

**DATE: 17/11/2005**

**Issue No 2**

**IB2 Tag Specification**

TEL +44 (0)121 623 8086  
FAX +44 (0)121 623 8087  
WEB www.eplate.com

**Physical Specification**

Parameter	Specification
Physical Size of tag PCB excluding Antenna and Battery	32 mm x 32 mm
Tag profile	3.5 mm
Encapsulation Size	Upon Request
Encapsulation material	ABS
Humidity (Tolerance of PCB)	5 % to 90 % (non condensing in free air)
Weight of tag only including Battery and Antenna	12 g
Potting material	Cold Potting process
Waterproofing	This will be provided by the potting material

**Electrical Specification**

Parameter	Specification
Ping rate and data re-programmability	Yes (This is done via needle adapter before potting)
Data to be transmitted	See section 3.4
RF Encryption	Basic
Security against cloning of Tag	Firmware embedded on read protected flash memory Data embedded on read protected EEPROM
Activation at installation	Yes (This is done via needle adapter during ID writing before embedding)
Hand-held reader requirement	Yes
Tag transmission distance to Hand-held	0.1 m to 10 m
Tag transmission distance to fixed reader	1 m to 100 m
Antenna polarisation	Vertical
Temperature limits (tag only)	Optimal operating range: -15 °C to 40 °C Maximum temperature range: -35 °C to 80 °C
Temperature limits after encapsulation	Maximum temperature range: -50 °C to 150 °C
Electromagnetic Radiating Power	< 1 mW
Modulation	ASK
Frequency	868.3 MHz or 916.5 MHz
Bandwidth	600 KHz
Bitrate	80 net kBit/s, 100 kBaud
Stability of carrier frequency	80 ppm

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### **Data Definition**

The transmitted telegram includes the following data:

<b>Field</b>	<b>Data Length (Bit)</b>
Start Delimiter	8
Protocol ID and Version	8
Age Counter	16
ID (17 Char of 6 Bit)	102 (+2 padding)
Flags	8
CRC	16

### **Battery status**

Battery status can be determined by 2 different methods:

- Tag age counter (MSB)  
The Age Counter is reset during production and incremented after each transmission. Dependant on the ping rate, the age of the tag can be easily calculated.
- Battery flag  
A bit in the flag byte is used to transmit the output of a comparator indicating a low battery condition.

### **Contents programming**

Content of the ID (13 Bytes) and the ping rate (1 Byte) is programmed in the EEPROM of the tag during the potting process. EEPROM and code memory is locked after programming.

This content is sent using the on-board encryption via the air interface to the reader.

### **Security, encryption**

Telegrams on the air interface change after each transmission, which makes it more difficult to hack than a fixed pattern. Programmed ID is never contained directly on the air interface.