TOFD Probes & Wedges

SIUI

TOFD Probes

Ordering Information:

T2-12L-UN

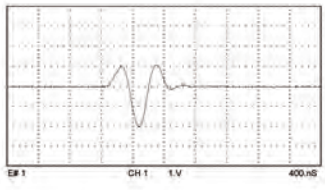
- TOFD Frequency
- Crystal dimension Φ12
- Connector Type: L-LEMO 00,MD-Microdot
- Screw Thread Unit:UN

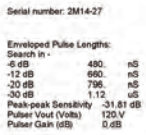
LEMO 00 Connector

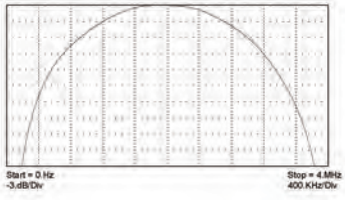
Microdot Connector

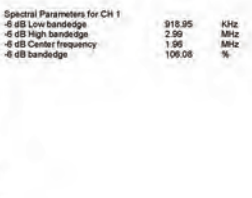
Probe	Frequency	Crystal Diameter D1	Max. Pulse Voltage	Housing Dimension	Screw Thread Unit	Compatible Wedge
	MHz	mm	V	mm		
T2-12L-UN	2	12	-800	D2:18 H:32	UN:11/16-24UNEF	TFD-45/60/70-UN
T2-14L-UN	2	14	-800	D2:18 H:32		
T2.25-12MD-UN	2.25	12	-800	D2:18 H:22.3		
T2.25-14MD-UN	2.25	14	-800	D2:18 H:22.3		

Test Report： T2-14L-UN 9mm plexiglass test block



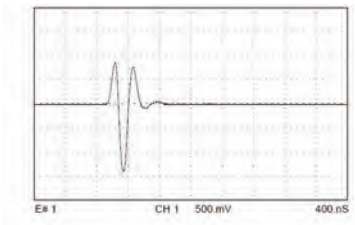






Probe	Frequency	Crystal Diameter D1	Max. Pulse Voltage	Housing Dimension	Screw Thread Unit	Compatible Wedge
	MHz	mm	V	mm		
T2-10L-UN	2	10	-800	D2:18 H:32	UN:11/16-24UNEF	TFD-45/60/70-UN
T2.5-10L-UN	2.5	10	-700	D2:18 H:32		
T3.5-10L-UN	3.5	10	-700	D2:18 H:32		
T5-10L-UN	5	10	-500	D2:18 H:32		
T2.25-10MD-UN	2.25	10	-800	D2:18 H:22.3		
T3.5-10MD-UN	3.5	10	-700	D2:18 H:22.3		
T5-10MD-UN	5	10	-500	D2:18 H:22.3		

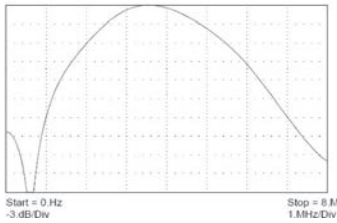
Test Report： T3.5-10L-UN 9mm plexiglass test block



Serial number: 94

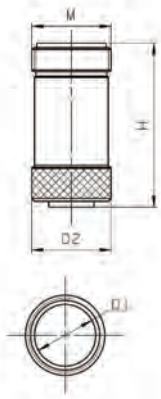
Enveloped Pulse Lengths:
Search in -

-6 dB	273.6	nS
-12 dB	372.	nS
-20 dB	469.6	nS
-30 dB	827.2	nS
Peak-peak Sensitivity	-34.5	dB
Pulser Vout (Volts)	120.V	
Pulser Gain (dB)	0.dB	



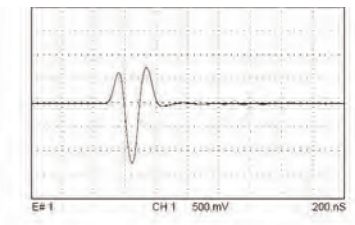
Spectral Parameters for CH 1

-6 dB Low bandedge	2.02	MHz
-6 dB High bandedge	5.45	MHz
-6 dB Center frequency	3.74	MHz
-6 dB bandedge	92.05	%



Probe	Frequency	Crystal Diameter D1	Max. Pulse Voltage	Housing Dimension	Screw Thread Unit	Compatible Wedge
	MHz	mm	V	mm		
T4-6L-UN	4	6	-500	D2:11.5 H:28.7	UN:3/8-32UNEF	TFB-45/60/70-UN
T5-3L-UN	5	3	-500	D2:11.5 H:28.7		
T5-6L-UN	5	6	-500	D2:11.5 H:28.7		
T7.5-3L-UN	7.5	3	-300	D2:11.5 H:28.7		
T7.5-6L-UN	7.5	6	-300	D2:11.5 H:28.7		
T2.25-6MD-UN	2.5	6	-800	D2:11.2 H:19.7		
T3.5-6MD-UN	3.5	6	-700	D2:11.2 H:19.7		
T5-3MD-UN	5	3	-500	D2:11.2 H:19.7		
T5-6MD-UN	5	6	-500	D2:11.2 H:19.7		
T7.5-3MD-UN	7.5	3	-300	D2:11.2 H:19.7		
T7.5-6MD-UN	7.5	6	-300	D2:11.2 H:19.7		

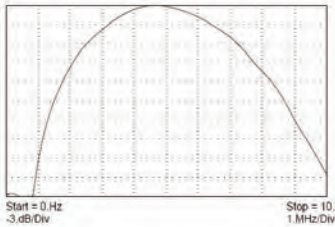
Test Report： T5-6L-UN 9mm plexiglass test block



Serial number: 318-1(1)

Enveloped Pulse Lengths:
Search in -

-6 dB	202.	nS
-12 dB	280.	nS
-20 dB	350.4	nS
-30 dB	608.8	nS
Peak-peak Sensitivity	-35.56	dB
Pulser Vout (Volts)	120.V	
Pulser Gain (dB)	0.dB	

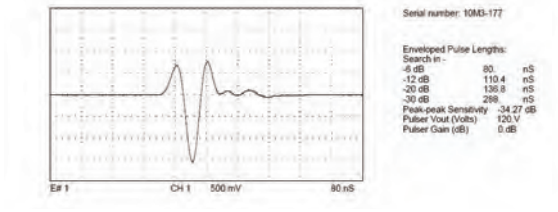


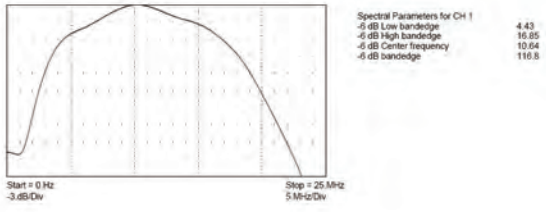
Spectral Parameters for CH 1

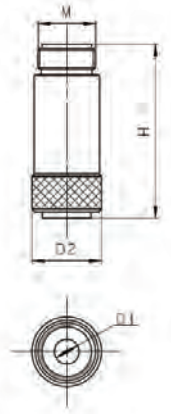
-6 dB Low bandedge	2.52	MHz
-6 dB High bandedge	7.22	MHz
-6 dB Center frequency	4.87	MHz
-6 dB bandedge	96.49	%

Probe	Frequency	Crystal Diameter D1	Max. Pulse Voltage	Housing Dimension	Screw Thread Unit	Compatible Wedge
	MHz	mm	V	mm		
T10-3L-UN	10	3	-300	D2:11.5 H:28.7	UN:3/8-32UNEF	TFC-45/60/70-UN
T10-6L-UN	10	6	-300	D2:11.5 H:28.7		
T15-3L-UN	15	3	-200	D2:11.5 H:28.7		
T10-3MD-UN	10	3	-300	D2:11.2 H:19.7		
T10-6MD-UN	10	6	-300	D2:11.2 H:19.7		
T15-3MD-UN	15	3	-200	D2:11.2 H:19.7		

Test Report： T10-3L-UN 9mm polystyrene test block







SIUI can Provide

A series of TOFD probes compatible with different TOFD flaw detectors;
Customization of TOFD probes and wedges with different specifications.

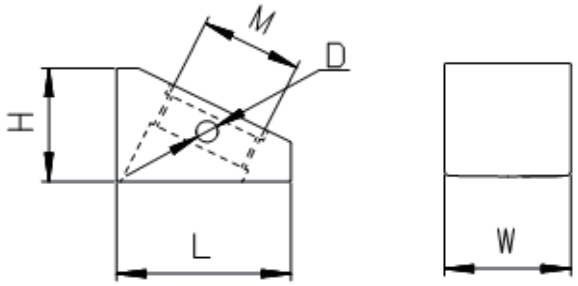
Wedge for TOFD Probe

Ordering Information:

TFB-45-UN-I

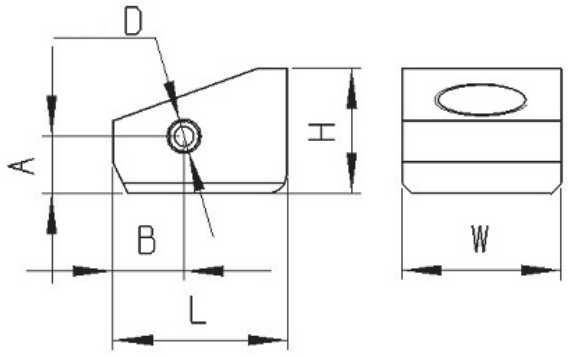
- Series Code
- Refracted Angle in Steel
- Screw Thread Unit: UN
- I:irrigation/ without “I” is non-irrigation

Non-irrigation Wedge



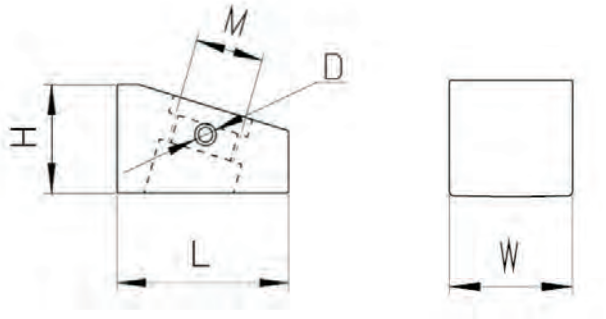
Wedge Model	Type	Velocity m/s	Refracted Angle in Steel	L mm	W mm	H mm	D mm	Screw Thread Unit
TFB-45-UN	Brass Longitudinal Wave Wedge	2730	45	24	16	16	3	UN:3/8-32UNEF
TFB-60-UN		2730	60	24	16	16	3	
TFB-70-UN		2730	70	24	16	16	3	
TFC-45-UN		2360	45	24	16	14.6	3	
TFC-60-UN		2360	60	24	16	14.6	3	
TFC-70-UN		2360	70	24	16	14.6	3	
TFD-45-UN		2730	45	31	24	21.5	3	UN:11/16-24UNEF
TFD-60-UN		2730	60	31	24	21.5	3	
TFD-70-UN		2730	70	31	24	21.5	3	

Short Flank Non-irrigation Wedge



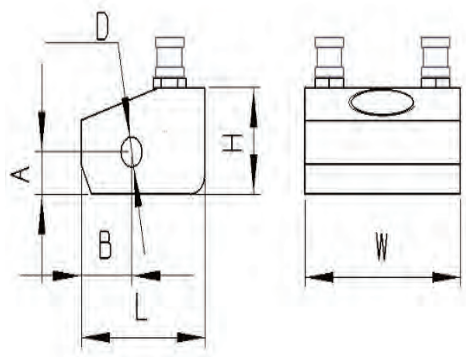
Wedge Model	Type	Velocity m/s	Refracted Angle in Steel	L mm	W mm	H mm	D mm	Screw Thread Unit
TFG-45-UN	Resins Longitudinal Wave Wedge	2730	45	17.5	16	12.3	3	UN:3/8-32UNEF
TFG-60-UN		2730	60	17.5	16	12.3	3	
TFG-70-UN		2730	70	17.5	16	12.3	3	
TFH-45-UN		2360	45	17.5	16	12.3	3	
TFH-60-UN		2360	60	17.5	16	12.3	3	
TFH-70-UN		2360	70	17.5	16	12.3	3	

Irrigation Wedge



Wedge Model	Type	Velocity	Refracted Angle in Steel	L	W	H	Outer Aperture D	Inner Aperture D	Screw Thread Unit
		m/s		mm	mm	mm	mm	mm	
TFB-45-UN-I	Resins Longitudinal Wave Wedge	2730	45	20	32	13	6	3	UN:3/8-32UNEF
TFB-60-UN-I		2730	60	20	32	13	6	3	
TFB-70-UN-I		2730	70	20	32	13	6	3	
TFC-45-UN-I		2360	45	20	32	12.5	6	3	
TFC-60-UN-I		2360	60	20	32	12.5	6	3	
TFC-70-UN-I		2360	70	20	32	12.5	6	3	
TFD-45-UN-I		2730	45	30.5	32	18	6	3	UN:11/16-24UNEF
TFD-60-UN-I		2730	60	30.5	32	18	6	3	
TFD-70-UN-I		2730	70	30.5	32	18	6	3	

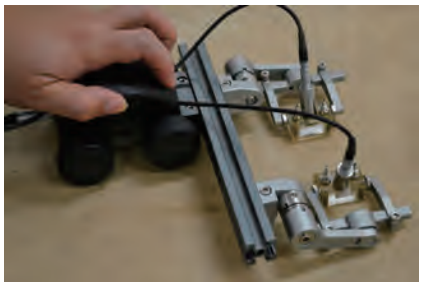
Short Flank Irrigation Wedge

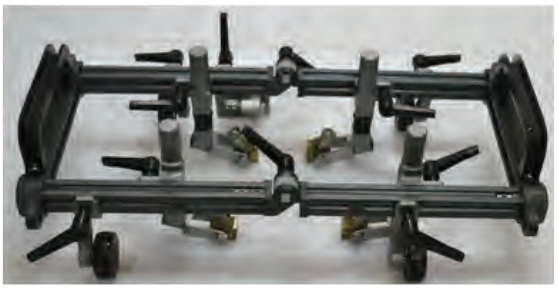


Wedge Model	Type	Velocity	Refracted Angle in Steel	L	W	H	Outer Aperture D	Inner Aperture D	Screw Thread Unit
		m/s		mm	mm	mm	mm	mm	
TFG-45-UN-I	Resins Longitudinal Wave Wedge	2730	45	17.5	22	11.2	3	2	UN:3/8-32UNEF
TFG-60-UN-I		2730	60	17.5	22	11.2	3	2	
TFG-70-UN-I		2730	70	17.5	22	11.2	3	2	
TFH-45-UN-I		2360	45	17.5	22	10.6	3	2	
TFH-60-UN-I		2360	60	17.5	22	10.9	3	2	
TFH-70-UN-I		2360	70	17.5	22	10.9	3	2	

Crawler for TOFD

Different crawlers compatible with TOFD probes can be provided by SIUI.





TOFD Probe Selection

(Based on ASTM E2373-04)

Probe selection shall be based on the application requirements. The following tables provide initial recommended probe parameters for specified thickness ranges in ferritic steels. For austenitic or other attenuative materials, nominal frequencies normally need to be reduced and element sizes increased.

Table 1 For Steel Thickness Ranges up to 75 mm (3 in.)

Nominal Wall Thickness	Nominal Frequency	Element Size	Recommended Angles
mm(in.)	MHz	mm(in.)	
<12 (0.375)	10 to 15	2 to 6 (0.08 to 0.25)	60 to 70°
12 to < 35 (0.375 to 1.4)	5 to 10	2 to 6 (0.08 to 0.25)	50 to 70°
35 to < 75 (1.4 to 3)	2 to 5	6 to 12 (0.25 to 0.5)	45 to 65°

For thickness ranges in steel 75 to 300 mm, the beam divergence from a single element is not likely to provide sufficient intensity for good detection over the entire thickness. For thickness 75 mm (3 in.) and greater (in steel) the examination piece shall be divided into multiple zones. For thickness 75 mm (3 in.) and greater (in steel) and when required in smaller thickness, sensitivity targets shall be placed in a reference block at least at 25% and 75% through thickness in each zone to verify that there is adequate beam coverage for the multiple zone technique used.

Table 2 For Steel Thickness Range 75 mm (3 in.) to 300 mm (12 in.)

Wall Thickness Zone	Nominal Frequency	Element Size	Nominal Angles
mm(in.)	MHz	mm(in.)	
<35 (0 to 1.4)	5 to 10	2 to 6 (0.08 to 0.25)	50 to 70°
35 to < 100 (1.4 to 4)	2 to 7.5	6 to 12 (0.25 to 0.5)	45 to 65°
100 to < 300 (4 to 12)	2 to 7.5	6 to 12 (0.25 to 0.5)	45 to 65°

On thick sections requiring more than one TOFD pair the lateral wave or back-wall signal may not always be visible. Therefore, provision in the linearizing algorithms must be made to permit inputs of other parameters instead of the lateral and back-wall signal positions. For wall thickness less than 75 mm (3 in.), technique qualifications may require they too be divided into smaller ranges with each range addressed by a dedicated TOFD pair.

SIUI

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