

Multimedia Courses Advanced Ultrasonic Testing

PHASED ARRAY

TOFD

A PHASED ARRAY

- PHASED ARRAY TECHNOLOGY
- PHASED ARRAY PROBE
- WORKING PRINCIPLES
- ELECTRONIC SCANNING
- BEAM FOCUSING
- SIGNAL PRESENTATION
- CALIBRATIONS
- CHARACTERIZATIONS AND SIZING OF DEFECTS
- APPLICATION FOR WELD INSPECTION
- SELF-EVALUATION TESTS



B TOFD (Time Of Flight Diffraction)

- INTRODUCTION TO TECHNIQUES
- DETECTION OF DISCONTINUITIES
- LIMITS AND ADDITIONAL SCANS
- TOFD SYSTEM CALIBRATION
- TOFD SIGNAL ANALYSIS
- SELF-EVALUATION TESTS



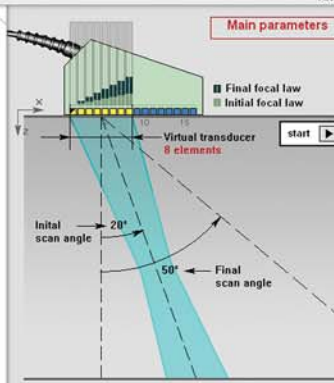
Phased Array :: Electronic Scanning A.54

Electronic scanning modes: 5/6
Sectorial scanning: 2/2

The main parameters to be set for programming a sectorial scan are as follows:

- virtual transducer (number of elements participating in the beam emission): 8
- initial scan angle: 20°
- final scan angle: 50°
- angular increment (to determine the increase of beam angle at each step of scanning): 1°
- number of focal laws required by the scan: 31

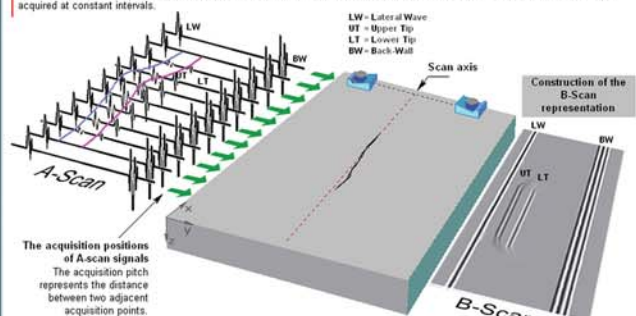
The result is a sequence of activation of the same elements of the virtual transducer, in which the focal law is varied at each step to vary the beam emission angle (from the initial to the final angle).



TOFD (Time Of Flight Diffraction) :: Introduction to techniques B.27

Data visualization: 6/8
B-scan presentation: 2/4

The B-scan presentation is constructed during the probe movement along the scan axis, encoding the succession of A-scan data acquired at constant intervals.



Phased Array :: Signal Presentation A.102

S-scan presentation: 6/6

b-scan, c-scan, **S-SCAN**

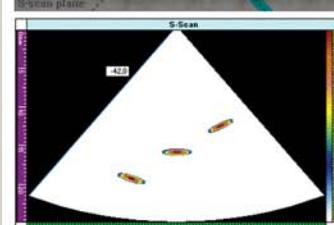
Probe: Straight (longitudinal wave)
 Angled (shear wave)

Angular half aperture: ± 42°

S-scan map:
S cursor: 42°

A-scan map:

Scanning



TOFD (Time Of Flight Diffraction) :: TOFD system calibration B.92

System calibration

Geometric calibration

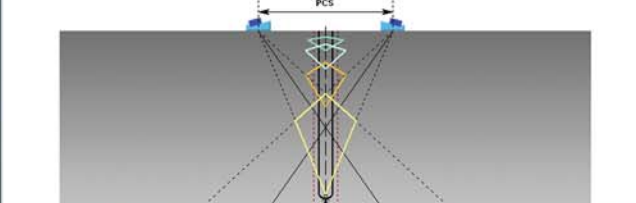
Shape: Circular Rectang
Profile: -6 dB -20 dB

Wall thickness [mm]: 300
Width of interest area [mm]: 40

Inspection zones

SCAN No	Frequency [MHz]	TOFD PAIR Size [mm]	Angle [°]	PCS [mm]	FOCUS DEPTH [mm]	DEPTH SCANNED [mm]
1	5	6	70	110	29.0	9.8
2	2	12	60	138	39.8	21.9
3	2	12	45	160	80.0	51.2
4	2	12	35	224	160.0	103.0

Calculating the scan plane



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