

Are Coated Kraft Paperboard and Microflute
“Like Goods”?

A Supplementary Report

By

Charles P. Klass

July 2020

Klass Associates Inc.
Madeira Beach, FL 33708 USA
chuck@klassassociates.com
Office Phone: +1-727-827-7827
Cell Phone: +1-727-410-4394

Background and Introduction

My name is Charles P. Klass. I have been retained by Kinsman Legal acting on behalf of Graphic Packaging International LLC and Graphic Packaging International Australia Converting Ltd (collectively referred to as "GPI") in relation to Investigation 548 by the Australian Anti-Dumping Commission to prepare a report to Kinsman Legal setting out an opinion on the following question within my field of expertise:

Is microflute a "like good" to the goods under consideration?

The goods under consideration are:

kraft paperboard, coated on one side with clay of other inorganic substances, grammage 360-430 grams per square metre (GSM), wet strength treated.

Microflute is:

a narrow caliper corrugated cardboard comprised of three layers as follows:

- *Clay coated top sheet liner (normally printed)*
- *Corrugated medium*
- *Liner*

I prepared a report answering that question that was submitted to GPI in June 2020. In that report I concluded that microflute is not a like good to coated unbleached kraft paperboard.

On 18 June 2020, Gross & Becroft filed a letter in which they challenged my first report.

The purpose of this supplementary report is to address the challenges to my report.

For the reasons stated in this supplementary report, there is nothing in the Gross & Becroft letter that would change my conclusions in the first report.

Overall Conclusions

I stand by my opinions in my June 2020 report about the differences in the two products:

GPI coated unbleached kraft paperboard and Visy microflute are physically significantly different materials using dramatically different manufacturing processes.

- GPI paperboard is made as a solid fiber board produced on a fourdrinier paper machine. The pulp is refined and blended with wet strength resins. It is surface sized with starch, coated with pigment coatings and calendered to provide smoothness. The product is shipped unprinted in roll form to Australia.
- Visy microflute is manufactured in a dramatically different process. It is made by gluing three separate layers of paperboard to form a microflute corrugated structure. The liners may be either kraft or recycled pulp. The corrugating medium used in microflute is made from recycled fibres. Before the separate layers are glued together on the corrugator, the top liner is roll-to-roll flexo preprinted before corrugating. The microflute product is shipped as sheets and/or box blanks.

A Report by Charles P. Klass

Key physical differences caused by the different manufacturing processes include:

- Significant differences in bulk density
- Maintenance of strength and appearance under wet conditions

I confirm and stand by my previous opinion that microflute and coated kraft paperboard are not like goods.

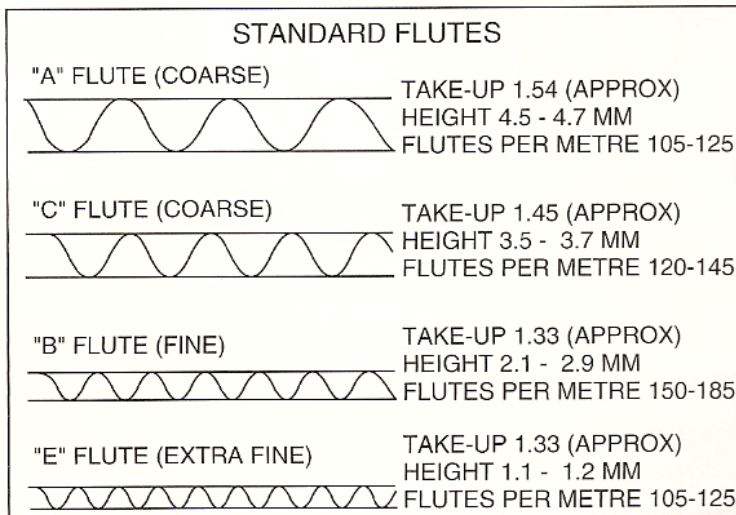
My First Report Does Not Include E Flute

The Gross & Bancroft letter includes some wrong statements, for example:

“Further, as for the physical comparison, the submission’s author repeats the same category error of aggregating E flute with N flute and calling both microflute, which is not the correct comparison in this case.”

My June 2020 report does not categorise E flute as microflute. The only reference to E flute in the report is on pages 8 and 9 in the following diagram which does not refer to E Flute as microflute:

“Standard flutes include A, C, B and E flutes:



Microflute is used for lighter weight and lower caliper constructions:”

I should note that various global producers of microflute include F, N and V flutes in microflute. Some global producers and marketers do include E flute in microflute, but I did not include E Flute in my discussion of microflute in my first report.

Now to address the points made by the Gross & Becroft letter on pages 9-11:

Visy Glama’s specific comments in response to GPI’s further submission are set out in the table below:

Submission reference	Visy Glama Response
Pg 2 under heading ‘Overall Conclusion’	We note that GPI acknowledges that both kraft paperboard and microflute are both paper based products. However contrary to what GPI says, the 3 layers of paper in microflute are not individually known as ‘paperboard’ but simply paper layers or liners.

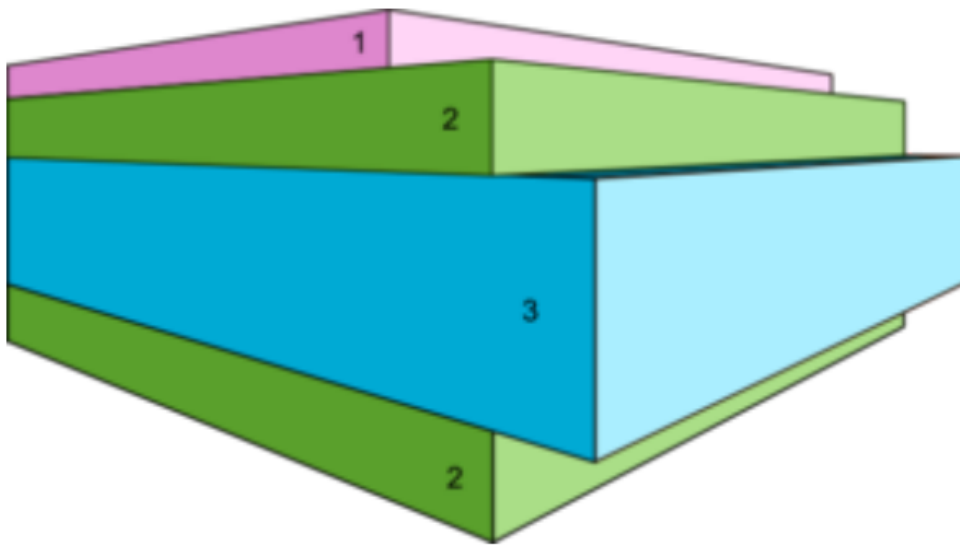
A Report by Charles P. Klass

My conclusion is the same and is valid whether the three layers in the Visy Glama product are referred to as paper, paperboard or liner. Solid unbleached kraft paperboard is a solid sheet as produced completely on the fourdrinier paper machine in a continuous process and not three separate layers of paper glued together in a separate converting operation known as corrugating as is the case for microflute.

Submission reference	Visy Glama Response
Pg 4, 3 rd para	There is a reference to GPIs product as being 'formed as a solid sheet' but there is no mention of the fact that the 'solid sheet' is in fact the fusion of several plys (sic) or layers of material (and likewise microflute has 3 layers, with the middle layer being a corrugated medium). We note there is no diagram supplied by GPI showing these composite layers. Please refer to our diagram at " VG-3 ".

Visy's diagram "**VG-3**" does not illustrate the GPI solid unbleached paperboard product but rather FBB – Folding Box Board – a grade developed and widely used in Europe.

Note that what is shown in **VG-3** as paperboard is actually an illustration of Folding boxboard. It is not kraft paperboard. Here is the Wikipedia illustration of "Folding boxboard":¹



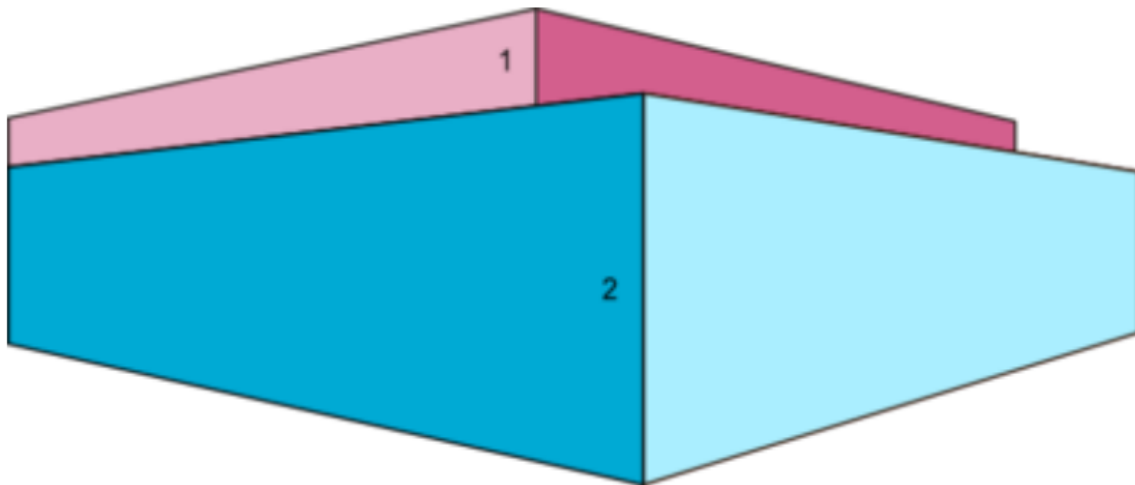
FBB construction:

- 1 – Coating
- 2 – Bleached chemical pulp
- 3 – Mechanical pulp
- 4 – Unbleached/Bleached chemical pulp

Wikipedia definition of Folding Boxboard.

¹ The complete page of the Wikipedia definition for Folding boxboard including supporting references is attached as Appendix A.

The product produced by GPI is solid unbleached paperboard. Here is the Wikipedia illustration of “Solid unbleached board” for comparison:²



SUB construction:

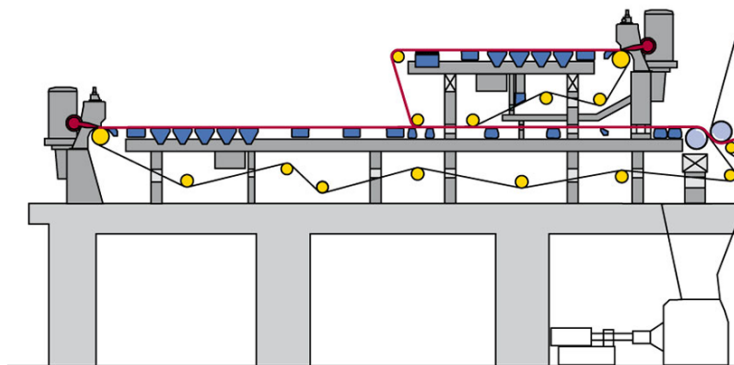
1 – Coating

2 – Solid Unbleached Board

Not drawn to scale

Wikipedia illustration of Solid Unbleached Board

This demonstrates a lack of understanding on the part of Visy counsel of the manufacturing of solid unbleached kraft paperboard. As explained in my June 2020 report, solid unbleached kraft paperboard is a solid fiber material formed into a solid sheet on a multiple fourdrinier machine. Visy counsel could have found better information on Wikipedia, which I can confirm as technically correct.



Forming section of a solid unbleached kraft board machine.

² The complete page of the Wikipedia definition for Solid unbleached board including supporting references is attached as Appendix B.

A Report by Charles P. Klass

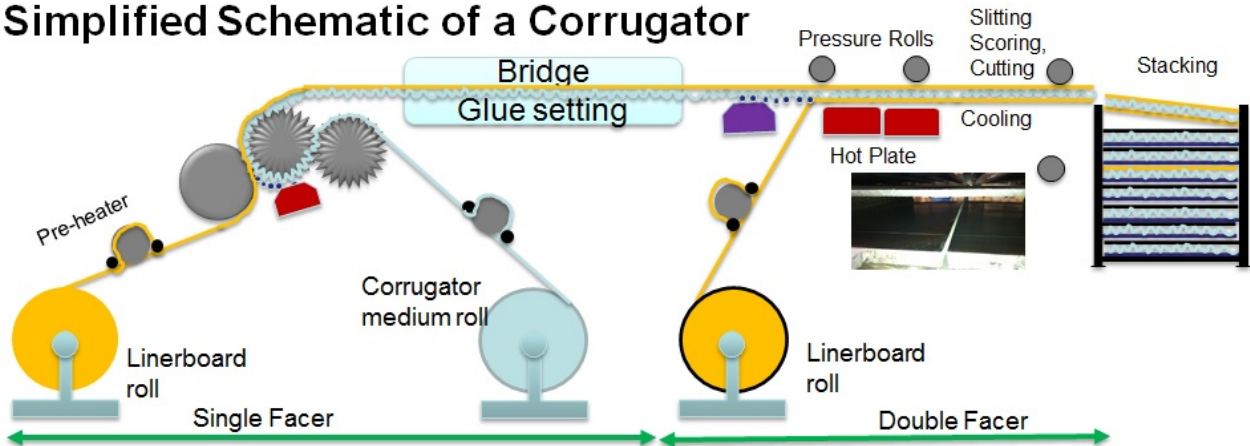
The “plies” being referred to exist only on the wet end of the paper machine as different layers of fiber suspensions in water from separate headboxes.³ During the papermaking process, the fibers from the fiber suspension layers intermingle at the interface to form a solid sheet. The solid sheet is pressed and the dried. The fibers are held together by hydrogen bonds as water is removed from the paperboard sheet.

I did not include a diagram of composite layers of solid unbleached kraft paperboard because separate plies or layers never exist other than momentarily as different slurry layers during the papermaking process. Although the fibers supplied to the upper and lower headboxes of the forming section of the fourdrinier machine may be refined differently to provide a smoother surface for coating and printing on what will become the printed outside of the box, the sheet never exists as separate plies.

Because there are different layers of slurry from the headboxes on the fourdrinier paper machine, some of the industry literature refers to solid board as multi-ply paperboard. However, this terminology does not support the claims by Visy counsel.

Microflute is not made solely on a paper machine but rather by combining three separately produced sheets on a corrugator with the middle ply being corrugated as shown in this illustration.

Simplified Schematic of a Corrugator



Microflute and solid unbleached kraft paperboard are very different products. They are very different products because they are made by totally different production processes.

Submission reference	Visy Glama Response
Pg 5, 5 th para	The list of packaging and display applications cited for 'microflute' is misleading in that the list of applications would include all fluted corrugated products, and not merely microflute (as narrowly defined for the purposes of this dumping application). It appears the US based expert doesn't understand that it is only Visy Glama that makes microflute in Australia, and that xxxx xxxxxx [confidential – percentage] of this microflute is used in Australia for beverage can multi-packs.

³ At the point where the fiber suspensions from the upper and lower headboxes of the fourdrinier paper machine are combined, the fiber suspensions are comprised of 10-20% fiber and 80-90% water not yet formed into a web or sheet. Solid unbleached kraft board is pressed and dried as a single sheet and not as plies.

A Report by Charles P. Klass

This misstates what I said in my first report. I was not referring to the entirety of all fluted corrugated products but rather to only microflute. As stated in the advertising bulletin for *Micro Flute Paper Market*, a multi-client study just published by Future Markets Insights forecasts: “Micro Flute Paper Market Expected to Witness a CAGR (Compound Annual Growth Rate) of 4.0% through 2019-2029”:

Microflute was developed as a lightweight box material of construction that is well suited to a wide variety of packaging and display applications. Examples of microflute applications include:

- Advertising and promotional displays
- Clamshells for fast food restaurants
- Boxes and gift packs for premium liquor
- Cosmetics packaging
- Packaging for electronics and digital devices
- Alternative to multi-ply recycled boxboard for folding cartons

I may not have direct experience in the Australian market, but I do have extensive experience in consulting with producers of microflute in North America, Europe, and Asia – reflected in the above statement. The major differences between microflute and kraft paperboard stem from the physical differences. These physical differences also apply in Australia.

Submission reference	Visy Glama Response
Pg 9, diagrams	Visy Glama notes the listing of 4 standard flute sizes and 3 non-standard sizes and that ‘microflute (F Flute)’ with a height of 0.75mm is one of these flute sizes. Visy Glama’s microflute product has a flute size of approximately 0.7mm and therefore the other sizes listed in this diagram are not relevant to this dumping application. This demonstrates that inaccuracy of the like goods analysis in this submission.

The inclusion of the diagrams showing standard and non-standard flute sizes were included only to assist the non-technically-trained reader in understanding the definition of microflute.

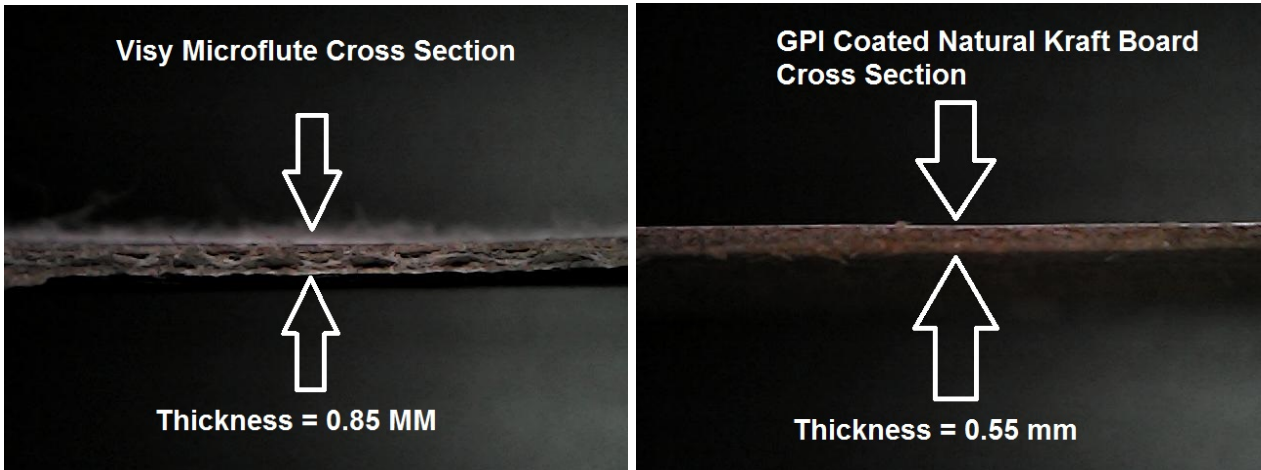
Submission reference	Visy Glama Response
Pg 9, final para	Visy Glama’s microflute product has a thickness of 0.7mm and not 0.85mm as is asserted.

I was provided with two samples for use in preparation of my report:

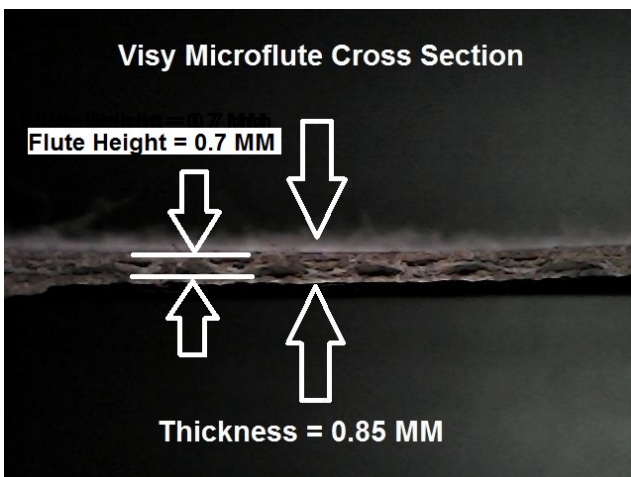
- Sheet of Graphic Packaging coated unbleached kraft paperboard printed for use in 24 pack of Coca Cola Classic cans
 - Testing with a micrometer showed this sample to have a thickness 0.55 mm
- Carton of Visy microflute Pepsi Max Taste No Sugar 30 Pack cans
 - Testing with a micrometer showed this sample to have a thickness 0.85 mm

The values obtained by micrometer testing were used in my report.

A Report by Charles P. Klass



Furthermore, it appears that Dr. Becroft may be confused or not understand the definitions of and differences between microflute product thickness and flute height as shown in this illustration.



Microflute product thickness (normally referred to as “caliper”) includes the combined laminated thickness of the inner liner, fluted corrugating medium and outer liner.

The above cross section views to the two products make the differences in bulk density visually apparent.

Bulk, another significant physical difference

On page 8 Item 5 of the Gross & Becroft letter, there is a statement:

5. Both microflute and kraft paperboard (within the GUC) have a similar GSM (grams per square metre) measurement of usually between 400-420, which is suitable for a customer’s product specifications.¹⁸ It is not correct to say, as contended by GPI, that GSM is not an applicable specification for microflute.¹⁹

Microflute may be measured and specified in GSM, but it is more common for the packaging industry internationally to specify corrugated board in terms of caliper (thickness).

A Report by Charles P. Klass

Even if we accept Visy's statement, it leads to evidence of significant difference in bulk density of the two products. According to ISO 534:2011 *Paper and Board – Determinants of Thickness, Density and Specific Volume*, bulk is expressed as cc/gram.

The formula in ISO 534:2011 for calculating bulk is:

$$\text{Bulk: cc/gram} = \text{Thickness mm} \times \text{GSM} \times 1000$$

Where cc is cubic centimeters.

This table compares the two materials assuming 400 – 420 gsm and 0.85 mm thickness for microflute and 0.55 mm thickness for GPI board:

Product	Thickness - mm	Grammage GSM	Bulk cc/gram
Visy Microflute	0.85	400	340000
Visy Microflute	0.85	420	357000
GPI Board	0.55	400	220000
GPI Board	0.55	420	231000

The bulk of microflute is significantly higher than that of GPI coated solid unbleached board – showing that they are significantly different goods physically. In my opinion, measures of bulk provide a very informative comparison of microflute and kraft paperboard.

Submission reference	Visy Glama Response
Pg 10, 1st para	The statement concerning microflute that 'It does not form as readily into beverage carrier packaging – often resulting in ragged edged or unsightly cracking at the folds' is not correct. This sort of finish can sometimes appear for any fibre based product that is cut to size (converted) using a process called rotary die cutting. However, the converting process used by Visy Glama is what is known as flat bed die cutting (and not rotary die cutting). This is exactly the same cutting process used in converting GPI's kraft cartonboard. Visy Glama's microflute product is not inferior in its finishing and is fully fit for purpose.

There is no mention of rotary die cutting anywhere in my report. Cracking at the fold is not dependent on whether converting is done by rotary die cutting or flat bed die cutting. It is a result of the fundamental differences in materials of construction.

Coated unbleached kraft paperboard is more resistant to crack at the fold due to the strength of the hydrogen bonded fibers and the tensile stiffness orientation of the board to resist fiber separation and penetration through the coating layer when the board is folded in carton converting.

In microflute, folding in carton converting causes stress on the outer paper liner, which does not have the same resistance to strain and fiber debonding – resulting in potential for cracking at the fold as evidenced in this photo.



Close-up showing Visy microflute crack at fold

Submission reference	Visy Glama Response
Pg 10	For reasons stated earlier in this submission, Visy Glama does not agree with the statements contending that its microflute product has less optimal printing outcomes or that the surface of microflute has a 'washboard appearance'.

Side-by-side close-up photos of printed surfaces of the two products shows the significant difference in print fidelity.



GPI Coated Solid Unbleached Kraft

VISY Microflute

Note the crisp sharp edges of the word “ENERGY” on the GPI Coated Solid Unbleached Kraft compared to the ragged and uneven definition of the letters in the word “ENERGY” on the VISY Microflute.

Also note the undulations in the washboard appearance of the VISY Microflute.

I stand my observation that the GPI product is differentiated by a superior printing surface.

A Report by Charles P. Klass

Submission reference	Visy Glama Response
Pg 12, bottom	It is not factually correct that Visy Glama's microflute product has a reinforcing strip inside the packaging but that GPI's kraft paperboard product does not require such a strip (due to its asserted superior strength). In fact, both Visy Glama's microflute product and GPI's imported kraft paperboard have the same strip. Please see photo attached and marked as 'VG-5'.

Visy illustration **VG-5** shows samples of the same carton design made from GPI kraft paperboard with a reinforcing strip. I received no instruction as to whether GPI in Australia uses a reinforcing strip. My observation was based on USA experience with 30-can-pack beverage carriers made from GPI board, which did not have a reinforcing strip under the manufacturer's joint at the top side handle. The overlap of the manufacturer's joint provides adequate strength and eliminates the need for a separate reinforcing strip. If GPI Australia has a reinforcing strip, it would be out of an abundance of caution.

Submission reference	Visy Glama Response
Page 13, final para	It is implied in the submission that the use a different type of pine species (Southern Pine in the US versus Radiata Pine in Australia) would render the products as being not like goods. These raw material differences in the composition of the goods are clearly not of themselves significant. Such differences are not obvious without a technical understanding of the goods and it is necessary to look at the overall physical characteristics of the goods (as well as factors such as commercial and functional likeness).

It may take a technical understanding of the differences between pine species and resultant unbleached kraft pulp properties, they are physically quite different and evidence of the two products not being like goods.

Submission reference	Visy Glama Response
Pg 14	The submission provides: 'Visy microflute and GPI coated solids unbleached kraft carrierboard are competing for some of the same business with beverage packagers. However, this does not prove that they are like goods. Microflute is sold for a wide variety of applications other than beverage carriers including packaging food and non-food items.' This is false and misleading in that GPI is referring to all fluted corrugated products and not Visy Glama's microflute, which as noted above is almost exclusively manufactured for use as beverage multipack packaging. It is however correct that GPI's product and Visy Glama's microflute are both used in the sale of beverage multi-pack packaging and importantly it is beyond doubt that they directly compete for the same customers in the same market.

The Gross & Becroft statement misstates what I said in the report. I was not referring to the entirety of all fluted corrugated products but rather to only microflute. As stated in the advertising bulletin for *Micro Flute Paper Market*, a multi-client study just published by Future Markets Insights forecasts: "Micro Flute Paper Market Expected to Witness a CAGR (Compound Annual Growth Rate) of 4.0% through 2019-2029":

A Report by Charles P. Klass

Microflute was developed as a lightweight box material of construction that is well suited to a wide variety of packaging and display applications. Examples of microflute applications include:

- Advertising and promotional displays
- Clamshells for fast food restaurants
- Boxes and gift packs for premium liquor
- Cosmetics packaging
- Packaging for electronics and digital devices
- Alternative to multi-ply recycled boxboard for folding cartons

GPI coated unbleached kraft carrier board is specifically designed for beverage carrier applications including use of wet strength resins along with fiber in forming the solid unbleached board and crosslinkers in the coating formulation to maintain strength and appearance in wet conditions.

Submission reference	Visy Glama Response
Pg 15, 3 rd para	The submission asserts that there are differences in the packaging of the two products with the suggestion that the conversion of microflute may be done 'in line' (ie on the corrugation machine). This is not correct. The conversion of microflute is undertaken 'off line', which is the same as for GPI's product.

Microflute is produced by combining three separately produces webs of paper – inner liner, corrugating medium and outer liner on a corrugator. Sheets of microflute are supplied to the carton converting operation by die cutting, scoring, folding and formation of the manufacturer's joint with adhesive. I do not know whether Visy corrugates and microflute in line, but it is technically possible and is done by some microflute producers.

GPI coated solid unbleached kraft board is received as unprinted rolls, which are then sheeted for printing. The printed sheets are supplied to the carton converting operation by due cutting, scoring, folding and formation of the manufacturer's joint with adhesive,

The converting of printed sheets into beverage carrier cartons is the same process for both products.

Submission reference	Visy Glama Response
Pg 16	Visy Glama does not agree with a number of statements such as the assertion that GPI's product and Visy Glama's microflute are made from significantly different materials, that GPI's product has superior strength and appearance under wet conditions and better print outcomes. These statements have already been addressed in section 3 of this submission in reply.

I stand by my opinions in my June 2020 report about the differences in the two products:

GPI coated unbleached kraft paperboard and Visy microflute are physically significantly different materials using dramatically different manufacturing processes.

- GPI paperboard is made as a solid fiber board produced on a fourdrinier paper machine. The pulp is refined and blended with wet strength resins. The product is made as a solid fiber board produced on a fourdrinier paper machine. It is surface

A Report by Charles P. Klass

sized with starch, coated with pigment coatings and calendered to provide smoothness. The product is shipped in unprinted roll form to Australia.

- Visy microflute is manufactured in a dramatically different process. It is made by gluing three separate layers of paperboard to form a microflute corrugated structure. The liners may be either kraft or recycled pulp. The corrugating medium used in microflute is made from recycled fibres. Before the separate layers are glued together on the corrugator, the top liner is roll-to-roll flexo preprinted before corrugating. The microflute product is shipped as sheets and/or box blanks.

Key physical differences caused by the different manufacturing processes include:

- Significant differences in bulk density
- Maintenance of strength and appearance under wet conditions

I confirm and stand by my previous opinion that microflute and coated kraft paperboard are not like goods.

Respectfully submitted,

A handwritten signature in cursive script that reads "Charles P. Klass".

Charles P. Klass

APPENDIX A

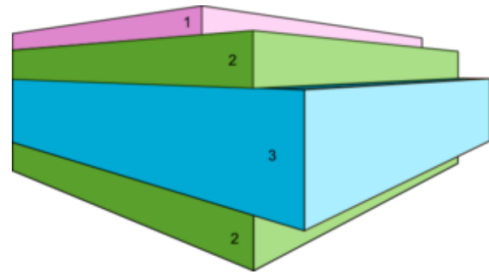
7/14/2020

Folding boxboard - Wikipedia

WIKIPEDIA

Folding boxboard

Folding boxboard, also referred to as **FBB** or by the DIN Standard 19303 codes of GC or UC, is a paperboard grade made up of multiple layers of chemical and mechanical pulp.^[1] This grade is made up of mechanical pulp in between two layers of chemical pulp. The top layer is of bleached chemical pulp with an optional pigment coating.^[2] This is a low-density material with high stiffness and has a slightly yellow colour, mainly on the inside. The major end uses of folding boxboard are health and beauty products, frozen, chilled and other foods, confectionaries, pharmaceuticals, graphical uses^[3] and cigarettes.^[4]



FBB construction:

- 1 – Coating
- 2 – Bleached chemical pulp
- 3 – Mechanical pulp
- 4 – Unbleached/Bleached chemical pulp

See also

- Solid bleached board
- Solid unbleached board
- White lined chipboard

References

1. Iggesund Paperboard (2008). "Product Catalogue: General Technical Information" (<https://web.archive.org/web/20110713004736/http://www.iggesund.com/Main.aspx?ID=d3f6ae98-6286-435d-bf6d-99a7ca881cab>). Archived from the original (<http://www.iggesund.com/Main.aspx?ID=d3f6ae98-6286-435d-bf6d-99a7ca881cab>) on 2011-07-13. Retrieved 2009-07-18.
2. Iggesund Paperboard AB (2008). "Paperboard the Iggesund Way": 11.
3. Stora Enso (2009). "Wide selection of boards for consumer goods" (<https://web.archive.org/web/20090701041612/http://www.storaenso.com/PRODUCTS/PACKAGING/CONSUMER-BOARD/Pages/consumer-board.aspx>). Archived from the original (<http://www.storaenso.com/products/packaging/consumer-board/Pages/consumer-board.aspx>) on 2009-07-01. Retrieved 2009-08-06.
4. Iggesund Paperboard (2008). "Incada" (<http://www.iggesund.com/main.aspx?ID=0515507C-D151-45D5-9627-01F3BADC6ABE>). Retrieved 2009-08-06.

Retrieved from "https://en.wikipedia.org/w/index.php?title=Folding_boxboard&oldid=963328792"

This page was last edited on 19 June 2020, at 06:03 (UTC).

Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. By using this site, you agree to the [Terms of Use](#) and [Privacy Policy](#). Wikipedia® is a registered trademark of the [Wikimedia Foundation, Inc.](#), a non-profit organization.

APPENDIX B

7/14/2020

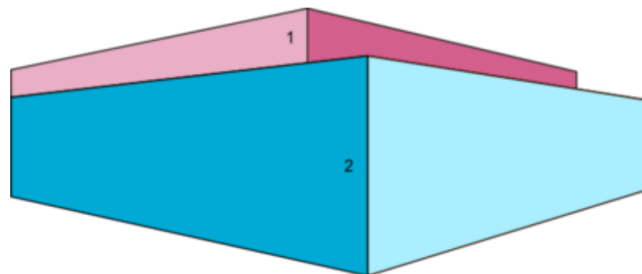
Solid unbleached board - Wikipedia

WIKIPEDIA

Solid unbleached board

Solid unbleached board, also known as **SUB**, is a grade of paperboard typically made of unbleached chemical pulp. Most often it comes with two to three layers of mineral or synthetic pigment coating on the top and one layer on the reverse side. Recycled fibres are sometimes used to replace the unbleached chemical pulp.^[1]

The main end use for this type of board is for packaging of frozen or chilled food, beverage carriers, detergent^[2] cereals, shoes, toys and others.^[3]



SUB construction:
 1 – Coating
 2 – Solid Unbleached Board
 Not drawn to scale

See also

- Folding boxboard
- Solid bleached board
- White lined chipboard

References

1. Stora Enso (2008), *Paperboard Guide*
2. Twede, Diana; Selke, Susan E. M. (2004), *Cartons, Crates and Corrugated Board: Handbook of Paper and Wood Packaging Technology*, Lancaster, PA: DasTech Publications
3. Pro Carton (2009). "Types of Cartonboard" (http://www.procarton.com/?section=types_of_cartonboard). Retrieved 2009-09-22.

Retrieved from "https://en.wikipedia.org/w/index.php?title=Solid_unbleached_board&oldid=829662176"

This page was last edited on 10 March 2018, at 00:37 (UTC).

Text is available under the [Creative Commons Attribution-ShareAlike License](#); additional terms may apply. By using this site, you agree to the [Terms of Use](#) and [Privacy Policy](#). Wikipedia® is a registered trademark of the [Wikimedia Foundation, Inc.](#), a non-profit organization.