SORVALL® BASIC CENTRIFUGATION FORMULAS

To calculate the most exact value of RCF at any speed for any given radius use the RCF equation:

$RCF = 11.17\ r\ (rpm/1000)^2$ where r = radius in centimeters

$RCF = 28.38\ R\ (rpm/1000)^2$ where R = radius in inches

To calculate K factor for a rotor:

$$K = \frac{(2.53 \times 10^{11})\ \ln\ (R_{max}/R_{min})}{(rpm)^2}$$

where:

R_{max} = the maximum radial distance a particle can be from the rotor's axis of rotation. Usually measured out to the bottom of the tube cavity.

R_{min} = the minimum radial distance a particle can be from the rotor's axis of rotation. Usually measured out to the liquid meniscus in the tube.

The smaller the K factor, the more efficient the rotor, or the less time it takes to pellet particles.

To calculate pellet time:

$T = K/S$ where: T = pellet time in hours

K = K factor

S = sedimentation coefficient

To convert pellet times between rotors:

$$T_1/K_1 = T_2/K_2 \ \therefore\ T_1 = T_2\ (K_1/K_2)$$

where:

T_1 = time to pellet in the “new” rotor

T_2 = time to pellet in the “old” rotor

K_1 = K factor of the “new” rotor

K_2 = K factor of the “old” rotor

To adjust K factor for runs performed at less than maximum speed:

$$K_{new} = K_{rotor}\ (\text{maximum speed of rotor/actual run speed})^2$$

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