



# *Spotlight On*

## Motorola ATEX Two Way Radio Portfolio



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## Objective of this Spotlight

The aim of this document is to enhance your knowledge of Motorola's ATEX radio and associated accessory portfolio.

It will provide a source for the explanation of the ATEX rating associated with these products and be a reference document for on going use.

This document is not intended to explain the ATEX standard however in the Glossary various web links are available where further information regarding the standards can be found.\*

\*All information and web links are correct at the time of publication January 2010.

## Intrinsically Safe Products

Intrinsically Safe Products are those designed to be used in hazardous areas where there is a risk of causing hazards due to the presence of explosive gases and/or dusts.

There are three categories of Intrinsic Safety approvals:

1. ATEX – Atmosphere Explosive. Certification to the ATEX directive 94/9/EC
2. IEC Ex – International certification system for Ex products
3. FM – IS approval by US based Factory Mutual certification body

Approved devices provide additional user safety protection when using communication and other equipment in these types of working conditions. This document will focus on Motorola products meeting the ATEX standard. ATEX is an abbreviation of **AT**mospheres **Ex**plosive, a Directive from the European Union. Use of these products is mandatory in the EU (European Union) and EFTA (European Free Trade Area) and came into force 1<sup>st</sup> July 2003.

Manufacturers submit their products to Notified Bodies which test and certify these products to the ATEX standard. Upon successful completion of tests, the manufacturer issues a Declaration of Conformity with reference to ATEX directives. The Notified Body then issues ATEX Certificates for the product. The Notified Body used by Motorola is **Dekra Exam GmbH**.

## **Declaration of Conformity weblinks for Motorola radios**

### **MTP850 EX**

[http://www.motorola.com/Business/XU-EN/Product+Lines/Dimetra+TETRA/MTP850EX\\_XU-EN\\_XN-EN\\_XC-EN\\_XM-EN\\_XE-EN\\_PK-EN\\_XF-EN](http://www.motorola.com/Business/XU-EN/Product+Lines/Dimetra+TETRA/MTP850EX_XU-EN_XN-EN_XC-EN_XM-EN_XE-EN_PK-EN_XF-EN)

### **MTP810 EX**

[http://www.motorola.com/Business/XU-EN/Product+Lines/Dimetra+TETRA/MTP810Ex\\_XU-EN\\_PK-EN\\_XF-EN](http://www.motorola.com/Business/XU-EN/Product+Lines/Dimetra+TETRA/MTP810Ex_XU-EN_PK-EN_XF-EN)

### **GP340 ATEX Blue**

[http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP340+ATEX+-+Blue+version\\_XU-EN%252CPK-EN](http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP340+ATEX+-+Blue+version_XU-EN%252CPK-EN)

### **GP380 ATEX Blue**

[http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP380+ATEX+-+Blue+Version\\_XU-EN](http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP380+ATEX+-+Blue+Version_XU-EN)

### **GP580 ATEX Blue**

[http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP580+ATEX+-+Blue+Version\\_XU-EN%252CPK-EN](http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP580+ATEX+-+Blue+Version_XU-EN%252CPK-EN)

### **GP680 ATEX Blue**

[http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP680+ATEX+-+Blue+Version\\_XU-EN](http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series/GP680+ATEX+-+Blue+Version_XU-EN)

## **Radios in Hazardous Areas**













Two way radios can be a risk in Hazardous areas for reasons listed below. Our ATEX approved radios are specifically designed to minimize the risk.

- When a radio transmits, it emits electromagnetic energy. If the energy level is too high it can cause explosive gases present in the environment to ignite
- Sparking. If a radio is disconnected from its battery, or accessories from the accessory socket, sparks could occur which could cause an explosion. The stored energy in the radios (capacitors or inductors) can result in a spark when failures occur.
- High Temperatures. Failures in the radios or on the connected devices can cause components or surfaces of the enclosures to heat up to a level that could cause a dust or gas explosion.

A global survey conducted by Motorola's Sales teams showed that the top three concerns of users of Intrinsically Safe products are:

1. Equipment is environmentally safe, in other words reliable, robust and ATEX approved
2. Audio features - loudness, crystal clear sound and tone
3. Equipment handling and operation is easy while wearing gloves

## Examples of Explosive Hazards

	Industry	Explosive Hazard
	Chemical Industry	Flammable gases, liquids and solids are converted and processed in many different processes in the chemical industry, which may give rise to explosive mixtures.
	Gas Pipelines and Distribution Centres	Explosive gas/air mixtures may be formed when natural gas is released, for example by leakage.
	Power Generating Companies	Lump coal, which is not explosive in mixture with air, may be converted in the conveying, grinding and drying processes into coal dust capable of forming explosive dust/air mixtures.
	Sewerage Treatment Plants	When waste waters are treated in purification plants, the gases generated may form explosive gas/air mixtures.
	Landfill Tips and Civil Engineering	Flammable gases may arise in landfill sites. Elaborate technical arrangements are needed to avoid uncontrolled gas emission and possible ignition. Flammable gases from various sources may collect in poorly ventilated tunnels, cellars, etc.
	Wood-working Industry	Wood-working gives rise to wood dusts. These can form explosive dust/air mixtures, e.g. in filters or silos.
	Paint-spraying Operations	The overspray generated in paint spray bays and the solvent vapours released may give rise to explosive atmospheres when mixed with air.
	Agriculture	Biogas production plants are operated on some farms. Explosive biogas/air mixtures may arise if the gas is released, e.g. by leakage.
	Metal-working Operations	When shaped parts are manufactured from metals, explosive metal dusts may be produced during grinding - this particularly applies to light metals. These metal dusts may give rise to an explosion hazard in dust collectors.
	Food and Feedstuffs Industry	Explosive dusts may arise during transportation, storage and processing of grain, sugar, etc. If they are exhausted and collected by filtering, explosive atmospheres may arise.
	Pharmaceutical Industry	Alcohols are often used as solvents in the production of pharmaceuticals. Agents and auxiliary materials that give rise to dust explosions, such as lactose, may also be used.
	Oil Refineries, Rigs, Processing Plants and Filling Stations	The hydrocarbons handled in refineries are all flammable and may give rise to explosive atmospheres even at ambient temperature. The area around oil processing plant is generally regarded as a place where explosive atmospheres may occur.

## Risk Levels Classified by Zones

**IMPORTANT** -You will **not** be asked to define this zone classification for a Hazardous Area. This is the role of the site operator. Therefore the information is provided only as background information for your greater understanding.

The risk level is assessed and organised by two primary factors;

- (i) The amount of time a hazardous substance is present i.e. continuously, frequently or occasionally.
- (ii) The type of hazard i.e. Gas, Dust, Mining

Part of the equipment rating will include one or more Device Category designators.

All the Risk Levels assume that the hazard is present during normal operations

Area Classification		Zone Criteria (Durations in the table are typical)
Explosive Gases	Explosive Dusts	
Zone 0	Zone 20	Present continuously or for long periods (>1000 hours per annum)
Zone 1	Zone 21	Likely to occur in normal operation occasionally (>10 hours and <1000 hours per annum)
Zone 2	Zone 22	Unlikely to occur in normal operation, if it does it will only be for short periods (<10 hours per annum)

Hazardous areas are classified into zones on the basis of the frequency and duration of the occurrence of an explosive atmosphere.

For more detailed classification refer to DEKRA EXAM GmbH.

Hazardous environment has to be classified stating zone, i.e. gas or dust according to explosive substance as above. If determined by inspection that there is no explosive substance then the area is non-classified.

## Maximum Temperatures & Gas Groups

	T1: 450°C	T2: 300°C	T3: 200°C	T4: 135°C	T5: 100°C	T6: 85°C
<b>I</b>	Methane					
	Acetone	Ethyl alcohol	Benzine	Acetaldehyde		
	Ethane	l-amyl acetate	Diesel fuel	Ethyl ether		
	Ethyl acetate	n-butane	Aircraft fuel			
	Ammonia	n-butyl alcohol	Heating Oil			
	Benzene-pure		n-Hexane			
	Ethanoic Acid					
	Carbon Monoxide	<b>GP340Ex, GP380Ex, GP580Ex, GP680Ex MTP850 Ex, MTP810 Ex</b>				
	Methanol					
	Propane					
	Toluene					
<b>IIB</b>	Coal Gas (Lighting Gas)	Ethylene	<b>GP340Ex, GP380Ex, GP580Ex, GP680Ex, MTP850 Ex</b>			
<b>IIC</b>	Hydrogen	Acetylene				Carbon disulphide

Motorola ATEX radios (including MTP850 Ex and Professional Series ATEX radios) have the highest IIC rating, and are also rated T4 which covers all gasses except methane and sulphide.

For more information on explosive gasses, refer to DEKRA EXAM GmbH.

## ATEX Certification for Motorola Radios

<b>Professional Series ATEX</b> <u>BVS 07 ATEX E 095 X</u>	<b>MTP850 Ex</b> <u>BVS 08 ATEX E 143 X</u>	<b>MTP810 EX</b> <u>BVS 08 ATEX E 153 X</u>
<b>I 2 G Ex ib IIC T4</b> (Gas Rating)	<b>II 2G Ex ib IIC T4</b> (Gas Rating)	<b>II 2G Ex ib IIA T3</b> (Gas Rating)
<b>II 2 D Ex tD A21 IP6x ib D21 T110°C</b> (Dust Rating)	<b>II 2D Ex ibD 21 IP6x T90°C</b> (Dust Rating)	<b>II 3D Ex ibD 22 IP6x T90°C</b> (Dust Rating)
<b>I M2 Ex ib I</b> (Mining Rating)		

### **Explanation of Gas Rating: II 2 G Ex ib IIC T4**

II	Group II other environments (chemical industry, refineries, etc)
2 G	Category 2 equipment Gas
Ex	Explosion-proof equipment
ib	Type of intrinsic safety protection (ib – “limitation of energy” Zone 1 & 2)
IIC	Protection in the most explosive gas environment (incl. hydrogen)
T4	Device surface temperature will not exceed 135°C

### **Explanation of Dust Rating: II 2 D Ex tD A21 IP6x ib D21 T110°C**

II	Group II other environments (chemical industry, refineries, etc)
2 D	Category 2 equipment Dust
Ex	Explosion-proof equipment
tD	Dust protection by enclosure
A21	Enclosure certified for Dust Zone 21 by IP rating
IP6x	IP Protection level for Dust
ib	Type of intrinsic safety protection (ib – “limitation of energy” Zone 1 & 2)-max rf power < 2W
D21	Dust Zone 21
T110°C	Maximum temperature of device surface

### **Explanation of Mining Rating: I M2 Ex ib I**

I	Group I Mining
M2	Category 2 equipment Mining; equipment is intended to be de-energized in the event of an explosive atmosphere. The means of protection relating to equipment in this category assure the requisite level of protection during normal operation and also in the case of more severe operating conditions, in particular those arising from rough handling and changing environmental conditions
Ex	Explosion-proof equipment certified to European ATEX Directive
ib	Type of intrinsic safety protection (ib – “limitation of energy” Zone 1 & 2)-max rf power < 2W
I	Explosion group I - methane



## Motorola ATEX Radios Overview

Motorola Professional Series Radios	Motorola Tetra Radios
ATEX and IEC Ex Certified	ATEX and IEC Ex Certified
IP64 enclosure sealing	IP64 enclosure sealing
MIL Spec 810F	MIL Spec 810F
Unique Motorola Accelerated Life Testing (ALT)	Unique Motorola Accelerated Life Testing (ALT)
Dedicated emergency button	Dedicated emergency button
Emergency call functionality	Emergency call functionality
5-one and trunked versions available	ETS 300 019 1-7 class 7.3E
Man Down Option Board	GPS and Man Down built in
Lone worker operation	WAP enabled (MSPD)
<b>Distinctive Blue Colour</b>	<b>Bright Red Colour</b>

### Professional Series ATEX Models

#### **Blue ATEX Radios**

GP340 ATEX 5 Tone  
 GP380 ATEX 5 Tone  
 GP680 ATEX MPT1327  
 GP580 ATEX Smart Zone



<http://www.motorola.com/Business/XU-EN/Business+Product+and+Services/Two-Way+Radios+-+Licensed/Portable+Radios/GP+Professional+Series?pMotFeatures=41168>

## **Professional Series ATEX Accessories**

### **Part Number      Description**

#### **Batteries**

NNTN5510DR      Battery Li-Ion 1480mAH ultra high capacity ATEX

This battery will be available in Q1 2010 for black and blue models and will replace existing batteries NNTN5510BR, NNTN5510CR and NNTN7174AR

#### **Chargers**

WPLN4189A      Impres multi unit charger, 230V Euro Power Cord  
WPLN4188A      Impres multi unit charger, 230V UK Power Cord  
WPLN4205A      Impres multi unit charger, 120V US Power Cord (not CE compliant)  
WPLN4194A      Impres display multi unit charger, 230V Euro Power Cord  
WPLN4193A      Impres display multi unit charger, 230V UK Power Cord  
WPLN4204A      Impres display multi unit charger, 120V US Power Cord (not CE compliant)  
MDHTN3001C      Rapid single unit charger, 230V Euro Power Cord  
MDHTN3002C      Rapid single unit charger, 230V UK Power Cord  
MDHTN3000C      Rapid single unit charger, 120V US Power Cord (not CE compliant)  
WPLN4184A      Impres single unit charger, 230V Euro Power Cord  
WPLN4183A      Impres single unit charger, 230V UK Power Cord  
WPLN4206A      Impres single unit charger, 120V US Power Cord (not CE compliant)  
MDRLN4883      Travel charger with VPA adapter and coiled cable

#### **Carry Cases**

GMLN1112B      Soft leather case for keypad models (GP380EX, GP580EX, GP680EX)  
GMLN1113B      Soft leather case for GP340 EX  
GMLN1110B      Heavy Duty leather case for GP380EX, GP580EX, GP680EX  
GMLN1111B      Heavy Duty leather case for GP340 EX  
PMLN5134A      ATEX Belt Clip (Plastic)  
NTN5243A      Carry Case Shoulder Strap (Nylon)  
HLN9985B      Waterproof Bag (Plastic)  
MDHLN6602A      ATEX Universal Chest Pack (Nylon)  
MDRLN4815A      ATEX GP Radio Pack (Nylon)

#### **Headsets**

PMLN5151A      ATEX Over-the-head Heavyduty Headset  
PMLN5152A      ATEX Behind-the-head Heavyduty Headset  
PMLN5153A      ATEX Over-the-head Lightweight Headset  
PMLN5154A      ATEX Behind-the-head Lightweight Headset  
PMMN4055A      ATEX Throat Microphone w/80mm PTT  
PMMN4056A      ATEX Skull Microphone w/ 80mm PTT

### Audio RSM

GMMN1111A	ATEX GP Remote Speaker Microphone for Black and Blue Models
PMMN4058A	ATEX Remote Speaker Microphone for Blue Models

### Antennas

NAE6483AR	Antenna UHF 403-520MHz Whip
NAE6522AR	Antenna UHF 438-470MHz
PMAD4012A	Antenna VHF 136-155MHz
PMAD4013A	Antenna VHF 155-174MHz
PMAD4014A	Antenna VHF 136-155MHz
PMAD4015A	Antenna VHF 155-174MHz Whip
PMAD4023A	Antenna VHF 150-161MHz
PMAD4025A	Antenna VHF 150-161MHz
PMAD4042A	Antenna VHF 136-155MHz
PMAD4049A	Antenna VHF 146-174MHz
PMAE4002A	Antenna UHF 403-433MHz
PMAE4003A	Antenna UHF 430-470MHz
PMAE4016A	Antenna UHF 403-520MHz Whip

### Miscellaneous

GMDN0386A	Sew on Dock
GMDN0497A	Belt Loop Dock
GMDN0445AC	Belt Loop with Screw on Dock
GMDN0566AC	Leather Belt Loop with Screw on Dock
GMDN0547A	Dock for Uniform Tag
WALN4307	Screw on Dock

### Tetra ATEX Models

MTP850 Ex – red model  
MTP810 Ex - black model

<http://www.motorola.com/tetra/mtp850ex/>



<http://www.motorola.com/Business/XU-EN/Product+Lines/Dimetra+TETRA/TETRA+Terminals/TETRA+Hand+Portables>

## **Tetra ATEX Accessories**

### **Part Number      Description**

#### **Batteries**

NNTN7383A      ATEX Li-Ion Battery

#### **Carrying Options**

PMLN5287A      Hard Leather Case, Black

PMLN5288A      Soft Leather Case, Black

PMLN5004A      Shoulder Wearing Device

PMLN5134A      Belt Clip (2.5 inch)

NTN5243A      Shoulder Strap

#### **Audio Accessories**

PMMN4058A      Remote Speaker Microphone with Volume Control

PMLN5389A      Over the Head Heavy-duty Headset

PMLN5390A      Behind the Head Heavy-duty Headset

PMLN5391A      Over the Head Lightweight Headset

PMLN5392A      Behind the Head Lightweight Headset

PMMN4063A      Throat Microphone with 80 mm PTT Button

#### **Antennas**

85007012001      Short Stubby Antenna, 380–430 MHz

8587526V14      Medium Stubby Antenna, 380–430 MHz

8575279M01      Whip Antenna, 380–430 MHz

85012000001      Whip Antenna, 806–870 MHz

8575277M02      Stubby Antenna, 806–870 MHz

#### **Covers**

PMLN5419A      Dust Cover

#### **Chargers**

WPLN4199B      Impres™ Single Unit Charger – Base Only

WPLN4182A      Impres™ Single Unit Charger – US Plug

WPLN4183A      Impres™ Single Unit Charger – UK Plug

WPLN4184A      Impres™ Single Unit Charger – EU Plug

WPLN4185A      Impres™ Single Unit Charger – Australia Plug

WPLN4186A      Impres™ Single Unit Charger – Argentina Plug

NNTN7471A      Impres™ Single Unit Charger – Korea Plug

WPLN4197A	Impres™ Multi Unit Charger – Base Only
WPLN4187A	Impres™ Multi Unit Charger – US Cord
WPLN4189AA	Impres™ Multi Unit Charger – EU Cord
WPLN4188AA	Impres™ Multi Unit Charger – UK Cord
WPLN4190A	Impres™ Multi Unit Charger – Australia Cord
WPLN4191A	Impres™ Multi Unit Charger – Argentina Cord
WPLN4205A	Impres™ Multi Unit Charger – International (110 V)
WPLN4146A	Impres™ Multi Unit Charger – Korea Cord
WPLN4198A	Impres™ Multi Unit Charger with Display – Base Only
WPLN4192A	Impres™ Multi Unit Charger with Display – US Cord
WPLN4194AA	Impres™ Multi Unit Charger with Display – EU Cord
WPLN4193AA	Impres™ Multi Unit Charger with Display – UK Cord
WPLN4195A	Impres™ Multi Unit Charger with Display – Australia Cord
WPLN4196A	Impres™ Multi Unit Charger with Display – Argentina Cord
WPLN4204A	Impres™ Multi Unit Charger with Display – International (110 V)
WPLN4145A	Impres™ Multi Unit Charger with Display – Korea Cord
PMLN5198A	Impres™ Single Unit Charger – SMPS US AC Cord
PMLN5194A	Impres™ Single Unit Charger – SMPS UK AC Cord
PMLN5188A	Impres™ Single Unit Charger – SMPS EU AC Cord
PMLN5214A	Impres™ Single Unit Charger – SMPS Argentina AC Cord
PMLN5199A	Impres™ Single Unit Charger – SMPS Australia/NZ Cord
NNTN7470A	Impres™ Single Unit Charger – SMPS China Cord

### **Cables**

PMLN5237A	RS232 Data Cable
PMLN5235A	USB Data Cable

## Glossary

### Intrinsic Safety Standards Hierarchy:

EU directive ATEX 94/9/EC  
ETSI standards

### Intrinsic Safety (IS)

IS is a protection technique for safe operation of electronic equipment in explosive atmospheres. The concept was developed for safe operation of process control instrumentation in hazardous areas.

### CENELEC

Founded in 1973 as a merger of CENELCOM and CENEL, CENELEC is the European Committee for Electrotechnical Standardization with a mission to prepare voluntary electrotechnical standards that help develop the Single European Market/European Economic Area for electrical and electronic goods and services removing barriers to trade, creating new markets and cutting compliance costs. Standards valid at the date of this document:

- **EN 60079-11:2007** - Electrical Apparatus for explosive gas atmospheres, Part 11 – Intrinsic Safety ‘i’
- **EN 60079-0:2006** - Electrical Apparatus for explosive gas atmospheres, Part 0 - General requirement
- **EN 61241-0:2006** - Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements
- **EN 61241-1:2004** - Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD" or
- **EN 61241-11:2006** - Electrical apparatus for use in the presence of combustible dust - Part 1: Protection intrinsic safety "ib"

More information can be found on [www.cenelec.org](http://www.cenelec.org) and [www.cenorm.be](http://www.cenorm.be).

### IEC Standards

International Electrotechnical Commission (IEC) is a system for certification to standards relating to equipment for use in explosive atmospheres. More about IEC standards and certification can be found on: <http://iecex.iec.ch/iecex/iecexweb.nsf/welcome?openform>

### ATEX – “ATmospheres EXplosibles”

ATEX is a framework for controlling explosive atmospheres and the equipment and protective systems used in them. It is mandatory in all EU member states & EFTA countries since July 1st 2003.

## **ATEX Directives:**

### **1. Directive 99/92/EC (“ATEX 137”) – Workplace Directive – “Use” Directive**

The directive 1999/92/EC, also known as ATEX 137, formulates minimum requirements for the safety and health protection of employees at places of work which could be endangered by potentially explosive atmospheres. The directive is therefore mainly applicable for the users of hazardous plants and equipment.

### **2. Directive 94/9/EC (“ATEX 95”) – Equipment Directive**

The directive 94/9/EC, better known as the ATEX directive (ATEX 100a), regulates the manufacture and bringing into circulation devices and protective systems for use in hazardous areas. The safety aspects are based on the "Fundamental safety and health requirements for the design and construction of devices and protective systems for normal use in hazardous areas. These are the requirements that must be met by equipment and protective systems intended to be used in potentially explosive atmospheres (flammable gases, vapours or dusts)

More information on ATEX Directives and Atex Guidelines can be found on DEKRA EXAM GmbH.

### **Motorola Accelerated Life Test (ALT)**

Motorola Accelerated Life Test is unique Motorola test regime to simulate over 5 years hard usage in the field. It is considerably beyond MIL SPEC test parameters and includes extreme thermal, mechanical, electrical and environmental tests to ensure extremely high quality levels. ALT is conducted during product development to detect potential problems and improve radio design.

### **MIL Spec 810F**

Military standard tests designed to ensure operations in the hardest conditions. The MIL-STD-810 test series are approved for use by all departments and agencies of the United States Department of Defense (DoD). Although prepared specifically for DoD applications, the standard may be tailored for commercial applications as well. More information can be found on:

<http://www.dtc.army.mil/navigator/>

### **ETS**

ETS-environmental conditions and environmental tests for telecommunications equipment. They are performed by The European Telecommunications Standards Institute (ETSI) which produces globally-applicable standards for Information and Communications Technologies (ICT). For more information refer to: <http://www.etsi.org/WebSite/Standards/Standard.aspx>



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