



Montreal Neurological Institute and Hospital
McGill University

CBIG-03-002

RPM CONVERSION

Version:	1.0	Supersedes:	NA
Category:	Equipment	Effective date:	18-Jun-2020


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1. REVISION HISTORY

Version	Summary of revisions	Effective Date
1.0	Initial	18-Jun-2020

2. SCOPE AND APPLICATION

This protocol is to be used for the RPM conversion into X g and vice-versa.

3. REFERENCE TO OTHER SOP OR DOCUMENTS

When adopting this SOP for local use, please reference *C-BIG Repository: CBIG-03-002 RPM Conversion*.

3.1 Reference to Other C-BIG SOPs or Documents

NA

3.2 Reference to External SOPs or Documents

1. Thermoscientific, Tech Tip #40, TR0040.1: Convert between times gravity (X g) and centrifuge rotor speed (RPM) 2009

4. PERSONNEL QUALIFICATION AND RESPONSIBILITIES

To be read by all personnel who need to change RPM into X g and vice versa. All personnel who read this SOP should sign the form found in the reading log binder.

5. ABBREVIATIONS AND DEFINITIONS

Abbreviation	Definition
C-BIG	Clinical Biological Imaging and Genetic Repository
QA	Quality Assurance
QC	Quality Control
RCF	Relative Centrifuge Force
RPM	Rotation Per Minute
SOP	Standard Operating Procedure
X g	Times Gravity

6. MATERIALS AND EQUIPMENT

NA

7. PROCEDURES

7.1 RPM conversion

The use of RPM in a protocol is only correct if a specific centrifuge model and rotor is addressed and needed. When different rotors and centrifuges are used the RPM becomes invalid since the rotor diameter differs from model to model. The RCF expressed in X g is the correct unit to use across multiple centrifuges and rotors since it remains consistent for all types of centrifuges and rotors. X g value is the amount of acceleration to be applied to the sample in the centrifuge making it irrelevant to the size

and diameter of the rotor. RCF calculation depends on the rotation speed, the radius of the rotor used, and it is relative to the force of Earth's gravity.

To convert RPM into RCF and vice versa, the rotor radius is needed and is measured from the axis of rotation to the inner bottom of the swing-out cup. The relationship between RPM and RCF is as follows:

$$g = (1.118 \times 10^{-5}) R S^2$$

g: relative centrifugal force

R: radius of the rotor in centimeters

S: speed of the centrifuge in RPM

8. QUALITY CONTROL / QUALITY ASSURANCE

All the equipment used should be monitored, cleaned and calibrated as by their specific SOPs.

9. APPENDICES/FORMS

NA