



Absorb



Apply



Diffuse



Filter



Vent



Wick

How to Ultrasonically Weld PTFE Protection Vents

Electronic devices need protection vents, but the traditional expanded PTFE (ePTFE) material is delicate and struggles to handle the rigors of automated assembly processes that would save manufacturers time and money.

Challenge

The ability for manufacturers to move to automated assembly processes for protection vents is limited by the usage of ePTFE as the primary material.

At Stake

Protection vents made from sintered PTFE are stronger, don't require support, and can withstand automated assembly process – including ultrasonic welding.

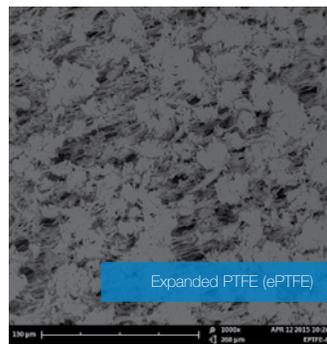
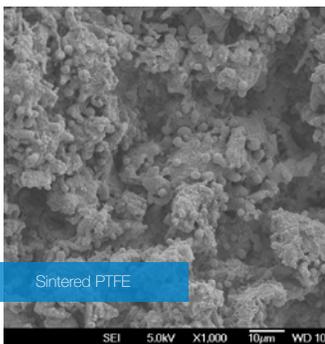
Solution

What is PTFE?

Polytetrafluoroethylene (PTFE) is a well-known polymer that creates a material with excellent temperature, environmental, and chemical resistance. Porous PTFE is widely used in protection vents on electronic devices because it can keep liquid and dust from entering the enclosure, while allowing enough air flow to equalize pressure and prevent internal damage and contamination of the enclosed electronics.

What types of PTFE exist?

There are two kinds of porous PTFE - sintered PTFE and expanded PTFE (ePTFE). Here's a look at their differences:



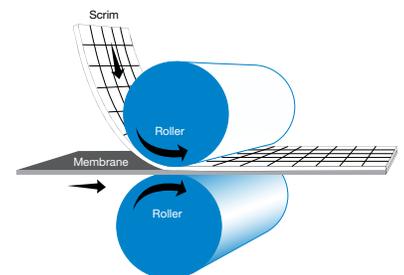
Durability

Think of ePTFE like a tissue. It's easy to wrinkle and the more you handle it, the more likely it is to get damaged. When ePTFE is made, it's repeatedly stretched to create microfractures that produce pores. While this process makes ePTFE a breathable material, it also makes it frail.

Sintered PTFE is stronger. You can see and feel the difference in the material. It's not easily damaged when handled. When sintered PTFE is made, it isn't stretched, instead particles are fused together to create a porous yet strong structure.

Support

Because of ePTFE's delicate structure, it requires additional protection during the device assembly process. Manufacturers often laminate ePTFE to a fabric scrim, coat it, or use injection molded housings to prevent damage. Sintered PTFE is the opposite. With its engineered strength, it doesn't require any support. As a result, protection vents made from sintered PTFE can be attached easily to the electronic device without damage.





Die-cut disc



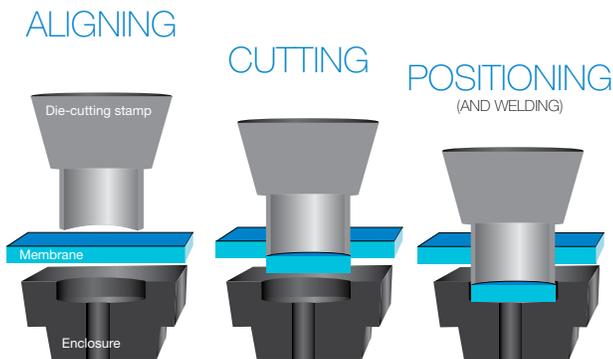
Slit Roll

Ease of assembly

Because of the variation in durability, the two materials are quite different when it comes to the available assembly options.

Even with the scrim as support, it can be difficult to use ePTFE in more demanding assembly processes like ultrasonic welding. As the supporting layer is applied to one side, operators need to ensure that the orientation of the material is correct, meaning a more manual and time intensive process. The scrim can also delaminate, which can cause the device to malfunction.

Sintered PTFE, on the other hand, doesn't require the supporting layer, so the assembly is streamlined (including ultrasonic welding).



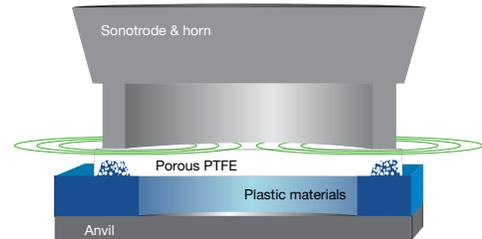
How ultrasonic welding works with sintered PTFE

Let's illustrate how protection vents made out of sintered PTFE can be ultrasonically welded:

- Sintered PTFE is introduced into the assembly process either as an already die-cut disc or a slit roll format where it is cut prior to or during the welding process.

- Heat is generated by the ultrasonic vibration of the stamp (horn). The temperature generated by the stamp needs to be slightly higher than the melting temperature of the base substrate. Dwell time and pressure should allow the melted substrate enough time to create a mechanical bond that attaches the vent.

ULTRASONIC WELDING



- Note that the material to which sintered PTFE is bonded should have good flow properties and lower than 260°C melting temperature for optimum success.

How to get started with sintered PTFE protection vents

If you're ready to upgrade to a more durable, assembly friendly, sintered PTFE protection vents, try POREX Virtek™ protection vents. As a global leader in porous polymers, Porex's engineers have been helping manufacturers increase performance and decrease assembly time and costs for decades in diverse global industries.

TOP 5 REASONS TO CHOOSE SINTERED PTFE

- Ultrasonic welding is possible
- Manufacturing process is streamlined
- No supportive layer required
- Less risk of material damage and scrap
- Reduced risk of product failure

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