MATHEMATICAL MODEL FOR ARC HEIGHT SATURATION

Measuring two Almen strips, where the exposure time for the second strip is double the first, an approximation of Almen saturation may be calculated.

PROCEDURE:

1. Measure first arc height \((H_1)\) at exposure time \((T_1)\).
2. Measure second arc height \((H_2)\) at exposure time \((T_2)\) which is double \(T_1\).
3. \(S = \frac{(H_1)^2}{2H_1 - H_2}\) where \(S\) = saturation height \(H_1\) = height at \(T_1\) \(H_2\) = height at \(T_2\)

The above model is based on an exponential response of the Almen strip. For a copy of the math derivation, circle Bingo No. 6.

The key to accuracy is a judicious choice of exposure time \(T_1\). If it is between 5% and 40% of the true value, then it will be accurate within 5%. Obviously choosing a value of \(T_1\) that is greater than 40% or less than 5% will result in extrapolation and measurement errors that are greater than 5%. A third strip, exposed at double \(T_2\) and labeled \(T_3\) may then be calculated if too small of a value is chosen for \(T_1\).

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CLELAND MANUFACTURING COMPANY
2125 ARGONNE DRIVE
MINNEAPOLIS, MINNESOTA 55421
612-571-4606
Bingo No. 1

UNIVERSAL FINISHING MACHINES, IN...