Produced process for wood conglomerate boards
Verfahren zur Herstellung von Platten eines Holzkonglomerats
Procédé pour la production des panneaux d’un conglomérat du bois

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The present invention relates to a production process for wood conglomerate boards built from elongated wooden particles.

Industrial use of solid wood is causing environmental problems, as well as presenting technical problems, so that it is becoming increasingly difficult to find solid wood with suitable technical and economic characteristics which allow to supply an increasingly quality-conscious market while at the same time preserving ecosystems.

In order to partially solve this problem, conglomerate boards are known in which low quality wood can be employed, due both to their nature and the parts employed.

Known processes for construction of wood conglomerate boards are normally related to obtaining boards of large surface area and typically small thickness, of approximately up to 30 mm., while not solving the problems which exist for thicker boards. A few processes meant to obtain greater thickness boards are known, although these are in general directed at solving structural problems, so that they lack edge and surface finish characteristics, while less thick boards lack important mechanical properties.

There exist several types of boards made from elongated particles, all of which have as a characteristic element a flat, approximately rectangular section particle with approximately parallel greater surfaces, as known for example from DE-A-19,632,997.

Based on this particle geometry, the process for obtaining boards is quite similar in all cases: particles are dried and glued with a heat-hardened adhesive, forming a blanket in which the particles are aligned longitudinally. This blanket is continuously or discontinuously introduced in a press where in high temperature conditions and with steam injection it is subjected to the appropriate pressures in order to obtain the desired final product, as regards thickness and density, so that the glue is cured and the conglomerate is formed which may later be longitudinally cut and calibrated.

During formation of the particle blanket it is frequent for many particles to be misaligned away from the longitudinal direction, so that there may be a large number of particle crossings. In these crossings appear gaps between particle sides and faces, so that if these gaps are to be reduced in order to increase the board density high pressures are required in the pressing stage, requiring powerful presses.

Higher board densities are not convenient for many applications, as it hinders later processes such as machining, nailing, etc.

Additionally, there exist parts with particles subjected to overpressures, so that the tendency to recover the original shape or thickness in the presence of moisture makes the increased thickness of these particles alter the surface appearance of the board.

The object of the present invention is to prevent the aforementioned problems by the use of elongated particles shaped so that they allow to minimise the gaps formed between particles when forming the blanket prior to obtaining the board.

A further object of the present invention is to obtain boards thicker than those obtained by traditional methods.

In order to obtain the board in accordance with the object of the invention, elongated particles are used which are glued to form a blanket in which the particles are distributed longitudinally or slightly deviating from said sense. As in traditional methods, the blanket is subjected to pressures under high temperatures and steam in order to cure the glue.

According to the invention, the elongated particles which form the board have an approximately curved triangular cross-section, are between 70 and 300 mm long, between 4 and 30 mm wide and a have thickness, defined as the smaller height of the triangle or section, between 0.5 and 4 mm.

The triangular cross section of the particles is preferably defined by two greater sides, one convex and one concave, forming an acute angle between them, and a third smaller concave side substantially shorter than the other two. The particles therefore have an elongated or pointed cross section.

The board obtained by the process of the invention can reach a thickness between 25 and 150 mm., with densities between 500 ad 900 kg/m3.

Wood particles used to form the board may be obtained from either coniferous or broadleaf trees of low density. After drying, between 4% and 15% humidity, a heat hardening adhesive is applied to these particles in amounts ranging from 1.5% to 12%. Later a blanket is formed with these particles with a constant width and with the particles aligned predominantly in a longitudinal sense. Particles in the board will preferably have a deviation of under 10% in the horizontal plane and under 3% in the vertical plane.

The characteristics of the invention will be understood more clearly in view of the following description, made with reference to the accompanying nonlimiting drawings, where for purposes of illustration the following is shown:

Figure 1 shows a perspective view of an elongated wood particle used for the process of the invention.

Figure 2 shows an enlarged cross section of the particle of figure 1.

Figure 3 shows a perspective view of a board segment obtained in accordance with the process of the present invention, showing enlarged views of the particle distribution.

The board obtained by the process of the invention is formed from elongated particles (1), with a curved triangular cross-section (2), shown enlarged in figure 2.
This cross section (2) is elongated in shape, with two longer sides labelled (3) and (4), the former concave and the latter convex, which form an acute angle between them. The third side, labelled (5), is concave and substantially shorter in length.

Figure 3 shows a segment (6) of a board obtained by the process of the invention. As may be seen in inset (7), particles (1) are clearly oriented in a longitudinal direction, with slight deviations which in the horizontal plane are preferably under 10%.

In the particles superposition at various levels, as shown in inset (8), particles (1) also run longitudinally with deviations from the vertical plane of under 3%.

Several laboratory tests have been performed, showing that boards obtained enjoyed physical, mechanical and surface finish characteristics which could hardly be obtained in a stable manner in the wood employed at the start.

Using Insignis pine trunk particles 120 x 20 x 1.5 mm were obtained using a cutter block and dried to 8% humidity, then glued with 3.5% isocyanate resins. Afterwards a blanket was formed with the particles oriented and it was inserted in a press where the glue was cured by applying heat and injecting steam under pressure. The product thus obtained had the following properties: density 620 kg/m³; MOE 65,200 kg/cm²; MOR 570 kg/cm²; 24 hour swelling 5.6%; face-perpendicular tensile strength 15 kg/cm².

Patentansprüche

1. Herstellungsverfahren für Holzkonglomeratplatten, basierend auf langleichen Teilchen, welche geklebt werden, um einen Rohling zu bilden, in welchem die Teilchen in Längsrichtung oder mit leichten Abweichungen von dieser Richtung verlaufen, wobei der Rohling bei Wärme und Dampf, die zum Härten des Klebstoffs zugeführt werden, gepresst wird, dadurch gekennzeichnet, dass die langleichen Teilchen, welche die Platte bilden, einen annähernd gekrümmten Dreieckquerschnitt und eine Länge von 70 und 300 mm, eine Breite zwischen 4 und 30 mm und eine Dicke, die als die kleinste Höhe des Dreieckschnitts definiert ist, zwischen 0.5 und 4 mm aufweisen.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass der Dreieckquerschnitt der Teilchen durch zwei größere Seiten, eine konkave und eine konvexe, welche einen spitzen Winkel zwischen ihnen bilden, und durch eine dritte konvexe Seite, die wesentlich kürzer als die anderen zwei ist, definiert wird und eine längliche zugesetzte Form definiert.

3. Teilchen zum Bilden von Holzkonglomeratplatten mit einer langleichen Form, dadurch gekennzeichnet, dass es einen gekrümmten Dreieckquerschnitt und eine Länge zwischen 70 und 300 mm, eine Breite zwischen 4 und 30 mm und eine Dicke, die als die kleinste Höhe des Dreieckschnitts definiert ist, zwischen 0.5 und 4 mm aufweist.

Revendications

1. Procédé de production de plaques de bois aggloméré, à partir de particules qui sont collées pour former une couverture dans laquelle les particules sont disposées longitudinalement ou avec de légers écarts par rapport à cette direction, la couverture est pressée en y appliquant de la chaleur et de la vapeur pour polymériser la colle, caractérisé par le fait que les particules allongées constituant la plaque ont une section transversale sensiblement triangulaire courbe, de 70 à 300 mm de longueur, de 4 à 30 mm de largeur et de 0.5 à 4 mm d'épaisseur, définie comme étant la plus petite hauteur de la section triangulaire.
2. Procédé selon la revendication 1, caractérisé par le fait que la section transversale triangulaire des particules est définie par deux côtés les plus grands, l'un concave et l'autre convexe, qui forment mutuellement un angle aigu, et par un troisième côté, concave, sensiblement plus court que les deux autres, définissant une forme pointue allongée.

3. Particule pour former des plaques de bois aggloméré, caractérisée par le fait qu'elle a une section transversale triangulaire courbe, 70 à 300 mm de longueur, 4 à 30 mm de largeur, et 0,5 à 4 mm d'épaisseur, définie comme étant la plus petite hauteur de la section triangulaire.