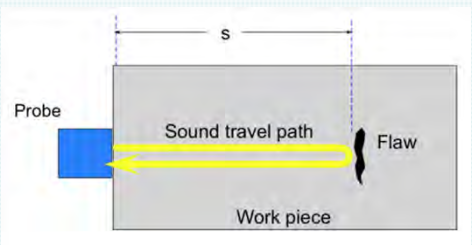
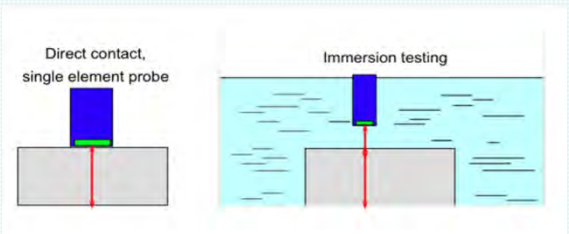
European Commission

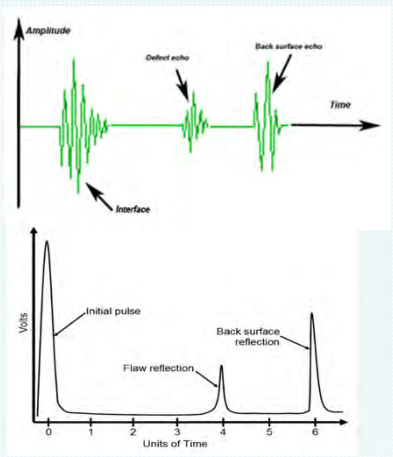
Ultrasonic Seals Basics

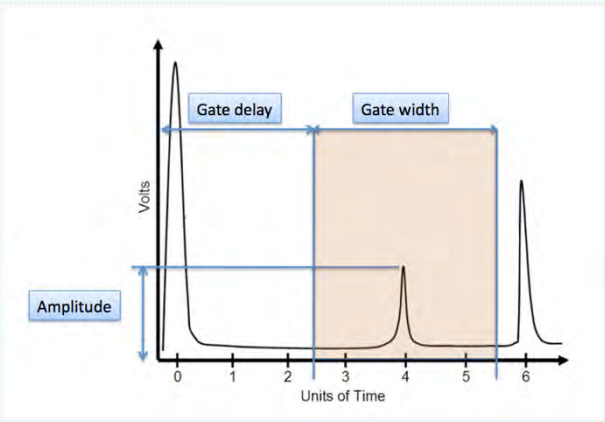
Principle:

- Ultrasonic sound waves are reflected at interfaces and by internal flaws
- Transducer with piezoelectric crystal which resonates at 10 MHz
- Pulse-echo mode (one single transducer sends & receives the pulsed waves)
- Water used as coupling







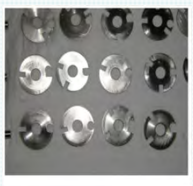


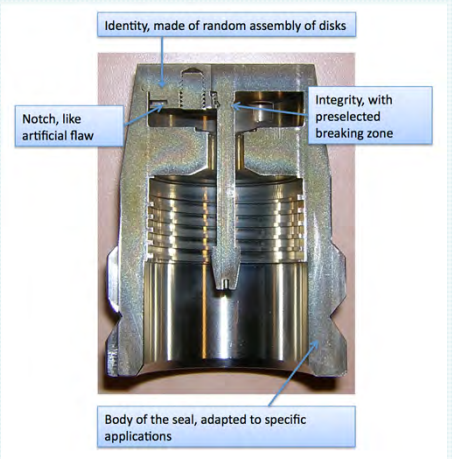
Pulse–echo representation:

- Amplitude of received pulse versus travel time of emitted pulse
- Gate or window (delay & width) to increase gain on specific defect zone

Ultrasonic seal:

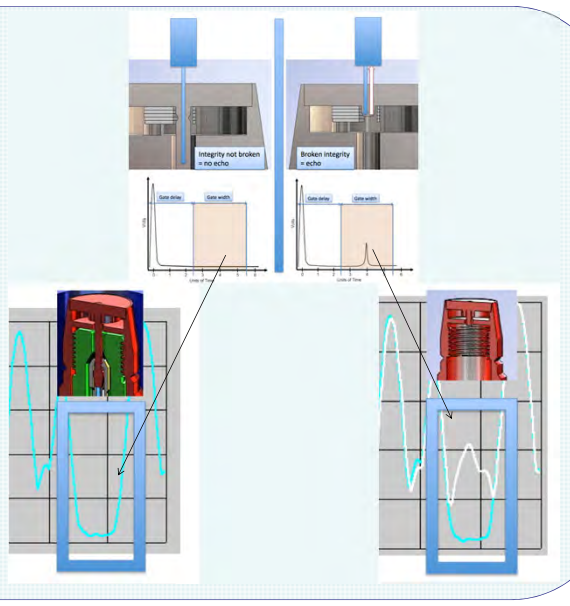
- Identity: Artificial flaws made on stainless steel disks brazed (T> 1000° C) together to form a unique signature
- Integrity: Breaking zone in the ultrasonic window





Ultrasonic readings:

- Rotating transducer above the disks gives the unique signature
- Transducer above the integrity: echo = broken



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