ROHM AND HAAS

PARALOID ™ K-125 Processing Aid for Vinyl

Description

PARALOID K-125 processing aid is an all-acrylic, general purpose additive that offers outstanding efficiency in improving the processing characteristics of Vinyl compounds. Formulations containing the processing aid can achieve desirable performance with 25% less additive than conventional products, making PARALOID K-125 the most efficient processing aid for Vinyl available today for most applications.

When used in Vinyl compounds, processing behavior is markedly improved with no adverse effects on such properties as impact strength, thermal stability, tensile properties, DTUFL, or electrical characteristics.

Use of PARALOID K-125 not only improves important processing characteristics such as melt strength, faster fusion, and better edge formation, but also promotes melt homogeneity. The results are reduced surging, less melt fracture and plateout, faster takeoff, improved surface finish, and fewer rejects or shutdowns. The bottom line is improved productivity.

Because of the high measures of homogeneity and hot melt strength gained with the processing aid, extensibility of the Vinyl formulation is enhanced and is evidenced in the outstanding deep draw characteristics achieved in thermoforming. Sheet extensibility can be increased by a ratio of 5:1 when PARALOID K-125 is added to the formulation.

These same improvements in hot melt strength and homogeneity combine for faster processing rates, high surface quality, and better dimensional control in the finished product, even in highly filled systems such as pipe formulations.

TABLE 1: PARALOID K-125 Physical Property Data

Appearance	White free-flowing powder
Bulk Density	0.43 g/cc
Molecular Weight (M_w)	4.0 - 5.0 million
Specific Gravity	1.15
Refractive Index	1.489
Tg	106°C
Median Particle Size	74 microns

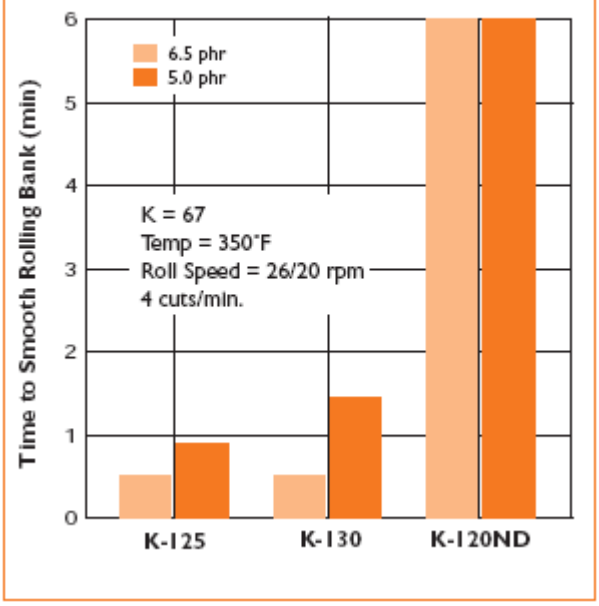
TABLE 2: PARALOID K-125
Processing Efficiency Without Negative Side Effects

	No Processing Aid	0.8 phr PARALOID K-125
Tensile Properties		
Max. (psi)	7290	7220
Mod. (psi)	362000	350000
Elong. (%)	>150	≥150
Izod Impact @ 23°C		
Ft-lbs/in.	1.7	1.8
Ductility (%)	0	0
Std. Dev.	0.14	0.23
DTUFL, °C at 264 psi	69	68
Haake Thermal Stability		

Equil. Torque	1210	1279
Equil. Temp, °C	213	213
Dynamic Stability (mm:ss)	13:30	13:00
Brabender Mixing Bowl Evaluation		
190°C/45 rpm/60 gm		
Fusion Time (mm:ss)	4:14	3:26
Fusion Torque (mg)	1636	2093
Fusion Torque (mg)	1584	1787
Equil. Temp (°C)	194	196

(Typical Siding Formulation without Impact Modifier)

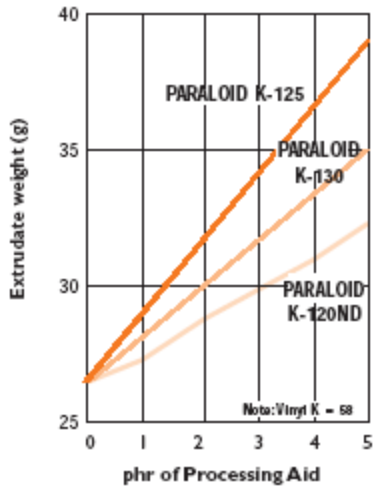
FIGURE 1
MILLING EFFICIENCY OF PARALOID K-125



High Efficiency With PARALOID K-125 in Packaging

Formulations for thermoformed packaging benefit from the high degree of efficiency obtained with PARALOID K-125. The additive not only provides faster fusion of sheet and a shorter time to smooth rolling bank, but also provides exceptional hot melt strength with low loading levels. This permits deep draw thermoforming of sheet in 10-40 mil thicknesses for a wide variety of packaging materials including blister packs and trays.

FIGURE 2
PARALOID K-125 OFFERS SUPERIOR MELT STRENGTH FOR THERMOFORMING



FDA Compliant

Sheet containing the additive also benefits from a smoother, glossier surface with improved edge formation and reduced streaking. The additive is acceptable for food contact applications under FDA Regulation 21CFR 178.3790 and 21CFR 177.1010.

Flexible and Semi-Rigid Vinyl

In flexible and semi-rigid Vinyl applications, PARALOID K-125 is also the processing aid of choice. Although its ability to promote fusion is less apparent due to the high plasticizer loading in these formulations, data show marked improvements in melt strength, melt homogeneity, elasticity, and flow characteristics when it is used.

The appearance of flexible and semi-rigid Vinyl also benefits appreciably when PARALOID K-125 is added to the formulation.

TABLE 3: PARALOID K-125 For Flexible and Semi-Rigid Applications

	Semi-Rigid		Flexible	
DOP	25	25	54	54
PARALOID K-125, %	0	5	0	5
Rolling Bank[1]	F-	G+	F-	G
Hot Strength[1]	F-	G+	F	G
Release from Mill[1]	G	G+	G	G
Appearance[2]				
10 mil film	5	1+	1+	1
40 mil sheet	10	3+	6	2

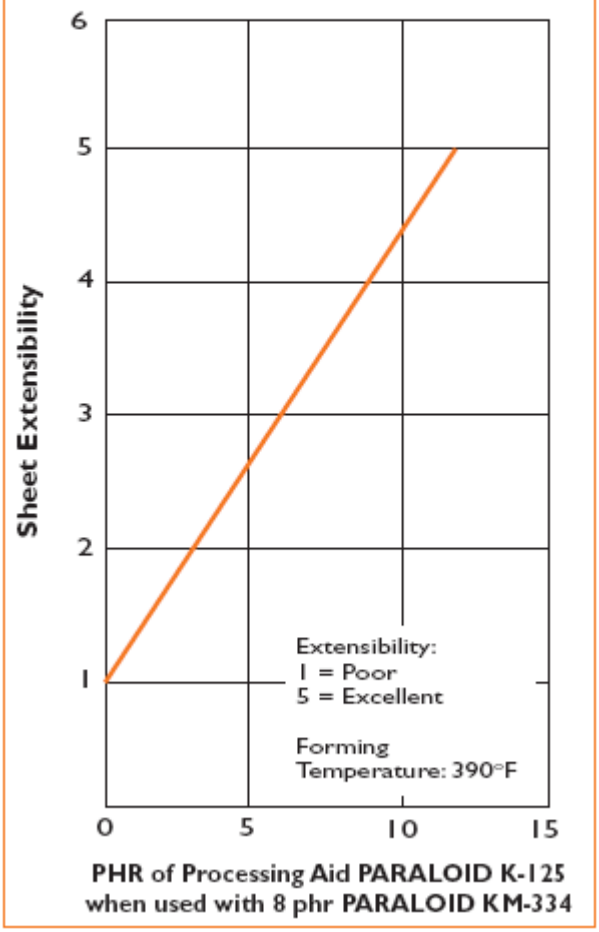
[1]Ratings: P=Poor, F=Fair, G=Good
[2]Ratings: 1=Smooth Surface, No Imperfections
10=Badly rippled

Building and Construction

Manufacture of the many Vinyl products used by the construction industry is significantly improved with the addition of PARALOID K-125 to the formulation.

Vinyl sheeting, wall coverings, profiles for interior and exterior windows, siding, and signage are just some of the many products that employ this high-efficiency additive.

FIGURE 3
EFFECT OF PARALOID K-125 PROCESSING AID ON FORMING EXTENSIBILITY OF VINYL SHEET (NOMINAL 0.125 IN.)



Just as it does in packaging, PARALOID K-125 improves extensibility for deep draw thermoforming of construction sheeting greater than 40 mils in the thickness. In windows and other profiles it imparts good dimensional stability for fewer problems with expansion and contraction. Surface characteristics of Vinyl building products, such as siding and profiles, are of the highest quality, due to the processing aid's ability to speed fusion time and reduce melt fracture, which often results in an unsightly appearance.

TABLE 4: Brabender Processing Behavior of PARALOID K-125 in Vinyl Siding/Window Formulation

PARALOID K-125 (phr)	Fusion Time (minutes)	Torque at Fusion (mg)	Torque 5 minutes after Fusion (mg)
0	1.6	3400	2600
2	0.8	3600	2700
Conditions:	185°C/60 rpm/60-gram charge		
Formulation:	Vinyl (K=67)/ADVASTAB™[1]/CaSt		
(phr)	100 1.2 1.3		
	Wax 165/TiO_2/KM-334/K-175		
	1.0 10.0 5.0 0.5		

[1]Tin Stabilizer

The good surface quality achieved with PARALOID K-125 is especially important to the use of many Vinyl building products in decorative applications.

Vinyl Pipe

PARALOID K-125 permits greater control of the wall thickness and section weight of extruded Vinyl pipe. This enables manufacturers to meet critical specifications and construction code requirements. Pipe compounds containing the additive also exhibit improved surface appearance on both inner and outer walls. Tensile properties and burst strength are also improved with the use of PARALOID K-125.

Extrusion rates are improved because of the faster fluxing and higher melt strength imparted by the processing aid. Pipe formulations benefit from the addition of PARALOID K-125 in both single- and twin-screw machinery.

The additive is especially effective in improving the processing characteristics of highly filled formulations containing large amounts of calcium carbonate extender.

PARALOID K-125 in Specialty Injection Molding

Injection-molded applications, such as Vinyl pipe fittings, computer and business machine housings, electrical adapter boxes, appliance housings, and keyboard covers are made better and faster with the addition of PARALOID K-125 to the formulation. Molding can be accomplished at higher temperatures and speeds without surface defects. The additive maximizes flow length to permit filling longer, more complex cavities.

Weld line strength is increased, and the dispersion of other additives, such as impact modifiers, is ensured for more consistent impact values from part to part.

Storage, Handling, and Disposal (see MSDS for details)

Standard recommended storage conditions are as follows:

- Store indoors, protected from weather (moisture)
- Temperature should not exceed 140°F
- Protect from ultraviolet light
- With stretch hood or stretch wrap intact (if applicable)
- Unopened (if material is opened, it should not be left exposed and should be used within one month); ambient temperature preferred.

When stored correctly in the original packaging, the shelf life is:

- 2.5 years from date of manufacture

Safe Handling Information

Avoid high concentrations of dust in air and accumulation of dust on equipment. An airborne dust of this material can create a dust explosion. When handling and processing this material, local exhaust ventilation may be required to control dust and reduce exposure to vapors. To prevent dust explosions, employ bonding and grounding for operations capable of generating static electricity. Dispose by placing powder or pellets in airtight bags. Incinerate or landfill at a permitted facility in accordance with local, state, and federal regulations.

Material Safety Data Sheets (MSDS)

Material Safety Data Sheets are available outlining hazards and safe handling methods. Contact Rohm and Haas for copies of the MSDS for this product and for other handling information.

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 March 2002