

Glossary of Terminology

This glossary is to acquaint all employees with the terminology used within the Pulp & Papermaking Industry. Some of the terms used are applicable only to this industry.

A

Absorbency	The property of a paper which causes it to take up liquids with which it is in contact.
Absorption	The penetration of one substance into another.
Accepts	Useable pulp that has passed the screening operation.
Acidity	Quantitative capacity of an aqueous solution to react with basic anions (hydroxyl groups).
Acid Sizing	Internal sizing under acid stock conditions.
Activated Sludge	A biological treatment process using growing micro-organisms (activated sludge) to remove pollutants from waste water. Pollutants removed are converted to biological solids.
Acute Toxicity	A pronounced effect (severe impairment of functions or death) produced rapidly in an organism by a toxicant. A 96 hour period of exposure is normally used to categorise such effects.
Adsorption	The adhesion of one substance to the surface of another.
Aerobic	Taking place in the presence of free oxygen.
Afterdryers	A set of steam heated cylinders which are the final drying process for the paper sheet on the paper machine.
Agglomerate	To collect together fine suspended particles usually for removal from suspension.
Air Bells	Burst froth bubbles in stock.
Air Dry (AD)	Term applied to any pulp or paper sample whose moisture content (usually 5% to 9%) is in equilibrium with the surrounding atmospheric conditions. In the industry, air dry pulps are assumed to contain 10% moisture.
Air Knife	Thin flat jet of air delivered from an adjustable slotted orifice, used to doctor excess coating from a wet, freshly coated surface.
Alkaline Pulping	A general term, but usually applied to the kraft or soda process as in contrast to the acid sulphite process.
Alkaline Sizing	Internal sizing under alkaline stock conditions.
Alkalinity	An expression of the total basic anions (hydroxyl groups) present in aqueous solution. Also represents (in water analysis) the carbonate, bicarbonate and other salts which will react with water to produce hydroxyl groups.
Alkylketene Dimer (AKD)	An aqueous emulsion used for sizing under alkaline conditions eg. Hercon and Keydime.
Alum	Refers to various hydrated salts of aluminium sulphate. (a) Aluminium sulphate is used for precipitation of the rosin size onto the pulp to give water-resistant properties to the paper when sizing under acid conditions. Also to flocculate filler and increase retention. (b) Aluminium sulphate is used as a release agent in lightweight grades to prevent sticking to the wet press of the paper machine.

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Aluminate	Sodium aluminate is used for increasing pH of paper stock and also for sizing.
Ambient Conditions:	Surrounding or background conditions.
Anion	Negatively charged ion.
Antichlor:	Chemical scavenger used to remove traces of chlorine, hypochlorite or other active chlorine species.
Appearance	The effect upon the sense of sight, resulting from observation of the colour, finish, cleanliness and formation of papers.
Aquifer:	A soil or rock layer that is sufficiently saturated and permeable to yield significant quantities of water to wells.
Ash	Mineral residue left from burning a sample of paper to determine the percentage of filler it contains.
Australian Height Datum (AHD):	A national reference system for relative height measurement in Australia.

B

Back Side	Drive side of the paper machine or a pulp machine.
Back-Pressure Turbine:	Steam turbine from which the exhaust steam is not condensed, but is transported and utilised in an industrial process.
Back Water (B/W)	Water returned from the pulp or paper or board making process for re-use.
Bacterial Slime	Bacterial slime consists of micro-organisms (plant animals) which have grown in some section(s) of the wet-end of the paper machine system. If this slime is permitted to grow in thickness, it will eventually break loose in the piping system and be carried with the pulp to the paper machine (see slime spots).
Barring	Regularly spaced CD lines (bars) caused by high-energy, high-frequency disturbances mainly at the machine wet-end, eg. shake table vibrations, flowbox head oscillations, screen pulsations or wire/slice speed mismatch. The other main source is calender rolls.
Base Stock	Refers to paper that will subsequently be coated, laminated or treated in other ways.
Basic Weight	Weight per unit area of paper.
Basis Weight	A measurement of paper mass per unit area, normally expressed as grams per square metre. (see also Grammage)
Belt Press	A device for separation of liquids and solids by squeezing between two belts of mesh fabric.
Bioaccumulation	A process that includes bioconcentration (whereby chemical substances enter aquatic organisms directly from water) and uptake of chemical residue from dietary sources.
Bioassay	An experimental procedure designed to determine the concentration, dose or level of a substance or physiochemical parameter necessary to obtain a given response in a given percentage of organisms during a given time exposure.
Biochemical Oxygen Demand (BOD)	A measure of the amount of oxygen used in the microbial breakdown of biodegradable matter. (see Water Quality Indicators).
Biodegradable	Able to be decomposed readily by the action of micro-organisms.
Biomass	Quality of living organic matter.

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Black Liquor	Spent cooking liquor from a kraft or soda cook, containing dissolved organic wood materials and residual alkali compounds.
Bleach	A chemical used to whiten paper pulp: a solution of chlorine or similar chemicals.
Bleachability	Qualitative term used to describe the relative ease with which pulp can be bleached. Sometimes erroneously used to describe the amount of bleaching agent (ie. the bleach requirement).
Bleaching	Chemically treating a pulp to alter the colouring matter so the pulp has a higher brightness.
Blend Chest	A chest used for blending of fibrous and non-fibrous raw materials located prior to machine chest.
Blinding	Blockage of the pores in machine clothing by dirt, filler, fines etc. resulting in reduced drainage and/or permeability.
Blotting Paper	An unsized paper used generally to absorb excess ink from many other purposes where absorption is the required characteristic or where a soft spongy paper is needed, even though the absorption is of secondary importance. It is usually made from a very free, ie. lightly beaten, stock.
Blow	Pulp is discharged under pressure from a digester.
Blow Creases	Wet-end creases emanating from air between felt and wet paper as it enters a press snip.
Blow Tank	The tank into which cooked pulp is discharged under pressure from a digester vessel.
Board	Also known as paperboard or cardboard – a product made in several layers. Recycled waste paper is used in most paperboards. The amounts and quality of pulps used are determined by the various qualities required in the board. Some boards (unlined box boards) are made entirely from waste paper.
BOD (Biochemical Oxygen Demand)	A measure of the amount of oxygen required to oxidise all biodegradable material present. Usually tested on waste water, effluent, etc. A 5-day BOD involves a 5-day incubation period as total time for degradation of most wastes is too long for routine testing.
Bonding Strength	The resistance of a coated or uncoated paper to picking or lifting of its surface fibres, or delamination of the paper.
Bone Dry	Moisture-free (also termed 'oven dry').
Bowl	Calender Roll usually made from compressed fibrous material.
Break	Complete tear or rupture of the web of paper or paperboard during manufacture. Also during any subsequent operation (eg. printing).
Breaking Length	Measure of pulp tensile strength which is independent of the basis weight of the paper sheet, equal to the length of paper which will just support its own weight when hung freely from one end.
Breast Roll	Large-diameter roll around which the fourdrinier wire passes at the forward end, where the stock is discharged from the headbox onto the wire. Also the support roll for the web at a coating air knife.

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Brightness	Degree of reflection of a sheet of pulp or paper measured under standardised conditions; used to indicate the degree of whiteness. Originally was a judgement of the amount of light reflected to the eye from the surface of the paper, irrespective of hue or saturation of colour. Is now measured by optical comparators. Many factors affect brightness, including the degree of bleaching of pulp, addition of chemicals such as titanium and fluorescent dyes. Top grades of text and book papers with these chemicals have brightness in the range 85-90+. Coated wood-free papers range from about 80 to 85. Coated publication papers are in the high 70's. Newsprint was traditionally around 60 but bleaching of mechanical pulps has allowed newsprint brightness to be increased to 70+.
Broke	Paper trimmings or damaged paper from the paper machine or finishing rooms. Usually re-processed as part of the furnish into saleable paper.
Brown Stock Washer	A unit used to wash the freshly cooked paper pulp to remove digesting chemicals before the pulp is bleached.
Brown Stock	Pulp before bleaching.
Bulk	Ratio of thickness-to-basis weight of paper. A dense sheet has low bulk.
Bull Screen	Screen with large perforations used prior to normal screening.
Bund	A low earthen or concrete wall constructed around an area to prevent the inflow or outflow of liquids.
Bursting Strength	Resistance of paper to rupture under pressure, as tested on a mullen or 'pop' tester.

C

Calcite	A material used as a filler for today's alkaline sized papers. It also effects the softness, opacity, porosity and finish of the paper.
Calcination	Heat into higher temperature as in conversion of lime mud to quick lime.
Calender	Assembly of rolls at the dry-end of the paper machine imparting a finish to the paper, reducing bulk and roughness.
Calender Blackening	Crushing of paper by excessive calendering, or by calendering wet paper. Calender blackening renders the cellulose translucent. This reduces the reflectivity which results in a darker apparent shade. Most prevalent on chemical pulp furnishes. It is made worse by lumpy formation.
Calender Cuts	Defects caused by cutting of the web of paper during calendering due to creases, often from a slack sheet.
Calender Stack	Cast iron rolls at the dry-end of the paper machine. Smooths, levels and improves the surface finish and influences density of the sheet.
Calender Stamps	Defects in calendered paper or board caused by foreign material adhering to the calender rolls.
Caliper	Thickness of a paper sheet measured under specified conditions, expressed in millimetres (ie. mm).
Camber (Crown)	The difference in diameter between the middle and ends of a roll to allow for the deflection of the roll under load, and be sure that nip pressure is even over the width of the roll.
Cation	Positively charged atom or group of atoms.

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Cationic Starch	Modified starch containing groups capable of conferring a positive charge on the micro-molecule in aqueous solution under suitable pH conditions. Commonly used in the paper industry, as the slightly charged starch attaches more efficiently to the negatively charged (anionic) paper fibres.
Cellulose	Chemically, a polymer composed of glucose monomers. It is the main constituent of plant fibres.
Centrifuge	A device for separation of liquids and solids by spinning them rapidly to increase the gravitational effect.
Centriscreen	Stock cleaning equipment, pressurised screen with rotating vanes.
Ceramic	Non-metallic, stone-like material used in areas of high wear, eg. foils, vacuum box covers, centrifugal cleaner bodies.
Chain Grate Stoker	In a coal fired boiler, the chain grate stoker forms the bottom of the boiler and the moving bed on which the coal is spread and burns.
Chelating Agent:	A chemical which "locks up" unwanted metal ions.
Chemical Oxygen Demand (COD):	A measure of the amount of oxygen required (mg/L) to chemically oxidise organic matter.
Chemical Pulp	Pulp obtained by cooking wood with solutions of various chemicals usually under pressure and temperature. The principal chemical processes are the sulphite, sulphate (kraft) and soda processes.
Chest	Stock tank. Large tank or vessel for storing stock or water.
China Clay	A high grade of clay used with similar materials as filler, for paper or pigment in coating.
Chlorine Number	Test method for determining the bleach requirement of a pulp. It indicates the number of grams of chlorine absorbed by 100g of pulp under specified conditions.
Chop	(a) short, chunky bundle of unseparated fibres occurring in groundwood. (b) the cross direction cut made on a sheet of paper or board on a sheet cutter.
Chromopher	Chemical group responsible for colour.
Clarifier	Settling tank used for separating solids from effluent.
Clarifier Under Flow	The solid drawn off from the bottom of the clarifier.
Classifier	Term with wide application. Usually refers to laboratory device for separating aqueous suspension of pulp fibres into various-length fractions.
Close Formation	A fibre structure which results in a uniform density in a sheet of paper. The opposite of wild, cloudy or uneven formation.
Closed System	Papermaking system wherein white water is mainly recirculated and not discharged to waste.
Clothing	Collectively used term for all the felts, wires and fabrics used on a papermaking machine.
Coagulation	To cause colloidal particles to clump together into settleable particles.
Cockle	A warped or bulged spot in the sheet caused by localised, non-uniform shrinkage during drying.
Co-generation Plant	A plant in which electrical power and process heat, usually steam, are produced together, resulting in much more efficient use of fuels than separate generation of power and process heat.

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Collector	Chemical designed to bring together ink particles that have been freed by the pulping action so that they can later be removed.
Colloidal	A suspension of particles which are so fine that they will not settle out.
Colour	Coating mixture either white or coloured.
Competency	Competency comprises knowledge and skills and the consistent application of that knowledge and skills to the standard of performance required in employment.
Conditioning	Exposure of paper sample to control environment so that the moisture content of the sample will reach equilibrium with a specified atmospheric condition.
Condensate	Any material that has condensed from a gaseous phase into a liquid phase. Usually refers to water that has condensed from steam in a heat exchange process. In pulp and papermaking it is normally from digester heater and paper machine dryers. It is usually collected and returned to the boiler plant as feed water.
Consistency (S/C)	Weight percentage of oven dried pulp in a pulp and water mixture.
Continuous Stationery	Paper for use in business forms or computer .
Contraries	Material unsuited for papermaking, present in some wastepaper resources.
Cooking	Treating fibrous raw materials with chemicals under heat and pressure to produce pulp for paper making.
Copy Paper	Paper made especially for use in photocopying machines.
Core	A tube on which paper is wound into rolls for shipment. The material usually is metal or a convolute-wound paperboard.
Cotton Linters	A cellulose by-product of the cotton oil seed industry which can be cooked to produce paper pulp.
Couch Roll	Large, perforated roll around which the fourdrinier wire passes at the end where the sheet is transferred. It is the main drive roll for the fourdrinier section, and typically contains one or two stationary suction boxes for sheet dewatering. Couch Roll can also be a plain roll with another roll on top which is covered with a felt jacket (i.e. No. 3 M/C).
Creping	Formation of parallel micro-corrugations in the cross-direction of paper imposed by a doctor blade as the paper is peeled off a steam cylinder. It makes the paper softer and more extensible.
Cross-Direction (CD)	The direction at right angles to the direction of running a paper machine. Refers to both paper and to the paper machine or pulp machine.
Crushing	Defect in the sheet caused by applying excessive pressure during an early stage of pressing before the sheet is sufficiently dewatered.
Curl	Tendency of paper by itself to bend or partly wrap around the axis of one of its directions. Usually caused by changes in weather, faulty drying on the paper machine, or in a multi-ply sheet with differing ply composition.
Cutter	A machine which cuts rolls of paper into predetermined sheet sizes.
Cylinder	A metal cylinder which is steam heated and used for drying the paper.

C

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D

Dandy Roll	A skeleton cylinder covered with a woven wire cloth. The dandy roll is one method of applying watermarks to paper while wet. Used for smoothing the surface and 'closing' the formation. It is positioned after the forming area of the wire and usually after the second flatbox.
Decibel (A scale) (dB(a)):	An international weighted scale of sound levels.
Deckle Cutter	A high pressure jet of water that is used to trim the wet paper machine web on the wire table to a set width.
Deckle Edge	A feather edge in the untrimmed paper formed by the water jet. High-quality text papers feature a carefully formed deckle edge which enhances the finished paper.
Defoamer	(a) A liquid added to reduce foaming of stock. (b) A mineral additive added to the furnish to prevent 'foam spots'. Either 'bentonite' or diatomaceous earth is added to pulps containing pitch.
Defoamers	May be water or oil based. Water based defoamers break the surface tension of bubbles so they collapse. Oil based defoamers act on bubbles in the same way and also reduce dandy throwing by reducing the adhesion of the fibres for the dandy. Oil based defoamers also destroys sizing if used at too high a dose rate.
De-inking	Removal of ink and other extraneous materials (contraries) from printed, reclaimed papers by mechanical disintegration and chemical treatment, with subsequent washing or flotation separation. The stock is then called 'de-inked stock'.
De-inked Pulp	Waste paper pulp which has had some or all of the ink removed by either washing or flotation.
-Demineralisation	Removal of minerals from water usually so that it can be used in boilers.
Density	Density generally is the ratio of the weight of paper to the volume, ie. high-density paper has a high weight-to-volume ratio.
Dewpoint	Temperature at which a gas and/or vapour will begin to condense when cooled.
Dewatering	Removal or reduction of water content, usually by mechanical means.
Dezurik	Trade name of stock consistency apparatus and valves.
Diazo Base	The base paper produced for coating by others for use in plan printing.
Diethylenetriamine Pentaacetic Acid (DTPA)	A chemical chelating agent used in the peroxide brightening process to deactivate any metals present in the pulp and prevent them from reducing the effectiveness of the brightening chemicals. It is also used in the deinking process to prevent unwanted decomposition of hydrogen peroxide.
Digester Vessel	The pressurised vessel in which cellulose material such as wood chips or cotton linters is cooked into paper pulp.
Dimensional Stability	Ability of the sheet to retain its dimensions under production stresses and humidity fluctuations.
Dispersant	A chemical whose function is to take ink and dirt particles that have been freed during the pulping process and keep them in suspension.
Dispersion	A process which by mechanical action breaks up ink and dirt particles in recycled pulp so that they are not individually visible to the naked eye.
Displector	A synthetic liquid surfactant which is a combination dispersant and collector used in deinking.

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Dissolved Oxygen (DO)	The concentration of oxygen dissolved in water or effluent (see Water Quality Indicators).
Doctor	Thin plate or scraper of metal or plastic, in contact with a roll along its entire length to keep the roll free from paper, pulp, size, dirt, etc., by a scraping action.
Doctor Dust	Dust that accumulates on doctors. It usually consists of fuzz from the paper. If not cleaned off regularly from the doctor it may be attracted to the paper and be pressed into it.
Draw	Difference in speed between two adjacent sections of the paper machine. The term also is applied to the tension in the sheet caused by the speed differential.
Dregs	Settleable solids which comprise the underflow from the green liquor clarifier.
Dry End	That part of the paper machine where the paper is dried, calendered and reeled.
Dryer Hood	A hood which encloses the dryer section to prevent heat losses and maintain uniform drying. It can be a partial hood or a fully enclosed hood.
Dryers	(a) In a paper mill that portion of the paper machine where the wet web is dried on large, heated rollers. Can be infra-red or hot air assisted. (b) Various varnishes added to printing ink to speed drying of the printed area.
Dyefix	This is a cationic (positively charged) polymer which increases the affinity (attraction) of the anionic (negatively charged) dyes for the fibres. Dyefix will reduce the affinity of the cationic dyes for fibre and therefore dyefix should not be used when large amounts of cationic dye are being used.
Dyes/Dyestuffs	Dyes are added to all papers to produce a certain colour or to produce a degree of WHITENESS.

E

Effective Concentration EC₅₀	The concentration of a given substance in a suitable medium at which 50% of test organisms show no effect over a specified period of exposure.
Ecosystem	A physio-chemical environment containing a community of adapted organisms.
EC Units	A standardised measurement of electrical conductivity corrected to a temperature of 25°C (see Salinity).
Effluent	Waste process water.
Electrotype	A wire forming a design which is brazed onto a dandy roll for use in water marking.
Embossed	A finish imparted to paper by means of raised or depressed engravings on steel rolls so as to leave a visible surface design on the paper. Normally a conversion process.
Emission	Passage of air contaminants into the atmosphere via a gas stream or other means.
Emulsion	A suspension of one liquid dispersed as fine droplets within another liquid.
Envelope Papers	Paper suitable for envelope manufacture.
Enzyme	A large group of proteins produced by living cells which act as catalysts in the chemical reactions on which life depends.
Erasability	That property of a sheet which permits writing on the sheet to be removed by erasure and which resists erosion by erasure. After erasure, the sheet should present a satisfactory appearance and permit rewriting on the area.

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Estuary	The area of a river where tidal effects are evident and where fresh water and sea water mix.
Evener Roll	A perforated hollow roll used to even out flows and disturbances in machine flow boxes. Also known as rectifier or holey roll.
Expansion	A change in the dimensions, usually cross-grain direction, of a sheet of paper due to absorption of moisture.
Extractives	Generally any material that can be dissolved in a solvent. In wood, it specifically refers to the tall oil or turpentine precursors that amount to 1 to 5% of the wood substance.

F

Fabric	A general term for non-metallic meshes or wires used in pulp and papermaking.
Faecal Bacteria	Bacteria that occurs in faecal material.
Fan Pump	Pump used for stock distribution, usually supplies dilute stock to the sheet-forming device.
Feed Stock	The input material at the beginning of the process. In the Steinbiess project the Feed Stock is waste paper.
Feed Water Treatment	Treatment of water prior to its use in the boilers (see Demineralisation).
Felt	A woven cloth used to carry and support the web of paper between press and dryer rolls on the paper machine. Synthetic felts are mainly used. Dryer felts of cotton or synthetic materials support the paper web through the dryer section.
Felt Dryer	A steam-heated drying cylinder or hot air blower, used to dry the dryer felt.
Felt Mark	An imperfection in paper caused by some coarse or grainy character of the felt.
Felt Seam	The CD join in a dryer felt, or pin seam in a press felt. Also the mark made by the manufacturer across the width of the felt which provides a guide to felt squareness.
Felt Side	The side of a sheet of paper opposite to the wire side of the sheet on a cylinder machine. This is the top side of the sheet when it is formed on a fourdrinier wire.
Fibre Length Index (F.L.I.)	The Fibre Length Index is the percentage of fibres remaining on a standard grid when using the F.L.I. test method. It is a measure of the shortening effect in fibres of the refining process.
Fibrils (Fibrillae)	Thread-like elements unravelled from the walls of native cellulose fibres, in papermaking by the action of refiners.
Filler	In this context, mineral materials such as clay and ground limestone used to fill the spaces between cellulose fibres in the paper sheet.
Fine Paper	A general term for printing, writing and business papers as distinct from packaging papers. They usually possess good pen and ink writing characteristics.
Fines	Very small fibres and fibre fragments that readily pass through a filter wire cloth.
Finish	(a) To finish paper is a term used to describe the cutting, counting, sorting, trimming and packing of paper. (b) The finish of a sheet of paper refers to the condition of its surface. A high finish gives a smooth, uniform surface. A low finish gives a relatively rough surface.
Finishing	The cutting, rewinding, counting, sorting, trimming and packing of sheets or rolls to despatch against orders.

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First Flush	The first 10mm of rainfall on a hard surfaced area. This will normally contain any potential pollutants.
Flocculation	The coagulation or coalescence of finely divided particles in suspension.
Flotation	A process where microscopic air bubbles are attached to particles in water to float them to the surface.
Flotation Saveall	A device using flotation to remove fibres and mineral filler from processed water so that both the water and the recovered materials can be re-used.
Flowbox	Supplies stock to the wire in an even flow pattern. Sometimes called 'headbox' or "breast box".
Fluorescent Papers	(a) High-whiteness papers manufactured with fluorescent white dyes which make the paper appear brighter by improving their light-reflecting characteristics. (b) paper or boards which are surface-coated with highly luminous colours which not only reflect light but emit light as a colour when exposed to light.
Foils	(a) Hydrodynamic strips for removing water from stock on the wire. Foils replace table rolls on modern machines. (b) Rotating screen clearing bars in centriscreens.
Formation	Degree of uniformity of the fibre distribution in a sheet of paper. A uniform distribution is described as 'close formation', while an irregular distribution is described as 'wild formation'.
Forming Board	A board placed under the fourdrinier wire after the breast roll and before the first table roll or foil to prevent the wire sagging under the weight of stock. The forming board reduces stock bounce.
Forming Fabric	The moving screen at the Wet End of a Paper Machine where the sheet is formed.
Forward Drive Roll	A roll situated forward and lower than the fourdrinier suction couch roll around which the fourdrinier wire travels providing an easier web transfer to the first press felt.
Fourdrinier	The name given to the wet-end of the type of paper machine invented by Louis Robert, financed by Messrs. J. Henry and Sealy Fourdrinier. It is usually applied to an entire modern paper machine, including the dry-end, which, however was not a part of the first paper machines.
Free	(a) A term used by papermakers to indicate paper stock which parts readily with its water, as contrasted to wet or well-hydrated stock. (b) A sheet of paper which contains no groundwood.
Freeness (Canadian) (Schopper-Riegler)	Property of the stock indicating rate of drainage. A rapidly draining stock is termed free, or having high freeness.
Front Side	The working or tending side of the paper machine or pulp machine.
Furnish	The specific mixture of raw materials, both pulp and chemicals, from which a particular grade is manufactured.

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G

German Press	A rubber or polyurethane covered roll which presses the paper against a drying cylinder to help smoothness and thickness (applicable to No. 2 and No. 3 Paper Machines).
Gland Seals	Liquid sealing devices around the drive shafts of pumps, agitators, screens and such like.
Gloss	Property of sheet surface that is responsible for shiny or lustrous appearance, measured by the angular reflectance of light.
Grain	In machine-made papers, the direction in which the majority of the fibres are aligned, ie. the machine direction. Long grain is synonymous with 'machine direction' and short grain with 'cross direction'.
Grammage (GSM)	Weight per unit of a paper (ie. basis weight) in grams per square metre. (See also BASIS WEIGHT)
Guide Rolls	Rolls for tracking wires or felts.
Guillotine	A machine for trimming paper with a downward cutting action similar in operation to guillotine used in France. Used to cut square sheets with minimum fibre debris. Another type is used for splitting reject reels.

H

Hard-sized	Refers to a type of paper which has been treated with considerable size to resist moisture penetration. Opposite of 'soft sized'.
Hardwood	Commonly used word to describe timber from broadleaved trees, as distinct from timber obtained from conifers (softwood). Hardwood fibres are short in relation to softwood fibres. Eucalypt species are the normal hardwoods used in Australia.
Hard Cook	Generally refers to kraft or sulphite digester charge that has been under cooked with respect to target conditions; therefore producing a relatively high yield pulp.
Harland Drive	A sectional electric variable speed drive on a paper or board machine.
Hazchem	Abbreviation used for the hazardous chemical substances coding system used in the Australian Code for the Transport of Dangerous Goods by Road and Rail. The system is defined in Australian Standard As1216 and used a classification and labelling system adopted by the United Nations.
Head	Depth of fluid (and hence, pressure) above a reference point. In papermaking, usually refers to equivalent depth of stock above the slice lip of the flowbox.
Head Box	A flow regulating device which controls the volume of stock flowing to the flowbox or vat.
Hemicellulose	A type of carbohydrate found in plant cell walls in association with cellulose and lignin.
Hercon	An aqueous emulsion of Alkylketene Dimer (AKD) used for sizing under alkaline conditions.
High Wet Strength (HWS)	Paper which retains strength when wet.
Hog-Pit (Couch Pit)	A pit located under the wire containing an agitator (hog) to collect broke from the wire.

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Hood	A covering around the dryers to collect the hot humid air from the drying process and exhaust it. It is designed to control airflow for uniform and rapid drying. Also over an MG cylinder and to provide coating drying.
Humidity	The moisture condition of the air. Actual humidity is the number of grains of moisture in the air at any given time. Relative humidity is the percent of moisture relative to the maximum which air at any given temperature can retain without precipitation.
Hydrapulper	mechanical device for slushing waste paper and pulp.
Hydration	To swell the fibres and then partially break them down into fibrillae and mucilage or gel: any process of altering cellulose fibres to increase ability to absorb water.
Hydrate	Chemical substance that has had water added to its molecule.
Hydraulic Gradient	The change in standing or hydraulic head divided by the length of flow path in a given direction. If not specified, the direction is generally understood to be that of the maximum rate of decrease in head.
Hydrocyclone Cleaning System	A paper pulp cleaning device which without using moving parts, uses centrifugal force to separate dirt from the pulp.
Hydrophilic	Water attracting.
Hydrophobic	Water repelling.

I

Induction	Induction is defined as the <i>formal</i> process of familiarising new employees to the organisation, their job, and the work unit. In other words, acquainting new employees with the organisation and its purpose, and where their job is important to the scheme of things. By this definition, training new employees in the functional tasks and procedures specific to their job, is a separate issue.
Infra-red (IR)	Short-frequency heating used to dry paper. Can be electric or gas fired.
Inky Waste	Waste paper which is treated mechanically, not chemically, is used on recycled grades of paper.
Inorganic Compounds	All non-carbon based compounds, as well as the oxides and sulphides of carbon and metallic carbides. Includes metals, gases such as carbon dioxide, oxygen etc. and minerals (silica, limestone, etc.).
Inorganic Total Dissolved Solids	A measure of all dissolved solids in water except organic material. Equivalent to salinity or total dissolved salts. Usually measured by either conductivity or summing individual salts.
In-process Recovery	Collection, separation and re-use of water, paper fibre and other materials within the plant process operations.
Internal Sizing	Sizing obtained by chemical addition to the stock before the sheet is formed.

J

Jog	The mechanical or manual operation of producing a smooth-sided pile of paper by knocking the sheets against a smooth flat surface.
Joins	Re-reeler method of supplying a continuous sheet. The paper sheet is joined in the rewinding process usually by gummed tape.
Journal	Supporting shaft of a cylindrical roll which rotates in a bearing.

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K

Keydime	An aqueous emulsion of Alkylketene Dimer (AKD) used for sizing under alkaline conditions.
Kilowatt Hour	A measure of electrical energy: referred to in refining.
King Roll	The bottom roll of a calender stack.
Knock Down Shower	Water spray to wash sheet off wire, or to knock machine broke into a dry-end slusher.
Kraft Process	A chemical pulping process using sodium sulphide and sodium hydroxide, producing a strong low-brightness pulp.
Kraft Pulp	A strong pulp produced by the sulphate process by digestion of wood with sodium hydroxide and sodium sulphide.
Kuster Roll (Swimming Roll)	A calender roll in which crown can be varied to compensate for deflection and provide a uniform nip normally adjustable on the run.

L

Layboy	A paper or board sheet or pulp stacker which takes the sheet from the cutter and lays them in a pile.
Lignin	That extractive component of wood that binds the cellulose fibres together and that is removed during the pulping process.
Lignosulphonate	Any of several substances arising in the waste liquor of the chemical pulping process of softwood.
Linting	Poorly bonded fibrous material on the sheet surface.
Load	The net amount of a substance discharged into a body of water usually expressed as mass per unit of time.
Loading	Fine white mineral pigment used as papermaking additive to improve sheet opacity and smoothness (also termed 'filler').
Long Fibre Pulp (LF)	A general term given to pulps produced from soft woods such as pine. The fibre length of the pulp is long compared with that of hardwood.
Low Finish	A finish of paper which shows no glaze or gloss.
Lump Breaker Roll	Plain covered roll riding on top of the Couch Roll to consolidate the web and aid in water removal.

M

Machine Chest	An agitated chest containing pulp ready to be furnished to the paper machine or pulp machine.
Machine Direction (MD)	Direction of forward movement on the paper machine. Also called 'with the grain'. The direction at right angles to this is called the 'cross direction' or 'cross grain'.
Machine Wire	The continuous, bronze or synthetic fibre mesh which is the travelling surface upon which the web of paper is formed. It is usually referred to as the 'wire'.
Magnetite	Pulping process for Sulphite pulp using Magnesium Bisulphite as the cooking chemical.

GLOSSARY OF PAPERMAKING TERMINOLGY

Magnetic Flowmeter	Apparatus using magnetic principles for flow measurement.
Makeup Water	Water which must be added to a process to replace losses.
Making Order	Any order which cannot be filled from stock and is to be made in sequence according to purchasers' specifications.
Market Pulp	Pulp sold as a raw material to non-integrated paper mills.
Mechanical Agitation	Mixing.
Mechanical Pulp	Pulp produced from a pulping process using mechanical energy.
Melamine Resin	A chemical added to pulp to impart wet-strength to paper.
Micrometer	A device for accurately measuring the thickness or caliper of paper.
Moisture Content	The percent of moisture found in paper or pulp.
Mottle	Non-uniform colour of a paper sheet whether accidental or intentional.
Mount Hope Roll	A bowed roll which is used to widen a press felt or to prevent a paper sheet creasing.
Mullen Tester	Equipment which tests bursting strength of paper.
Multi-clone Dust Collector	A system used to remove dust from the exhaust gases of coal fired boilers using centrifugal force.
Multi-stage Screening and Cleaning	A series of processes which by mechanical means remove unwanted materials from the recycled pulp.

N

Needled Felt	A general term for a felt in which the nap or batt is needled onto a base fabric.
Newsprint	A generic term used to describe paper of the type generally used in the publication of newspapers.
Nip	Line of contact between two rolls, such as press or calender rolls. The 'line' is actually a narrow band owing to the compressibility of the web, felt and/or roll covers.
Non-filterable Residue (NFR)	All inorganic and organic material suspended in water, measured in mg/L (see Water Quality Indicators).
NO_x	Oxides of nitrogen, produced in high temperature combustion from the nitrogen and oxygen in the atmosphere.
Nutrient	A substance which provides nourishment for living organisms. In this context, the Nitrogen and Phosphorous containing substances which support microscopic aquatic life.

O

Off-Machine	Indicates the operation which is not performed on the paper machine, but as a separate operation (ie. as in off-machine paper coating).
Opacity	Property of a paper which prevents 'show-through' of printing from one side of sheet to the other. The opposite of transparency.
Open Draw	Transfer of an unsupported sheet as it passes from one section of the Paper Machine to the next section.

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Organic Compounds	Carbon-based compounds. Organic compounds are the basis of living matter, and include plant material, amino acids, oil and its derivatives, etc.
Oven Dry	Moisture-free (also "bone dry").
Oxygen Demand	The requirement for dissolved oxygen from water, resulting from the addition of chemicals or a waste water.

P

Pallet	A platform (usually constructed of light wood) on which paper or other materials are fastened for storage, handling and shipment. Commonly supported by wood or rolled fibre posts to provide space for picking up with a fork lift truck.
Paper	A homogeneous formation of primarily cellulose fibres which is formed in water suspension on the machine wire and bound together by felting of the fibres and by bonding agents.
Paper Machine	The machine upon which the fibres and other components of paper are formed, pressed, dried, calendered and wound into jumbo rolls.
Permeability	Degree to which a fluid (gas or liquid) permeates or transudes a paper or fabric. It may result from pressure differentials and/or capillary forces.
pH	Measure of the hydrogen ion concentration and the degree of acidity or alkalinity on a scale ranging from 0 to 14. Neutral point is 7.0 with 7.0 to 0 being increasingly acid and 7.0 to 14 increasingly alkaline.
Picking/Linting	(a) Picking of fibres in pressing and drying on paper machine. (b) The lifting of any portion of a paper surface furring the printing impression, due sometimes to inadequate surface sizing and sometimes to ink being excessively tacky.
Pickup	The amount of size solution transferred from the size press to the sheet (or coating).
Pickup Felt	A concept where the sheet is picked up off the wire by the felt which travels around a vacuum roll at the point of contact.
Pin Holes	(a) Small holes in thin paper due to fibres being drawn through the mesh of the wire by excessive suction. (b) Small holes in paper caused by fine particles of sand, etc. when the paper is calendered, the particles are crushed and fall out leaving a hole.
Piping	A type of creasing or ribbing in paper due to irregular tension and drying.
Pitch	Resinous materials present in wood that carry over into the pulping and paper making systems to form insoluble deposits.
Pinus Radiata	A fast growing species of pine used for pulp manufacture.
Point Source	Discharge from a pipe or channel to the receiving environment.
Polyelectrolyte	A water-soluble organic polymer used to aid in coagulation and flotation.
Polymer	Chemical compound consisting of repeating structural units.
Porosity	Property of containing connected air voids. The porosity of paper is evaluated by measuring the air permeability under standardised conditions.
Preparation	A general term given to the slushing, cleaning, refining and blending of fibrous raw materials prior to their use on the machine.
Press	Rolls used to compact fibres and remove water from the wet paper web, or wet pulp web, or for surface application of a liquid to the paper web as in a size press. Also to dewater stock as with a Davenport Press.

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Printability	That property of a paper which yields printed matter of good quality. This property at present is not accurately defined: it is judged by uniformity of colour of the printed areas, contrast between printed and clear areas, legibility of the printed matter and show-through. It is generally believed that this property is related to ink receptivity and uniformity, compressibility, smoothness and opacity of the sheet.
Process Control	Generally to describe computer-based systems that regulate and monitor the entire manufacturing process on a paper machine including speed, basis weight, moisture content, etc.
Profile	An outline of the variation in a measured property. Usually a graph showing the variations in basis weight, moisture content or other property from point to point in a paper web, either in the machine direction or cross-direction.
Protocol	Analytical method or procedure.
Pulp	A fibrous material produced by chemical or mechanical means from fibrous cellulose raw material. After suitable treatment, pulp is used to make paper and paperboard.
Pulper	A device used for reducing pulp lumps, broke or recycled paper to pulp again. It normally consists of a tank or chest with suitable agitation to accomplish dispersion.
Pulpwood	Timber suitable for making pulp.
Pulp Substitutes	A general term to describe materials such as recycled or recycled mill production which can be used in place of more expensive pulps.

Q

Queen Roll	The second bottom roll in a calender stack.
QCS	Quality Computer System

R

Ream	A quantity of paper — 500 sheets for most papers, some tissues 450 sheets.
Receiving Waters	Water into which waste water is discharged.
Recycled Fibre	Wood fibre which has previously been processed to form a paper product. The product is reduced to a pulp and the useful fibre reprocessed.
Recycled Paper	Paper, board, etc. which has been used and collected for re-use in a paper mill.
Reel	Continuous length of paper or board wound on a shell.
Reeler	An apparatus for winding up the web of paper into a solid reel.
Reel Set	MD curl induced into paper or board when winding or reeling a web into a roll. Usually occurs near the core.
Refiner	A machine usually fitted with rotating discs or with a cone and plug for the treatment of fibrous materials to develop properties required for the manufacture of paper.
Refining	The treatment of stock in a refiner.
Register	(a) "Cut to Register" — watermark grades are controlled in Register to end up with the watermark in the centre of finished sheet. (b) Exact correspondence in the position of printed matter in relation to other material already printed on the sheet. Of special importance in the printing of 4-colour halftone prints.

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Rejects	Slithers of wood or chips that cannot be converted to fibre. Also includes paper clips, staples etc. from recycled paper.
Retention	The amount of filler or other material which remains in the finished paper expressed as a percentage of that added to the furnish before sheet formation.
Retention Aid	Is a chemical which causes particles ie. filler fibre particles, to flock together and thereby are retained in the sheet.
Rewinder	A machine which takes rolls from the paper machine, slits or rewinds onto smaller rolls.
Ridge (or Hard Spot)	Area in a roll or skid of paper in the machine direction that is higher (in the case of a roll).
Rigidity	Stiffness: resistance to bending: inflexibility.
Rope Carrier	Principal method of sheet threading for the dryer section of a paper machine, by means of two ropes that run in grooves on the front side of the dryer cylinders. The paper tail is placed between the ropes, which carry it through the dryer section.
Rosin	A natural resin obtained after distilling the turpentine from the gum of the southern pine. When cooked with caustic soda or soda ash, it forms a soap that is used for the sizing or water-proofing of paper.
Roughness	A measure of surface smoothness.
Runnability	Performance of corrugating paper in corrugating process (speed of running). Can refer to general performance of a paper machine, coating or printing press.
Run-off	That portion of precipitation water which flows across the ground surface, eventually returning to streams.

S

Salinity	Measure of the concentration of inorganic salts in a liquid. The electrical conductivity of a solution provides a convenient means of measuring salinity. The units of electrical conductivity are Micro Siemens/cm (us/cm) @ 25°C, commonly referred to as EC units. Also known as inorganic total dissolved solids.
Saponified	Converted into soap by reaction with an alkali.
Saturated Steam Saveall	Steam at its condensing temperature (for a given pressure). (a) Shallow pans beneath paper machine wires to catch backwater. (b) An apparatus used to recover fibre from backwater either by filtering, sedimentation or flocculation.
Seal Water	Water that is used to provide a lubricating seal on glands of rotating machinery.
Screen	Any device used to separate undesirable objects from pulp and starch or coating slurry, and to improve fibre dispersion.
Shadow Mark	A defect in paper appearance which looks like the drilling pattern in a suction roll. IT is due to opacity effects caused by areas of vacuum and pressure as the wet web passes over a suction roll.
Shake	Means of oscillating the fourdrinier wire.
Sheahan Rope	Dual ropes which are used to lead part of the paper web through the paper machine. (See also TAIL and ROPE CARRIER).
Sheeter	A machine for the cutting of paper from reels into sheets and stacking those sheets onto pallets or discharging them as packs.

GLOSSARY OF PAPERMAKING TERMINOLGY

Shives	Small bundles of fibres that have not been separated completely in the pulping operations. Can show up in the finished paper sheets.
Side Run	The roll of paper run in conjunction with a regular run in order to complete the fill of a paper machine.
Size	A material added to the stock or to the surface of the sheet to impart water-resistance to the sheet.
Sizing	The process by which a chemical (often rosin size) is applied in the papermaking process to impart a degree of resistance to water.
Size Press	Section of paper machine where surface treatments are applied to the sheet of paper to give it special qualities. Normally a pair of rolls towards the end of the dryer train between which the dry or partially dry web is passed, and into the nip of which a liquid, usually starch, is applied to impart strength to the sheet. Sometimes a chemical may be added to produce a water-resistant sheet.
Slice (Slice Lip)	Flowbox opening delivering stock to wire.
Slime	Fungus or other bacteriological growth. If not controlled in the papermaking system, slime deposits will cause process and quality problems.
Slime Spots	Semi-transparent spots produced in paper. They are caused by micro-organisms (plants or animals) which have grown in one of the many wet spots around the wet-end of a paper machine. Eventually they may get into the paper on the wire. Although these spots are sterilised by the dryers, they are unsightly and may leave holes in the paper. Frequently they cause wet-end breaks.
Slimicides	Compounds added to the furnish to inhibit the build-up of bacterial slime in the machine system. (See BACTERIAL SLIME).
Slitter	Rotary knife used to slit a paper web into specified width or to trim the outer edges.
Sludge	Fibre, filler or biological solids settled out of the paper making process in the waste water treatment clarifier.
Slurry	A mixture of liquids and solids. A suspension of insoluble in water.
Slusher	A general term for pulpers used to reduce broke or pulp laps, etc., to a fibre slurry.
Smelt	Molten chemical. In this context sodium carbonate recovered from cotton linters cooking liquor.
Smoothing Press	That part of the paper machine just before the dryer section, consisting of two bare rolls, usually a bottom roll of brass and a top rubber roll, which further smooths the paper if necessary, generally not used on low-finish papers.
Smoothness	The texture of the surface of paper. Also called its 'finish'. Generally determined with a tester which measures the time required for a given volume of air to flow between the surfaces of the paper sample and a piece of optically-flat glass under standard loading conditions.
Soda Ash	Used for increasing the pH of paper stock.
Sodicity	The level or presence of soluble Sodium salts in water.
Soft Cook	Kraft or sulphite digester charge that has been over-cooked, therefore producing a lower yield pulp easier to bleach.
Soft Edge	A roll edge of low paper web tension. Due to thickness being less. Often shows a starred pattern on the roll end when hardened back up.
Softwoods	Cone-bearing trees. Since they usually keep their needles or leaves the entire year, they are popularly called evergreens.

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Sound Pressure Level (SPL)	The sound pressure level is the measurement of the presence of a noise source, dependent upon the environment in which it was measured. Sound Pressure Level is the root mean square of instantaneous sound pressure expressed in decibels (dB) reference to 2×10^{-5} Pa.
Splice	The joining of the ends of two webs of paper to make a continuous sheet, as during the winding of rolls.
Spreader Bar	A bowed cylindrical bar used to spread the sheet and to prevent the dry paper web from creasing.
Stamp	Impressions in sheet, ie shiny mark.
Starch	Material which is used as a surface or internal additive to provide strength.
Starring	Appearance of the end of a reel which has partly collapsed due to soft edge, knocking or dropping of the reel. Or by hardening up a soft edge on a running reel.
Static Electricity	Charges of electricity may be contained by paper which has been improperly dried or has sustained excessive pressure in calendering. It is particularly apparent in paper which is too dry, but also in properly dried paper affected by local atmospheric conditions after shipment. It can be caused by low relative humidity in the pressroom.
Stickies	Contraries which adhere to rolls, dryers, etc. when heated.
Stock	Wet pulp of any type at any stage of the manufacturing process. More specifically, the prepared papermaking furnish.
Stock Consistency	Weight of OD fibre/100 ml sample.
Stock/Wire Speed	The ratio of stock speed which affects sheet formation and the ratio of MD to CD properties.
Stretch Roll	A roll in the felt or wire run which is adjusted to apply the proper operating tension and to maintain tension as the felt or wire stretches with use.
Stuff	Paper making stock as it is ready to be pumped to the Headbox.
Suction Box	A device at the wet end of the machine which removes water from the paper web. Located under the wire or in the suction couch or suction press and removes water by means of a vacuum pump.
Suction Pick-up	The transfer of the wet paper web from the forming section to the press section using a suction press roll and felt run. It's use ensure that the web does not have to pass unsupported over any draw until it is well consolidated.
Suction Press	A rubber-covered perforated roll, usually a bronze or stainless steel shell equipped with an inside suction box.
Sulphate	A general term for pulp produced by digestion of wood with sodium sulphate. (See KRAFT).
Sulphite	A general term for pulp produced by digestion of wood with sulphurous acid and its acid salts.
Superheated Steam	Steam at a higher temperature than its saturation (condensing) temperature.
Surface Sized	Paper that has been treated with starch or other sizing material at the size press of the paper machine.
Surface Sizing	The addition of a sizing agent in solution to the surface of a sheet or web.
Surfactant	Chemical which reduces surface tension of water to aid in wetting solids or emulsifying grease and oil.

GLOSSARY OF PAPERMAKING TERMINOLGY

T

Tack	Resistance of an ink film to being split between two surfaces, as between blanket and paper for an offset press.
Tail	Narrow width of paper web that is first fed through a section of the paper machine to establish the paper run. Once it is established the full width of the paper web is then run through by traversing the water jet cross cutter. (Tail cutter).
Tailings	Rejected material from fine screening operations.
Tail Cutter	Water jet on wire to cut a tail or narrow deckle.
Tearing Strength Test	Strength test of paper designed to show how much force the paper will stand before it tears.
Tear-Out	Small sample taken from the Parent Reel.
Tensile Strength	The force parallel to the plane of the specimen required to produce failure in a specimen of given width and length under specified conditions of loading.
Thermo Mechanical Pulp (TMP)	A pulp making process in which steam heated wood chips are refined in a disc refiner to directly produce pulp.
Titanium Dioxide	A pigment made from titanium ores, which is of minute particle size, has great opacifying and brightening properties when added to the papermaking furnish.
Top Side	Paper web side that has not been in contact with the wire during manufacture. Also termed 'felt side'.
Total Dissolved Solids (TDS)	A measure of the quantity of dissolved solids in a given volume of water or waste water (see Water Quality Indicators), usually measured by evaporation.
Total Dissolved Solids (TDS)	The concentration of the common ions found in water and reported by volume (mg/L).
Total Suspended Solids (TSS)	The concentration of filterable particles in water (retained on a 0.45 um filter) and reported by volume (mg/L).
Toxicant	A substance which is poisonous to living things.
Transducer	Device for converting energy from one source to another.
Trim	(a) Indicates the maximum width of finished paper. (b) The deckle edge removed when slitting or cutting the machine roll to customer size.
Turbidity	A measure of the cloudiness of the water which is determined from the amount of light scattered by suspended particles (see Water Quality Indicators).
Turbine	Enclosed rotary type of prime mover in which heat energy (steam or gas) is converted into mechanical energy by the force of a high velocity flow (of steam or gas) directed against successive rows of radial blades fastened to a central shaft.
Turbine Generator	Rotary Turbine coupled with an electric generator.

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V

Vat Creases Fine creases caused by loose draws (slack sheet between two sections).

W

Waste Paper (Recycled Paper) Including waste paperboard, is the major substitute for new pulp derived from the various pulping processes (see RECYCLED PAPERS).

Waste Water Water used in a process to carry unwanted materials away or process water that can no longer be used.

Watermark Design formed among the fibres of a sheet as a result of the wet paper web coming into contact with the pattern of the dandy roll. The paper becomes thinner and more translucent where the fibres are displaced by the raised design.

Web

1. Term applied to the full width of the paper sheet in the process of being formed, pressed, dried, finished, or converted.
2. An amount of paper wound onto a core by a reeler.

Wet-End That portion of the paper machine between the headbox and the dryer section where the sheet is formed and pressed.

Wetness Wetness is a measure of the rate at which water drains from the pulp and is dependent on the degree of beating.

White Water General term for water removed from a pulp slurry and containing fibre fines and/or additives. On the paper machine, the water that flows through the fourdrinier forming fabric as the sheet is formed.

Winder See Reeler.

Wire Side That side of the sheet of paper which was originally in contact with the forming wire or fabric.

Wood-free Pulp furnished without mechanical pulp.

Z

Zeolite Hydrated silicate of calcium and aluminium sometimes used in water softening and detergent manufacturing.

Zooplankton Planktonic animal life.