

ATTRIBUTES	DEFINITION	IMPORTANCE
BRIGHTNESS	The percentage of light at a specific wavelength (457 nm) reflected from the paper surface. Brightness depends on lighting and observation conditions. It is called the “Blue Reflectance Factor.”	It is interpreted by the observer as the "whiteness" of the paper.
GLOSS	The reflection of the rays on the surface of paper, in parallel and in the direction of the eye of the observer. It is obtained through the calendering process or the monolucid effect.	It is important in printing tasks where there is a need to highlight the motifs.
GLUING	Products can be manufactured without gluing, with internal gluing or with internal and surface gluing.	<p>Internal gluing avoids or retards the penetration of water and other fluids, although it does not make the product waterproof or moisture resistant and does it impede the penetration of ink vehicles.</p> <p>External gluing goes further to improve surface resistance, ink anchoring, abrasion resistance, tensile strength, fold resistance and other properties.</p>
MOISTURE CONTENT	<p>The amount of moisture the product contains expressed as a percentage of the total weight. The fibers absorb water internally as well as on the surface and expand as they absorb moisture and shrink as they lose it.</p> <p>Dimensional alterations cause a stronger variation in the direction perpendicular to fiber orientation, due to the increase in their diameter. This is the main reason for register distortion in the printing process.</p>	The loss of moisture to the environment causes product shrinkage along the external edges of stacks and reels, making them stretch while leaving the center saggy. Meanwhile, moisture gain can cause the product's edges to become saggy. To reduce these distortions, the product should be maintained packed in moisture proof material until the moment of use.
BULK	Bulk is the ratio between thickness and density. In other words, bulk = thickness / density.	Bulk may vary between papers with the same densities and thicknesses, due to the differences in their structures (type of fiber used, percentage of mineral content, degree of refining, etc.) that affect their volume.
CURL	<p>Product curl has three basic causes: the structural difference between the two sides of the paper and its exposure to high or low relative humidity; cuts very close to the roll core or improper decurling; and the application of moisture on the surface during printing, causing it to reach equilibrium with the environment.</p> <p>Curling of cutsized papers is controlled</p>	<p>To avoid curl, the moisture content of the paper and the temperature of the press or copy room must be properly controlled. Another measure is to put the paper in the room 24 hours before opening the boxes or removing the packaging, especially in the winter.</p> <p>Papers with significant differences between sides, such as papers coated on</p>

	<p>during the manufacture process so that it remains flat after passing through copying machines. Printing papers should not present curl, otherwise problems will arise in the feeding of printing machines and in binding or finishing equipment.</p> <p>Lower grammage papers present a higher tendency to curl.</p>	<p>one side, must be treated by manufacturers to minimize curl effects.</p>
THICKNESS	<p>The distance between the two sides of a sheet of paper in microns (μm), with 1 micron = 1mm/1000.</p>	<p>Thickness is important in case of papers to produce materials with specifications related to it.</p>
FORMATION	<p>Describes the structure of the product and the way the fibers are interlaced. It is a relative property, since a good formation in one type of product can be considered unacceptable in another product.</p>	<p>Products with good formation print with less mottling and have more uniform opacity.</p>
DENSITY	<p>The weight of a 1 m² sheet of paper. Therefore, 300 m² means that a sheet of 1 m² weighs 300g.</p>	<p>The higher the density, the higher the weight of the final printed material.</p>
FELT SIDE AND WIRE SIDE	<p>Refer to the top side (felt side) and back side (wire side) of paper made in a conventional Fourdrinier machine.</p> <p>Paper produced by a machine with two wires (twin wire) has two wire sides and presents very slight differences between both surfaces.</p>	<p>The wire side has less filler and fines than the felt side, and consequently is more resistant to picking and more prone to cracking on the outside of a fold. Whenever possible, it is the side chosen for printing dense areas.</p> <p>The felt side, however, offers better printability.</p>
SMOOTHNESS	<p>Refers to the product's surface levelness and affects functional properties as well as appearance. Short fibers produce smoother paper than long fibers. Smoothness is usually measured by a test of airflow over the paper's surface. In general, smoothness decreases as density increases.</p>	<p>A smoother product will result in shaper printing.</p>
OPACITY	<p>The amount of light absorbed by the product. Filler loads disperse the light and increase opacity. Mechanical pulp and non-bleached fibers absorb light and increase opacity as well.</p>	<p>Important in front and back printing. A lack of opacity (transparency) reduces the contrast of printed materials.</p>
TAX-EXEMPT PAPER	<p>Tax-exempt paper is the industry name in Brazil for paper used to print books, newspapers and periodicals. Learn more at: http://www.ethos.org.br</p>	<p>Using this paper for other purposes is considered a tax crime.</p>
POROSITY	<p>Porosity defines the product's resistance to the penetration of air. The porous structure consists of the passages on the surface and between the fibers and pores that extend across the product. Uncoated papers have</p>	<p>Porosity affects the absorption of the printing ink vehicle and the penetration of adhesives and varnishes.</p>

	<p>moderate porosity, while coated papers are relatively non-porous.</p> <p>The degree of porosity depends on the manufacturing process. A product containing only long fibers is more porous than a product containing only short fibers, because the latter are more compacted during manufacture. Filler load renders the product less porous.</p>	
<p>INK RECEPTIVITY</p>	<p>Receptivity or absorption is a property that determines the amount and speed with which printing ink penetrates the paper. The degree of absorption of the product surface influences the ink drying process and the phenomena associated with drying.</p> <p>High absorption papers rapidly absorb the fluid components of ink and prevent the blocking effect, while low absorption promotes anchoring and brightness. The equilibrium point is not well defined and depends on variables other than the paper. For this reason, ink properties should be adjusted for the specific paper, which in turn should uniformly accept the printing ink.</p>	<p>A very smooth product of low porosity requires and absorbs less ink.</p>
<p>MECHANICAL STRENGTHS</p>	<ul style="list-style-type: none"> • Bursting strength: the hydrostatic pressure required to burst a paper sample when subjected to a constant force distributed uniformly across one of its sides. Considered a general indicator of paper resistance, it is associated with stiffness and tensile strength. Bursting resistance decreases as filler load increases. • Tear strength: the strength required to tear the paper a specified distance once the tear has started. Paper has greater resistance to tearing in the direction perpendicular to fiber orientation (transversal). The longer the fibers, the greater the tear strength. • Tensile strength: the maximum strength the paper supports under certain conditions before breaking. Not as important in the case of sheet paper, it is fundamental in paper reel applications. • Folding endurance: the amount of double folds the paper can endure under tension before breaking. In general, papers are more resistant in the direction perpendicular to fiber orientation. Long fibers with a high 	<p>All printing papers must be strong enough to resist being run on printers at normal speeds.</p>

	degree of interweaving produce papers with higher fold resistance. Endurance is heavily influenced by moisture content.	
STIFFNESS	<p>The product's capacity to resist bending caused by its own weight. It is determined basically by the product's grammage to thickness ratio. Theoretically, stiffness varies as the cube of thickness, i.e. a doubling of thickness produces an eight-fold increase in stiffness.</p> <p>Stiffness decreases as filler load, moisture content and calandring increase.</p>	<p>In general, low grammage papers cause feeding problems on printers, so they are fed with a fiber orientation opposite to the recommended direction.</p> <p>All papers are stiffer when folded transversally to fiber orientation.</p>
FIBER ORIENTATION	<p>Refers to the alignment of the fibers. It is called machine direction or longitudinal direction when the flow is in alignment with the paper's manufacturing direction. An orientation perpendicular to this direction is called transversal (or cross-grain direction).</p>	<p>The combined effect of fiber orientation and moisture variation directly influences the printing result. In flatbed offset printers, the paper's fiber direction should be parallel to the printing cylinders. In the opposite direction, papers present greater stiffness and performance, especially if of low grammage.</p> <p>Paper is more easily folded and is less prone to crease when the fold is parallel to the fibers. For this reason, when binding, fiber orientation should be parallel to the bind of the book, avoiding buckling or distortions and allowing the book to remain open by itself.</p>
ABSOLUTE MOISTURE	<p>It is the quantity of water contained in the paper in relation to its mass, expressed in percentage.</p>	<p>Humidity should be considered one of the main care factors when stocking paper. Excess humidity can cause defects such as curl, waves and dimensional variation.</p>