

TITLE: CELLULAR PVC PRODUCTS (Closed Cell Foam)

The incorporation of foaming agents into a plastisol, and the subsequent decomposition of the foaming agents, results in a cellular PVC product. Foams with densities as low as six pounds per cubic foot can be achieved while maintaining a fine, uniform cell structure. The advantages of a foam, besides density or weight reduction, are numerous. Acoustical and thermal insulation is enhanced, the feel or "hand" of the product is softened, and in products such as wall coverings, a three dimensional design can be achieved.

The choice of ingredients that are used in a foamable plastisol are of utmost importance for a consistent, reproducible product with adequate processing latitude to make it commercial viable. The PVC resin-plasticizer combination has to be compounded to fuse at the temperature range where the foaming agent is activated. Fusion of the PVC either before or after the foaming agent is activated will result in a collapsed or underblown foam. Foaming agent and activator have to be selected to provide the desired product quality, production line speed, and gauge control across the width of the coating substrate.

Of numerous foaming agents used in the industry, the most prevalent is azodicarbonamide (Azo). The amount of Azo in the compound, the type and amount of foam activator, resin and plasticizer choice, all contributes toward the density of the expanded foam. As a guide, the published gas yield for Azo is 220ml of gas per gram.

On the following page are typical starting point formulations for low, medium, and high density Azo foams.

SERVICE

VALUE

RELIABILITY

PolyOne

SPECIALTY RESINS GROUP

1.866.PolyOne

WWW.POLYONE.COM

PolyOne Corporation
33587 Walker Road
Avon Lake, OH 44012

FORMULATIONS					
HIGH		MEDIUM		LOW	
Geon® 121A	80	Geon® 180X7	80	Geon® 180X5	100
Geon® 213	20	Geon® 213	20	Santicizer 160	10
Palatinol 711P	65	Palatinol 711P	65	Palatinol 711P	70
Paraplex G 62	5	Paraplex G 62	5	Actafoam R 3	3
Actafoam R 3	1	Actafoam R 3	2	Kempore SD 125	16
Kempore SD 125	2	Kempore SD 125	6		

PLASTISOL FLOW PROPERTIES

Brookfield Viscosity (CPS)			
Initial 2 RPM	1,750	7,900	8,000
20 RPM	1,875	3,800	4,500
1-Day 2 RPM	2,050	10,250	12,500
20 RPM	2,050	8,750	6,300
1 Week 2 RPM	1,750	13,750	15,200
20 RPM	1,875	9,200	7,500
Severs Efflux @ 95 PSIG (Grams/100 Seconds)	106	130	116
Gelation Temperature (° F)	225+	225+	207

**EXPANDED FOAM PROPERTIES
20 MIL WET CASTING EXPANDED**

5 Min @ 350°F			
Expansion Ratio	3.0	6.1	10
Density (PCF)	33.6	14.3	8.25
Structure Rating	Fine	Fine	Fine
3 Min @ 375°F			
Expansion Ratio	4.0	6.7	11
Density (PCF)	25.5	12.6	6.85
Structure Rating	Fine	Fine	Fine
2 Min @ 400°F			
Expansion Ratio	3.8	6.1	12
Density (PCF)	26.1	13.5	6.35
Structure Rating	Fine	Fine	Fine
3 Min @ 400°F			
Expansion Ratio	3.6	6.8	12
Density (PCF)	27.4	12.6	6.20
Structure Rating	Fine	Fine	Fine
5 Min @ 400°F			
Expansion Ratio	4.3	6.6	----
Density (PCF)	22.3	12.3	----
Structure Rating	Fine	Fine	Collapsed

® PolyOne Corporation
© PolyOne Corporation 2001

The information contained herein is believed to be reliable, but no representations, guarantees or warranties of any kind are made as to its accuracy, suitability for particular applications or the results to be obtained therefrom. The information is based on laboratory work with small-scale equipment and does not necessarily indicate end product performance. Because of the variations in methods, conditions and equipment used commercially in processing these materials, no warranties or guarantees are made as to the suitability of the products for the application disclosed. Full-scale testing and end product performance are the responsibility of the user. PolyOne Corporation shall not be liable for and the customer assumes all risk and liability of any use or handling of any material beyond PolyOne Corporation's direct control. The SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Nothing contained herein is to be considered as permission, recommendation, nor as an inducement to practice any patented invention without permission of the patent owner.

PolyOne Corporation / 33587 Walker Road, Avon Lake, Ohio 44012