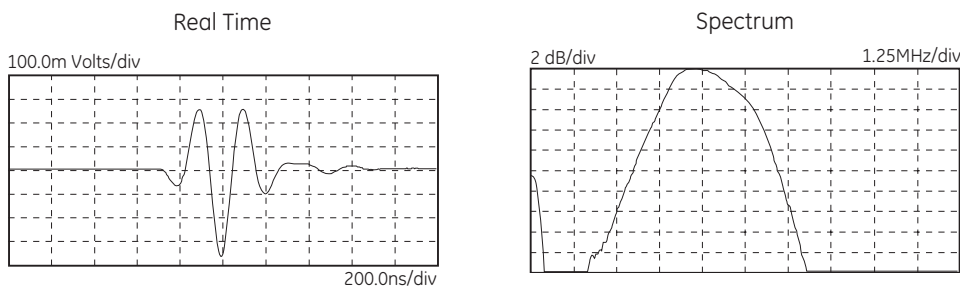


Transducer Selection Criteria—North American Standards

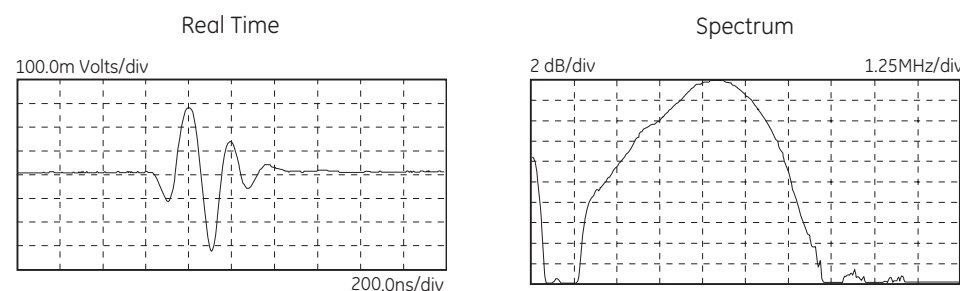
For transducers manufactured to North American standards, GE Inspection Technologies offers three performance ranges: **Alpha**, **Benchmark**, and **Gamma Series**. Waveform and frequency certification, per ASTM E-1065, are supplied with all flaw detection transducers at no charge.

Alpha Series Features



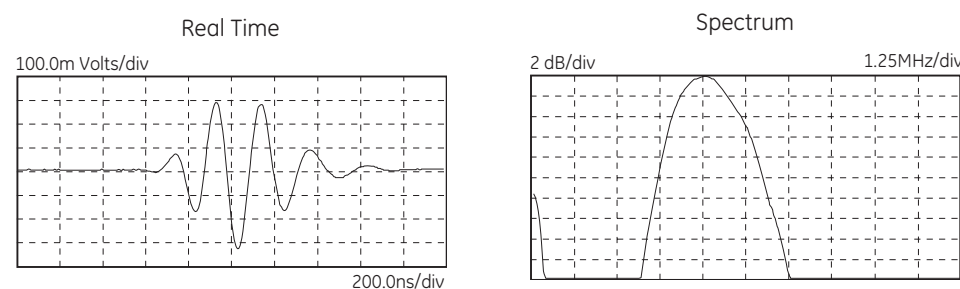
- Recommended for applications where resolution is the primary consideration.
- Suitable for applications such as thickness measurement and near-surface flaw detection.
- Very short pulse—mechanically damped to the limit of current technology.
- Gain is usually lower than that of the Gamma and Benchmark Series.
- Broadband—typical 6 dB bandwidths range from 50% to 100%.
- Typical Alpha waveforms (right) exhibit one to two full ring cycles, depending on frequency, size and other parameters.

Benchmark Series Features



- Proprietary **BENCHMARK COMPOSITE®** (piezocomposite) active elements.
- Penetration in attenuative materials is far superior to conventional transducers.
- High signal to noise on coarse grain metals, fiber reinforced composites, et al.
- Short pulse—resolution usually superior to Gamma Series.
- Gain is usually higher than that of the Gamma and Alpha Series.
- Very broadband—typical 6 dB bandwidths range from 60% to 120%.
- Low acoustic impedance element improves performance of angle beam, delay line, and immersion probes—excellent match to plastic and water.

Gamma Series Features



- General purpose transducers, recommended for the majority of applications.
- Medium pulse, medium damping—best combination of gain and resolution.
- Matching electrical network ensures maximum gain and optimum waveform for general use.
- Medium bandwidth—typical 6 dB bandwidths range from 30% to 50%.
- Typical Gamma waveform exhibits three to four full ring cycles, depending on frequency, size and other parameters.

Transducer Selection Criteria and Performance

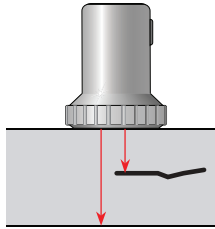
General Information

The ultrasonic transducers in this catalog are divided into two general categories, Contact and Immersion.

Transducers for the Contact Inspection Method

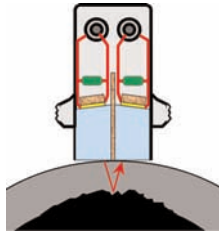
Straight Beam—Single Element

- Parts with regular geometry and relatively smooth contact surface
- Flat or curved contact surface
- Flaw or backwall parallel to surface or detectable with beam normal to surface
- Preferred for penetration of thick sections
- Delay line types improve near surface resolution
- Requires couplant layer, typically a gel, oil, or paste
- Typically used for manual inspection



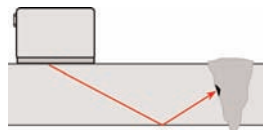
Straight Beam—Dual Element (TR)

- Transmit and receive elements separated by crosstalk barrier
- Flaw or backwall parallel to surface or detectable with beam normal to surface
- Best for thin sections, near surface resolution
- Requires couplant layer, typically a gel, oil, or paste
- Typically used for manual inspection



Angle Beam

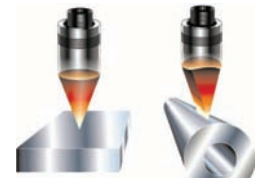
- Element mounted on integral or replaceable wedge
- Uses refraction to transmit shear or longitudinal wave at a predetermined angle
- Most standard transducers generate shear waves by mode conversion
- Preferred for parts with inclined flaws, such as welds
- Available in both single and dual element types
- Requires couplant layer, typically a gel, oil, or paste
- Sometimes used in mechanized or automated testing



Transducers for the Immersion Method

Immersion Transducers

- Acoustically matched for best efficiency in water
- Suitable for parts with irregular geometries
- Commonly used in mechanized or automated testing
- Best method for consistent coupling and reproducible results
- Large parts can be tested using probe holders, bubblers, or water jets
- Transducers can be focused to improve results



Spherical (Spot, Point) Focus Cylindrical (Line) Focus

Focused Immersion Transducers

- Spherical focus forms a point or spot
- Cylindrical focus forms a line

Advantages of Focusing

