WHAT WE CLAIM IS:

~~1. A method of bonding a substantially planar sheet material to a corrugated sheet~~ material both of which are porous using a continuous process, the method characterised by the steps of:

a) applying a controlled amount of adhesive to the apex contact portion of the corrugated sheet material; and

b) holding the respective planar and corrugated sheets together at a specified pressure and for a specified pressing period so that a bond is formed between them.

2. A method as claimed in claim 1 wherein steps a) and b) are undertaken at an ambient temperature.

3. A method as claimed in claim 1 or claim 2 wherein the specified pressing period refers to the bond time (BT) calculated by the formula:

BT=DHT/RP

wherein RP is the rate of production in metres/minute and DHT is the distance in metres the two respective sheets are held together.

4. A method of bonding a substantially planar porous sheet material to a corrugated porous sheet material using a continuous process as claimed in claim 1 wherein the speed of production has been calculated by the formula:

RP=DHT/BT

wherein RP is the rate of production in metres/minute; DHT is the distance in ~~metres for which the two respective sheets are held together; and BT is the bond~~

~~time of the adhesive in minutes.~~

5. A method of manufacturing an apparatus having a large and small intermeshing corrugating rollers for continuously producing a single face porous sheet material comprising the step of using the formula:

RP=DHT/BT

to determine the diameter of the large corrugating roller and percentage of the circumference of the large corrugating roller about which an endless belt assembly needs to apply pressure so as to achieve the desired rate of production;

wherein RP is the rate of production in metres/minute; DHT is the distance in metres for which the two respective sheets are held together; and BT is the bond time of the adhesive in minutes.

6. An apparatus which bonds substantially planar porous sheet material to corrugated porous sheet material, to produce a single face corrugated porous sheet material as part of a continuous process which utilises a large corrugating roller and a smaller corrugator roller and glue applicator assembly together with an endless tensioned belt , wherein the rate of production of the apparatus has been determined by the formula:

RP=DHT/BT

wherein RP is the rate of production in metres/minute; DHT is the distance in metres the two respective sheets are held together; and BT is the bond time of the adhesive in minutes.

7. An apparatus which bonds a substantially planar porous sheet material to a ~~corrugated porous sheet material, to produce a single face corrugated porous~~

~~sheet material via a continuous process, wherein the apparatus includes a large~~ diameter corrugating roller intermeshing with a smaller diameter corrugating roller, and an endless tensioned belt assembly arranged to apply pressure over the circumferential surface of the large corrugating roller to facilitate lamination of the planar and corrugated sheets wherein the circumference of the large diameter corrugating roller about which the endless belt can apply tension is governed by the formula:

$$C=(RP.BT)/X$$

wherein C is the circumference of the roller (i.e. $\pi 2r$) ; RP is the rate of production in metres/minute and BT is the bond time in minutes; and X is maximum percentage of the circumference about which pressure can be applied by the endless tensioned belt.

8. An apparatus which bonds a substantially planar porous sheet material to a corrugated porous sheet material to form single face corrugated porous sheet material via a continuous process wherein the apparatus includes a large diameter corrugating roller intermeshing with a smaller diameter corrugating roller, and a endless tensioned belt assembly which includes a tensioned belt arranged to apply pressure over the circumference of the large corrugating roller to facilitate lamination of the planar and corrugated sheets wherein the percentage of the circumference of the large corrugating roller which does not have the tensioned belt applying pressure thereto is limited solely by the minimum relative space required for the smaller corrugating roller and glue applicator assembly.

9. A method of operating a large diameter corrugating roller intermeshing with a ~~smaller diameter corrugating roller and an endless tensioned belt comprising a~~

~~pressing step in which the tensioned belt is arranged to apply pressure over a~~ portion of the circumferential surface of the large corrugating roller to form an adhesive bond between a substantially planar porous sheet material and a corrugated porous sheet material comprising the further step of using the percentage of belt span about the circumference of a larger corrugating roller to determine the rate of production.

10. A method of using a tensioned belt and a large diameter corrugating roller intermeshing with a smaller diameter corrugating roller and glue applicator assembly to produce single face corrugated board from a porous planar sheet material and planar corrugated sheet material, the method comprising the step of applying an adhesive to the corrugated sheet material, at an ambient temperature, and then holding the respective planar and corrugated sheets together via the tensioned belt, for a specified period of time.

11. A method as claimed in claim 1 which utilises a large corrugating roller and an endless tensioned belt wherein the maximum rate of production is determined by the formula:

$$RP = X(\pi 2\ r).BT$$

wherein RP is the rate of production in metres/minute, BT is the bond time in minutes, and X is the percentage of the circumference of the large corrugating roller about which pressure is applied by the endless tensioned belt.

12. A method as claimed in claim 10 wherein the maximum rate of production is determined by the formula:

$$RP = X(\pi 2\ r).BT$$

~~wherein RP is the rate of production in metres/minute, BT is the bond time in~~

~~minutes, and X is the percentage of the circumference of the large corrugating~~ roller about which) pressure is applied by the endless tensioned belt.

13. An apparatus as claimed in claim 7 wherein the endless tensioned belt is configured so the belt can apply pressure over 70% - 93% of the circumference of the large corrugating roller.

14. A method of bonding a substantially planar sheet material to a corrugated sheet material both of which are porous using an automated process the method characterised by the steps of:

a) applying adhesive to the corrugated sheet material with a glue application (GA) roller which has lateral left to right grooves about the GA roller's circumference which engage with teeth on the corrugating roller wherein said grooves in the GA roller hold a set amount of glue therein

b) holding the respective planar and corrugated sheets together at a specified pressure and for a specified time so a bond is formed there between.

15. A method of bonding as claimed in claim 14 wherein the dimensions of the grooves on the GA roller enable

- a line of adhesive to be held therein;

- the teeth (or a portion thereof) on the corrugating roller and apex contact portion of the corrugated sheet to be received therein;

such that a line of adhesive can be applied to the apex contact portions of the corrugated sheet.

16. An apparatus for making single face corrugated board by bonding a corrugated ~~sheet material having one or more crests onto a substantially planar sheet, both~~

~~of which are porous, the apparatus including:~~

- an applicator configured to apply adhesive to each crest of the corrugated sheet material, and

- a pressing mechanism for pressing the planar sheet against the crest of the corrugated material

wherein the applicator is configured to apply a controlled amount of adhesive to apex contact portions on each crest of the corrugated sheet material and wherein the pressing mechanism is configured to press the planar sheet material against the corrugated sheet material at a specified pressure for a specified time so a bond is formed there between.

17. An apparatus which bonds substantially planar porous sheet material to a corrugated sheet material via a continuous process wherein the apparatus includes large corrugating roller which intermeshes with a small corrugating roller wherein the diameter of the smaller roller is at least substantially between 0.16m-0.2m diameter and the large corrugating roller has a diameter of at least substantially between 0.4m-2.0m.

18. An apparatus as claimed in claim 8 wherein the apparatus operates at a maximum rate of production determined by the formula:

$$RP = X(\pi 2\ r).BT$$

wherein RP is the rate of production in metres/minute, BT is the bond time in minutes, and X is the percentage of the circumference of the large corrugating roller about which pressure can be applied by the endless tensioned belt.

19. The use of the principle:

~~RP=DHT/BT~~

~~in the construction of a single face paperboard manufacturing facility;~~

wherein RP is the rate of production in metres/minute; DHT is the distance in metres for which the two respective sheets are held together; and BT is the bond time of the adhesive in minutes.

20. A use of a water based adhesive in the production of single face paperboard.

21. The use of claim 20 wherein the adhesive is a dispersion containing vinyl acetate copolymer.

1. ~~22.~~ An apparatus for manufacturing a single face corrugated sheet of porous material via an automated process wherein the apparatus includes:

- a corrugating roller;
- a contoured roller to apply discrete droplets of glue to the crests of freshly corrugated sheet material.
- an endless fluted conveyor belt assembly having an endless fluted conveyor surface including a plurality of adjacent flutes wherein the flutes are configured to correspond to the teeth on the corrugating roller.
- a pressure mechanism configured to hold freshly corrugated sheet material to the fluted conveyor surface whilst adhesive is applied by a glue applicator;
- an endless tensioned belt assembly which holds planar sheet material and the corrugated sheet material together so a bond is formed there between;

wherein the pressure mechanism is in the form of a vacuum pump and wherein the vacuum pump is positioned solely the front end of the endless fluted conveyor assembly.

23. An apparatus for manufacturing double face corrugated board via a continuous in-line automated process wherein the apparatus includes:

i) a single face corrugator module comprising:

- a corrugating roller;
- an endless fluted conveyor belt assembly having an endless fluted conveyor surface including a plurality of adjacent flutes wherein the flutes are configured to correspond to the teeth on the corrugating roller;
- a pressure mechanism configured to hold freshly corrugated sheet material to the fluted conveyor surface whilst adhesive is applied by a glue applicator; wherein the pressure mechanism is in the form of a vacuum pump and wherein the vacuum pump is positioned solely the front end of the endless fluted conveyor assembly;

wherein the module is configured so that sheet material passing between the respective intermeshing teeth on the corrugating roller and endless fluted conveyor belt assembly becomes corrugated and is subjected to a first pressure mechanism before contacting a glue applicator in the form of a contoured roller and coming into contact with planar sheet material and a second pressure mechanism in the form of an endless tensioned belt assembly which holds the respective planar and corrugated sheets together so a bond is formed there between;

ii) a laminator module comprising:

- two vertically opposed endless linear tensioned belt assemblies which receive there between:

a) planar sheet material; and

b) single face corrugated sheet material from the corrugator module

wherein a glue applicator in form of a contoured roller applies adhesive to the single face corrugated board and/or planar sheet material prior to entering the opposed endless tensioned belt assemblies which hold the planar sheet material and single face corrugated board together so a bond is formed there between.

~~24. A method of bonding for use in the manufacture of single face or double face~~ corrugated board (both of which are porous) characterised by the step of using an arrangement of at least one endless linear tensioned belt assembly and one endless slatted conveyor assembly to hold corrugated sheet material together with planar sheet material so a bond is formed there between.

25. A method as claimed in claim 24 wherein the corrugated sheet material and planar sheet material are held together for a specified pressing time calculated by the formula:

BT=DHT/RP

wherein RP is the rate of production in metres/minute; DHT is the distance in metres the two respective sheets are held together; and BT is the bond time in minutes of the adhesive used and this determines the pressing period.

26. A corrugated sheet material produced by any one of the methods or machines in ~~the preceding claims.~~