ACOUSTIC CONTROL SYSTEMS

Ultrasonic transducer S3373

DATA SHEET

Intended use

The ultrasonic single element transducer S3373 is used to perform the wall thickness measurements and ultrasonic flaw detection in metallic, plastic and composite materials by transmitting and receiving ultrasonic longitudinal waves. The transducer can be used as a part of ultrasonic thickness gauges and flaw detectors in pulse-echo mode.

Main technical specifications

Type of transducer:	**single element, piezoelectric**
Type of generated wave mode:	**Longitudinal**
Nominal frequency:	**5 MHz**
Effective transducer aperture diameter:	**8 mm**
Delay time in transducer protector:	**0.15 μs**
Piezo-element electric capacity:	**1700 ± 100 pF**
Maximum excitation pulse voltage, V:	**± 250 V**
Operating temperature range	**–30...+50°C**
Connector type:	**LEMO00.250**
Dimensions:	**36 × 18 × 16 mm**
Weight:	**20 gr**

Measurement conditions and equipment used

Transmitting: square pulse with amplitude 20 V.
Pulse duration:
40 ns when determining the shape and spectrum of the backwall echo-signal in a steel sample
100 ns when measuring the signal amplitude in samples with different thickness and recording the characteristics (calculated as a half period for the nominal transducer frequency)

Receiving: amplifier with the frequency bandwidth 0.01 to 15 MHz and the input impedance 1 kΩ. The effective noise level adjusted to the amplifier input, max. 20 μV

Damping 200 Ω (connected in parallel to the receiving piezoelement)

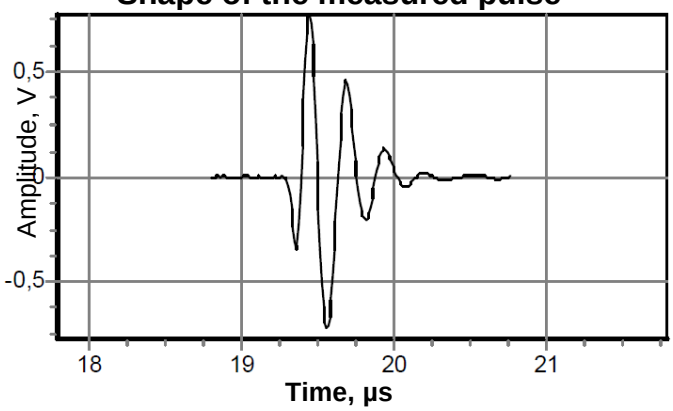
Cable: RG174 with wave impedance 50 Ω and 1 m length

Samples: standard steel samples, longitudinal wave velocity 5910 m/s, thickness 100, 50, 30, 20, 10, 2.5, 1.5, 1

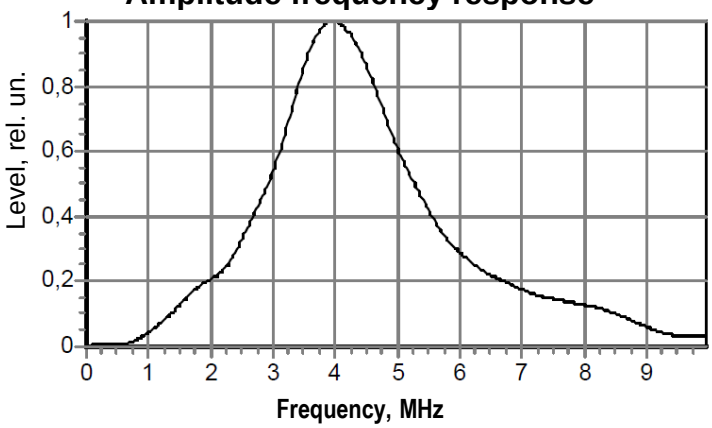
Ambient conditions Temperature 25ºC, rel. humidity 43%

Measured characteristics

Shape of the measured pulse



Amplitude frequency response



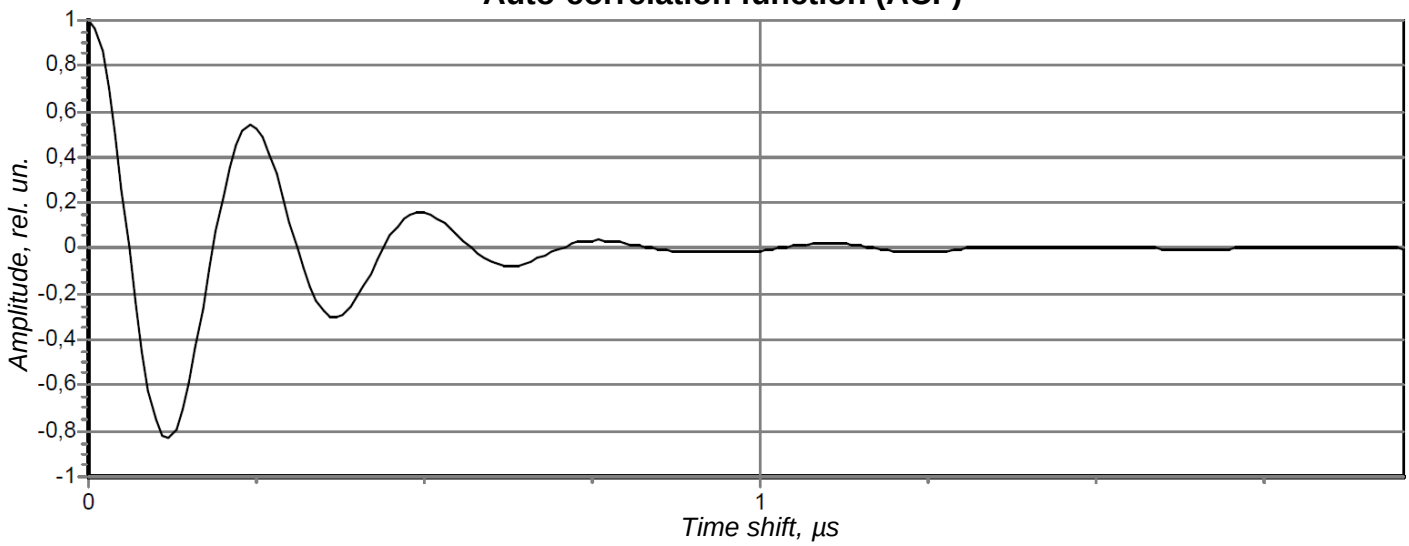
Time parameters

Echo signal duration	
at the –6 dB level	**0.29 μs**
at the –14 dB level	**0.51 μs**
at the –20 dB level	**0.66 μs**

Frequency parameters

Maximum spectrum frequency	**3.95 MHz**
Lower band frequency at –6 dB level	**2.93 MHz**
Upper band frequency at –6 dB level	**5.25 MHz**
Relative band at –6 dB level	**58.6%**
Operating frequency	**4.08 MHz**

Auto-correlation function (ACF)

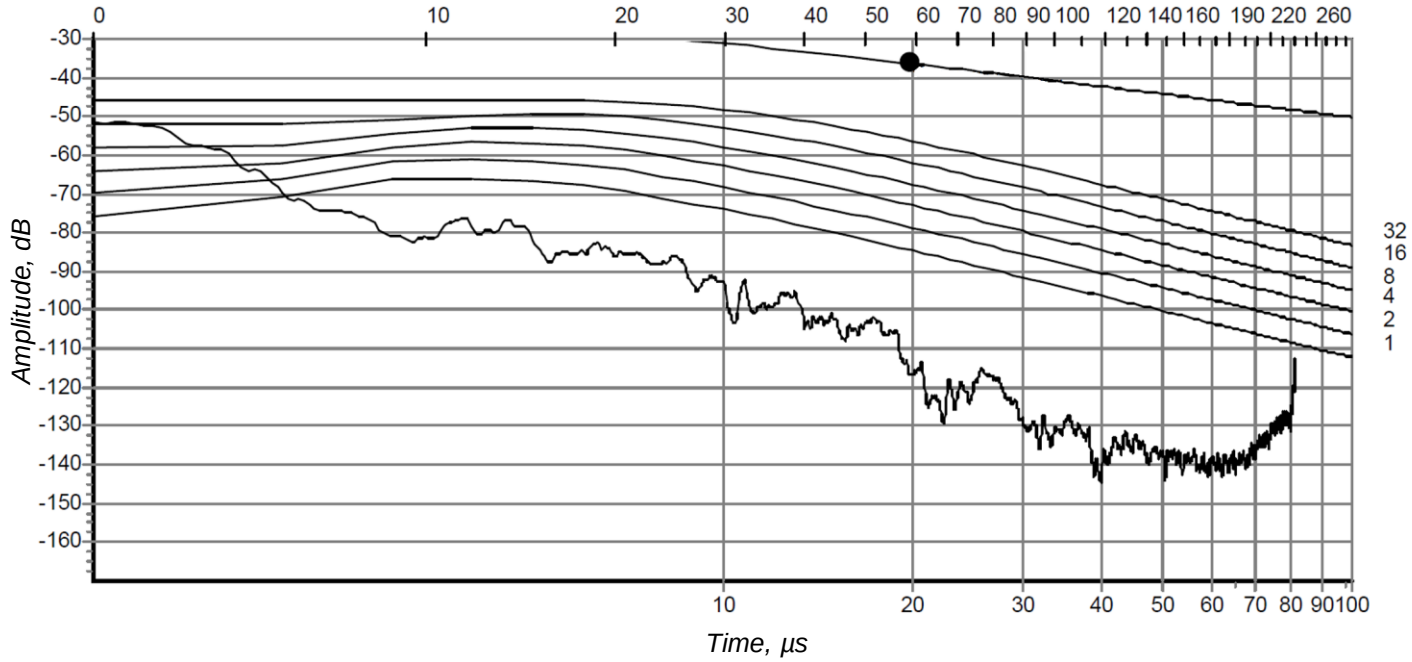


Main lobe maximum of ACF: 0.54 Time shift of the main lobe maximum of ACF: 0.22µs

Reverberation noise curve (RNC) and DGS diagram (distance gain size diagram) / ADD diagram (the amplitude-distance-diameter diagram)

The reverberation noise curve (RNC) of the transducer is obtained without the ultrasonic load.

The excitation pulse amplitude of the transducer (20 V) is taken as a 0dB level.



The backwall echo-signal amplitude in the reference specimen CO-2 at the depth of 59 mm is marked with the black dot. The calculated function of the backwall signal amplitude for different depth values is reconstructed over the empiric value.
The flat bottom hole squre values are shown for the corresponding DGC / ADD curves are shown on the right side of the diagram.
The backwall-signal to reverberation noise ratio in the time frame 15 to 25 µs (peak noise value by non-loaded transducer) corresponds to 61.2dB.