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Understanding Paper Weights and Thickness

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Agenda

- Weights and Thickness Measurements
- Basis Weights
- M Weight
- GSM
- Caliper
- PPI
- Comparison Chart
- Wrap Up

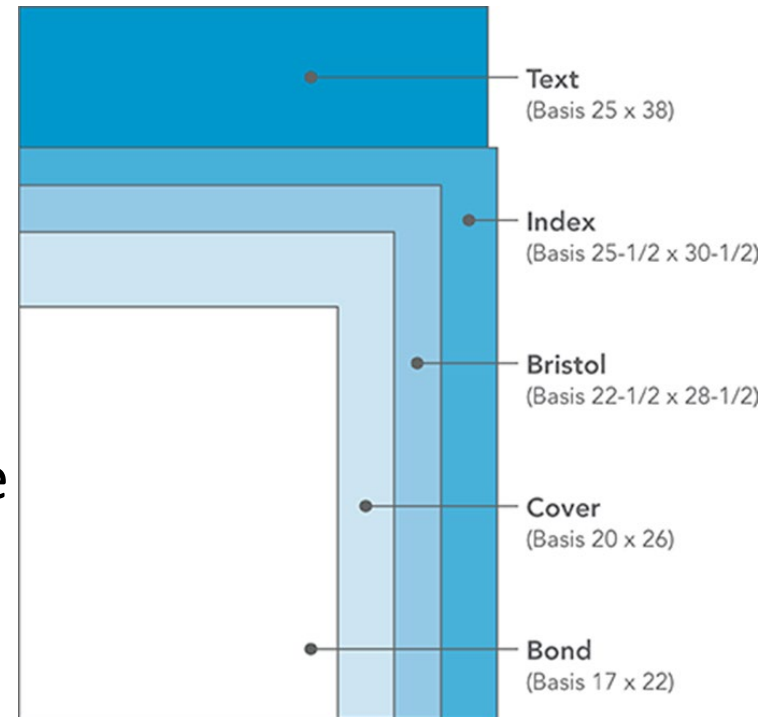


Paper Weights & Thicknesses

- Choosing the correct paper thickness for a print job can be confusing but it is very important.
- Paper sheets can be specified in Basis Weight, M Weight, Caliper, GSM, LBS & PPI
- 80 # Text & 80# Cover?
- Why is the same GSM different for different substrates?
- OEMs have thickness substrate limits for their digital presses.

Basis Weight

- The weight, measured in pounds, of 500 sheets of paper in that paper's base sheet size.
- Sizes were determined when paper was invented for a type of printing.
- Even after the paper is trimmed to a smaller size, it is still categorized by the weight of the base sheet size.
- Since the starting base size is not the same between paper types, the basis weights do not correspond directly. (80# Text is much lighter than 80# Cover)



Standard Base Sizes

M Weight

- M Weight is the term used for the weight of 1,000 sheets (2 Reams) of the actual size (any size) of a paper.
- This is helpful to determine the weight of a shipment of paper.
- It is also helpful if the print job is being mailed.



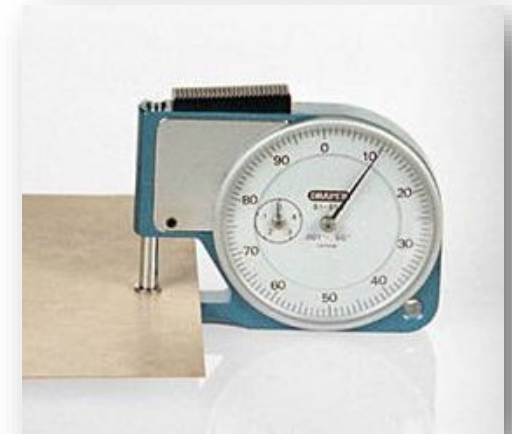
2 reams of 8.5x11 20# Copy Plus weigh 10 lbs, so it is specified as 10 M.

Grams Per Square Meter

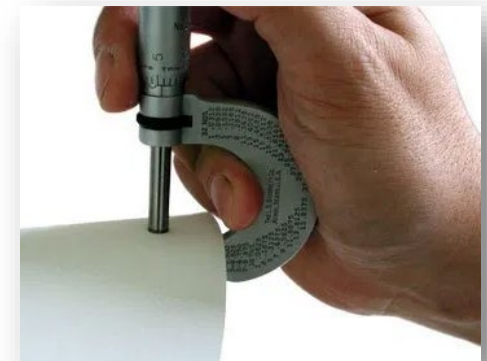
- Listed as GSM or g/m²
- The weight in grams of a square meter of paper or substrate.
- Generally speaking, the higher the GSM the heavier & thicker the paper.
- Density is an important factor in determining GSM. The more pulp, filler or fibers in a substrate, the more dense it will be.
- GSM is not a good way to be sure of the thickness of a substrate.

Caliper

- Simply the paper's thickness measured in thousandth's of an inch.
- Caliper is measured using a micrometer.
- Caliper is usually expressed in "points" or PTS.
.007 = 7pt
- A substrate's caliper is affected by it's Basis Weight, Recipe and Finish.
 - A 100# cover stock with a smooth finish would not have the same caliper as a 100# cover stock with a felt finish.
 - The felt finish sheet would be toothier and thus have a thicker caliper.
 - Caliper is also affected by the mix of pulp & air in a sheet of paper. Referred to as Yield.
- Most customers are ultimately concerned about the caliper when specifying a substrate.



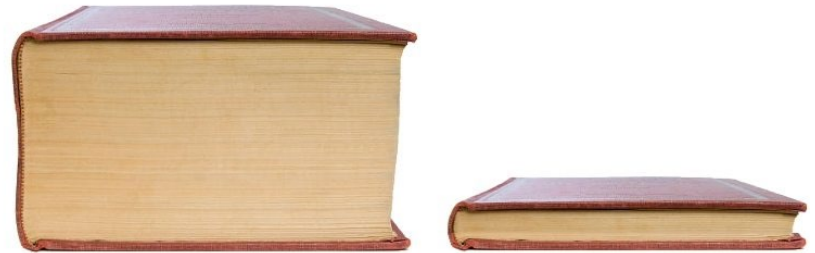
Digital Micrometer



Manual Micrometer

Pages Per Inch - PPI

- A measurement of how many sheets will make up an inch thickness of paper.
- Necessary for book printers to determine thickness of a book in sheets & pages.
- Each sheet is 2 “pages”.
- To determine the PPI, divide two by the caliper of the given sheet



$$\underline{2 / .0038} = 526 \text{ PPI} = 263 \text{ sh}$$

20# Bond / 50# Offset

$$2 / .0048 = 417 \text{ PPI} = 208 \text{ sh}$$

24# Bond / 60# Offset

$$2 / .0058 = 345 \text{ PPI} = 172 \text{ sh}$$

28# Bond / 70# Offset

Paper Weight & Thickness Comparison Chart

Bond Ledger	Offset Text	Cover	Tag	Index	Points	Caliper (Inches)	Millimeters	Metric (grams/sq meter)
Equivalent Weight								
16	40	22	37	33	3.2	.0032	0.081	60.2 gsm
18	45	24	41	37	3.6	.0036	0.092	67.72 gsm
20	50	28	46	42	3.8	.0038	0.097	75.2 gsm
24	60	33	56	50	4.8	.0048	0.12	90.3 gsm
28	70	39	64	58	5.8	.0058	0.147	105.35 gsm
29	73	40	62	60	6	.0060	0.152	109.11 gsm
31	81	45	73	66	6.1	.0061	0.155	116.63 gsm
32	85	45	74	67	6.15	.00615	0.156	120 gsm
35	90	48	80	74	6.2	.0062	0.157	131.68 gsm
36	90	50	82	75	6.8	.0068	0.173	135.45 gsm
39	100	54	90	81	7.2	.0072	0.183	146.73 gsm
40	100	56	93	83	7.3	.0073	0.185	150.5 gsm
43	110	60	100	90	7.4	.0074	0.188	161.78 gsm
44	110	61	102	92	7.6	.0076	0.193	165.55 gsm
47	120	65	108	97	8	.0078	0.198	176.83 gsm
53	135	74	122	110	9	.0085	0.216	199.41 gsm
54	137	75	125	113	9	.009	0.229	203.17 gsm
58	146	80	134	120	9.5	.0092	0.234	218.22 gsm
65	165	90	150	135	10	.0095	0.241	244.56 gsm
67	170	93	156	140	10.5	.010	0.25	252.08 gsm
72	183	100	166	150	11	.011	0.289	270.0 gsm
76	192	105	175	158	13	.013	0.33	285.95 gsm
82	208	114	189	170	14	.014	0.356	308.52 gsm
87	220	120	200	180	15	.015	0.38	312 gsm
105	267	146	244	220	18	.0175	0.445	385.06 gsm

Paper Thickness Wrap Up

- There are several ways to determine the thickness or weight of a paper
- Basis Weight is expressed in pounds
- GSM is also based on weight
- OEM's specify their digital equipment capability in GSM thickness.
- Caliper is based on thickness and is what most customers are concerned about.
- PPI is mainly important to book printers and direct mail houses
- Our marketing collateral has all of the paper thickness & weight specifications for each item. (except for PPI)

#1105739 18x12 80# - 66M - 216 GSM – 9.2 PT - McCoy Digital Gloss Cover

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You are now a paper thickness expert!

Thank you!