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EQUATIONS

Magnetic Analysis Corporation

Helpful Equations for Setting Up and Running TACTIC™ Machines

Some equations are used regularly by operators as they are calculating appropriate scan index (helix) throughput rates and other test parameters. Below are some of the most commonly used equations, for quick reference.

TACTIC Setup Equations

TACTIC equation for thru-put speed

$$LTR = .3 \times SFM \times P/D$$

Where: SFM = rotational speed in surface feet / minute

LTR = linear test rate

P = pitch or helix

D = material diameter

Transducer selection for bar with sound velocity approx 4 x vel. in water

$$FL \text{ (min)} = D \times 3/4$$

B ≠ N (for B < N : B=N/2 gives max Pitch) (suitable for long Notch)

(for B > N: (suitable for FBH and short Notch)

(greater B gives higher Pitch but also higher noise.)

P (max) = $IB - NI / n$ (where n is number of detections required and $n \geq 1$) and $P \leq B$.

d = 0.02 inch or 0.5 mm (practical baue assumed).

PRR = determined by instrument settings and must be maximized during setup.

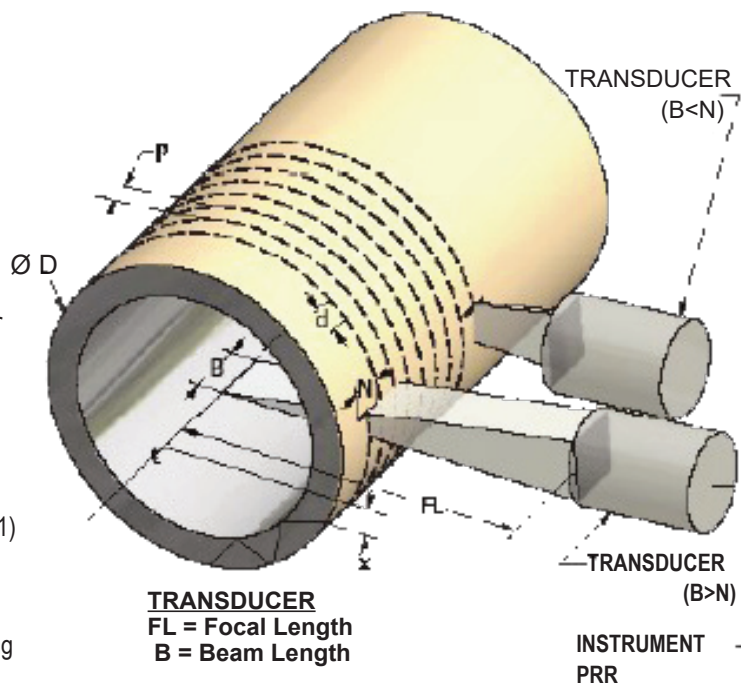
MS = $100 \times PRR \times d / FS$ (where FS is Full Scale surface velocity of tester. (For Model 76 series with FS = 400 SF/min. (120 M/min) and d s assumed above).

$$MS = PRR / 40$$

x = $D / 6$ (offset from "normalized" to create 45 deg. shear wave)

Notes: Testing speed is a function of rotational speed and helix (pitch). Rotational speed is a function of material straightness and pulse repetition rate. Helix is a function of transducer configuration and the minimum notch size. Transducer beam length is a function of material grain size and other metallurgical considerations.

Contact us for answers to your questions or to order parts or new equipment.



TRANSDUCER

FL = Focal Length
B = Beam Length

MATERIAL

D = Diameter (outside)
N = Notch Length

TEST SPEC

P = Pitch (linear advance per revolution of mat'l)
d = displacement of mat'l surface between pulses of transducer

INSTRUMENT

PRR = PUIlse Repetition Rate (pulses/second)

TACTIC TESTER

WA= Wheel Angles per calculator
x = offset to produce 45° shear wave
MS = Motor Speed (-100)%



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