



# STI

## Screw Tag Insert



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### 1 PRODUCT DESCRIPTION

The patent-pending **TROI STI-1 and STI-2** RFID tag designs provide automatic identification and tracking capabilities never-before available in such a unique, tiny plastic package designed for rugged or hazardous use-areas.

The tag is designed to be mounted to any metallic surface by screwing the tag into a threaded hole. It can withstand unprecedented high temperature (consistent temperatures of 200 degrees Centigrade), high pressure and severe environmental conditions.

#### 1.1 SPECIFICATIONS

|  |   |
|--|---|
| <b>Device type</b><br>Passive RFID tag | <b>Standard:</b> UHF (Ultra High Frequency band)<br><b>Optional:</b> HF (High Frequency band)<br><b>Optional:</b> LF (Low Frequency band)               |
| <b>Air interface protocol</b>          | UHF: EPCGlobal Class1Gen2 / ISO/IEC 18000-6C<br>HF: ISO/IEC 15963, ISO/IEC 14443<br>LF: ISO/IEC 18000-2   |
| <b>Operational frequency</b>           | <b>Standard:</b> UHF 865-869 MHz (EU), 902-928 MHz (US)<br><b>Optional:</b> LF 125 KHz<br><b>Optional:</b> HF 13.56 MHz                                 |
| <b>IC options - UHF</b>                | <b>Standard:</b> Alien Higgs 3 (others on request)<br><b>Optional:</b> EM, Fujitsu, Impinj, NXP (others on request)                                     |
| <b>EPC memory - UHF</b>                | <b>Standard:</b> 128 bit<br><b>Optional:</b> Up to 240 bit  |
| <b>EPC memory content</b>              | Unique 96-bit number encoded  |
| <b>Extended memory - UHF</b>           | <b>Standard:</b> 512 bit  |
| <b>HF EEPROM</b>                       | ISO/IEC 15693, 64 Bit UID; 512 bit & 1024 bit<br>ISO/IEC 14443 A, 7 Byte UID; 512 bit & 1024 bit  |
| <b>LF EEPROM</b>                       | <b>Standard:</b> 512 bit & 256 bit  |
| <b>TID - UHF</b>                       | Factory-programmed, non-changeable, unique 64-bit ID.   |
| <b>Read range - UHF</b>                | Real-world: 1 – 2 meters<br>Lab environment: 7 meters   |
| <b>Applicable surfaces</b>             | Any metallic material   |
| <b>Material</b>                        | Proprietary high temperature plastic  |
| <b>Weight</b>                          | <b>STI-1:</b> 0.6 oz; 17 grams<br><b>STI-2:</b> 0.2 oz; 5.6 grams   |
| <b>Standards compliancy</b>            | ISO 17665 – Sterilization of Health Care Products – Moist Steam<br>ISO 11135 - Sterilization of Health Care Products – Ethylene Oxide<br>ATEX-compliant |
| <b>Product RoHS compliant?</b>         | Yes   |

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### 1.2 DIMENSIONS

#### Thread Pitch

STI-1: 36 mm X 4 mm

STI-2: 24 mm X 3 mm

#### PLAN VIEW

STI-1

STI-2



#### PROFILE VIEW

STI-1

STI-2





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### 1.3 READ RANGE

|                      | UHF max read-range on metal with 4W ERP     |
|----------------------|---|
| STI-series (915 MHz) | 660.4 cm / 260 inches (6.63 m / 21.75 feet) |

The read range listed above was obtained from a lab test environment. Actual test results may be different. Testing in actual use environments is strongly recommended.

### 1.4 ENVIRONMENTAL SPECIFICATIONS

|                          |  |
|--------------------------|--|
| Operating temperature    | -50°C to +200°C*<br>-50°F to +392 °F*  |
| Temperature Cycling Test | 200 deg C, continuous for 30-days  |
| IP classification        | IP68:<br>- Complete protection against dust<br>- Protection against continuous immersion in water (Tested for 5 hours in 1 m [3.3 ft] depth)   |
| Weather resistance       | Excellent, including UV-resistance and sea water immersion   |
| Pressure resistance      | Embedded RFID tag tested to 30,000 PSI for 30 days   |
| Chemical resistance      | No physical or performance changes in:<br>- Salt water<br>- NaOH (depending on concentration)<br>- Sulfuric acid (depending on concentration)<br>- Motor oil (tested in 168 hour exposure)<br>Generally good against:<br>- Most solvents<br>- Most acids and bases |

\* **NOTE:** The RFID tag will not be functional if it is left at the maximum indicated temperatures such that the internal soak temperature exceeds +80 deg C. The RFID tag itself will function between -50 deg C and +80 deg C.

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## 1.5 SUPPORTED SERVICES

Several options are available:

- Tag pre-encoding
- Laser engraving on tags surface

For further details, please contact **TROI LLC**.



Information has been laser-etched onto the tag.

## 1.6 POSSIBLE APPLICATIONS

### Metal surfaces

Metal returnable containers, metal canisters, metal pallets, metal pipes, high value metal items, aerospace applications, military applications, etc.

## 2 INSTALLATION INSTRUCTIONS

### 2.1 DRILL AND TAP THE MOUNTING HOLE

**TROI's STI** series of tags are designed to be screw-mounted flush with the metal surface.

For the specific tag being mounted, use the correct end mill to drill the appropriate sized hole and then use the correct bottom tap to thread the hole to the appropriate thread and pitch size. See Section 1.2 DIMENSIONS for the details.

The series of pictures, below, show a mounting block and a piece of thick-walled pipe that have been correctly drilled and tapped. For the block, the mounting hole for the **STI-1** is on the left, and the **STI-2** is on the right.





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A mounting hole has been end-milled and bottom-tapped into the sidewall of a pipe.

## 2.2 MOUNT THE TAG

Once the hole has been correctly end-milled and bottom-tapped, it is recommended that a dab of high-temperature silicone be placed on the threads, or at the base of the tag before the tag is screwed into the hole.





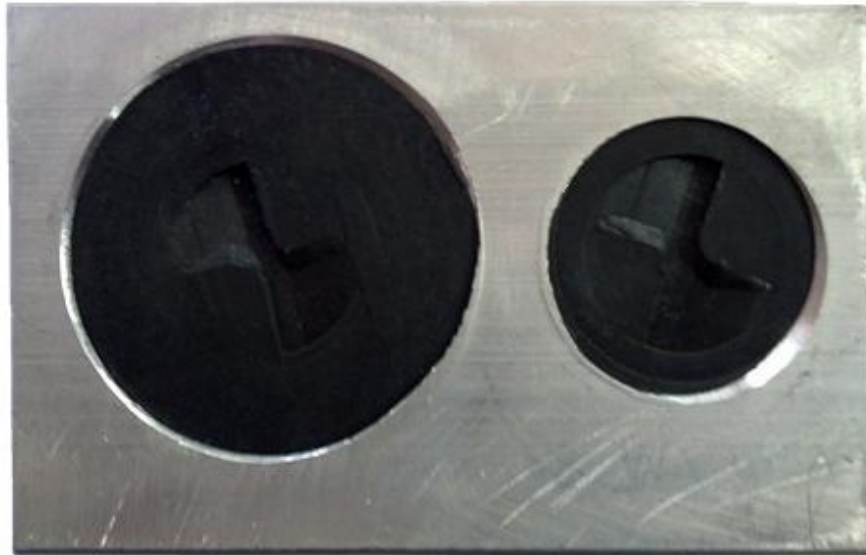
# STI

## Screw Tag Insert

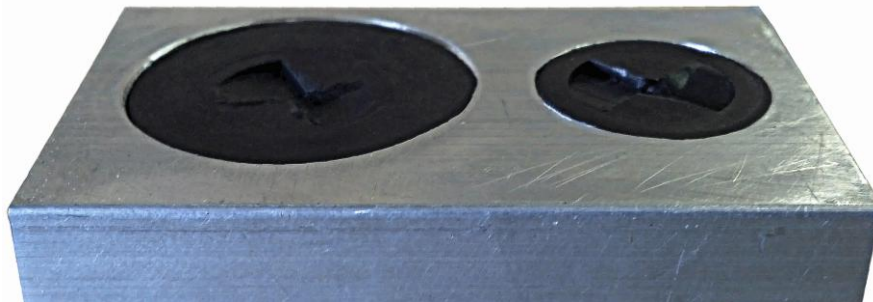


In the pictures below of the block, the **STI-1** is on the left, and the **STI-2** is on the right.

**NOTE: TROI's STI-series** of tags has been designed with an anti-tamper screw slot so that, once installed, it cannot be backed out.



This perspective shows the **STI-series** tags anti-tamper screw-mount head construction.



This perspective shows the tags mounted flush with the surface of the block.

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Close-up of an **STI** tag mounted into a pipe; notice that the tag is mounted flush to the surface of the pipe. Recessing the tag into the pipe deeper than shown may adversely affect the ability to interrogate the tag.

### 3 CONTACTING TROI LLC

For additional information and technical support contact:

#### **TROI LLC**

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#### **ADVISORY**

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