# Quality Foam PVC Starts With SURECEL™ Processing Aid Technology

SURECEL™ Acrylic Processing Aids enable improved efficiency and high-quality cell structure at any thickness.

# PVC Foam Applications

With our focus on cost optimization and weight reduction, we are at the forefront of PVC foam additive innovation. As experts in the field, we understand the unique requirements of various foam production technologies, including free foam extrusion, Celuka extrusion, and co-extrusion. Our comprehensive range of additives is designed to enhance foam quality and performance during these key manufacturing processes. Partner with us to unlock new possibilities for your foamed PVC products and leverage our expertise to achieve outstanding results in your specific application.

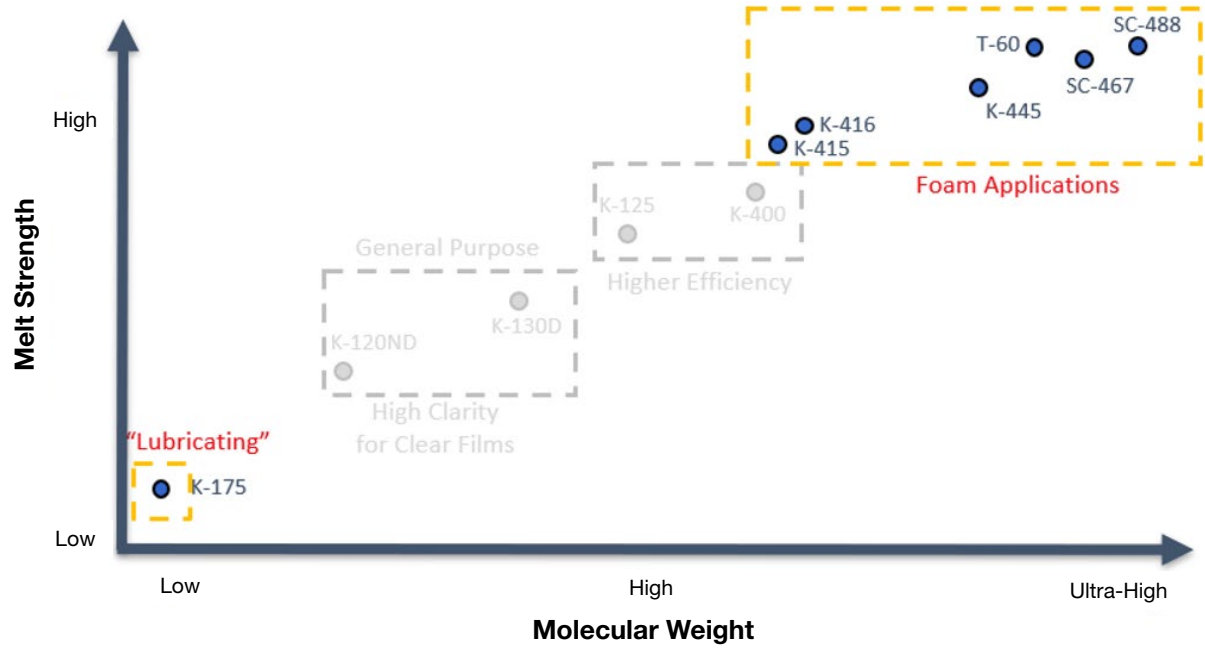
# Additives for PVC Foam Formulation

PVC formulation variables affect the foaming of rigid PVC products. One of the most important formulation variables is undoubtedly the Acrylic Processing Aid. It's Molecular weight (Mw) greatly influences melt rheology and hence the foam process. The Mw of processing aids affects melt strength, melt elasticity, cell growth and cell density. Due to their complementary features, we recommend PARALOID™ and SURECEL™ Acrylic Processing Aids and Polymeric Lubricants for PVC foam applications. The combination of PARALOID™ and SURECEL™ Processing Aids with PARALOID™ Polymeric Lubricants, allows Dow to address the needs for your PVC foam end-use products, such as sheets, foam core pipes, and foam profiles.

| ACRYLIC PROCESSING AIDS | | |
|---|---|---|
| **Product Name** | **My Range** | **Applications** |
| PARALOID™ K-416 | High Mwi | Foamed core pipes, Foamed sheets |
| PARALOID™ K-445 | Very high Mw | Foamed core pipes, Foamed sheets |
| SURECEL™ 467 | Ultra high Mw | Foamed Sheets, Foamed Profiles (Free Foam & Celuka) |
| SURECEL™ 488 | Ultra high Mw | Foamed Sheets, < 1in. (Free Foam & Celuka) |
| SURECEL™ T-60 | Very high Mw | Foamed Sheets (uniform cell structure for higher gauge) |

| POLYMERIC LUBRICANTS | | |
|---|---|---|
| **Product Name** | **My Range** | **Applications** |
| PARALOID™ K-175 | Excellent hot metal release | All |

# Processing Aids – Types and Applications




The graphic representations are presented here for illustrative purposes only and should not be construed as product specifications.

# PVC Foam Sheets

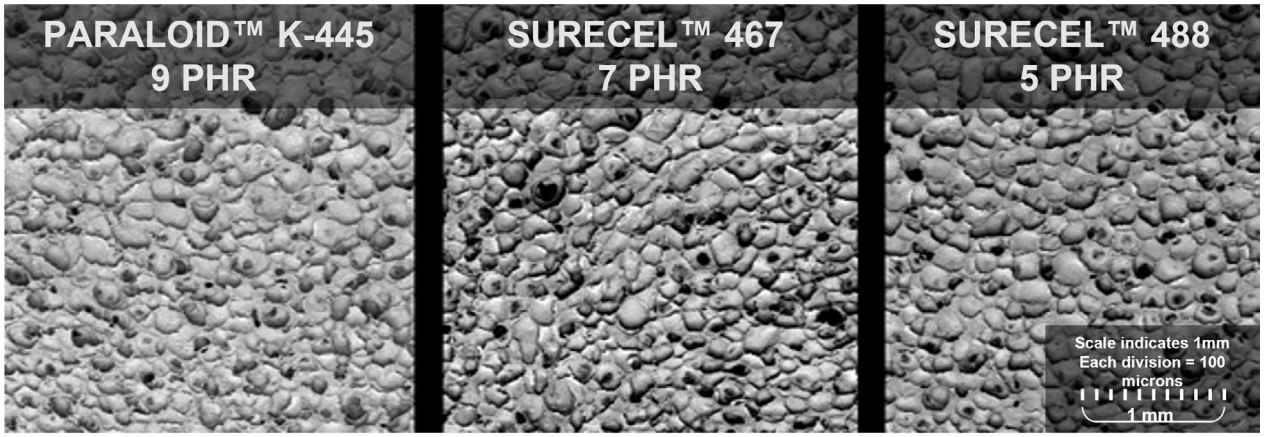
An extensive range of sheets can be produced in various widths and thicknesses via Free Foam extrusion, Celuka extrusion and Co-extrusion.

Dow produces four grades of Processing Aids: **PARALOID™ K-445**, **SURECEL™ 467**, **SURECEL™ 488** and **SURECEL™ T-60** for PVC foam sheet applications. The additive type and dosage depends on the extrusion technology, the thickness and the width of the sheets.

**SURECEL™ 467** is Dow's workhorse processing aid. Its ultra-high molecular weight provides outstanding melt strength and leads to exceptional efficiency. It's remarkable cellular structure and foam density properties make it ideal for PVC foam sheets up to 1.5in (3.8cm).

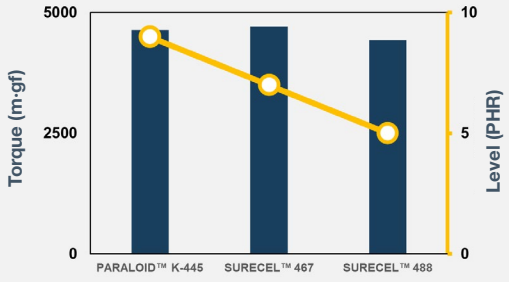
**SURECEL™ 488 Processing Aid** is designed with a tailored molecular weight distribution, to reach enhanced melt flow while maintaining a high efficiency of foaming. SURECEL™ 488 Processing Aid contributes to a stable structure for PVC foam sheets with high cell density and small cell size. The thickness of the final product is well controlled, and a low density can be reached while maintaining a high-quality surface for foamed sheets up to 1in (2.5cm).

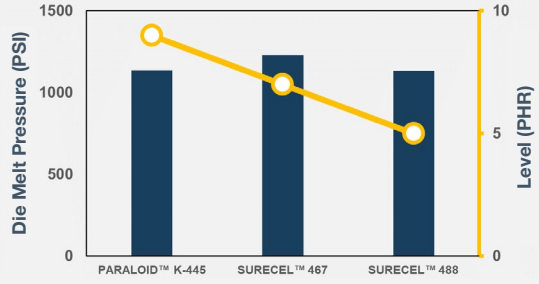
**PARALOID™ K-175 Polymeric Lubricant** is key to efficient production of free foam sheets. It prevents sticking at the high temperature edges of wide sheet dies, without the disadvantages of traditional lubricants.



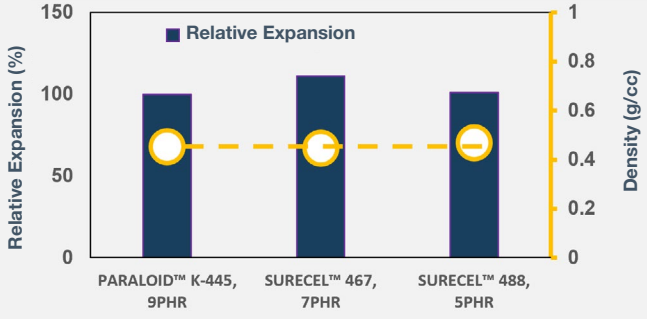

The data below highlights the foaming performance of the different grades of SURECEL™ and PARALOID™ Processing Aids and how they compare to each other. This comparison was conducted on a tin-stabilized PVC foam formulation.

## Processing data under different loading levels




## Melt expansion and density data under different loading levels




The data provided are typical and should not be construed as specifications.

# PVC Foam Profiles

## Lightweight Profiles

Co-extruded PVC foam profiles are mainly used in architecture as cladding, siding, decking, soffit and fascia. This type of profile provides a significant weight reduction with a highly weatherable surface.

**SURECEL™ 467 Processing Aid** is designed and produced with an ultra-high molecular weight. **SURECEL™ 467 Processing Aid** is an excellent choice to produce PVC foam profiles with thick walls while offering excellent cell structure, cell size distribution, and hence enhanced physical properties.

**SURECEL™ T-60 Processing Aid** is an excellent option when you are struggling to achieve a balance between your target density and cell structure. **SURECEL™ T-60 Processing Aid** is a foam cell promoter employing a distinct reactive polymer technology. It offers greater expansion and lower density than conventional processing aids of similar molecular weight, while maintaining a very wide processing window. This allows you to enhance gas containment and promote finer foam cell structure.

**SURECEL™ T-60 process aid (left) provides unmatched cell structure at thickness >1".**

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# Foam Core PVC Pipe

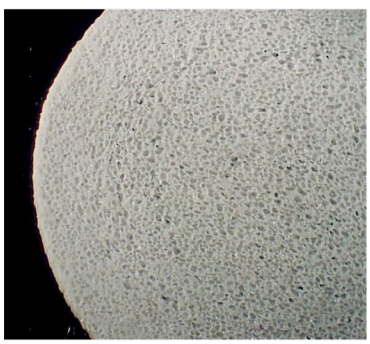
## Production of Large Diameter Pipe

Specific applications, such as PVC drain, waste and vent pipes of up to 6in. (15.2cm) diameter, use foam cores to achieve weight reduction while maintaining the desired levels of crush resistance for buried applications and noise reduction in apartment building down pipes.

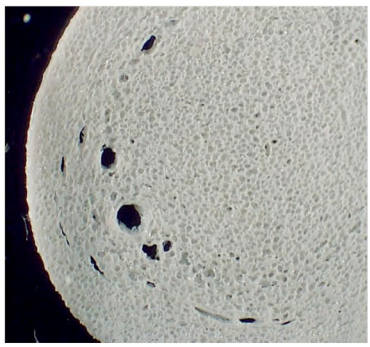
Foam core pipes find extensive use in irrigation systems for efficient water transportation, while their lightweight composition simplifies installation and maintenance. In ventilation systems, foam core pipes provide a reliable conduit for proper air circulation, gas removal, and temperature regulation, thanks to their excellent insulation properties.

**SURECEL™ 467 and SURECEL™ 488 Processing Aids** have a very high molecular weight and are used to produce foam core PVC pipes by co-extrusion technology.

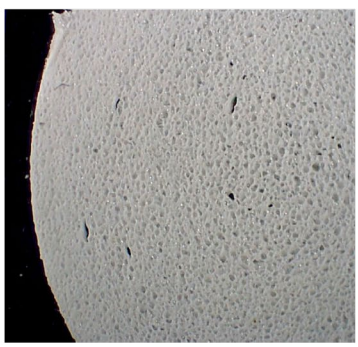
Our processing aids facilitate enhanced cell structure whether the material is recycled or a virgin formulation. **SURECEL™ 467** and **SURECEL™ 488 Processing Aids** contribute to an improved foaming process in small diameter pipes at high line speeds but also in large diameters running at far lower line speeds, resulting in foam core pipes that embody the desired weight reduction, crush resistance, durability and noise reduction advantages.



**6 phr**
Conventional Foam PA



**4.5 phr**
Conventional Foam PA



**4.5 phr**
Ultra-High Mw Foam PA

## About Dow

Dow (NYSE: DOW) combines global breadth; asset integration and scale; focused innovation and materials science expertise; leading business positions; and environmental, social and governance leadership to achieve profitable growth and help deliver a sustainable future. The Company's ambition is to become the most innovative, customer centric, inclusive and sustainable materials science company in the world. Dow's portfolio of plastics, industrial intermediates, coatings and silicones businesses delivers a broad range of differentiated, science-based products and solutions for its customers in high-growth market segments, such as packaging, infrastructure, mobility and consumer applications. Dow operates manufacturing sites in 31 countries and employs approximately 37,800 people. Dow delivered sales of approximately $57 billion in 2022. References to Dow or the Company mean Dow Inc. and its subsidiaries. For more information, please visit www.dow.com or follow @DowNewsroom on Twitter.

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