ACOUSTIC CONTROL SYSTEMS

Ultrasonic transducer D1771

DATA SHEET

Intended use

The ultrasonic dual element transducer D1771 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:	**dual element, piezoelectric**
Type of generated wave mode:	**Longitudinal**
Nominal frequency:	**5 MHz**
Effective transducer aperture diameter:	**12 mm**
Piezo-element electric capacity:	**1500 ± 150 pF**
Maximum excitation pulse voltage, V:	**± 250 V**
Operating temperature range	**–30...+50°C**
Connector type:	**2 x LEMO00.250**
Dimensions:	**23 × 44 × 15 mm**
Weight:	**22 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
125 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)

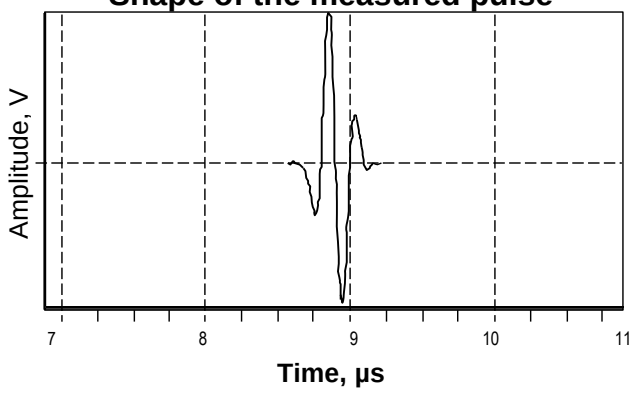
Cable: RG174 with wave impedance 50 Ω and 1 m length

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

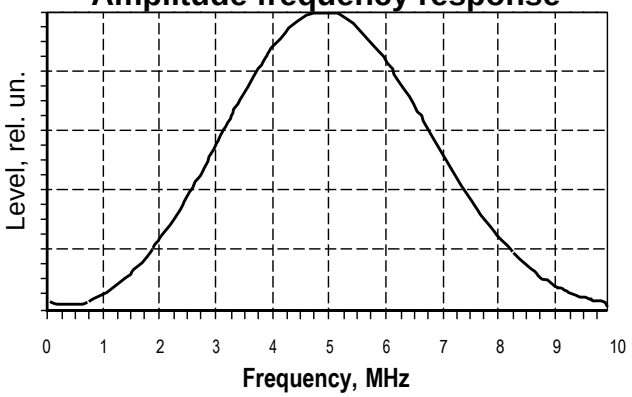
Ambient conditions Temperature 25ºC, rel. humidity 43%

Measured characteristics

Shape of the measured pulse



Amplitude frequency response



Time parameters

Echo signal duration	
at the –6 dB level	**0.15 µs**
at the –14 dB level	**0.33 µs**
at the –20 dB level	**0.37 µs**

Frequency parameters

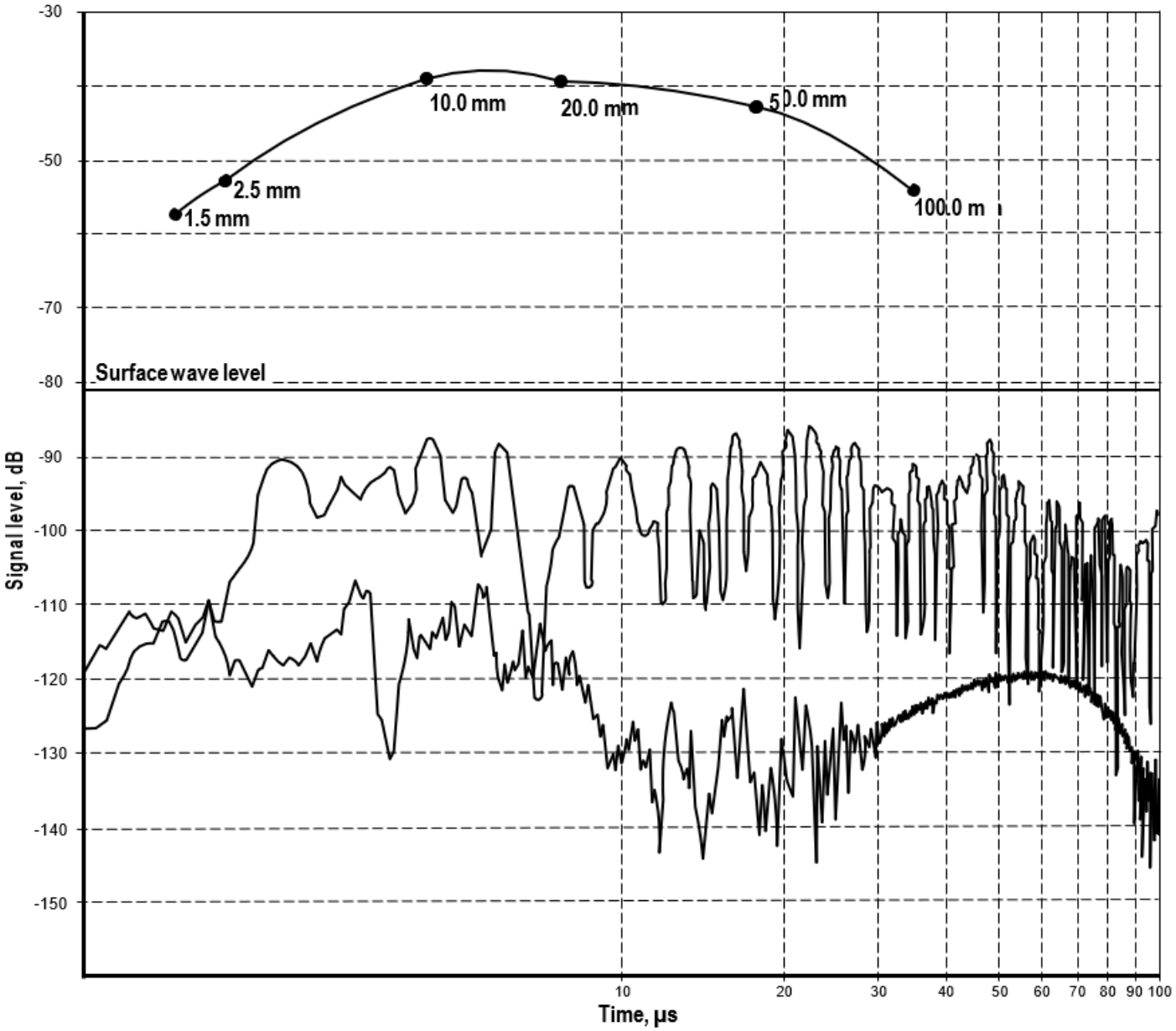
Maximum spectrum frequency	**4.88 MHz**
Lower band frequency at –6 dB level	**2.88 MHz**
Upper band frequency at –6 dB level	**7.03 MHz**
Relative band at –6 dB level	**85.0%**
Operating frequency *	**4.93 MHz**

Reverberation noise curve (RNC)

The reverberation noise curve (RNC) of the transducer is obtained without the ultrasonic load. The backwall signal level curve is obtained on steel-made reference samples with different thickness.

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

The time marking along the X axis corresponds to the signal propagation in the tested object material only.



The backwall signal levels at different depths are marked as dots. The thicknesses of appropriate samples in millimeters are given next to the dots. The dots are connected by an interpolated curve.
The lower RNC curve is built using the signals cleared from low frequency noise using an UFF. The upper RNC curve is built using the signals not cleared with UFF.
As a level line the noise level from the surface waves in transducer (cross-talk) is shown, corresponding to **81 dB**.