

World class antenna  
solutions for  
**Hazardous  
environments**

**Ex** certified antennas for  
professional communication



**Amphenol**  
Turkey & Middle East

# Safety in places

where mistakes cannot be forgiven



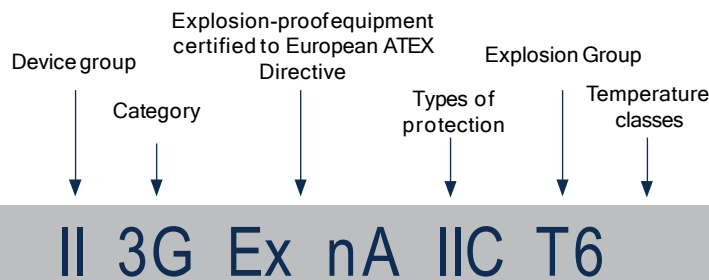
## Procom Ex certified antennas

Procom offers more than 25 different ATEX antenna types.

ATEX antennas for the Oil and Petrochemical industry where wireless onboard communication, paging systems, ground-to-air communication, maritime VHF communication and Wi-Fi data transmission systems are in use.

Risk of explosion requires a need for ATEX certified equipment.

Demands and requirements: Radio equipment and wireless solutions are more and more common for mission-critical voice and data communication in hazardous areas like oil platforms, FPSO vessels, tankers and refineries.



Procom Ex antennas classification



Marine

Refinery



# ATEX European Directive

## Potentially explosive atmospheres

Standard regulations for equipment used inside hazardous areas with potentially explosive atmospheres is a core issue for

critical communication. The EU took the lead in developing standards which became famous as ATEX directives (ATmosphères

EXplosibles). They apply to all kinds of electrical or non-electrical equipment and safety devices as well as machines and industrial facilities located within potentially explosive atmospheres. Since July 2003 it is mandatory to use devices which have an ATEX type approval all across Europe.

### 2014/34/EU Directive

Harmonises legal provisions of member states for devices and protection systems for designated use in potentially explosive areas. ATEX2014

### 1992/92/EC Directive

Minimum requirements for improving the health and safety protection of the worker at risk from explosive atmospheres. ATEX 137

TEMPERATURE CLASSES:	
For gases	Max. surface temperature
T1	450° C
T2	300° C
T3	200° C
T4	135° C
T5	100° C
T6	85° C
EXPLOSION GROUP:	
I	Methane (mining)
IIA	such as Propane
IIB	such as Ethylene
IIC	most dangerous group (e.g. hydrogen)

DEVICE GROUP	
II	All explosive areas (except mining)
CATEGORY	
1	Can be used in zone 0 or 20
2	Can be used in Zones 1 or 21
3	Can be used in Zones 2 or 22
ATMOSPHERE	
G	Gas

TYPES OF PROTECTION	
o	oil
p.	High pressure encapsulation
q.	Sand encapsulation
d.	Pressure resistant encapsulation
e.	Increased safety
ia	Intrinsic safety (required for zone 0)
ib	Intrinsic safety (required for zone 1)
m	Encapsulation
nA	Non-sparking apparatus
s	Special protection

# Procom Ex Antenna Portfolio

Procom offers more than 25 different ATEX antenna types. Based on the ATEX directives 2014/34/EU, the Procom product type series

CXL - Ex named below are ATEX marked and delivered with ATEX conformity. All products conform to **ATEX Class: II 3G Ex nA IIC T6**.

## CXL 150-1LW-SS-Ex

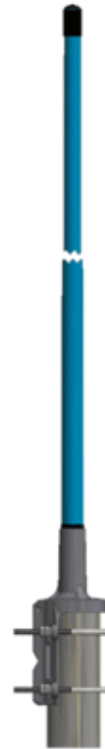
ATEX certified, 0 dBd, Omnidirectional Base Station Antenna for the 138 - 175 MHz Bands.

- ▲ Frequency range 138-175 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth: 18-21 MHz
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical

## CXL 450-1LW-SS-Ex

ATEX certified, 0 dBd, Omnidirectional Base Station and Marine Antenna for the 450 MHz Band in hazardous areas.

- ▲ Frequency range 380 - 430 MHz & 420 - 470 MHz & 460 - 510 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth: 30 MHz
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical



## MA 160-Ex

ATEX certified, End-fed Stainless Steel Dipole, Marine and Base Station Antenna for the International Maritime VHF band in Hazardous Areas.

- ▲ Model Covering 154 - 162 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ 1" Pipe Mount for installation versatility
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical

## MA 450-Ex

ATEX certified, End-fed Stainless Steel Dipole, Marine and Base Station Antenna for the 450 MHz band in Hazardous Areas.

- ▲ Model Covering 380 - 460 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth: 20 MHz
- ▲ 1" Pipe Mount for installation versatility
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical

Coming Soon!



### CXL 130-1C-Ex

ATEX certified, 0 dBd, Omnidirectional Base Station Antenna for the International Aircraft Band.

- ▲ Frequency range 110-140 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth: 30 MHz
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical

### CXL 130-1-Ex

ATEX certified, 0 dBd, Omnidirectional Base Station Antenna for the International Aircraft Band.

- ▲ Frequency range 118-137 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth: 19 MHz
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical



---

### CXL 2400-3LW-SS-Ex

ATEX certified, 3 dBd, Omnidirectional Base Station and Marine Antenna for the 2400 MHz Band.

- ▲ Frequency range within 2200 – 2700 MHz
- ▲ Gain: 5 dBi 3 dBd
- ▲ Bandwidth:  $\geq 200$  MHz @  $SWR \leq 2.0$  &  $\geq 100$  MHz @  $SWR \leq 2.0$  depending on model
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical

### CXL 2400-1LW-SS-Ex

ATEX certified, 0 dBd, Omnidirectional Base Station and Marine Antenna for the 2400 MHz Band.

- ▲ Frequency range within 2300 – 2700 MHz
- ▲ Gain: 2 dBi 0 dBd
- ▲ Bandwidth:  $\geq 100$  MHz @  $SWR \leq 1.5$
- ▲ Radiation: Omnidirectional
- ▲ Polarization: Vertical



---

### GPS 4-Ex

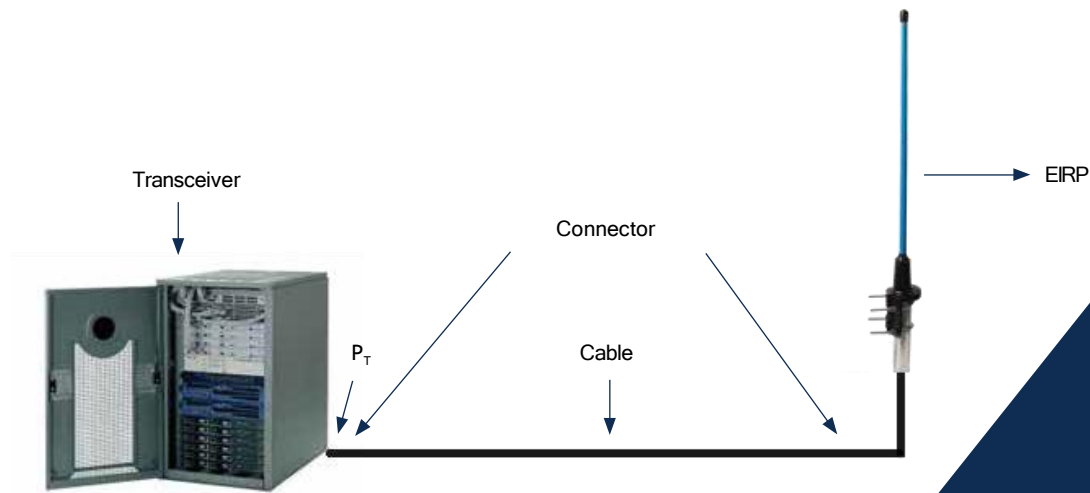
Passive GPS receiving antenna for Galileo, Glonass and BeiDou navigational system. Full hemispherical coverage due to quadrifilar helix antenna elements.

- ▲ Antenna type: Passive quadrifilar helix antenna
- ▲ Frequency: 1575 - 1650 MHz
- ▲ Gain: 2 dBic 0 dBd
- ▲ Polarization: Circular right-hand





# Hazardous Environments



Determining the EIRP of an RF transmitting system

EIRP	Ant. Gain	Connector	Cable	Connector	P <sub>T</sub>
	- (+ 5 dBi)	- (- 0.1 dB)	- (- 3.0 dB)	- (- 0.1 dB)	
2 W = + 33 dBm	+ 28 dBm	+ 28.1 dBm	+ 31.1 dBm	+ 31.2 dBm = 1.32 W	

Add/Deduct

## TRANSMITTER POWER P<sub>T</sub> VERSUS RADIATED POWER EIRP

Guidelines for determining the right transmitter power to fulfill the threshold power in a classified ATEX area.

### Calculate the EIRP:

EIRP = Effective isotropically radiated power

P<sub>T</sub> = Transmitter output power (dBm)

C<sub>T</sub> = Signal loss in cable (dB)

CON<sub>T</sub> = Signal loss in connector (dB)

G<sub>T</sub> = Gain of the antenna (dBi)

### Using this formula:

$$EIRP = P_T - CON_T - C_T + G_T$$

The EIRP is defined as the product of the power supplied to the antenna and the antenna gain.

The performance of the radio system depends on the antenna radiation, antenna gain, and of course, antenna location.

For RF with short pulses, the energy must be limited as per EN/IEC 60079-0, §6.6.1 table Transceivers radiate electromagnetic radiation which constitutes a possible ignition source in hazardous areas.

**Note:** The EIRP must not exceed the threshold power in a certain equipment group.

EQUIPMENT GROUP	THRESHOLD POWER [W]
Group IIA	6 W
Group IIB	3.5 W
Group IIC	2 W

It is very important to avoid the incident triggers by using the right equipment, installing certified equipment in the right location and in general fulfill the EU Ex standards.

**Product tests:**

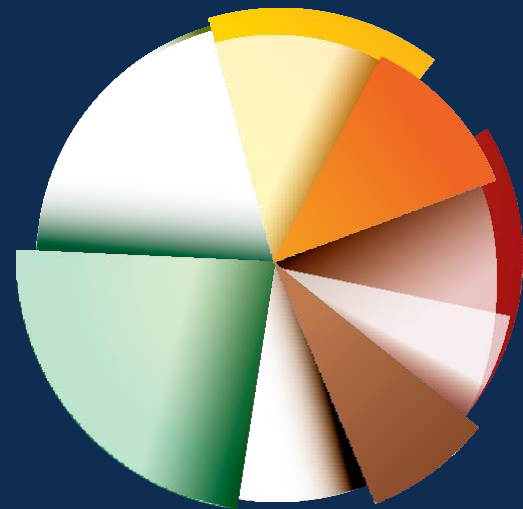
- ▲ Impact test
- ▲ Thermal endurance to heat and cold
- ▲ Ingress protection IP54 test

There are also special requirements regarding installation in hazardous areas.

**Installation issues:**

- ▲ Static electricity
- ▲ Materials build up electric charges
- ▲ Discharge can ignite an explosive atmosphere
- ▲ Must be wiped with a damp cloth
- ▲ Grounding – Done with a 4 mm non moveable wire of stainless steel.
- ▲ Installation – The antenna shall be installed by trained personnel in accordance with EN60079-14

**Incident triggers:**



- Static Electricity 22%
- Mechanical Spark 8%
- Other
- Electrical Arc and Sparks 8%
- Other

**ATEX Directives:**

Equipment: 2014/34/EU  
Workplace: 1992/92/EC

**RISK OF EXPLOSION REQUIRES A NEED FOR ATEX CERTIFIED EQUIPMENT.**

**Demands and requirements:**

Radio equipment and wireless solutions are more and more common for mission-critical voice and data communication in hazardous areas like oil platforms, FPSO vessels, tankers and refineries. In some installations it is difficult to place the equipment in safe areas because of narrow space and confined rooms.

In that case the communication equipment will, for some parts, be located in the classified area. Base station transceivers will be located in a safe area, because of the need for high power, but cable and antennas will sometimes be installed in, or pass through, classified areas, for example Zone 1 or Zone 2 where the equipment has to be ATEX certified.

Onboard a ship or an oil platform it can be difficult to find a safe and non-classified location. Typically antenna equipment will be installed in safe areas, but if space is limited, it may be impossible. This issue and demand can be solved by using ATEX approved products if the installation is to take place in a potentially explosive area.

When you install the communication equipment, it is important to follow the Ex standards and fulfill the requirements regarding transmitted power, cable loss, location, gain and EIRP.

Equipment in hazardous areas has to be approved due to EU standards 2014/34/EU.