ACOUSTIC CONTROL SYSTEMS

Ultrasonic piezoelectric transducer S5280 1.8A45D18CS
DATA SHEET

Main technical specifications

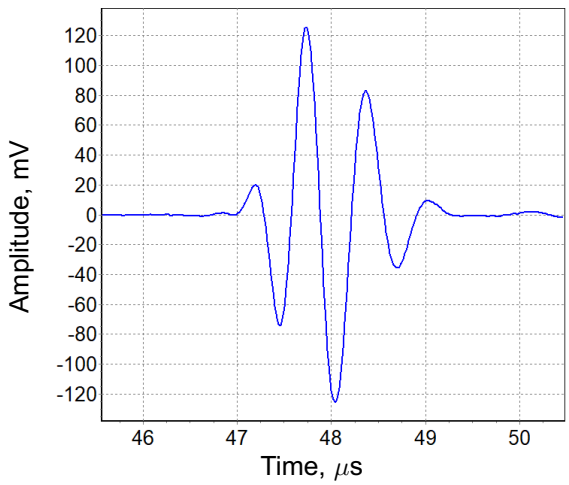
Transducer type:	Contact angle beam single
Nominal frequency:	1.8 MHz
Nominal beam angle:	45 °
Nominal echo pulse duration:	3.5 μs
Nominal relative band width:	50 %
Nominal sensitivity:	-60 dB
Piezoelement diameter:	18 mm
Nominal piezoelement capacity:	3500 $\pm$ 50 pF
Connector type:	LEMO 00.250
Operation temperature range:	from -20 to +50 °C
Dimensions:	24$\times$27$\times$23 mm
Weight:	40 g

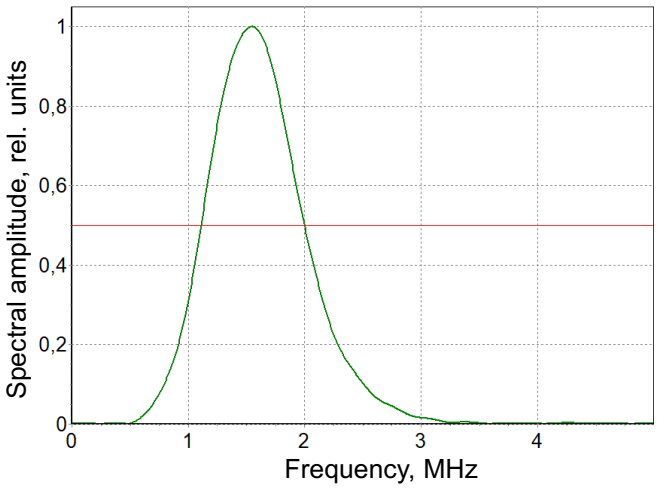
Measurement conditions and used equipment

Excitation:	Rectangular pulse with amplitude 20 V and duration **200 ns**, equal to half-period of nominal frequency oscillations.
Reciever:	Amplifier with 0.01-15 MHz bandwidth and 400 Ω input impedance. Effective noise level, normalized to the amplifier input level, is less than 20 μV.
Damping resistor:	100 Ω (connected in parallel to the transducer).
Cable:	Single LEMO-LEMO with wave resistance 50 Ω and 1.2 m length.
Samples:	1. Calibration block CO-3 from the set of ultrasonic calibration blocks 55724, serial number 190212; 2. Calibration block CO-2 from the set of ultrasonic calibration blocks 55724, serial number 190212; 3. Standard sample CO-1M of steel 20, ultrasonic shear wave velocity 3226 m/s.

Measurement results

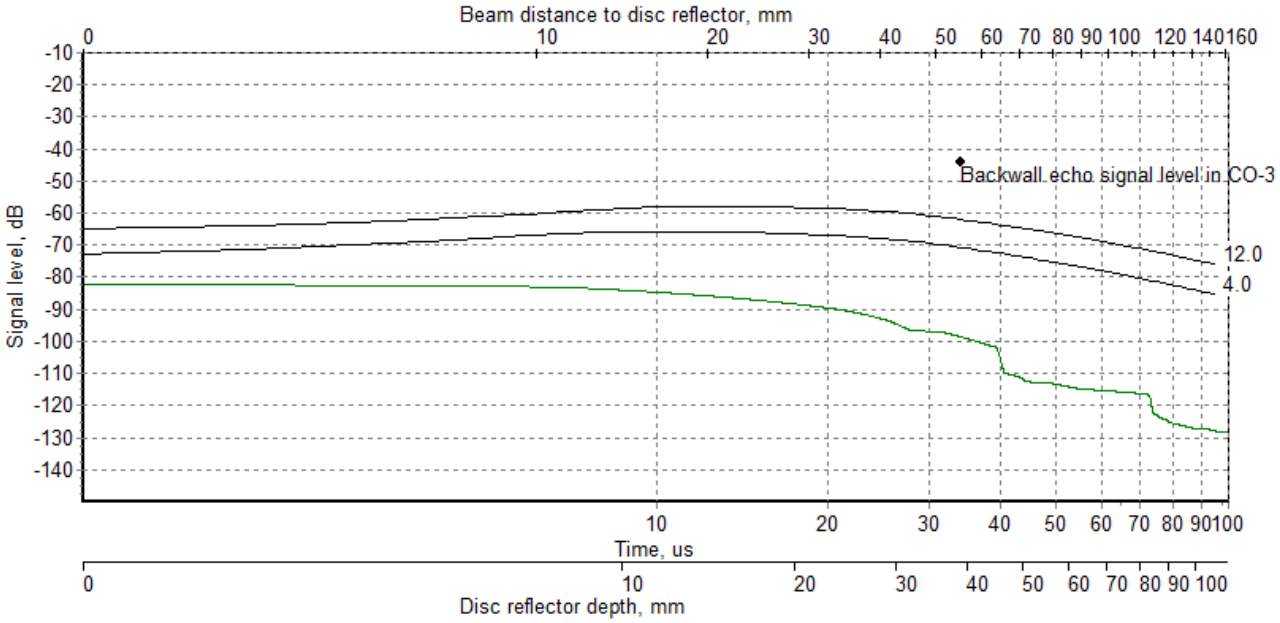
Echo pulse for 50 mm thickness and its spectrum





Reverberation-noise characteristics (RNC) of the tranducer without acoustic load and DGS diagram for flat bottomed reflectors with area 1, 3 and 10 mm^2

The level of 0 dB corresponds to the amplitude of the transducer excitation pulse.



Calculated parameters and acceptance results

Parameter	Value	Tolerance	Result
Work frequency (Mean of border spectrum frequencies) **, MHz**	**1.5**	1.4 – 2.2	**+**
Beam angle in steel , °	**45**	43.5 – 46.5	**+**
Echo pulse duration (at -20 dB level from maximum) **,** μ**s**	**1.72**	<= 3.5	**+**
Relative spectrum bandwidth (at -6 dB level) **, %**	**57**	30 – 70	**+**
Sensitivity (bottom echo pulse and excitation pulse amplitudes' ratio), **dB**	**-44**	>= -60	**+**
Sensitivity margin above the RNC in the time interval 2 - 50 μ**s according to DGS for reflector area of 1 mm^2, dB**	**46**	>= 25	**+**
Echo pulse amplitude, mV	**124**	—	
Transducer offset, mm	**20**	—	
Delay, μ**s**	**14**	—	
Spectrum maximum frequency, MHz	**1.5**	—	
Lower spectrum frequency (at -6 dB level) **, MHz**	**1.1**	—	
Upper spectrum frequency (at -6 dB level) **, MHz**	**2**	—	
Spectrum bandwidth (at -6 dB level) **, MHz**	**0.9**	—	