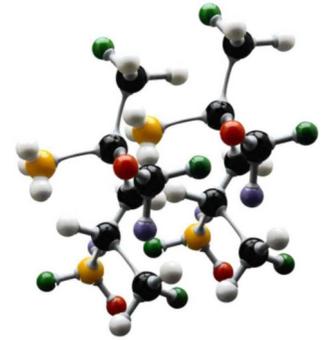


# Technical Information Sheet

 **U-FOAM**®



**Reticulated Foams** Air and fluid filters, Acoustics, Ceramic filters, Comfort pads, Outdoor furniture.

## General Description

- Reticulation is a process which removes the cell walls, leaving a material of skeletal structure having a void area of some 97%. These foams are specialty foams that are designed to have an open cell structure with few or no membranes.
- U-Foam the Only Company in India making Polyester foams and the first company in India to bring the reticulation technology to India.
- U-Foam's reticulated foams are unique, environmentally friendly, extraordinarily versatile polyurethane foams that can be fabricated into virtually any configuration, for use in hundreds of different products and applications





- Reticulation is a post process or a secondary process to manufactured foams and can thus have various pore sizes (usually called PPI or Pores Per Inch) these can vary from as low as 4 to 100 PPI to control permeability.
- Reticulated foams are available in a wide range of porosity, which is measured in PPI, or Pores Per (linear) Inch.
- There are two methods of reticulation: Thermal, and Chemical.
- U-Foam offers both variants of Reticulation Chemical and Thermal in Polyether and Polyester variants for various applications.
- Typical applications include filtering and controlled liquid delivery.
- Reticulated foams are easily fabricatable, and has high tensile, tear and elongation properties. They are also chemically resistant and can be produced with antifungal or antibacterial additives.
- In addition the thermal reaction considerably increases the physical strength of the material. This is achieved by the material removed in the process unblocking the cells being wrapped around the cell struts. This increases the strut thickness and results in an increased tensile strength and greater resistance to heat, abrasion and chemical attack.

### **Reticulated Polyesters**

Reticulated Polyesters are manufactured in a range of porosity from 4ppi to 120ppi, and are available in FR grades to FMVSS 302 and UL94 standard.

Applications suitable for reticulated polyester include: ceramic filter production, air filtration, fluid filtration, cosmetic, electronic and surgical products.

[ Reticulated polyesters are not suitable for water filtration applications. ]

### **Reticulated Polyethers**

Reticulated Polyether foams are also available in a wide range of porosity from 10ppi to 60ppi. They are also available in a number of colours.

Applications suitable for reticulated polyethers include air & water filtration, coalescing filtration and the bio-filtration of pond and fountain water systems.





## **Technology**

### **Thermal - [ T ]**

Thermal is a process that involves placing a bun of foam in a very large vacuum pressure vessel known as a "chamber". The vessel is evacuated and filled with an explosive gas mixture. The gas is ignited and a controlled flame front passes through the foam, melting the window membranes and leaving the skeletal structure intact. Thermal works with both polyester and polyether polyurethanes.

The benefit of the thermal process is a smooth, clean polished cell stand. This can be important in a clinical application such as a defoamer in a blood oxygenator or other medical applications.

Another benefit is that thermal works on polyethers which perform better in applications that require hydrolytic stability at evaluated temperatures.

Thermal can be done on buns for producing sheets or logs for producing rolls.



### **Chemical - [ C ]**

Chemical involves running the loaf of foam through a caustic bath of controlled temperature, concentration and duration. The caustic solution attacks and dissolves the window membranes, leaving only the skeletal structure. The foam is then washed, rinsed and dried.

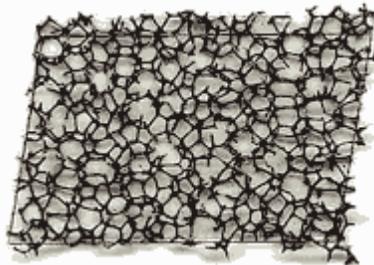
One shortcoming of this process is that it leaves a trace powder in the foam, making it unsuitable for some clinical applications. Chemical is not effective in polyether polyurethanes.

One benefit of the chemical process is that it produces a rougher or more etched cell strand which holds liquids better due to surface tension.

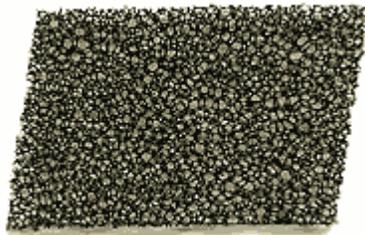
Another benefit is chemical produces softer feeling foam especially in higher porosities, which can be important for cosmetic applicators



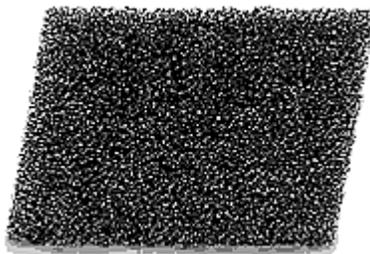
## Sample Reticulated Foams



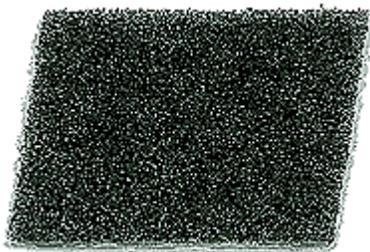
10 PPI



30 PPI



45 PPI



80 PPI



100 PPI

## Typical Applications

### **100 PPI Foam**

- sound absorber in anechoic chambers,
- microphone windscreens,
- lint free wiper pads,
- filters,
- face masks,
- hospital comfort pads,
- powder puffs and applicators,

### **10 PPI Foam**

- Effective as a sound attenuator,
- humidifier belt,
- scrubber pad,
- washable filtration media for
  - air conditioners,
  - furnaces,
  - small engines and
  - automobile air cleaners,
- Reticulated foam filters works as a depth loading filter, opposed to a surface loading filter, trapping dust particles within its cell structure. Because the reticulation process leaves behind the skeletal structure of the foam it is 97% void volume giving it a high degree of surface area for impingement of dust particles.
- With its homogeneous and uniform cell structure, a foam filter can be engineered for pressure drop and filtering efficiency by changing its pore size.
- Special purpose compressed foams can be made from a reticulated polyester or polyether filter foam by compressing the foam under heat and pressure in a heat press.



## **Typical Advantages**

When compared to conventional filter media such as synthetic fiber mats, woven and non-woven fabrics, fiberglass, forest paper, and metals, Reticulated foams exhibit superior properties, and offer substantial advantages:

- STRONG,
- EASILY FABRICATED,
- AND DEPENDING ON GRADE, RESISTANT to
  - many chemicals,
  - cleaning agents,
  - solvents,
  - acids, and
  - alkalis (see chemical compatibility).
- OUTSTANDING PHYSICAL CHARACTERISTICS include
  - high tensile,
  - elongation, and
  - tear properties,

allowing a variety of fabrication techniques such as cutting, shaping, stapling, tacking, stitching, cementing, and laminating, among others.

THESE MATERIALS ARE CONSIDERED "NON-NUTRIENTS"- they are not ingested by microbial organisms and are available with permanent fungicidal/bactericidal additives for enhanced antimicrobial activity.

STANDARD AND CUSTOM COLORS are offered for virtually any grade.

UNUSUAL FILTRATION REQUIREMENTS - These may be used in combination special needs

with each other or with other types of media for special needs

TYPICAL CONFIGURATIONS INCLUDE BUNS, SHEETS, ROLLS, AND DIE-CUTS -complex compound shapes are easily obtained; virtually any size or shape to meet a precise requirement.

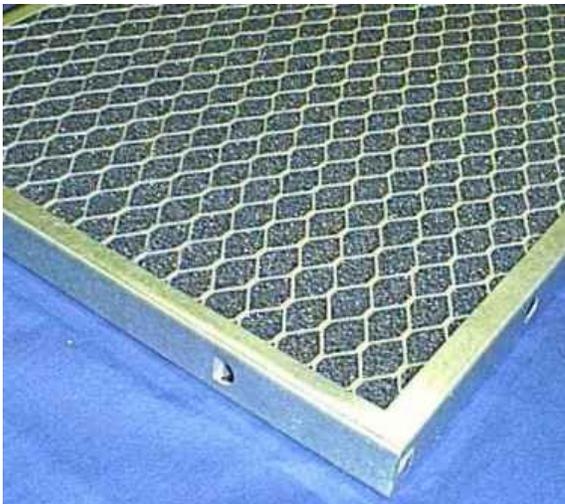
BROAD SELECTION OF PORE SIZES combined with the endless configurations available allows for complete design freedom with wide function and performance latitudes.

Reticulated foam is used on, in, or around thousands of products serving consumers, business, industry, health care, research, and armed forces around the world. Typical filtering applications are found in automotive, appliance small engine, and ceramic filters, among others.

Reticulated foam materials are also used for microphone windscreens, supermarket refrigerated counter mats, fluid applicators, demisters and coalesces sewage treatment (microbial substrate), and in literally hundreds of other products or processes.



**Reticulated Foam Product Samples**





## Chemical Compatibility

All foam materials can be safely used with water, soaps, detergents, most cleaning solvents, and dilute bleaches.

As with all flexible polyurethane foams, most solvents will cause some swelling and weakening of the polymer. Chlorinated solvents and aromatic hydrocarbons may cause swelling of all grades, but generally to a lesser degree for the polyester grades. Swelling from aliphatic hydrocarbons also occurs but to a much lesser degree than with the aromatics. Once the solvent is removed, the foams will return to their original size and strength.

Polyethers are generally not attacked by acids and alkalis, and are hydrolytically stable.

Polyesters grades are attacked by acids and alkalis, and are not hydrolytically stable.

Chlorine is detrimental to all grades. As with any product, the user is urged to thoroughly test the product to determine its suitability for the intended purpose.



## Typical Physical Properties

### For Reticulated Polyester Foam

Method of Test ASTM D 3574 - 01

S Series	3015	3020	3030	2545	3060	3080
Density Kg/mt <sup>3</sup>	22 to 26	20 to 26	19 to 22	23	23	23
Compression Deflection @ 25% (psi)	0.25	0.25	0.15	0.4	0.4	0.4
Tensile Strength (psi)	8	10	15	13	13	13
Elongation (%)	100	100	150	150	160	160
Tear Strength (lbs/sq.in)	3	3	2.5	2	2	2
Flame Resistance	N A	N A	N A	N A	N A	N A
Pore Size (PPI)	13 to 23	15 to 25	25 to 35	45	60	80

### Nominal pore size ranges

\*As measured on Laminar flow pressure drop appa-

Porosity grade (PPI)*	MIN	MAX	Suggested minimum sheet thickness (in.)
100	80	110	—
80	70	90	—
60	55	65	—
45	40	50	1/8"
30	25	35	3/16"
25	20	30	7/32"
20	15	25	1/4"
10	8	15	1/2"
3	3	5	1/2"

ratus at 575 fpm.



**IMPORTANT NOTICE REGARDING FLAMMABILITY**—All polyurethane foams including combustion modified foams will burn and generate smoke and gases. Performance conditions and corresponding data refer to typical performance in specific tests, such as UL-94 and MVSS-302, and should not be construed to imply the behavior of this or any other product under other fire conditions. All data regarding these products were obtained using specific test methods under controlled laboratory conditions intended to measure performance against specifications. Due to the great number and variety of applications for which U-Foam products are purchased, U-Foam does not recommend specific applications or assume any responsibility for use results obtained or suitability for specific applications. **IN NO EVENT SHALL BE RESPONSIBLE FOR ANY CLAIM IN EXCESS OF U-FOAM'S SALE PRICE OF THE PRODUCT TO WHICH THE CLAIM RELATES.**



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