Claims

1. A 3D nylon air duct molding method for making a flame retardant bending beam, the method comprising:

Step 1: making a 3D nylon air duct, including:

cutting a 300-500mm width nylon air duct into a prototype with size and shape of an inner cavity of a mould; and

using a sealing machine to seal up periphery of the prototype nylon air duct while leaving an air outlet open to obtain the 3D nylon air duct;

Step 2: preparing a carbon fiber flame retardant prepreg, wherein the carbon fiber flame retardant prepreg comprises a carbon fiber precursor pre-imgregnated with a flame retardant epoxy resin;

Step 3: laminating and pre-molding the carbon fiber flame retardant prepreg, including:

cutting the carbon fiber flame retardant prepreg into correct size and pasting the carbon fiber flame retardant prepreg into the inner cavity of the mould in layers according to lamination design sequence, wherein during the pasting, the layers of the carbon fiber flame retardant prepreg are pressed tightly with a plastic scraper;

placing the 3D nylon air duct into a middle of the inner cavity of the mould, and then pumping safety air pressure into the 3D nylon air duct to check if the 3D nylon air duct ventilates normally, wherein the safety air pressure is 0.1 MPa;

Step 4: curing and molding the carbon fiber flame retardant prepreg, including:

closing the mould from Step 3,

putting the closed mould in a hot pressing machine to thermoform under regulated standard temperature and pressure parameters for bending beam molding, wherein the parameters are as following:

curing time: 3600S,

curing temperature: 145±5°C,

external pressure of the hot pressing machine: 4 MPa,

3D nylon air duct pressing program:

0-50s, with a pressure within the 3D nylon air duct slowly increased to 0.2Mpa;

50-s, with the pressure within the 3D nylon air duct slowly increased to 0.6Mpa;

300-600s, with the pressure within the 3D nylon air duct slowly increased to 1.0Mpa; and

600-3600s, with the pressure within the 3D nylon air duct slowly increased to 1.2Mpa.

2. The method of Claim 1, wherein the thickness of the 3D nylon air duct is different according to shape and size of mould products, wherein the thickness is any one of 20μm, 40μm, or 60μm.

3. The method of Claim 1, wherein a material of the plastic scraper can be PET, PTFE, PVC, and mixtures of rubber with one or more.

4. The method of Claim 1, wherein the mould consists of:

an upper mould,

a lower mould,

two slide blocks; and

an air nozzle device located on the lower mould,

wherein the air outlet of the 3D nylon air duct is placed at a mouth of the air nozzle device,

the lower mould works as a reference for product placement,

the two slide blocks are placed on both sides of the lower mould, and

the upper mould is placed and fixed above the lower mould and the two slide blocks during the molding process.

5. The method of Claim 4, wherein the upper mould includes:

an upper mould main body with an arc space;

an arc groove on the upper mould main body;

two cutting boards installed on a left and right of the arc space respectively; and

two dam boards installed on a upper and lower side of the arc space respectively; wherein

one of the two dam boards is built with steps, and the other dam board is built with an upper mould groove that matches with the lower mould;

the flame retardant bending beam to be produced is within a range defined by the cutting boards and the dam boards; and

the whole upper mould is integrally formed.

6. The method of Claim 5, wherein the length of the arc groove ranges between 380-440mm, and the width of the arc groove ranges between 2-4mm.

7. The method of Claim 4, wherein the lower mould, being the reference for product placement, comprises:

a lower mould base,

2 steps on an upper and lower end of the lower mould base respectively, the air nozzle device being on one of the 2 steps;

a convex part in middle of the 2 steps;

a convex strip which matches to a corresponding groove on one of the slide blocks; and

an edge border built at joints between the step with the air nozzle device and the lower mould base.

8. The method of Claim 4, wherein the two slide blocks are completely symmetrical, each slider block comprises a convex surface and a convex part, and a

plurality of screw holes on a side of the slider block which enables the slider block to be locked tightly to the lower mould with screws.