CALCULATION COVER SHEET **Date:** 28-Nov-06
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Project: General engineering **Calc No:**
Title: Deriving general fitting equations for Rosin-Rammler formula for 2-point case

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Purpose:
Fitting a 2-value data set to a Rosin-Rammler formula.

Method:
The general form of the Rosin-Rammler equation is:

$$R = e^{-\left(\frac{D}{D_n}\right)^n}$$

where: R is the %retained at a size D, and both D_n and n are fitting parameters.

Given two points, R_1 retained at size D_1 and R_2 retained at size D_2, the two fitted parameters may be determined as follows:

$$D_n = \exp\left(\frac{\ln\left(\ln\left(\frac{1}{R_1}\right)\right)\times\ln(D_2) - \ln\left(\ln\left(\frac{1}{R_2}\right)\right)\times\ln(D_1)}{\ln\left(\frac{\ln\left(\frac{1}{R_1}\right)}{\ln\left(\frac{1}{R_2}\right)}\right)}\right) \quad \text{and} \quad n = \frac{\ln\left(\ln\left(\frac{1}{R_1}\right)\right)}{\ln\left(\frac{D_1}{D_n}\right)}$$

Once fitted, the %retained R at any size D can be estimated form the general form of the equation:

$$R = e^{-\left(\frac{D}{D_n}\right)^n}$$

and any size D that sees a %retained R can be determined by:

$$D = \sqrt[n]{\ln\left(\frac{1}{R}\right)\times {D_n}^n} \quad \text{or, rearranged as} \quad D = \left[\ln\left(\frac{1}{R}\right)\times {D_n}^n\right]^{1/n}$$

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