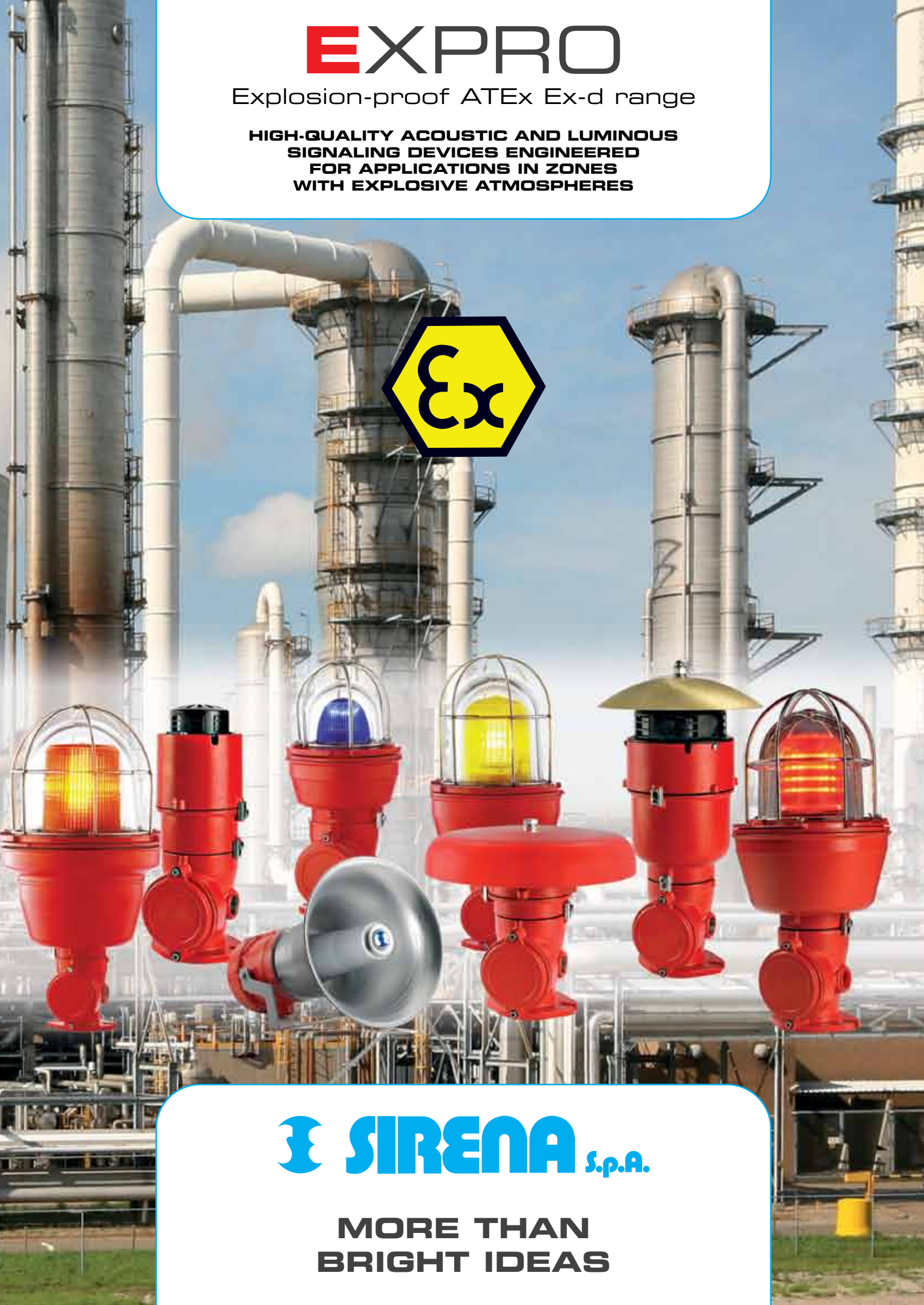
EXPRO

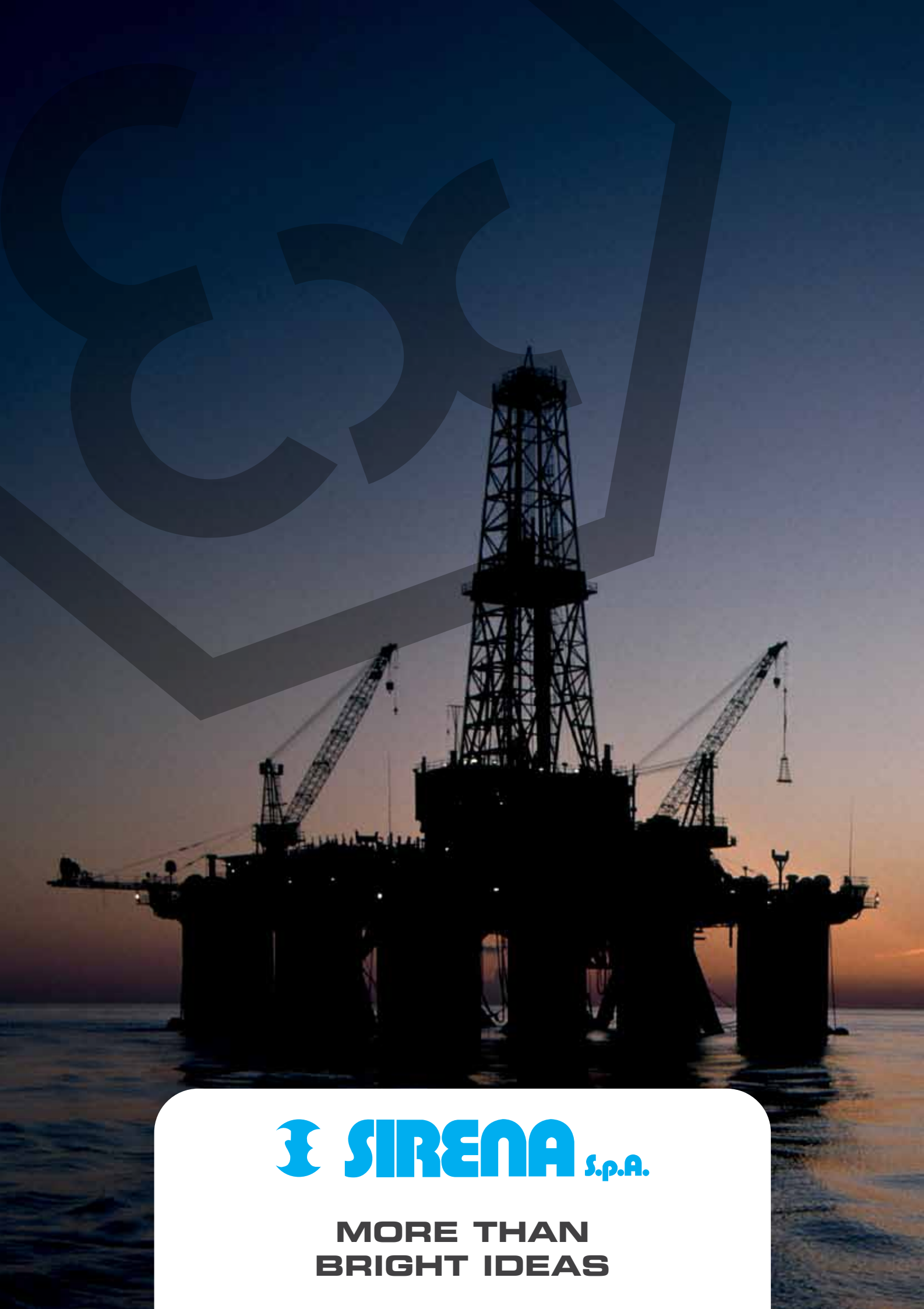
Explosion-proof ATEx Ex-d range

HIGH-QUALITY ACOUSTIC AND LUMINOUS SIGNALING DEVICES ENGINEERED FOR APPLICATIONS IN ZONES WITH EXPLOSIVE ATMOSPHERES



SIRENA S.p.A.

MORE THAN BRIGHT IDEAS



SIRENA S.p.A.

MORE THAN
BRIGHT IDEAS

EXPRO

Explosion-proof ATEx Ex-d range

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EXPRO

Explosion-proof ATEx Ex-d range

INTRODUCTION

Sirena, world leader in the design and manufacture of audible and visual signaling equipment presents its explosion proof, Ex-d class range.

The range, mainly intended for the chemical and petroleum sectors, has been engineered to meet the most demanding market requirements and to guarantee maximum safety and quality, according to extremely high design, production and certification standards.

Since the 1980's, Sirena has been present in the explosion proof market and is renowned as one of the manufacturers offering greater versatility in its range with technical characteristics second to none.

The new ATEx range, completely redesigned from both an electronic and mechanical point of view, allows Sirena's "know-how" and thirty-year experience in the field to be at the hands of all end-users of explosion proof products.

Today, Sirena offers a **complete range of audible and visual signaling devices.**

The acoustic range includes the new **SIAD** bells, available in three different sizes and all voltages, designed to offer a very **high sound output level** together with **unparalleled quality standards**.

The new siren range also sees the introduction of the **new MINICELERE** and **SUPERCELERE electromechanical sirens**: high performance products designed in great detail to meet the most demanding customer requirements. The acoustic range is complemented by the existing electronic sirens with the same high **efficiency and performance.**

The luminous range, has been completely reviewed both in presentation and content, employing the latest **SMD LED** technology recently introduced and developed by Sirena. A technology that increases both the optical performance and lifetime of the product, as well as virtually eliminating maintenance costs.

In this respect, Sirena has developed **OVOLUX** MULTI SMD and **FLR** S: these products contain years of technological research in a housing developed to guarantee maximum safety in explosive atmospheres.

In addition to the new technology remain the more traditional beacons such as the **MAXIXENOFLASH** and **STROBOFLASH** 6J and 15J Xenon beacons and the powerful **ROTALLARM** and **LAMPALLARM** with both filament or halogen H1 bulbs.

The **PAG** range completes Sirena's range of explosion proof products with a choice of pilot lights and switches.

CERTIFICATION

SIRENA'S explosion proof range of products has been approved by **CESI**, Notified Body of the Italian Government, according to (ATEx) Directive 94/9/EC for the certification of explosion proof devices intended for use in potentially explosive atmospheres.

Sirena's entire ATEx range has been certified for use in Group II, that foresees installation in all high risk areas, excluding mines.
Sirena's ATEx range of products has been appointed category 2, that allows use in Zone 1, 2, 21 and 22, in both the presence of gas (G) as well as dust (D).

Certification is according to EN/IEC 60079 directive that allows the use of the Ex identifying mark. Protection of the device is provided by an explosion proof housing with increased safety guaranteeing "de" status.

The proven explosion group, particularly important for use in explosive atmospheres due to gas, is IIC, the most dangerous, that includes Hydrogen and Ethyl Acetate.

The whole range is certified for use in class **T6 temperature**, that guarantees a maximum surface temperature of the housing of just 85 degrees celsius, that is the most difficult to obtain.

The range has also been **granted a protection degree of IP 66** that means it is totally protected from dust and powerful jets of water.

EXPRO

High-end explosion-proof ATEx Ex-d range

SIRENA S.p.A.

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EXPRO

Explosion-proof ATEx Ex-d range

ACOUSTIC RANGE

SIAD
SIADEL

MINICELERE
MINICELEREST

SUPERCELERE
SUPERCELEREST

ETH 12
ETH 20

SIAD
SIADEL

Explosion-proof bells available in three dimensions: 165, 215 and 265 mm. Specifically designed and made according to the highest quality standards, these products guarantee a sound level that meets the most demanding customer requirements making the SIAD - SIADEL range one of the most effective on the market.

Explosion-proof bells for use in Group II areas, Zones 1, 2 explosive atmospheres.

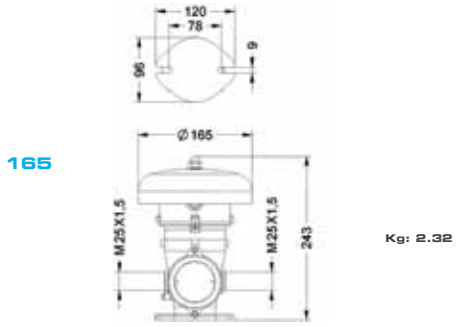
II 2G Ex d e IIC T6

- Approval: **CESI 10 ATEX 042 X**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - SIAD: 12V-24V-48V-110V-240V AC
  - SIADEL: 12V-24V-48V-110V-240V DC
- Audibility: max. 100 dB(A)1m
- Protection: IP 66
- Maximum surface temperature: T6

SIAD / SIADEL

V	~	12	24	48	110	240
	⎓	12	24	48	110	240
A	~	1	0.5	0.3	0.1	0.06
	⎓	0.55	0.3	0.2	0.06	0.03
dB	~	100				
	⎓	98				
Hz	~	1500÷10000				
	⎓	1500÷10000				

IP 66	On ∞	°C -20 +50
♪ —	M25x1.5	



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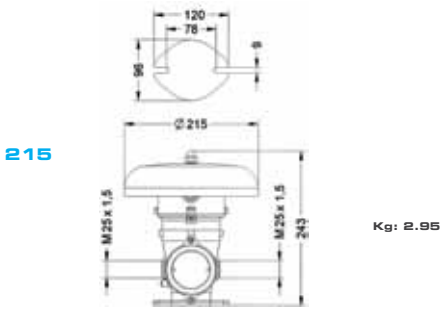

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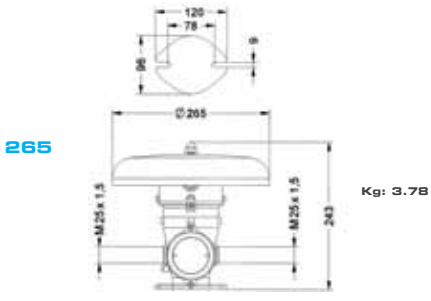


Kg: 3.78

CODES	12V	24V	48V	110V	240V
EX 165 SIAD	62258	62259	62260	62261	62262
EX 165 SIADEL	62273	62274	62275	62276	62277
EX 215 SIAD	62263	62264	62265	62266	62267
EX 215 SIADEL	62278	62279	62280	62281	62282
EX 265 SIAD	62268	62269	62270	62271	62272
EX 265 SIADEL	62283	62284	62285	62286	62287
SPARE STRIKER 165			84080		
SPARE STRIKER 215			84081		
SPARE STRIKER 265			84082		

EX 055 MCL

MINICELERE
MINICELEREST

Explosion-proof electromechanical sirens engineered and manufactured according to the strictest certification and electromagnetic compatibility standards. The MINICELERE range of sirens are of high mechanical precision and guarantee maximum performance with regard to sound level and product reliability.

Explosion-proof electromechanical sirens for use in Group II areas, Zones 1, 2, and 21, 22 explosive atmospheres.

II 2GD Ex d e IIC T6 Ex tD A21 IP66 T85 °C

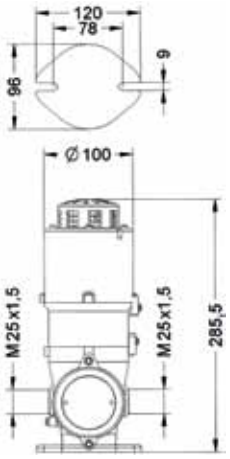
- Approval: **CESI 10 ATEX 038 X**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 12V-24V-48V-110V-240V ACDC
- Audibility: max. 92 dB(A)1m
- Protection: IP 66
- Maximum surface temperature: T6

MCL / MCT

V ~	12	24	48	110	240
A	4	2	1.3	0.55	0.32
dB	92				
Hz	1100±100				

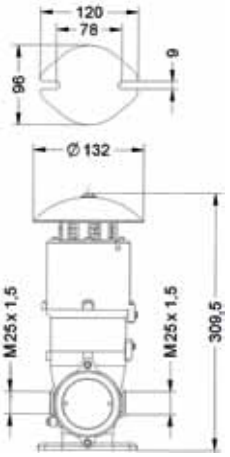
IP 66	**On:** 2 Min. **Off:** 15 Min.	°C -20 +50
	M25x1.5	

MCL



Kg: 2.40

MCT



Kg: 2.73

CODES	12V	24V	48V	110V	240V
EX 055 MCL	62253	62254	62255	62256	62257
EX 055 MCT	62248	62249	62250	62251	62252

EX 065 SCL

EX 065 SCT

SUPERCELERE
SUPERCELEREST

Explosion-proof electromechanical sirens, larger in size compared to the MINICELERE range, specifically engineered and manufactured for installation in areas where a higher sound level is required. The SUPERCELERE range is a unique combination of precision and technology representing the 30 years experience that SIRENA has established in the electromechanical siren field.

Explosion-proof electromechanical sirens for use in Group II areas, Zones 1, 2, and 21, 22 explosive atmospheres.

II 2GD Ex d e IIC T6 Ex tD A21 IP66 T85 °C

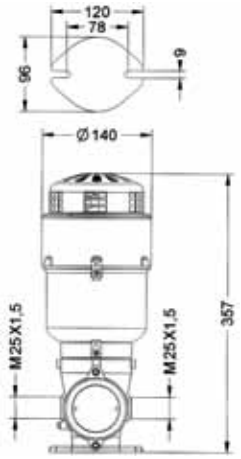
- Approval: **CESI 10 ATEX 038 X**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 24V-48V-110V-240V ACDC
- Audibility: max. 107 dB(A)1m
- Protection: IP 66
- Maximum surface temperature: T6

SCL / SCT

V ~	24	48	110	240
A	8	6.75	1.9	1.35
dB	107 (SCL) 106 (SCT)			
Hz	1000±100			

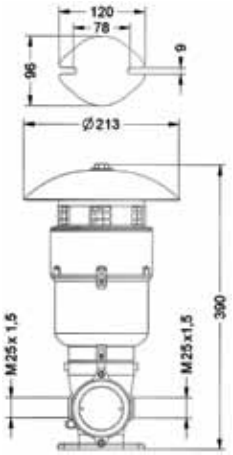
IP 66	On: 2 Min. Off: 30 Min.	°C -20 +50
	M25x1.5	

SCL



Kg: 4.10

SCT



Kg: 4.43

CODES	24V	48V	110V	240V
EX 065 SCL	62244	62245	62246	62247
EX 065 SCT	62240	62241	62242	62243

ELECTRONIC SIRENS

ETH 12 MD

ETH 20 MD

ETH 12 MD

V ~	12/24	110	240
V ⎓		-	-
mA	865	45	30
dB	Min. 91 - Max. 109		

ETH 20 MD

V ~	12/24	240
V ⎓		-
mA	550	25
dB	Min. 101 - Max. 112	

IP 65	On ∞	°C -20 +50
♪— --- ∿⎍	⌀ 3/4" NPT	

CODES	12/24V	110V	240V
ETH12 MD	57994	57997	57996
ETH20 MD	57998	-	

ETH 12 MD
ETH 20 MD

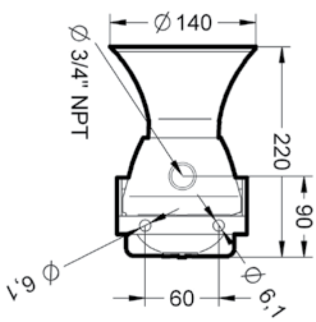
The explosion-proof electronic range of sirens, manufactured according to the highest quality standards, guarantee a high range sound level and the possibility to choose from different tones.

Explosion-proof electronic sirens for use in Group II areas, Zones 1, 2, and 21, 22 explosive atmospheres.

II 2GD Ex d e IIC T6 Ex tD A21 IP65 T85 °C

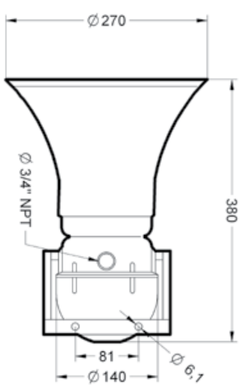
- Approval ETH12 MD: **INERIS 02 ATEX 0074**
- Approval ETH20 MD: **ISSeP 01 ATEX 014**
- Housing in copper-free aluminium alloy
- Epoxyvinyl paint RAL 3000
- Voltages available:
  - ETH12 MD: 12/24V ACDC, 110V-240V AC
  - ETH20 MD: 12/24V ACDC, 240V AC
- Audibility:
  - ETH12 MD: max. 109 dB(A)1m
  - ETH20 MD: max. 112 dB(A)1m
- Protection: IP 65
- Maximum surface temperature: T6

ETH 12 MD



Kg: 1.40

ETH 20 MD



Kg: 3.35

SIRENA S.p.A.

MORE THAN BRIGHT IDEAS

EXPRO

Explosion-proof ATEx Ex-d range

LUMINOUS RANGE

OVOLUX MULTI SMD
FLR S

MAXIXENOFLASH
STROBOFLASH

ROTALLARM
LAMPALLARM

PAG






EX 050 OVO M SMD

V ∿	12/24		90/240	
V ⎓			-	-
mA ∿	140	175	30	20
mA ⎓	50	50	-	-
FPM: STEADY, 0 - 1F, 120±10 2F, 2X90±10 - 3F, 3X140±10				

IP 66	On ∞	°C -25 +50
M25x1.5		

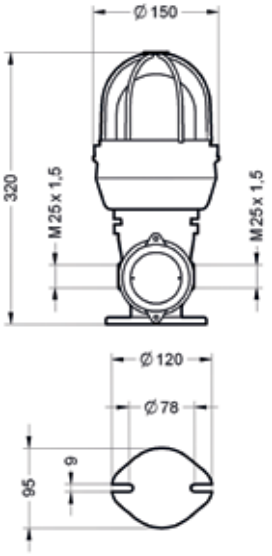
OVOLUX MULTI SMD

Small integrated LED beacon, ideal for alerting a change in machinery operational circumstances in explosive atmospheres. Designed according to ATEx regulations, OVOLUX MULTI SMD can be used in Group II explosive areas, Zones 1, 2, 21, 22.

Fitted with an electronic SMD LED circuit, OVOLUX MULTI SMD is particularly resistant to vibrations guaranteeing longer lifetime of the product and a significant reduction in maintenance costs. Multifunctional product allowing 4 different light options: steady, single flash, double flash, triple flash selectable via internal dip-switch.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 12V/24V ACDC, 90/240V AC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6
- High light intensity
- DIP-SWITCH to select the light functions (steady, single flash, double flash, triple flash)



Kg: 2.58

CODES

EX 050 OVO M SMD

12/24V ACDC	97191	97192	97193	97194	97195	97196
90/240V AC	97201	97202	97203	97204	97205	97206

EX 070 FLR S

V ∿	12/24		90/240	
V ⎓			-	-
mA ∿	530	325	110	70
mA ⎓	280	140	-	-
RPM: 140±10				
FPM (3F): 3x85±10				

IP 66	On ∞	°C -20 +50
M25x1.5		

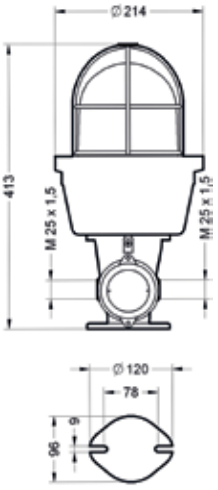
FLR S

Medium range integrated LED beacon, ideal for alerting a danger situation or a change in machinery operational circumstances in explosive atmospheres. Designed according to ATEx regulations, FLR S can be used in Group II explosive areas, Zones 1, 2, 21, 22.

Fitted with an electronic SMD LED circuit, FLR S is particularly resistant to vibrations guaranteeing longer product lifetime and a significant reduction in maintenance costs. Multifunctional product allowing three different light options*: steady, flashing, rotating.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 12/24V ACDC, 90/240V AC
- Colors available: blue - amber - red - green
- Protection: IP 66
- Maximum surface temperature: T6
- High optical performance:
  - Steady light: a deep and rich light source ideal for attracting attention yet without disturbing
  - Flashing light: triple-flash (strobe effect) ideal for all applications where an immediate attention gain is mandatory.
  - Rotating light: a unique rotating effect which perfectly simulates the traditional rotating beacons yet without moving parts hence enormously enhancing product lifetime



Kg: 3.35

CODES
EX 070 FLR S

12/24V ACDC	97211	97212	97213	97214
90/240V AC	97221	97222	97223	97224

* PLEASE INDICATE THE REQUIRED LIGHT OPTION SETTING WHEN ORDERING






EX 070 MXF 6J

V ∿	12/24		110	240
V ⎓			-	-
A	1.00	0.75	0.11	0.09
Cd(p)	2700	3600	1800	4500
FPM (1F): 65±10				

IP 66	On ∞	°C -20 +40
M25x1.5		

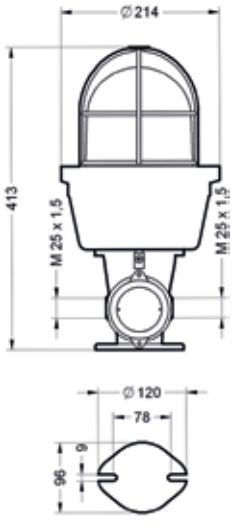
MAXIXENOFLASH

Medium range Xenon Flashing beacon, ideal for alerting a danger situation or a change in machinery operational circumstances in explosive atmospheres. Designed according to ATEx regulations, MAXIXENOFLASH can be used in Group II explosive areas, Zones 1, 2, 21, 22.

Fitted with a circuit specifically designed for these applications, MAXIXENOFLASH guarantees high light output thanks to the powerful 6J flash.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 12/24V ACDC, 110V-240V AC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6
- 6J xenon discharge tube



Kg: 4.83

CODES
EX 070 MXF 6J

12/24V ACDC	95641	95642	95643	95644	95645	95646
110V AC	95651	95652	95653	95654	95655	95656
240V AC	95661	95662	95663	95664	95665	95666

EX 0100 STF 15J

V ~	-	-	110	40
V ⎓	12/24		-	-
A	2.5	1.2	0.13	0.15
Cd(p)	19500	20000	4200	16500
FPM (1F): 65±10				

IP 66	On ∞	°C -20 +40
M25x1.5		

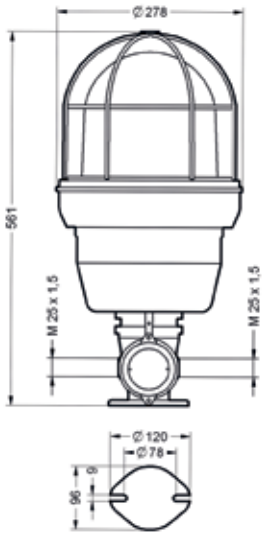
STROBOFLASH

Larger size Xenon flashing beacon, ideal for alerting a danger situation or a change in machinery operational circumstances in explosive atmospheres. Designed according to ATEx regulations, the STROBOFLASH can be used in Group II explosive areas, Zones 1, 2, 21, 22.

Fitted with a circuit specifically designed for these applications, STROBOFLASH guarantees high light output thanks to the powerful 15J flash.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - 12/24V DC, 110V-240V AC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6
- 15J xenon discharge tube



Kg: 11.0

CODES

EX 0100 STF 15J

12/24V DC	96551	96552	96553	96554	96555	96556
110V AC	96561	96562	96563	96564	96565	96566
240V AC	96571	96572	96573	96574	96575	96576






EX 080 ROTALLARM
EX 080 ROTALLARM H (HALOGEN)

EX 080 RA

V ∿	12	24	-	48	110	240
V ⎓	12	24	48	-	-	-
A	4	2.1	1	0.74	0.31	0.15
Cd(p)	5900	5900	5900	540	460	360
RPM: 160±30						

EX 080 RA H

V ∿	12	24
V ⎓	12	24
A	4.8	3.1
Cd(p)	9000	9000

IP 66	On ∞	°C -20 +50 H1: -25 +40
	M25x1.5	

CODES

EX 080 RA						
12V DC	95941	95942	95943	95944	95945	95946
12V AC	95951	95952	95953	95954	95955	95956
24V DC	95961	95962	95963	95964	95965	95966
24V AC	95971	95972	95973	95974	95975	95976
48V DC	95981	95982	95983	95984	95985	95986
48V AC	95991	95992	95993	95994	95995	95996
110V AC	96001	96002	96003	96004	96005	96006
240V AC	96011	96012	96013	96014	96015	96016
EX 080 RA H1						
12V DC	96021	96022	96023	96024	96025	96026
12V AC	96031	96032	96033	96034	96035	96036
24V DC	96041	96042	96043	96044	96045	96046
24V AC	96051	96052	96053	96054	96055	96056

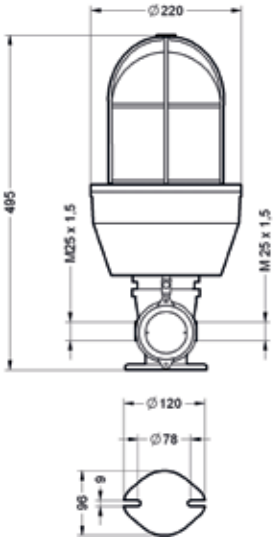
ROTALLARM

Traditional rotating beacon, available with either a filament bulb or halogen type H1 bulb. Large size beacon ideal for alerting a danger situation or a change in machinery operational circumstances in explosive atmospheres.

Designed according to ATEx regulations, ROTALLARM can be used in Group II explosive areas, Zones 1, 2, 21, 22.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - EX 080 RA: 12V-24V-48V DC, 48V - 110V-240V AC
  - EX 080 RA H: 12V-24V DC, 12V-24V AC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6
- Available with filament (EX 080 RA) or halogen (EX 080 RA H) bulbs



Kg: 7.42

EX 080 LA F (STEADY)
EX 080 LA L (FLASHING)
EX 080 LA L H (FLASHING HALOGEN)

LAMPALLARM

Traditional flashing beacon with either a filament bulb or halogen type H1 bulb. Large size beacon ideal for alerting a danger situation or a change in machinery operational circumstances in explosive atmospheres.

Designed according to ATEx regulations, LAMPALLARM can be used in Group II explosive areas, Zones 1, 2, 21, 22.

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

- Approval: **CESI 05 ATEX 043**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - EX 080 LA F: 12V-24V-48V 110V-240V DC/AC
  - EX 080 LA L: 12V-24V-48V DC, 24V-48V-110V-240V AC
  - EX 080 LA L H:12V-24V AC, 12V-24V DC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6
- Available with filament (EX 080 LA F o L) or halogen (EX 080 LA L H) bulbs

EX 080 LA F

V ~	12	24	48	110	240
A	3.3	1.65	0.83	0.36	0.17
Cd(p)	720	900	720	67	135

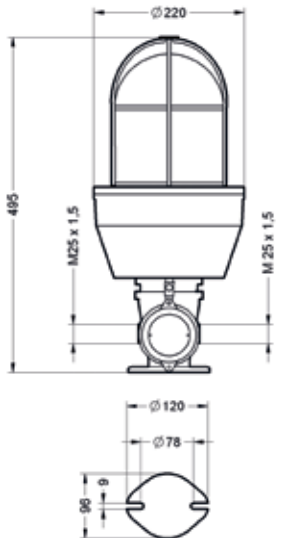
EX 080 LA L

V ~	-	24	48	110	240
V ⎓	12	24	48	-	-
A	3.4	1.7	0.83	0.36	0.17
Cd(p)	720	900	720	67	135
FPM: 110±20					

EX 080 LA L H

V ~	12	24
V ⎓	12	24
A	4.6	2.9
Cd(p)	720	720
FPM: 110±20		

IP 66	On ∞	°C -25 +50
M25x1.5		



Kg: 7.36

CODES

EX 080 LA F

12V ACDC	96171	96172	96173	96174	96175	96176
24V ACDC	96181	96182	96183	96184	96185	96186
48V ACDC	96191	96192	96193	96194	96195	96196
110V ACDC	96201	96202	96203	96204	96205	96206
240V ACDC	96211	96212	96213	96214	96215	96216

EX 080 LA L

12V DC	96061	96062	96063	96064	96065	96066
24V DC	96071	96072	96073	96074	96075	96076
24V AC	96081	96082	96083	96084	96085	96086
48V DC	96091	96092	96093	96094	96095	96096
48V AC	96101	96102	96103	96104	96105	96106
110V AC	96111	96112	96113	96114	96115	96116
240V AC	96121	96122	96123	96124	96125	96126

EX 080 LA L H1

12V DC	96131	96132	96133	96134	96135	96136
12V AC	96141	96142	96143	96144	96145	96146
24V DC	96151	96152	96153	96154	96155	96156
24V AC	96161	96162	96163	96164	96165	96166

PAG
PAG SP

Switches and pilot lights designed according to ATEx regulations, can be used in Group II explosive areas, Zones 1, 2, 21, 22.

EX 025 PAG: Explosion proof emergency switch ideal for activating alarm systems in explosive atmospheres, guaranteeing safety and long lifetime.

EX 045 LD PAG SP: Explosion proof pilot light, ideal for signaling the correct functioning of alarm/warning systems installed in explosive atmospheres.

EX 025 PAG

EX 045 LD PAG SP

EX 045 LD PAG SP

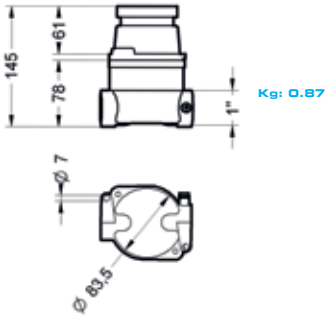
V ∿	12	24	48	110	240
V ⎓				-	-
mA	27	20	20	17	18

IP 66	On ∞	°C -20 +50
Ø 1" ISO 7/1		

II 2GD Ex de IIC T6 Ex tD A21 IP66 T85 °C

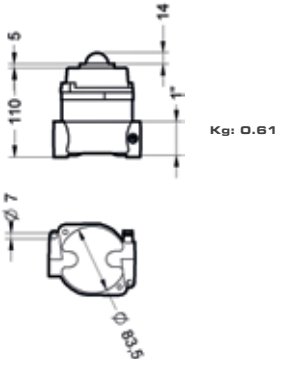
- Approval **CESI 05 ATEX 062**
- Housing in copper-free aluminium alloy
- Polyester paint RAL 3020
- Voltages available:
  - EX 045 LD PAG SP: 12V-24V-48V ACDC, 110V-240V AC
- Colors available: blue - amber - red - green - yellow - clear
- Protection: IP 66
- Maximum surface temperature: T6

EX 025 PAG



Kg: 0.87

EX 045 LD PAG SP



Kg: 0.61

CODES

EX 045 LD PAG SP

12V ACDC	97051	97053	97054	97055	97056
24V ACDC	97061	97063	97064	97065	97066
48V ACDC	97071	97073	97074	97075	97076
110V AC	97081	97083	97084	97085	97086
240V AC	97091	97093	97094	97095	97096

EX 025 PAG 96699

EXPRO

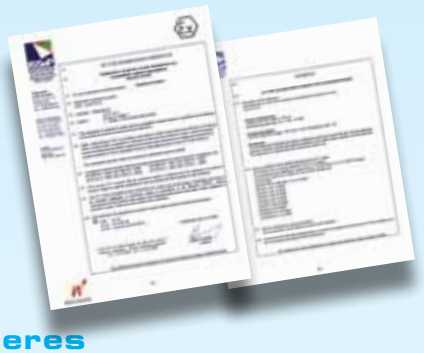
Explosion-proof ATEx Ex-d range

DIRECTIVE

Sirena's explosion proof range of products is approved according to **"ATEx" regulations (ATmosphére Explosive) 94/9/EC.**

Directive 94/9/EC defines an **explosive atmosphere** as a **mixture of inflammable substances** (in the presence of gas, vapours, mist saline or dust) **with air**, in **certain atmospheric conditions**, if an ignition has occurred, combustion spreads to the entire inflammable mixture. **An atmosphere** that can **become potentially explosive** in **certain working conditions and/or due to the surrounding environment** is defined a **potentially explosive atmosphere.**

Products certified according 94/9/EC Directive are defined to be suitable for use in potentially explosive atmospheres.



Furthermore, the **ATEx Directive** foresees that **manufacturers of electrical equipment to be used in zones with potentially explosive atmospheres** have an approved **Quality System** that is subject to constant control by an authorized body. Sirena has obtained the Masini Institute certificate, notified body n° 0068. The certificate proving conformity to the ATEx Directive specifications is 0068/QPR-AT/031-2005.

Electrical Equipment for use in explosive atmospheres

GROUPS - CATEGORIES - ZONES

The devices are divided into two groups, depending on the environment in which they are to operate:

- **Group I:** electrical equipment for use in mines and underground installations susceptible to firedamp
- **Group II:** electrical equipment for use in non-mining surface installations

Each group is classified in categories according to the level of protection that the devices must have:

GROUP I **Equipment for underground and installations in mining surfaces in the presence of firedamp and inflammable dust**		
Equipment category	**M1**	**M2**
Protection level	**Very high** (Device must continue to operate when explosive atmosphere is present)	**High** (Power supply to the device must be interrupted when explosive atmosphere is present)

GROUP II **Equipment for non-mining surface installations**						
Equipment category	**1**		**2**		**3**	
Protection level	**Very high**		**High**		**Normal**	
Explosive atmosphere	**Present continuously (or for long periods)**		**Likely to occur (in normal operation)**		**Not likely to occur (or for short periods - never in normal operation)**	
Nature of the atmosphere: **G= Mixture of air and gas, vapours or mist saline** **D= Mixture of air inflammable dust**	**G** **gas**	**D** **dust**	**G** **gas**	**D** **dust**	**G** **gas**	**D** **dust**
Zones where power supply and operation of the device is allowed	**0-1-2**	**20-21-22**	**1-2**	**21-22**	**2**	**22**

Group II equipment intended for use in gas explosive atmospheres are divided into **explosion groups** according to the nature of the gas itself and in relation to a parameter defined maximum experimental safe gaps (**MESG**) and the minimum ignition energy of a gas (**MIC:** MINIMUM IGNITING CURRENT).

EXPLOSION GROUP	GAS EXAMPLE	MESG	MIC
II A	Propane	>0,9 mm	>0,8
II B	Ethylene	da 0,5 a 0,9 mm	da 0,45 a 0,8
II C	Hydrogen and Acetylene	>0,5 mm	>0,45

TYPES OF PROTECTION

Types of protection define design standards for devices to be used in hazardous environments due to potentially explosive atmospheres.

Types of protection for the presence of potentially explosive atmospheres with GAS

TYPES OF PROTECTION	CODE	DESCRIPTION
Containment	**The explosion is confined inside the enclosure avoiding propagation to the surrounding atmosphere**	
Explosion proof enclosure (EN 60079-1)	**Ex "d"**	Type of protection in which the parts which can ignite an explosive atmosphere are placed in an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture which prevents the transmission of the explosion to the explosive atmospheres surrounding the enclosure
Prevention	**This technique increases the reliability of the electrical components which during normal operation cannot spark or reach a dangerous surface temperature**	
Increased Safety (EN 60079-7)	**"e"**	Type of protection in which measures are applied so as to prevent, with a higher degree of safety, the possibility of excessive temperatures and of the occurrence of arcs or sparks in the interior and on the external parts of electrical apparatus, which does not produce them in normal service
Intrinsically safety (EN 60079-11)	**"i"**	Type of protection when no spark or any thermal effect in the circuit, produced in the test conditions prescribed in the standard (which includes normal operation and specific fault conditions), is capable of causing ignition
Method of protection "n" (EN 60079-15)	**"n"**	Type of protection applied to electrical material so as to prevent ignition in surrounding explosive atmospheres in normal working conditions or in certain anomaly conditions specified by the standard
Segregation	**This method physically separates or isolates live electrical parts or hot surfaces from the explosive mixture so that they never come in contact with the ignition source**	
Internal pressure (EN 60079-2)	**"p"**	Type of protection in which the protective inert gas inside the enclosure is maintained at a higher Internal pressure than that of the surrounding atmosphere
Encapsulation (EN 60079-18)	**"m"**	Type of protection in which the parts which can ignite an explosive atmosphere are enclosed in a resin sufficiently resistant to the environmental influences in such a way that this explosive atmosphere cannot be ignited by either sparking or heating which may occur within the encapsulation
Immersion (EN 60079-6)	**"o"**	Type of protection in which the electrical apparatus is immersed in oil
Powdery filling (EN 60079-5)	**"q"**	Type of protection in which the enclosure is filled with a material in a finely granulated state

Types of protection for electrical apparatus for use in DUST atmospheres

Protection by enclosure (EN 61241-1)	**"tD"**	**Protection by Intrinsic safety** (EN 61241-11)	**"iD"**
Protection by Internal pressure (EN 61241-4)	**"pD"**	**Protection by encapsulation** (EN 61241-18)	**"mD"**

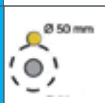
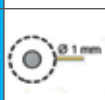
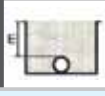
Temperature classes for Group II apparatus in atmospheres with GAS

Equipment, suitable for use in a potentially gas explosive atmosphere, must comply with another specification relating to the maximum surface temperature reached during operation that must be lower than the ignition or the explosive mixture. The maximum surface temperature is the highest temperature reached during the operation in normal conditions, at any point on the surface of the electrical device.

The temperature class is assigned to a device according to its maximum surface temperature This latter must therefore always be lower than the temperature of inflammation of the gas present in the surrounding atmosphere:

TEMPERATURE CLASS	MAXIMUM SURFACE TEMPERATURE	INFLAMMABLE GAS TEMPERATURE
T1	450 °C	> 450 °C
T2	300 °C	> 300 °C
T3	200 °C	> 200 °C
T4	135 °C	> 135 °C
T5	100 °C	> 100 °C
T6	85 °C	> 85 °C

DEGREE OF PROTECTION (EN 60529)

First digit: protection against accidental contact and penetration by solid foreign bodies			Second digit: protection against penetration of liquids		
IP			IP		
0		No perticular protection	0		No particular protection
1		Protection against solid bodies over 50mm and against contacts by large surfaces of the human body (e.g. the hands)	1		Protection against the vertical fall of drops of water (e.g. condensation)
2		Protection against solid bodies over 12,5 mm and against finger contact	2		Protection against the vertical fall of drops of water with a maximum incline of 15°
3		Protection against solid bodies over 2,5 mm (e.g. tools, wires)	3		Protection against the vertical fall of drops of water with a maximum incline of 60°
4		Protection against penetration of solid bodies with a diameter or thickness over 1 mm (e.g. wires)	4		Protection against splashes of water from all directions
5		Dust penetration is not fully excluded, but the quality that penetrates causes no damaging effects	5		Protection against jets of water from all directions
6		No dust penetration is permitted	6		Protection against waves of water or powerful jets
			7		Protection against the effects of immersion
			8		Protection against the effects of prolonged immersion under pressure

Symbols

	**"Ex"** distinguishes **apparatus that can be used in potentially explosive atmosphere zones**
II	**Groups** (I: for mines - II: for non-mining surface installations)
2	**Categories** (1: for use in zones 0 or 20/1 or 21/2 or 22 - 2: for use in zones 1 or 21/2 or 22 - 3: for use in zones 2 or 22)
GD	**G = Gas - D = Dust** (for installation in presence of gas and inflammable dust)
Ex	According to **EN 60079-0: 2006**, **EN 60079-1: 2007**, **EN 60079-7: 2007**, **EN 61241-0: 2006**, **EN 61241-1: 2004**, **EN 13463-1: 2009** Norms
de	**de:** (Increased safety explosion proof enclosure) **Types of protection** (for devices to be used in dangerous areas due to gas potentially explosive atmospheres)
IIC	**Explosion Group** (specified only for devices to be used in gas explosive atmospheres): **IIC** (highly dangerous group, e.g. Hydrogen and Acetylene)
T6	**Temperature class** (assigned according to maximum surface temperature of the device)
tD	**Types of protection** (for devices to be used in dangerous areas due to the presence of **dust potentially explosive atmospheres**): **tD** (by enclosure)
A21	**Method to determine dust penetration (according to IEC 60529): A21** (for enclosures intended for use in zones 20, 21 and 22)
IP 66	**IP Rating** (specified only for devices intended for use in dust explosive atmospheres)
T 85 °C	**Maximum surface temperature** (specified for devices intended for use in dust explosive atmospheres)
Ta -20+50°C	Assigned **Ambient Temperature Range**
CE	Graphic Symbol **"European Community"** indicates that the product conforms with Directive specifications relating to material, public health, consumer safety etc. etc.
0068	**N° of the notified body** responsible for supervision of production according to ATEX Directive 94/9/EC
CESI 10 ATEX 038 X	**"EC type" Examination Certificate No.:** identification entity who issued the certificate, the year of issue and the number of the certificate

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R.E.A. 487901 | Mecc. TO 027549 | Registro Imprese TO - C.F.01047730013
Partita IVA IT 01047730013 | Capitale sociale €5.000.000 di cui versato €5.000.000

Printed in Italy -
10/2012 Ref. 2050

MADE IN ITALY
Engineered, Developed and Assembled in Rosta, Italy

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