Determinate Hand Papermaking
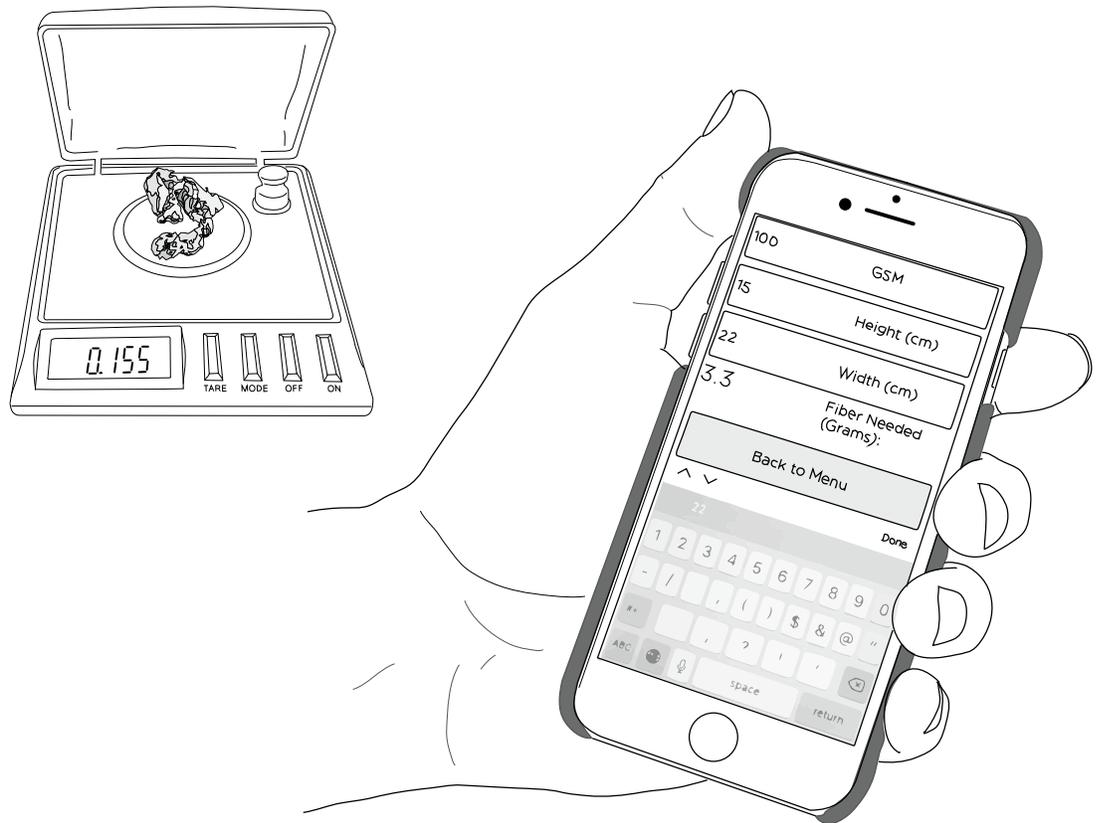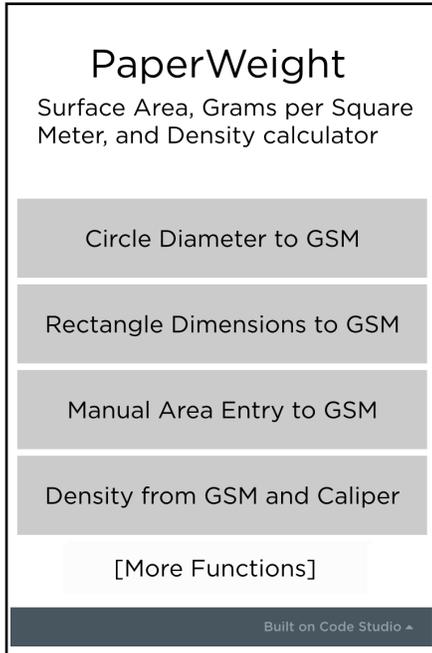
III

Describing the weight of paper in grams per square meter
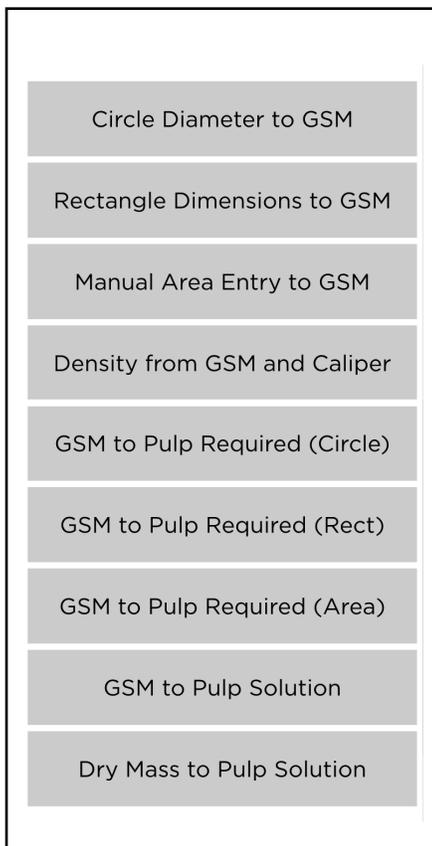
Text and illustrations by
Donald Farnsworth
2017

Describing the weight of paper in grams per square meter

PaperWeight Menus

Circle Diameter to GSM

Rectangle Dimensions to GSM

Manual Area Entry to GSM

Density from GSM and Caliper

GSM to Pulp Required (Circle)

GSM to Pulp Required (Rect)

GSM to Pulp Required (Area)

GSM to Pulp Solution

Dry Mass to Pulp Solution

Having the ability to determine the "weight" of a sheet of paper gives us the data necessary to calculate the pulp needed for the creation of a paper of the same weight. For example, in the case of a paper conservator wishing to make paper for an infill, knowing the weight of the document to be repaired is critical to determining the quantity of dried fiber necessary to form a matching sheet.

GSM: Paper weight in the metric system is expressed in **grams per square meter** (gsm or g/m^2): that is, if any given sheet could theoretically be enlarged to a 1 x 1 meter size without changing other variables such as density, what would it weigh?
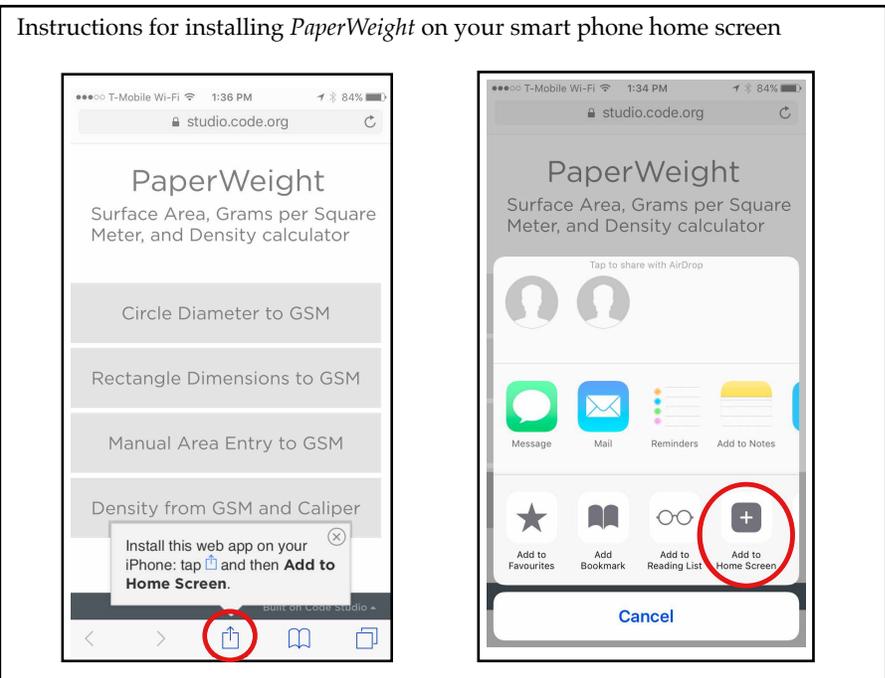
To find the gsm (g/m^2) of a rectangular sheet, use this straightforward equation:

(mass (g) x 10,000) ÷ sq cm = gsm

PaperWeight: We have created a free web-based app called *PaperWeight* to make calculation of gsm and density fast and easy. (The app was made using the open-source code.org, with coding help from Jordan Grelling).

Access the app on your desktop or mobile browser: **http://bit.do/paperweight**

Simply enter the variables of mass, height & width (or in the case of circular paper, mass & diameter) and the *PaperWeight* app calculates the corresponding gsm. In the *GSM to Pulp Required* menu, enter the variables of gsm and dimensions to calculate the required quantity (mass) of raw material (fiber) needed to make the specified weight sheet.

Instructions for installing *PaperWeight* on your smart phone home screen

PaperWeight examples:

Circle Diameter to GSM	Rectangle Dimensions to GSM	Manual Area Entry to GSM	Density from GSM and Caliper
.183 — Mass (grams) 5.7 — Diameter (cm) **71.715** Grams per Square Meter Back to Menu	1.6 — Mass (grams) 15 — Height (cm) 10 — Width (cm) **106.667** Grams per Square Meter Back to Menu	1.8 — Mass (grams) 144 — Surface Area (sq. cm) **125** Grams per Square Meter: Back to Menu	89 — Calculated GSM 22 — Caliper Reading (microns) Submit Value — Values: 22 **4.045** Density (g/L) Back to Menu
Enter mass, diameter to find gsm	Enter mass, height & width to find gsm	Enter mass & surface area to find gsm	Enter gsm & caliper to find density

GSM to Pulp Required (Circle)	GSM to Pulp Required (Rect)	GSM to Pulp Required (Area)	GSM to Pulp Solution
82 — GSM 5.7 — Diameter (cm) **0.209** Fiber Needed (grams): Back to Menu	85 — GSM 14 — Height (cm) 10 — Width (cm) **1.19** Fiber Needed (Grams): Back to Menu	90 — GSM 180 — Surface Area (sq. cm) **1.62** Fiber Needed (grams): Back to Menu	120 — GSM 1 — Deckle Depth (cm) **12** Pulp Solution Concentration (g/L): Back to Menu
Enter gsm, diameter to find grams of dry pulp required for the given gsm	Enter gsm, height & width to find grams of dry pulp required for the given gsm	Enter gsm & surface area to find pulp needed	Enter gsm & deckle depth to find pulp concentration

http://bit.do/paperweight

Acknowledgments

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2527 Magnolia St, Oakland CA 94703
www.magnoliaeditions.com