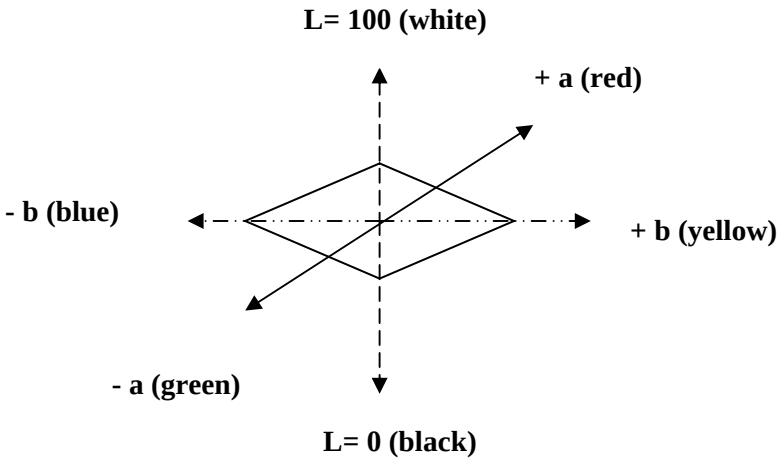
Important Parameters for Paper & Paperboard

All Paperboard tests are to be done after conditioning samples. The steps in conditioning are

1. Pre dry the samples at 60° C for 30 Minutes in a drying chamber with air circulation
2. Condition the samples at 23° C $\pm$ 1^0 C and 50 $\pm$ 2 % relative humidity at least for 3 hours

Bending Resistance (L&W)	Commonly referred to as "Stiffness" incorrectly is a measure of the resistance offered to a bending force by a rectangular sample, expressed in mN (millinewtons). The commonly used instrument is a L & W tester which consists of a clamp which can pivot about a vertical axis.The sample is held between the clamp and a knife connected to a transducer and the force measured after the clamp is pivoted through 15º for paperboards. The Procedural standards are as per Tappi T 556.
Brightness	The percentage of blue light reflectance of a sample measured at an effective wavelength of 457nm, to provide an indication of the amount of bleaching; generally, the higher the reflectance, the brighter the sample appears. Measured with two different standards – Tappi/GE and ISO. Though there is no direct correlation, ISO brightness of a sample is usually lower by 1 –1.5 units over GE brightness. The procedural standards are as per Tappi T 452
Bursting Strength	The maximum hydrostatic pressure required to rupture the sample by constantly increasing the pressure applied through a rubber diaphragm on 1.20 inch diameter sample. The sample is initially held flat & rigid and allowed to bulge during the test. B.S is expressed in kPa or psi. The procedure is laid out in Tappi t 403. Burst Factor = Burst, g/cm^2 / Grammage, g/m^2 Burst Ratio = Burst , Psi/Basis Weight, lb/ream Burst Factor = Burst, g/cm^2 / Grammage , g/m^2

Colour	Related to perception and therefore measured or specified in terms of colour space. A commonly used system is the CIE L,a,b system. This is based on the idea of colour opposites. L – measure of whiteness and varies from 100 for perfect white to 0 for perfect black a – redness to greenness b - yellowness to blueness See chart below



Compressibility	The reduction in thickness under compressive forces or pressure. It influences the ability of paper to change its surface contour and to conform to and make contact with the printing plate or blanket during printing impression. This is highly relevent in gravure and letter press printing. Compressibility is measured as a ratio of roughness under two different standard pressure in a Parker Print Surf tester.
Elongation	The tensile strain developed in a test sample at maximum tensile strength before rupture, measure as the % increase in the length of the sample to the original length. The standard procedures are laid out in Tappi T 404.

Gloss	It is the specular reflection of light which is reflected at an equal and opposite angle. Normally measured at 75°or 20°. It is advisable to measure high gloss surfaces at 20° angle. Printed and varnished surfaces are measured at 60° angle. The standard procedures are laid out in Tappi T 480
Grammage	Weight per unit area expressed in $g/m^{2.}$ The standard procedures are laid out in ISO 536, Tappi T 410.
Hardness	The degree to which paper will resist indentation by some other material such as a stylus, pen or printing plate. Hardness is measured with the help of bendtsen smoothness by tester with load on the measuring head.
Moisture Content	The absolute moisture content, expressed as a % of the paperboard weight. The sample is generally not conditioned while doing this test. The standard procedures are laid out in Tappi T 412 and ISO 287.
Opacity	The property of a substrate to resist passage of light. Important in book printing where both sides of paper are printed. The procedural standards are explained in ISO 2471.
Printability	The extent to which properties of paper lend themselves to the true reproduction of the original artwork. This is influenced by the printing process and can be evaluated in terms of – dot reproduction, dot gain, print gloss, hue shift and print uniformity.
Print Quality	The degree to which the appearance and other properties of a print approach a desired result. Lot of parameters in paper surface like roughness, gloss, ink absorption, whiteness, brightness affect this.
Ply Bond	The interlayer strength of the paperboard, measured on Scott Bond Tester, expressed in J/m^2 The standard procedures are explained in Tappi T 403.
Resiliency	The ability of paper to recover its original thickness and surface contour after release of the compressive forces of printing nips.

Stiffness (Taber)	A measure of flexural rigidity, Stiffness is the bending moment (g-cm or mNm) required to deflect the free end of a 1.5 in wide vertically clamped sample 15^0 from its center line when load is applied 50 mm away from the clamp; measured in MD & CD. The procedural standards are explained in Tappi T 489 and ISO 2491.
Surface Strength (Wax Pick)	A measure of the surface strength of the sample or surface resistance to picking. Pick occurs due to blisters or coating substance adhering to graded waxsticks(Dennison). This test is valid only for uncoated board or paper. For Coated stock IGT pick is used.
Tearing Resistance	The force required to tear a paperboard, measure in both MD & CD, expressed in mN(millinewtons). The procedural standards are explained in Tappi T 414.
Tensile Strength	The tensile force required to produce a rupture in a strip of paperboard, measured in MD & CD, expressed in kN/m. The procedural standards are explained in Tappi T 404.
Thickness (Caliper)	The perpendicular distance between the two surfaces of the board / paper, expressed in mm / μm, measured with a micrometer. The standard procedures are explained in Tappi T 411.
Water Absorption (COBB)	The surface water absorption over 60 seconds , expressed in g/m^2, measured by Cobb Test . The procedural Standards are explained in Tappi T 441.
Water Absorption (WICK)	Water absorption at the edges, expressed in kg/m^2, using Wick Test. Board surface is sealed with waterproof tape on both sides, weighed, placed in water @ 80^0F for 20 minutes and weighed again to measure the water absorbed by wicking.
Wettability	Printing ink / Glue adherence to the board surface is influenced by wettability, measured as the surface tension of the liquid, expressed in dynes/cm.

Whiteness	The extent that paper diffusely reflects light of all wavelengths throughout the visible spectrum i.e. the magnitude & uniformity of spectral reflectance measured as the percent light reflectance for the whole wavelength range. The procedural standards are explained in ISO 11475.