



Safety in Hazardous Environments

World Class Antenna Solutions for
Critical Industrial Applications

EX certified antennas
for professional communication



"Improve quality of service"

Procom **Ex** Certified Antennas

Designed for Safe Communications in demanding Industrial Applications

Wireless communications are critical for safe and efficient operations in aviation, mines, on offshore platforms, refineries, FPSO vessels and oil and gas tankers.

With the sharp focus on continuous process improvements in safety procedures, the need for approved antenna solutions has never been more important. Procom Ex antennas are certified for use in challenging, hazardous locations (HAZLOC).

Procom offers more than 25 different ATEX certified antenna models.

Models include ground to air VHF communications, marine VHF communications, paging systems, Wi-fi applications and GPS antennas.

Aviation



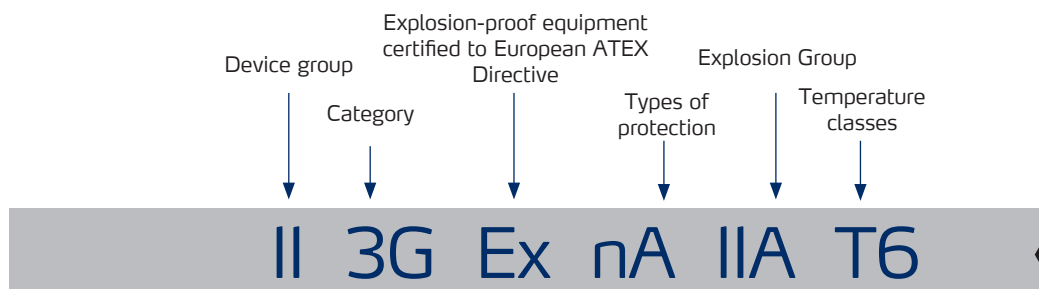
Refinery



Maritime



Oil & Gas



Procom Ex antennas classification



ATEX Directive for Explosive Atmospheres

ATEX: ATmosphères EXplosibles

The ATEX European directive defines the specifications of equipment used in hazardous locations (HAZLOC). These are

areas where concentrations of flammable gases, liquids or airborne dusts occur.

The ATEX directive applies to all kinds of electrical and non electrical equipment and safety devices. It also covers machines and industrial facilities located within HAZLOC areas. Since July 2003, it has been mandatory all across Europe to use devices that have an ATEX type approval.

94/9/EC Directive (ATEX 95)

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

1999/92/CE Directive (ATEX 137)

Defines minimum requirements for improving the health and safety protection of the worker at risk from explosive atmospheres.

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 94/9/EC, the Procom product type series

CXL - Ex named below are ATEX marked and delivered with ATEX conformity.

Airband

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

ATEX CLASS: II 3G Ex nA IIA IIC T6



VHF & UHF Marine and Base Station Antennas

CXL 150-1HD-Ex

ATEX certified, 0 dBd, Omnidirectional Base Station Antenna for the 144 - 175 MHz Bands.

- > Frequency range 144-175 MHz
- > Gain: 2 dBi 0 dBd
- > Bandwidth: 50 MHz
- > Radiation: Omnidirectional
- > Polarization: Vertical

CXL 450-1LW-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

ATEX CLASS: II 3G Ex nA IIA IIC T6



Wi-Fi

CXL 2400-3LW-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: ≥ 200 MHz @ $SWR \leq 2.0$ & ≥ 100 MHz @ $SWR \leq 2.0$ depending on model
- > Radiation: Omnidirectional
- > Polarization: Vertical

CXL 2400-1LW-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: ≥ 100 MHz @ $SWR \leq 1.5$
- > Radiation: Omnidirectional
- > Polarization: Vertical

ATEX CLASS: II 3G Ex nA IIA IIC T6



GPS

GPS 4-Ex

Active receiving antenna for the 1575 MHz NAVSTAR GPS satellite navigation system. Full hemispherical coverage due to quadrifilar helix antenna element. EMC tested to IEC 801 and IEC 255.

- > Antenna type: Quadrifilar helix active antenna
- > Frequency: 1575 MHz
- > Gain: > 32 dBi
- > Polarization: Circular right-hand

ATEX CLASS: II 3G Ex nA IIA IIC T6



Miscellaneous

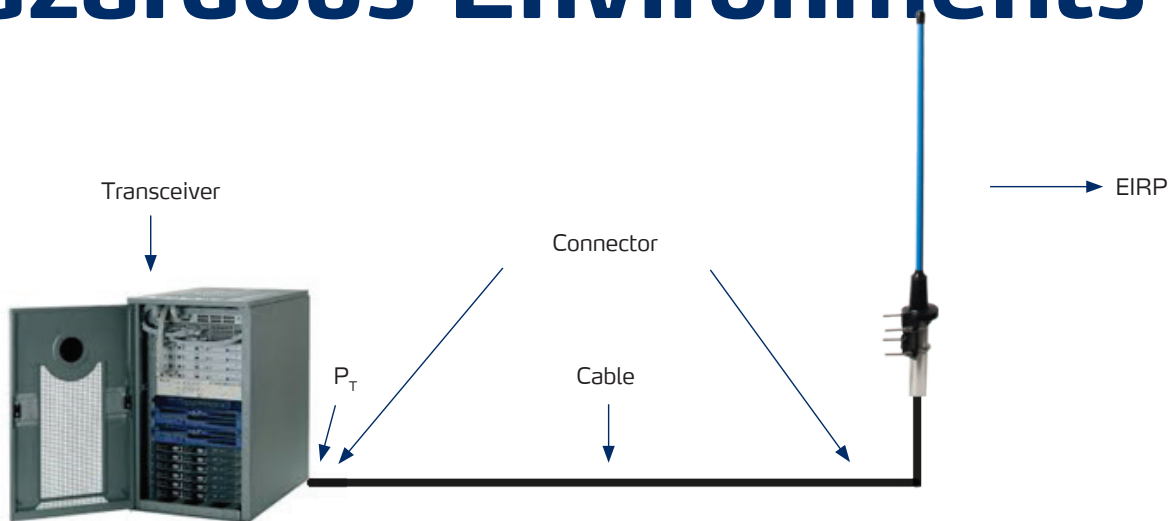
BU-Block-Ex

COMING SOON!

ATEX CLASS: II 3G Ex nA IIA IIC T6



Ex Antenna Equipment for Hazardous Environments



Determining the EIRP of an RF transmitting system

EIRP	Ant. Gain	Connector	Cable	Connector	P _T
	- (+ 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_T 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_T = Transmitter output power (dBm)

C_T = Signal loss in cable (dB)

CON_T = Signal loss in connector (dB)

G_T = Gain of the antenna (dBi)

Using this formula:

$$\text{EIRP} = P_T - \text{CON}_T - C_T + G_T$$

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

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. High power base station transceivers will be located in a safe area. Cable and antennas will sometimes be installed in, or pass through, classified areas, (eg. 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 94/9/EF.

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. Equipment has to undergo different tests.

Product tests:

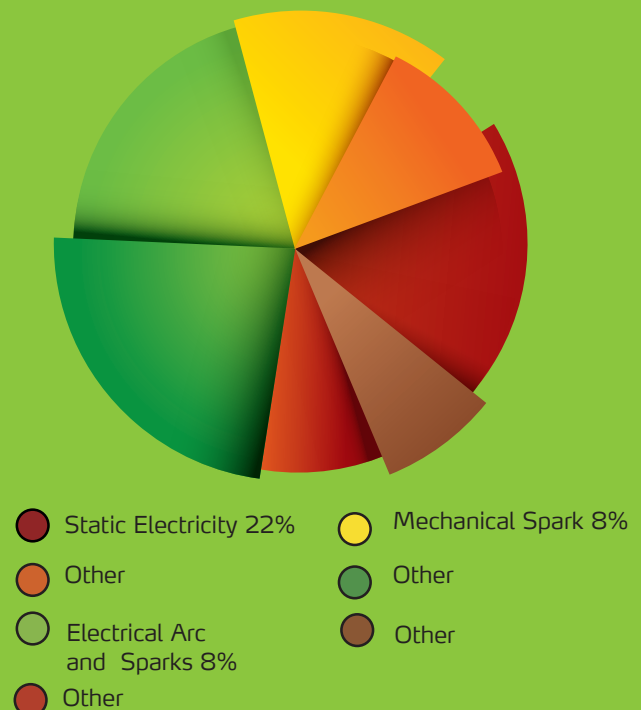
- > Impact test
- > Thermal endurance to heat and cold
- > Ingress protection IP54 test

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 4mm not moveable wire of stainless steel.
- > Installation – The antenna shall be installed by trained personnel in accordance with EN60079-14

Incident triggers:



ATEX Directives:

Equipment: 94/9/E

Workplace: 99/92/EC

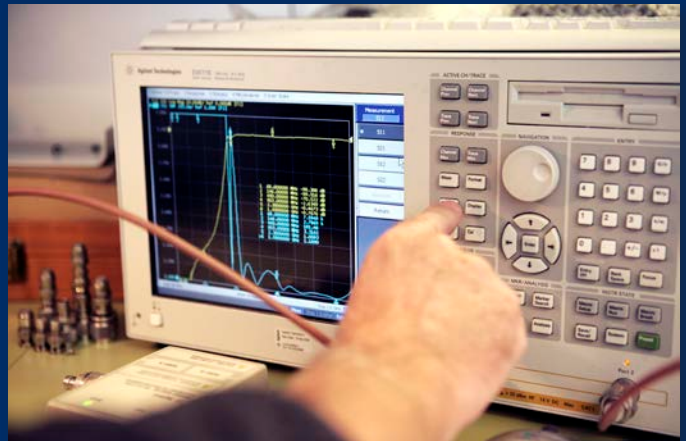
About PROCOM A/S

Founded in 1980, Procom A/S is one of the world's leading suppliers of rugged R.F. antennas. Based in Frederikssund, north of Copenhagen, Denmark, Procom produces a wide range of R.F. products including antennas, filters, combiners, couplers and R.F. measuring equipment for two way communications

Factories are located in Denmark and the U.K. with four sales offices in Europe and a network of dealers worldwide. Essential ingredients in the success of the company are a workforce dedicated to producing quality R.F. products and an in-house engineering team that can customize products to a client's specification.

Procom's growing client list includes large and small companies, government agencies, including military forces, law enforcement and First Responder teams.

When quality and reliability are critical to your R.F. communications project, contact Procom A/S.



Focused R.F. Engineering, World Class Products

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