



**Name of the Technology: Electro-Magnetic Acoustic Transducer (EMAT) for generation and detection of ultrasound in electrically conducting Metals**

**Summary:**

Electromagnetic Acoustic Transducer (EMAT) is the best suggested way to test electrically conducting metal structures for flaw, cracks and presence of residual stresses. It has various advantages over conventional piezoelectric approach of Non Destructive Testing (NDT). 3.2 MHz EMAT to generate radial polarized shear waves has been indigenously developed in the laboratory at CSIR- National Physical Laboratory. The sensor developed has specially designed spiral coil with rare earth permanent magnet. The design technology may be adopted for development of EMATs for different wave modes. Industry interested in development and commercialization of such EMATs may contact. Following are some of the features of the developed EMAT.



**Figure: Electromagnetic Acoustic Transducer developed for 3.2MHz ultrasonic shear waves**

**Specifications:**

- 3.2 MHz permanent magnet type EMAT
- Spiral coil for generation of radially polarized shear waves
- EMAT with adjustable sensitivity
- Differential mode signal for better S/N
- Low cost design

**Applications:**

- Flaw and crack detection in electrically conducting metallic structures
- Thickness measurement
- Material characterization
- Railroad and wheel inspection
- Detection of inhomogeneous (variable density) structures



### Advantages of EMAT based NDT:

- ❖ No contact between material and EMAT
- ❖ Can be used for testing of hot surfaces
- ❖ Surface preparation not required
- ❖ Couplant not required
- ❖ Fast real-time scanning of test surface is possible
- ❖ Same test location can be inspected for long time

### User Industries:

- ❖ Metallic Pipe Production Industry
- ❖ Aeronautic Industry
- ❖ Ultrasonic NDT providers
- ❖ Indian Railways

### Readiness level of the Technology:

Idea	Concept Definition	Proof of Concept	Prototype	Lab Validation	Technology Development	Technology Demonstration	Technology Integrated	Market Launch

### Related Patent:

Patent No: **Know How**  
Country: ---  
Publication Date: ---  
Grant Date: ---  
Year of Introduction: 2015  
Broad Area/Category: Ultrasonic Sensor