

# FLUOROPOLYMER COATINGS WIDE CHEMICAL COMPATIBILITY



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When filtering aggressive chemicals and solvents it is imperative to choose the correct filter housing base material, coating or surface modification.

The wide range of fluoropolymer coatings available, in conjunction with various application techniques, means the most appropriate solution should be available for your specific chemical process. Their relatively low cost (compared to exotic alloy construction or surface treatments) makes them an attractive proposition.

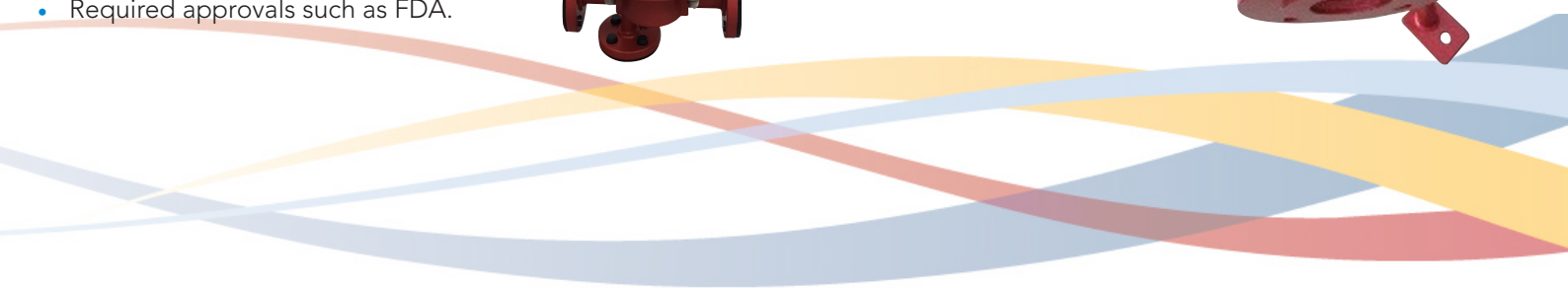
Coatings can be applied from 50 microns to several millimetres and in different polymers such as PFA and ETFE. Which to choose is dependent on design considerations such as:

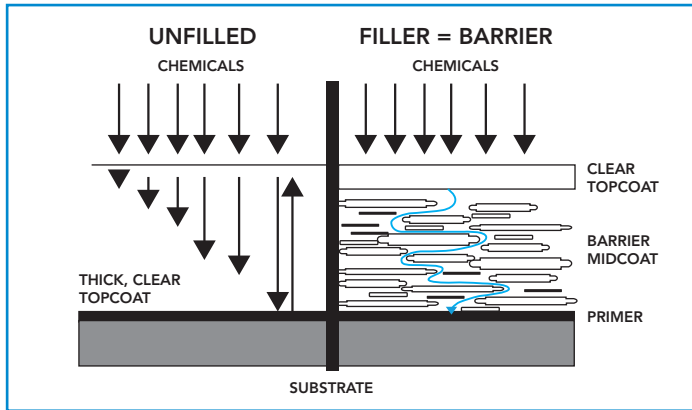
- Types of solvents /chemicals being processed (compatibility).
- Limitations on permeability / diffusion rates through the coating (length of service / chemical type).
- Complexity of internal design of the housing. In general, the more complex the geometry the thinner the coating has to be. Amazon Filters can work with you to optimise the geometry for the most appropriate coating for your process. The housing geometry is a critical to ensure an integral coating and long service life.
- Mechanical handling: how often is the housing disassembled (filter changes etc). Thin coatings of 50 100micron can be susceptible to mechanical damage.
- Required approvals such as FDA.

## LIMITATIONS OF FLUOROPOLYMER COATINGS

While having superb chemical resistance, fluoropolymer coatings suffer in varying degrees from permeability and susceptibility to damage that limit their useful life in service before repair or replacement is necessary. All fluoropolymer coatings are microporous which means that the process fluid permeates over time, eventually reaching the substrate, resulting in blistering and delamination of the coating, and chemical attack of the substrate.

To mitigate against this, we only use 'filled' coatings such as 'Ruby Red' high build PFA coatings which offer excellent resistance to both permeation and abrasion when compared to other fluoropolymer coatings.





The proprietary filler material dramatically decreases the permeation rate compared to unfilled PFA. This combined with 2-3 high-build coats offers a 200-300 micron thick barrier proven to last longer in service than comparable systems, leading to longer service life before repair or replacement.

For applications requiring thicker coatings for increased mechanical robustness and lower permeability we typically recommend a filled ETFE. This can be applied by spray coating or rotational lining with resulting coating thickness anywhere between from 0.5mm to 5mm.

## DESIGN CONSIDERATION AND COATING SELECTION

PFA coatings at approximately 250 microns will be applicable for the majority of general chemical /solvent applications. Moving to the filled ETFE will result in a greater coating thickness with the subsequent benefits of greater resistance to mechanical damage and lower permeability over time.... but increased cost.

Housing design in terms of geometry is critical in ensuring the chemically resistant coatings adhere correctly over the entire internal surface. This means ensuring adequate corner radiuses match to the coating type and internal welds are ground smooth. Amazon Filters have years of experience in housing design and will be happy to recommend the most appropriate solution for your particular process.



Example of 5mm ETFE rotational lining

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