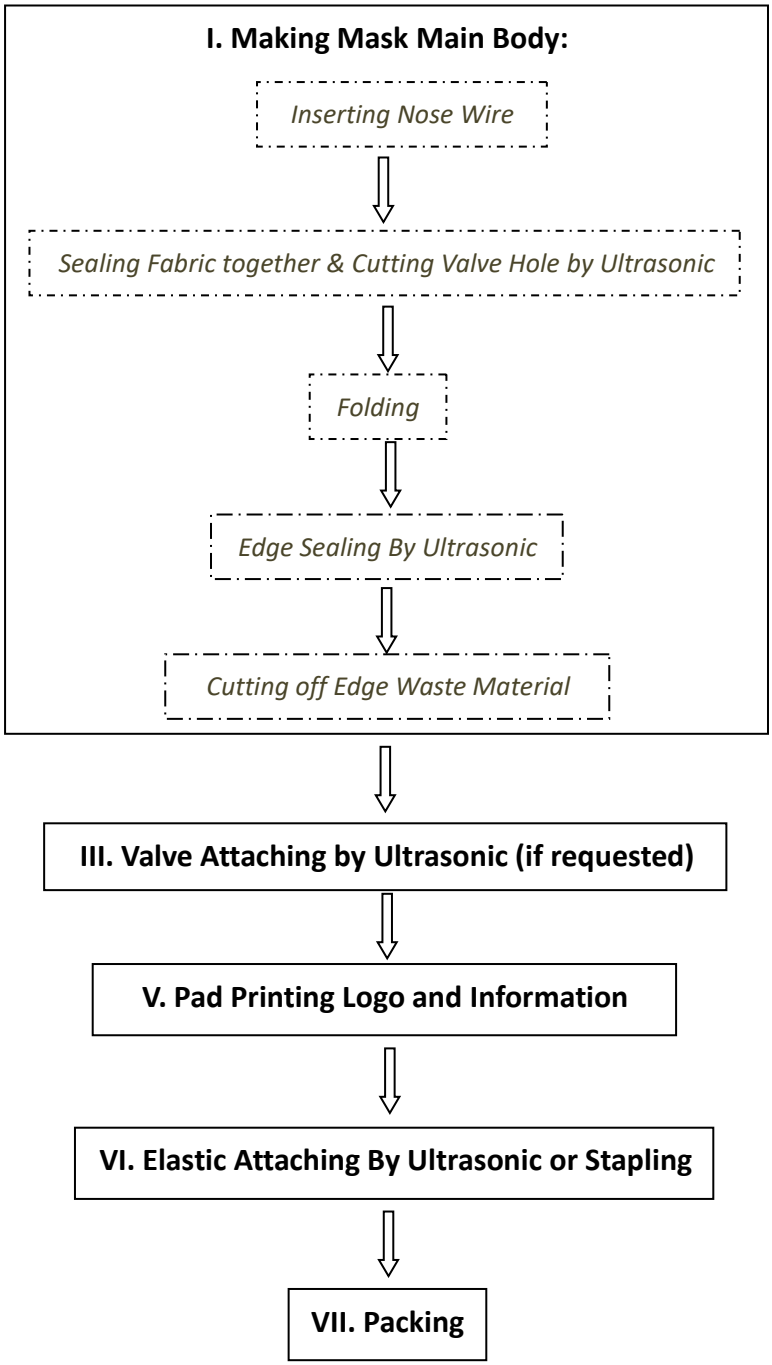
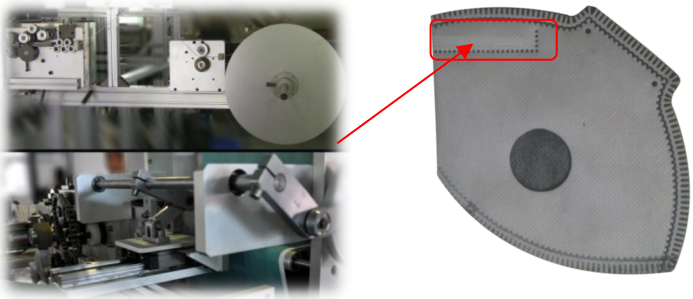
PROPOSAL B:

Folding Mask (N95) Production Procedure

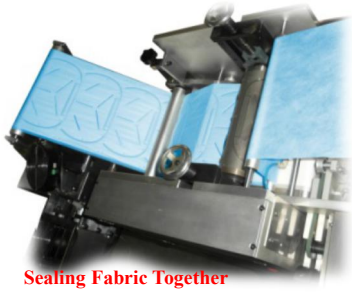
by Alex Lee


I. Making Mask Main Body:
Inserting Nose Wire
Sealing Fabric together & Cutting Valve Hole by Ultrasonic
Folding
Edge Sealing By Ultrasonic
Cutting off Edge Waste Material
III. Valve Attaching by Ultrasonic (if requested)
V. Pad Printing Logo and Information
VI. Elastic Attaching By Ultrasonic or Stapling
VII. Packing

I. Making Mask Main Body:



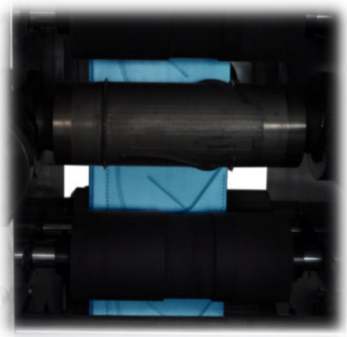
Nose Wire Inserting



Sealing Fabric Together

& Cutting Valve Hole by Ultrasonic

Folding Fabric



Edge Sealing By Ultrasonic

Make mask main body from different layers by one automatic machine, including inserting nose wire, finish sealing different fabric layers, Cutting valve hole, folding fabric, sealing edge to keep folding condition, cut off extra material around edge. All sealing is finished by ultrasonic while cutting is finished by cold rolling cutter.

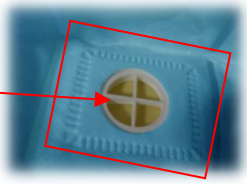
Material: Inside layer and outside layer formed by PP nonwoven, the middle layer as filter layer is formed by melt-blown fabric or activated fabric. And also can apply needle-punched fabric between PP nonwoven fabric layer and filter fabric layer.

Critical:

1. fabric tension affects mask sealing & cutting precision, tension control and mechanism/strength calculation is very importance, normally, it suggests to applied for PP fabric (& needle-punched fabric if there is) before material feed-in.
2. Fabric thickness affects production speed;
3. Fabric material and ultrasonic ability affects mask sealing strength;
4. The material & process of rolling moulds such as sealing roller and cutting roller affects its hardness and duration;
5. The specification of filter fabric fixes the level of protection and aspiration percentage;
6. Because fabric will be folded after inserting nose wire, the nose with can't be in too strong (weak than aluminum nose clip), and the extra nose inserting unit cost will be high than use a heating sticking machine, also the speed of machine will be slower;

7. Cut valve hole by the same ultrasonic system with the first sealing (sealing different fabric together), the duration of sealing & cutting roller might shorter. Also it can design a special ultrasonic cutting unit or cold rolling cutting unit after first sealing and before folding to keep mould duration, but the precision will be lower because of tension of fabric, and the machine cost will be about USD7000$ higher.

III. Valve attaching by ultrasonic *(Optional when aspiration valve requested)*

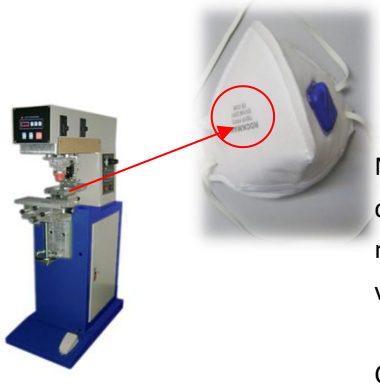


Normally, you can select to assemble aspiration valve onto mask by ultrasonic welding or non-welding through your valve design, however, for better leakage-proof, it suggests ultrasonic welding assembly.

Critical: Ultrasonic power, mould design, valve design and valve material will affect welding performance.

IV. Heat Sticking Nose Clip

V. Pad Printing Logo & Information



Normally, the mask specification information, brand logo, contact, etc is printed onto mask by pad printing. Also some makes design logo on valve injection moulds or make logo on valve by laser or printing.

Critical: Printing size and color numbers will fix the equipment specification and cost.

VI. Attached elastic by stapling or by ultrasonic spot welder

Normally, if is wants to attached elastic band onto mask directly (not using buckle), it can apply ultrasonic welding or stapling.

If use fabric type elastic band, it suggest use ultrasonic, if rubber band or other material type which can't be processed by ultrasonic, it requests stapling machine to staple it onto mask.

Critical: elastic material specification affect attaching performance and shrink rate, but also affects cost much.