



Liqui-PREP™

The Next Generation of Liquid Cytology

Manual Technical Tips

TIP Number: 009

Subject: Centrifuge g-Force

TECHNICAL TIP OVERVIEW:

Using the correct g-force for centrifugation is very important. This Technical Tip is to assist in the calculation of the correct g-force of your centrifuge.

There are two types of centrifuges, fixed bucket (the bucket holding the centrifuge tube stays stationary during centrifugation) and swinging bucket (the bucket swings out during centrifugation). For cytology a swinging bucket centrifuge is required and clearly superior.

NOTE: Technical Tips are intended to be suggested guidelines for handling cytology specimens. The Laboratory Professional may use these guidelines or make modifications as needed to process a given specimen.

g-FORCE CALCULATION:

RPM CALIBRATION - Before calculation of g-force, it is advisable to check the RPM verses setting marks on the centrifuge. This is easily performed using a tachometer. (Checking for Centrifuge RPM Calibration is required for laboratories that follow Good Laboratory Practices).

Definitions:

- RPM - Revolutions per minute. This is the speed of the centrifuge rotor.
- RCF - The Relative Centrifuge Force also referred to as g-force. This is the force resulting from the spinning action that is perpendicular to the axis of force as is related to the earth's gravitational force and has no units.
- g - stands for gravity.

g-force (RCF) Calculation:

- **The Calculation** - The formula for this calculation is:

$$\text{g-force (RCF)} = 0.00001118 \times \text{the radius of rotation (cm)} \times \text{RPM}^2$$

Any questions, contact your local Liqui-PREP™ representative or:

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g-FORCE CALCULATION:

If we have two centrifuges, centrifuge A having a radius of rotation of 7.15 cm and centrifuge B having a radius of rotation of 25.7 cm, each spinning at 2500 RPM will have two different g-force. Using the formula, centrifuge A will have a g-force of 500g at 2500 RPM while centrifuge B will have a g-force of 1800g at 2500.

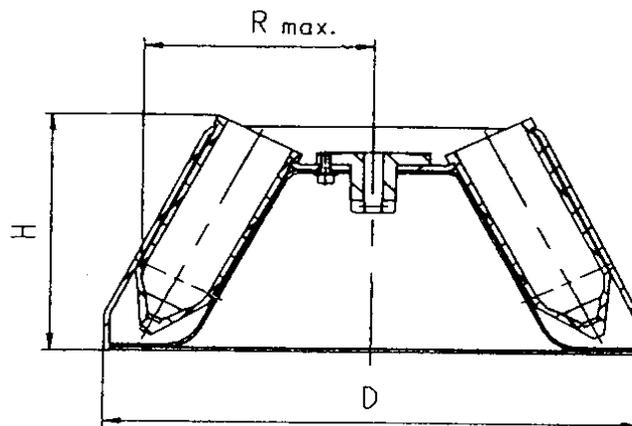
The above formula is easy to calculate after attaining the radius of rotation. An excel spreadsheet is available for this calculation (your local representative has this file or contact LGM for the file). Place the radius into the blue cell and it will show the g-force as various RPM speed. The challenge is to get an accurate radius of rotation. The radius can be obtained by measurement or from the centrifuge user manual.

USERS MANUAL SPECIFICATION - All centrifuges come with instruction manuals. Go the specification section of the centrifuge manual which will have the radius or diameter (divided the diameter by 2 for the radius of rotation)

Measuring the radius:

- **Swinging bucket** - Remove the center bolt on the rotor and remove it from the centrifuge. Then extend the swinging bucket parallel (or to the position the bucket is in during centrifugation) and measure from the center of the rotor to the end outer most end of the bucket. Using this measurement in centimeters, calculate the g-force or insert it into the LGM Excel spreadsheet.

The diagram below should give a good illustration of this measuring process.



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