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Description

This invention relates to the processing of continuous glass filaments and in particular it is concerned with the preparation of rovings from strands comprised of such filaments for conversion into fabrics by weaving and for use in the reinforcement of plastics, especially by the pultrusion process.

A well-known problem in the preparation of such rovings is the phenomenon sometimes known as "catenary". This is the lateral separation of individual strands from an untwisted roving made up of a bundle of such strands. It is caused by variations in tension present in the individual reel packages which are unwound and assembled side-by-side together to form the roving. "Catenary" gives rise to problems in further processing and in the final conversion of the roving; various methods are known for minimising its effect. These methods include sizing treatments and twisting processes, both of which give the desired cohesion, but at the expense of processing properties or the use of an extra process step, respectively.

According to the present invention, a method of producing a coherent untwisted continuous multifilament glass fibre roving comprises the steps of withdrawing individual continuous multifilament glass fibre strands from each of a plurality of creel packages, assembling them side-by-side to form a single roving, passing said roving at a rate of from 150 to 300 metres/minute without positive overfeed through an air treatment zone constituted by a confined passageway into which air is introduced at 0.5 cubic metres/minute under a pressure of from 400 to 600 KN/metre^2 and thereafter winding the treated roving into a package.

It will be seen that an air treatment zone in this particular context means a confined passageway into which air is introduced under pressure. It has been found that relatively small air pressures and volume throughputs are highly effective to produce an essentially catenary-free strand, even with strand linear densities in the range 300 to 9000 tex and at strand throughputs of 150—300 metres/minute. Air pressures of the order of 400 to 600 KN/metre^2 and air volume throughputs of 0.5 to 1.5 cubic metres/minute are effective for present purposes; this is much less than would be used in conventional air jet texturing processes. The present process has some similarity to the so-called co-mingling process, but the latter has hitherto been used for moderate texturing (bulking) of relatively fine manmade fibre yarns, in conjunction with heating to "set" the bulk developed. A degree of positive overfeed is used to ensure that such bulking is achieved.

By contrast, the present process when applied to a very much coarser glass fibre roving in the complete absence of positive overfeed results in a roving which is not bulked, but essentially free from catenary. If the throughput is reduced towards 150 metres/minute, the product may exhibit an apparent bulk. This bulk is only apparent, in the sense that on applying moderate tension to the roving, it exhibits minimal or even zero extensibility, couped with practically no change in its catenary properties. This type of product has been found to be valuable for use as a plastics reinforcement, particular in pultrusion processes.

At roving throughputs of the order of 300 metres/minute the product is catenary-free and useful as a weaving grade roving.

A particularly advantageous aspect of the invention lies in the fact that both of the two specific roving products just described can be made by incorporating the air treatment zone into the normal creel-to-package winding operation, without introducing any separate extra processing step. Conventional bulking apparatus is not needed for this.

A typical air treatment zone for present purposes comprises a V-shaped trough with a hinged lid clampable in sealing relation thereto. A trough about 2.5 cm long and about 0.5 cm deep has been found satisfactory, the airflow being introduced half way along the trough through an aperture about 0.25 cm in diameter, in the bottom of the V. Obviously, the precise geometry of the air treatment zone may be varied and some experimentation may be necessary in order to arrive at the optimum conditions for a particular roving and throughput. In particular, the degree of tangling and the amount of apparent bulk (if any) developed can be varied within sensibly wide limits whilst still achieving the desired catenary-free characteristic.

Claims

1. A method of producing a coherent untwisted continuous multifilament glass fibre roving, the method being characterised by the steps of withdrawing individual continuous multifilament glass fibre strands from each of a plurality of creel packages, assembling them side-by-side to form a single roving, passing said roving at a rate of from 150 to 300 metres/minute without positive overfeed, through an air treatment zone constituted by a confined passageway into which air is introduced at 0.5 to 1.5 cubic metres/minute, under a pressure of from 400 to 600 KN/metre^2 and thereafter winding the treated roving into a package.

2. The method of claim 1 characterised in that the roving has a linear density of from 300 to 9000 tex.

Patentansprüche

1. Verfahren zur Herstellung eines zusammenhängenden ungezwirnten endlosen mehrfädigen Glasfaserstranges, dadurch gekenn-

zeichnet, daß man einzelne endlose mehrfädige Glasfaserstränge von jeweils einer Mehrzahl von Lieferwerkpackungen abzieht, sie Seite an Seite unter Bildung eines einzigen Stranges anordnet, diesen Strang mit einer Geschwindigkeit von 150—300 m/min durch eine Luftbehandlungszone, die von einem verengten Durchgang, in welchen Luft mit 0,5—1,5 m^3/min unter einem Druck von 400—600 KN/m^2 eingeführt wird, ohne positive übermäßige Zufuhr führt und danach den behandelten Strang zu einer Packung wickelt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Strang eine lineare Dichte von 300 bis 9000 tex hat.

Revendications

1. Procédé pour produire un ruban de fibre de verre multifilamentaire continu non retordu cohérent, le procédé étant caractérisé par les stades de prélever des mèches de fibre de verre multifilamentaires continues distinctes de chacune de plusieurs bobines de cantre, de les assembler côte à côte pour former un ruban unique, de faire passer le ruban à une vitesse de 150 à 300 m/minute à travers une zone de traitement dans l'air constituée par un passage confiné dans lequel de l'air est introduit à raison de 0,5 à 1,5 m^3/minute sous une pression de 400 à 600 KN/m^2 sans suralimentation positive et d'envider ensuite le ruban traité en une bobine.

2. Procédé suivant la revendication 1, caractérisé en ce que le ruban a une densité linéaire de 300 à 9000 tex.