgroup.com](mailto:sales@theoxalisgroup.com)  
w: [www.theoxalisgroup.com](http://www.theoxalisgroup.com)  
Skype: saraoxalis



## Global Sales Offices

Oxalis Americas LLP  
4 Jefferson Plaza (Suite 500)  
Poughkeepsie  
New York  
12601  
USA  
[americas@theoxalisgroup.com](mailto:americas@theoxalisgroup.com)  
+1 845 337 3129

Oxalis China  
Room 215, Building 37, No.2049  
Pujin Road  
Minhang District  
Shanghai  
201112  
China  
[china@theoxalisgroup.com](mailto:china@theoxalisgroup.com)  
+86 21 64292906

Oxalis Middle East  
Oxalis Group Ltd  
P. O. Box 341276  
Office # D-708 HQ Building  
Dubai Silicon Oasis  
Dubai  
U.A.E.  
[middleeast@theoxalisgroup.com](mailto:middleeast@theoxalisgroup.com)  
+971 4 3712681

Oxalis Asia Pacific  
#03-03,  
10 Jalan Kilang,  
Singapore,  
159410.  
[asiapacific@theoxalisgroup.com](mailto:asiapacific@theoxalisgroup.com)  
+65 6795 2331

Oxalis India  
Oxalis Protection Technology Pvt  
Ltd  
Unit 135, 1st Floor, Satra Plaza  
Sector 19D, Palm Beach Road  
Vashi, Navi Mumbai  
400703  
India  
[india@theoxalisgroup.com](mailto:india@theoxalisgroup.com)  
+91 963 352 3247