versatile

Ultraflute

by sappi

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by **sappi**

All over the world there is an increasing need to use renewable, sustainable and biodegradable resources. Sappi's range of versatile Containerboard paper products ensures that whatever the application may be, there is a solution best suited to that need.

Sappi's products are manufactured with the end-use in mind and the versatility of the range allows for functional paper combinations to create value added products.

Our extensive range of kraft linerboard and semi-chemical fluting with a significant percentage of virgin fibre, is ideally suited for the high-end, heavy duty market applications which endure rigorous conditions within the supply chain.

Ultraflute is our new semi-chemical flute. Ultraflute is made with **virgin NSSC fibre** and is the preferred choice for maximising machine performance and runnability. Using Ultraflute has a cost advantage for customers due to its **strength** and **convertibility** characteristics, resulting in an improved **yield** and a lower cost end-use product whilst still meeting the required **performance** standards.

Ultraflute is made from renewable resources derived from responsibly managed and sustainable plantations. It is biodegradable and recyclable, making Ultraflute your natural choice for packaging requirements.

earth kind™

biodegradable recyclable responsible sustainable

Applications:

Agricultural and industrial applications including:

Fruit and vegetable paper packaging market where boxes are exposed to changing cyclic humidity conditions.

Agricultural applications where the cold chain is employed in both local and export markets.

Non-food applications such as tobacco leaves and long stem flowers.

Industrial applications where heavy duty boxes are required for shipping, e.g. automotive parts, domestic appliances, beverages and cans.

Frozen applications such as fish and meat.

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Inspired by life

GAUTENG
5th Floor
48 Ameshoff Street
Braamfontein 2017
Tel +27 (0)11 407 8111
Fax +27 (0)11 339 8022

EASTERN CAPE
255 Grahamstown Road
Deal Party
Port Elizabeth 6000
Tel +27 (0)41 486 2332
Fax +27 (0)86 557 3812

KWAZULU-NATAL
1st Floor
Pharos House
70 Buckingham Terrace
Westville
Tel +27 (0)31 279 6000
Fax +27 (0)86 648 5529

WESTERN CAPE
Cape Kraft Mill
7 Esso Road
Montague Gardens
Milnerton 7441
Tel +27 (0)21 552 2127
Fax +27 (0)21 552 2152

AUSTRALIA
Sappi Trading Australia
Suite 3 Level 5
South Tower
1-5 Railway Street
Chatswood
New South Wales
Australia
Tel +61 (0)2 9410 2911

BRAZIL
Sappi Trading Brazil
Rua Joaquim Floriano
466 conj 502-Corporate
Sao Paulo 04534-020
Brazil
Tel +55 (0)11 2165 8255

COLOMBIA
Sappi de Colombia S.A.S.
Edificio 90 Oficino 603
Carrera 19A # 90-13
Bogota D.C.
Colombia
Tel +57 (0)1 616 2022

HONG KONG
Sappi Trading
28/F One Pacific Centre
414 Kwun Rong Road
Kowloon
Hong Kong
Tel +852 2219 1011

KENYA
Sappi Papier Holding GmbH
Ground Floor
Longonot Place
Kijabe Street
Nairobi
Kenya
Tel +254 20 224 0922

MEXICO
Sappi Trading Mexico
Piso 3
Monte Libano 235
Col Lomas de Chapultepec
Mexico City
Mexico CP11000
Tel +52 55 5520 0125

SINGAPORE
Sappi Singapore Pte Ltd
10 Anson Road
#34-07 International Plaza
Singapore 079903
Tel +65 6372 1423

SOUTH AFRICA
Sappi Southern Africa
Africa Sales
5th Floor
48 Ameshoff Street
Braamfontein 2017
Tel +27 (0)11 407 4066

VIENNA
Sappi Papier Holding GmbH
Alserstrasse 21
Vienna 1080
Austria
Tel +43 (0)1 526 76 75 53

Printed on Magno Satin 200 and 400g/m²

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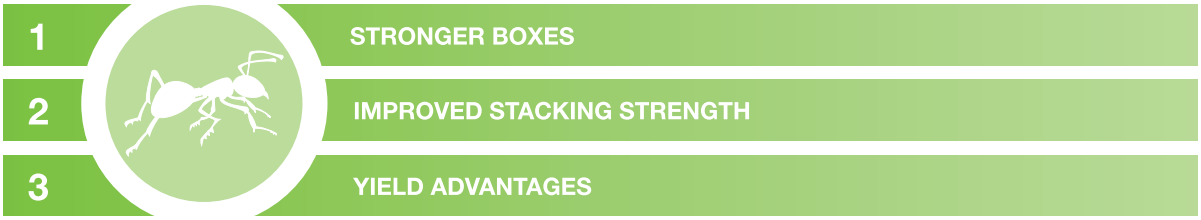
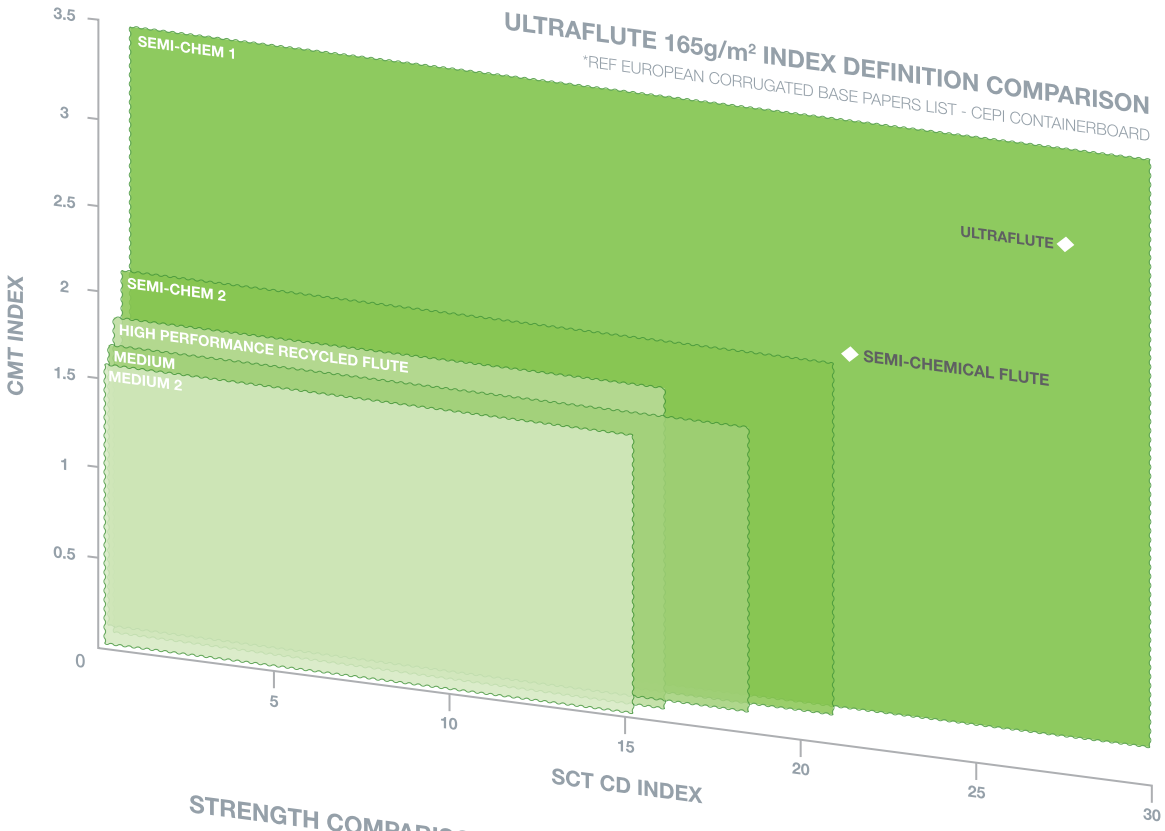
strength

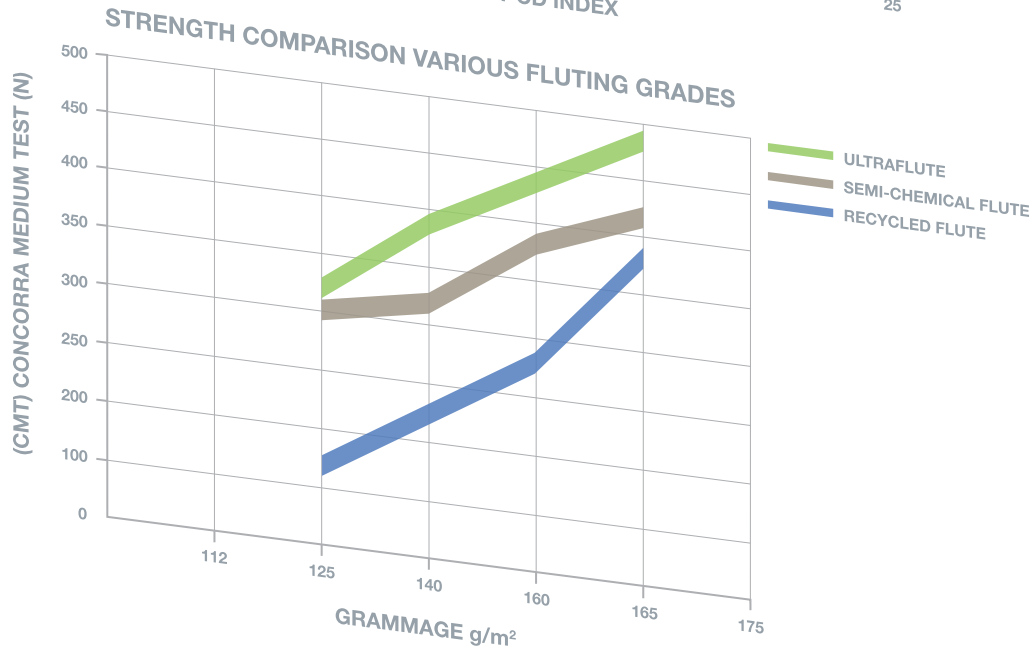
Strength

Ultraflute, with its high virgin fibre composition, is a world-class semi-chemical product offering superior strength characteristics.

Benefits







	CMT 30 INDEX	CCT 30 INDEX	SCT-CD INDEX
Semi-chemical 1	≥ 2.2	≥ 20.0	≥ 21.0
Semi-chemical 2	≥ 1.9	≥ 16.0	≥ 17

high humidity performance

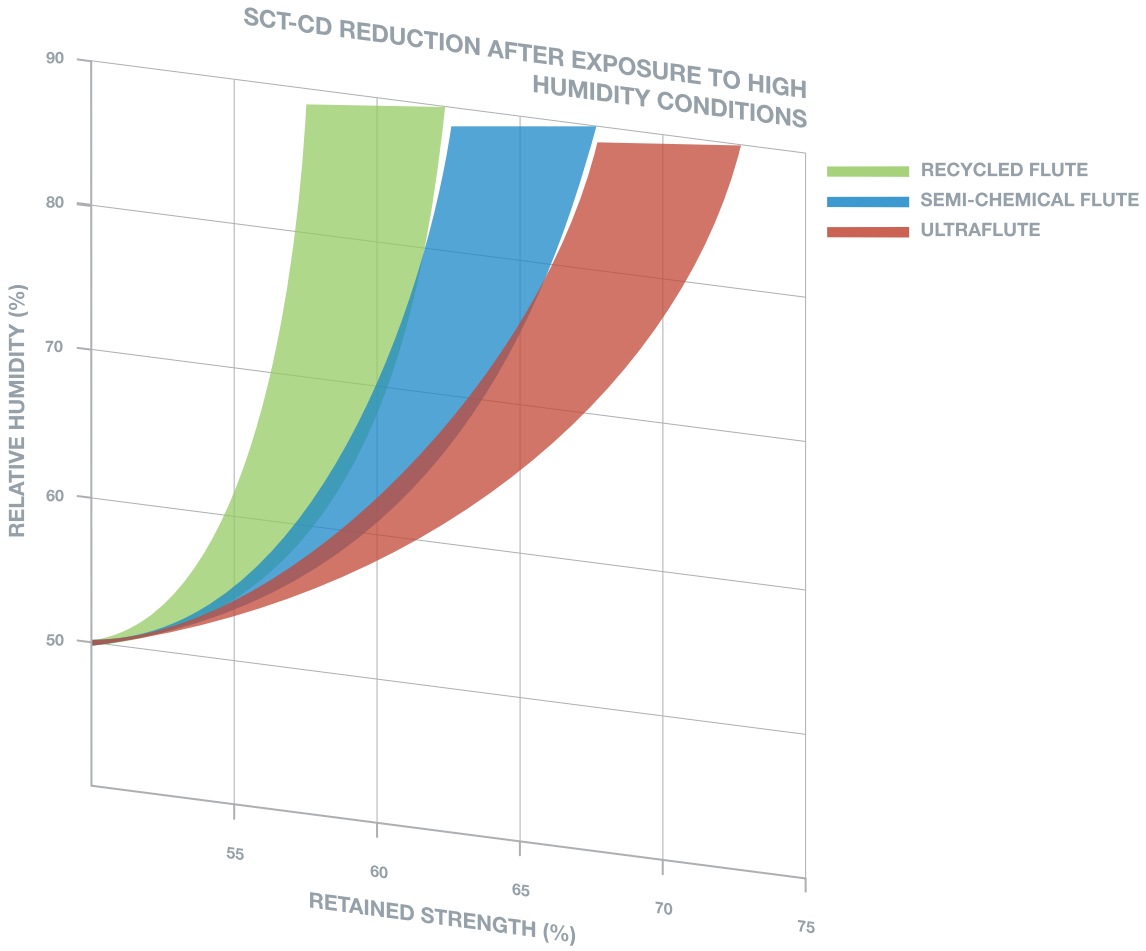
High Humidity Performance

The performance of fluting under high humidity conditions is a critical measure for box performance. Stacking strength can be achieved through the use of different types of fluting and basis weights, under standard testing conditions. However, exposure to high humidity can result in an entirely different performance level.

Ultraflute resists strength reduction under high humidity conditions better than our previous range of semi-chemical flute. Ultraflute typically retains more than 70% of its initial strength under high humidity conditions, and therefore this aspect of its performance supports the potential yield benefits.

Benefits

1. BETTER STRENGTH RETENTION
2. YIELD BENEFIT
3. MAINTAINS STRENGTH FOR LONGER PERIODS




convertible

Convertible

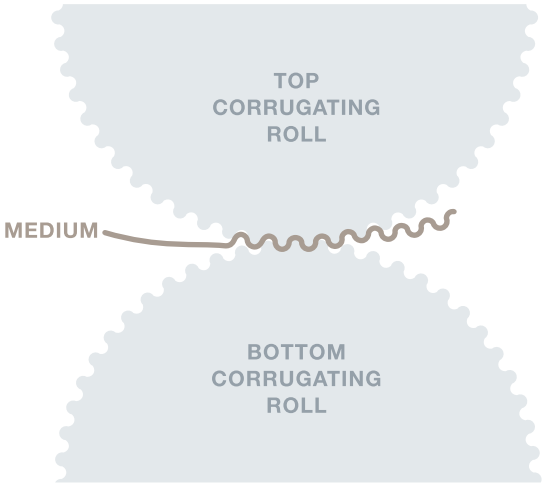
Convertibility is influenced by paper properties as well as the optimised running speed of machines.

Ultraflute allows for improved flexibility and better strength properties such as tensile, stretch and tear which could provide an increase in the operating window for the corrugator.

Using lower grammage Ultraflute allows for improved heat transfer, which can then result in corrugator speed increases.

Ultraflute allows the optimisation of raw material input costs.

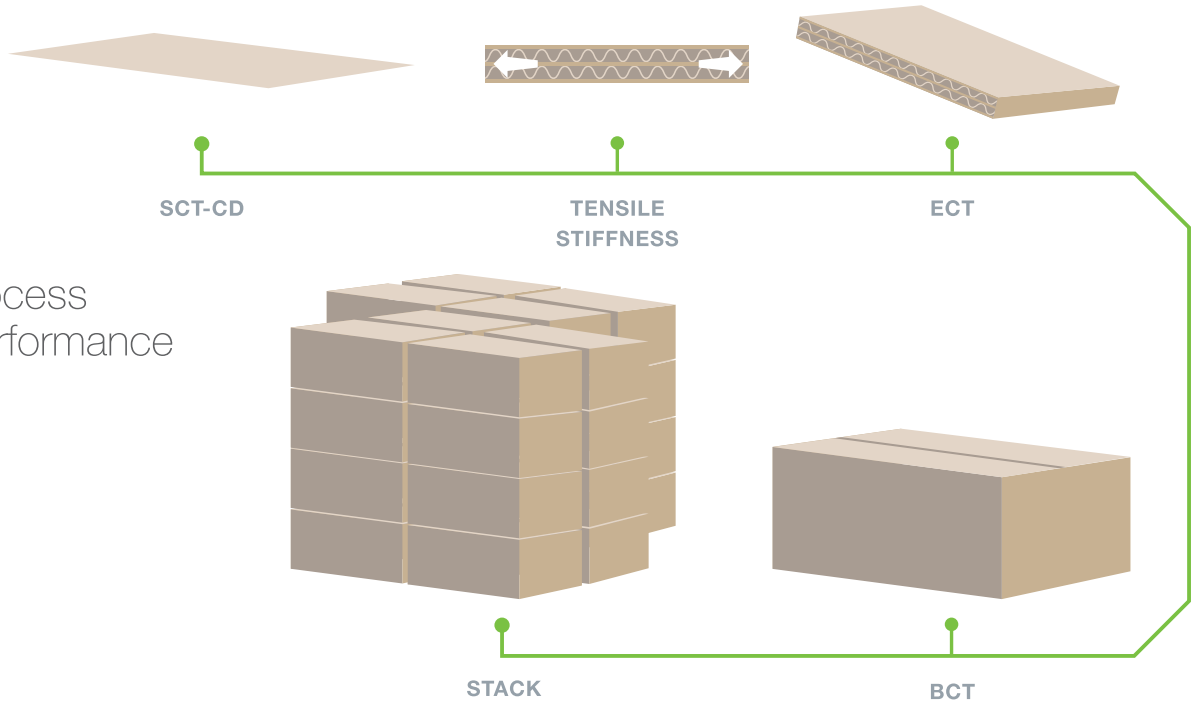
Combining these factors leads to superior board and box quality.



Benefits

1. IMPROVED FLEXIBILITY
2. INCREASED SPEED
3. RAW MATERIAL OPTIMISATION

Process Performance




lightweight

Lightweight

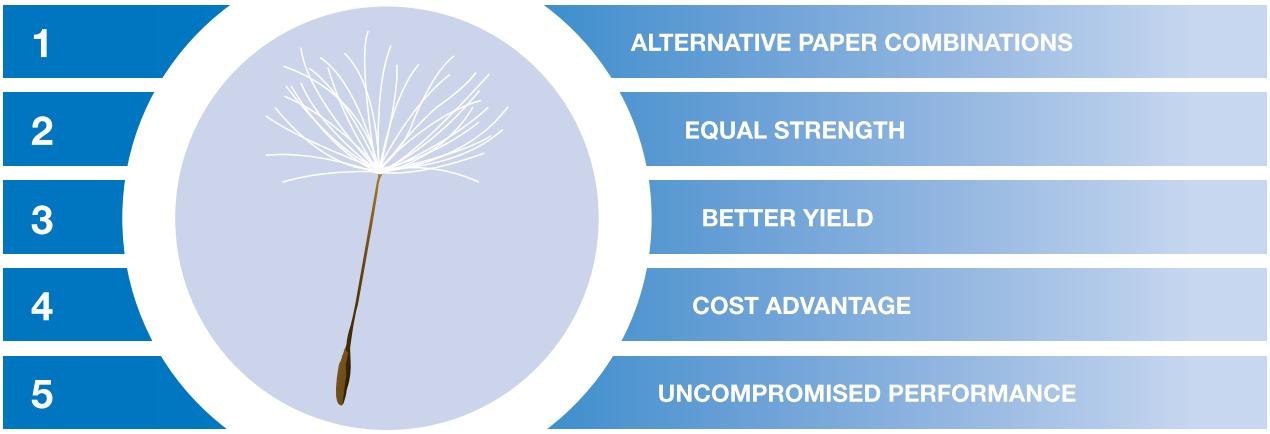
Lightweighting is a worldwide trend with decreasing average board weights. Ultraflute's lightweight benefit is that there is no compromise on product performance and the structural integrity of the box is maintained.

This reduces road, sea and air freight shipping costs with the added benefit of an improved carbon footprint. As a result of lightweighting the end-product becomes more cost-effective.

Replacing a higher grammage waste based fluting with Ultraflute enables customers to decrease the flute component of boxes, creating optimised fluting and liner combinations.

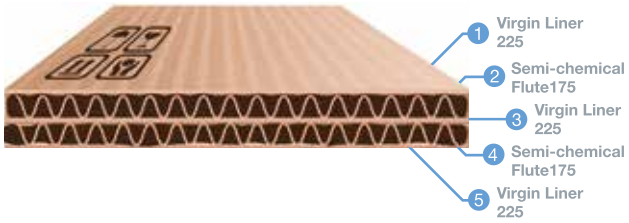
Ultraflute's better yield means you can use less paper to achieve the same results, allowing for more competitively priced end-use products.

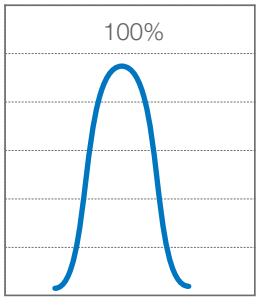
Benefits



Lightweighting cost analysis illustrative study

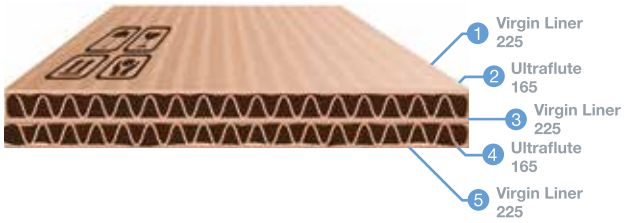
BOARD 1 - 175g/m² SEMI-CHEMICAL FLUTE
Total Board Weight: 1152g

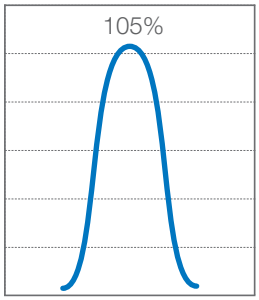




CARTON BCT at high humidity

BOARD 2 - 165g/m² ULTRAFLUTE
Total Board Weight: 1125g





CARTON BCT at high humidity

Benefits

- **2.4%** reduction in board weight - % drop in board grammage
- **5.7%** cost saving at equal price for both fluting products - paper yield improvements
- **5%** improvement in BCT

typical values

Typical Values

ULTRAFLUTE - STANDARDISED GRAMMAGE RANGE

PROPERTY	UNIT	METHOD OF ANALYSIS	125	140	150	165
Nominal Basis Weight	g/m^2	On-line	125	140	150	165
Moisture	%	On-line	9.5	9.6	9.6	9.3
Burst Index	$kPa.m^2/g$	ISO 2758	3.6	3.5	3.5	3.5
Ring Crush CD	kN/m	ISO 12192	1.2	1.5	1.7	2
CMT	N/10AF	ISO 7263	322	370	427	482
SCT CD	kN/m	ISO 9895	3.2	3.7	4.1	4.4
Porosity (Bendsten)	ml/min	ISO 5636/3	149	117	109	118
Test Date			May	May	May	May

Above values indicative of typical values

Also on request - other tests: CCT, Tensile MD, Tensile CD

Reel Size

1270 mm diameter x 102 mm core

Certifications

ISO 14001

ISO 9001

Forest Stewardship Council (FSC)®

Ultraflute has been tested for compliance with heavy metals and cadmium as specified by the BfR Recommendation XXXVI - Paper and Board for Food Contact.

Glossary

Glossary

BCT - Box compression test. Measure of the top to bottom compression strength of a corrugated container or box. It provides an indication of the container's ability to resist loads and protect its contents. The BCT test is measured in kilogram-force (kgf).

BfR - German Federal Institute for Risk Assessment.

Bursting Strength - Measure of the amount of pressure a piece of paper or paperboard can resist before rupture, measured in kilopascals (kPa). The burst strength provides an indication of a paper's resistance to rupture during handling and transportation.

CCT - Corrugated Crush Test (kN/m). Measure of the corrugating medium's resistance to crushing when a force is applied in the direction parallel to the fluted tips. The CCT provides an indication of the ability of the corrugated material to contribute to the overall compression strength of the container.

CD - Cross Direction of the paper sheet.

CEPI - CEPI Containerboard (CEPI Containerboard is the organisation formed from the merger in 2009 of the European Containerboard Organisation (ECO) and Groupement Ondulé (GO).

CMT - Concorra Medium test, also Flat Crush Test (N/10AF). The flat crush provides a measure of the flute rigidity of the corrugated board and essentially quantifies the resistance of the flutes to a crushing force applied to the surface of the board under prescribed conditions.

ECT - Edge Crush Test (kN/m). Provides a measure of the cross-direction crushing resistance of corrugated board. ECT is influenced by the board components, flute profile and the quality of the corrugating process.

FSC - Forest Stewardship Council™.

Grammage / Basis Weight - The weight of the paper per square metre g/m^2. Paper is generally bought on the mass, but the grammage of the paper determines the area of paper that the customer receives per ton and hence the yield. The lower the basis weight of the paper, the higher the yield.

High Humidity - 87% RH (+/- 2%) and 32 degrees Celsius (+/- 1%).

ISO - International Standards Organization.

ISO 14001 - Environmental Management System.

ISO 9001 - Quality Management System.

MD - Machine Direction of the paper sheet.

Medium / Flute - The term medium can be used interchangeably with fluting.

NSSC Pulp - Neutral Sulphite Semi-Chemical Pulp produced in a semi-chemical pulping process in slightly alkaline conditions. Wood chips are firstly softened by chemical treatment, with the remainder of the pulping action carried out via a disk attrition or by a similar mechanical device used for separating the fibres. NSSC Pulp provides excellent strength properties, particularly a high stiffness that is desirable in Containerboard grades.

RCT - Ring Crush Test (kN/m). Similar to the SCT in that it measures the compression resistance of the liner or corrugating medium. However, the impact of buckling is more prevalent in this test when compared to the SCT. Paper caliper also influences this test.

Recycled Flute - Fluting made with predominantly secondary or recycled fibre.

	CMT 30 INDEX	SCT-CD INDEX
Medium High Performance	≥ 1.8	≥18.0
Medium	≥ 1.6	≥ 15.0
Medium	≥ 1.3	≥ 13.5

SCT - Short Span Compression Test (kN/m). Measure of the characteristic 'compressive' strength of the paper or paperboard. Conducted over a shorter test length than traditional testing methods such as Ring Crush Test, therefore providing a greater buckling stability. SCT is taking over as the more predominant paper property used to predict the final compression characteristics of containers. Measured in the CD of the sheet.

Semi-chemical Flute - Fluting made with predominantly semi-chemical fibre such as NSSC.

Standard Humidity - 50% RH (+/- 2%) and 23 degrees Celsius (+/- 1%) - Conditioned.

Tensile - The tensile strength is the maximum tension that a sheet of paper can withstand before breaking.

Typical Value - 3 month moving average data, at time of print.