

# Honeywell High Performance Lubricants



Amplify your PVC processing

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# benefits



## High Performance Lubricants for PVC Window Profiles

Honeywell International, as a leader in the development of lubricant systems for the PVC industry has always met the challenge in providing new technology as our the industry evolves. To meet the current lubricant needs of our industry, Honeywell has developed a new product line of High Performance Lubricants (HPL's) designed to assist our customers PVC processors in obtaining the next level of product and processing performance.

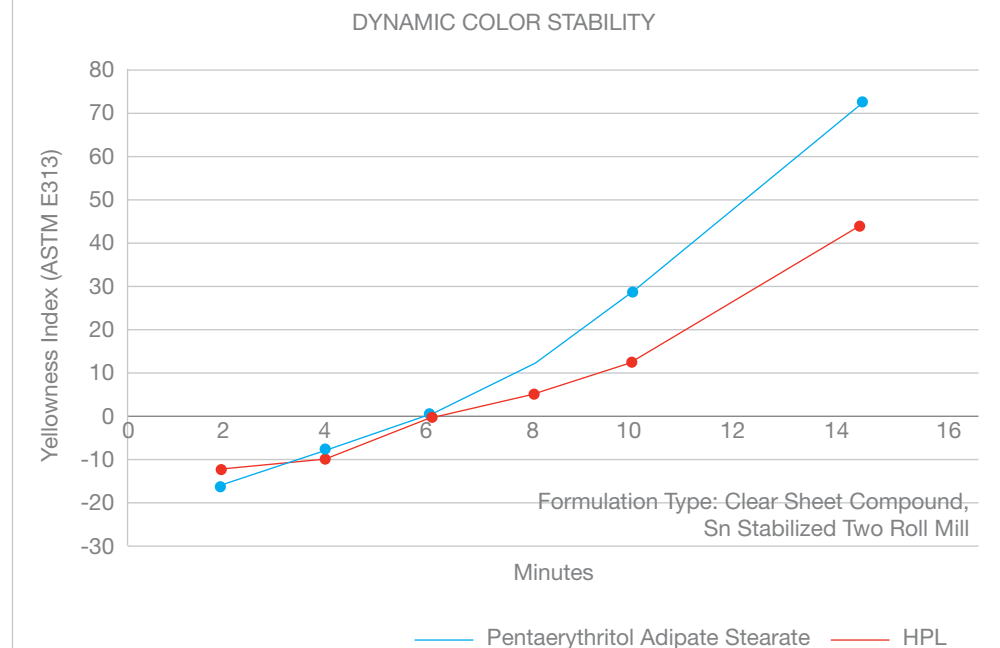
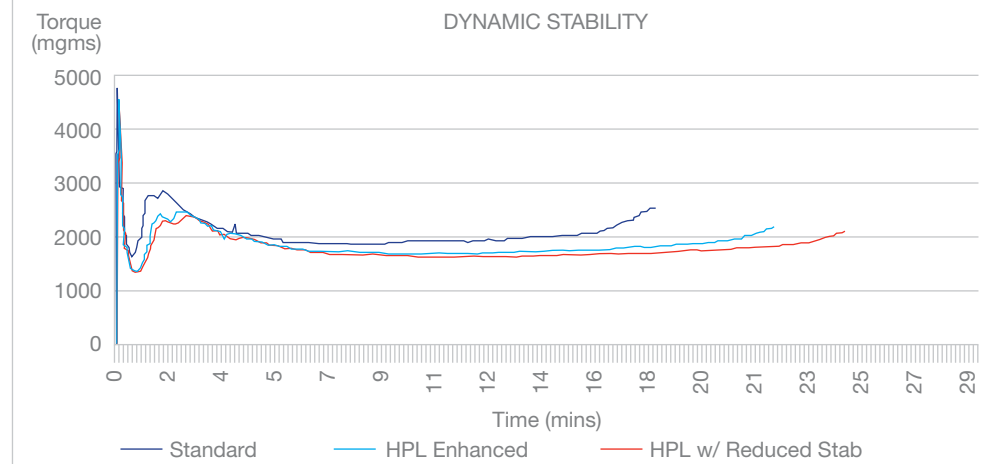
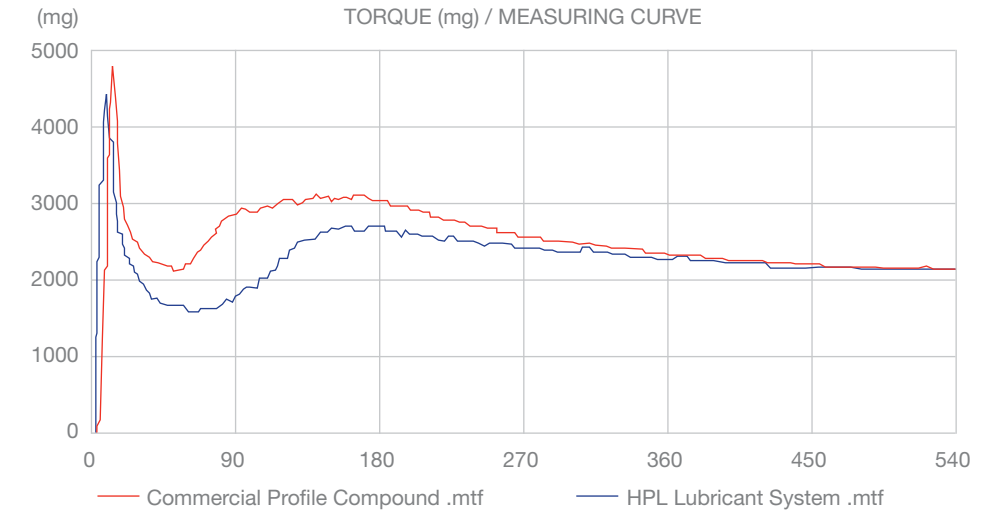
A series of performance evaluations were conducted to assess the benefits achieved using a Honeywell High Performance Lubricant system against a commercially available control in a PVC window profile formulation.

### HPL TEST FORMULATION

	phr
PVC Resin	100.0
Sn Stabilizer	1.5
TiO <sub>2</sub>	9.0
CaCO <sub>3</sub>	5.0
Acrylic Impact Modifier	4.5
Process Aid	1.0
<b>Honeywell HPL Package</b>	<b>1.8</b>

## Torque Rheometry

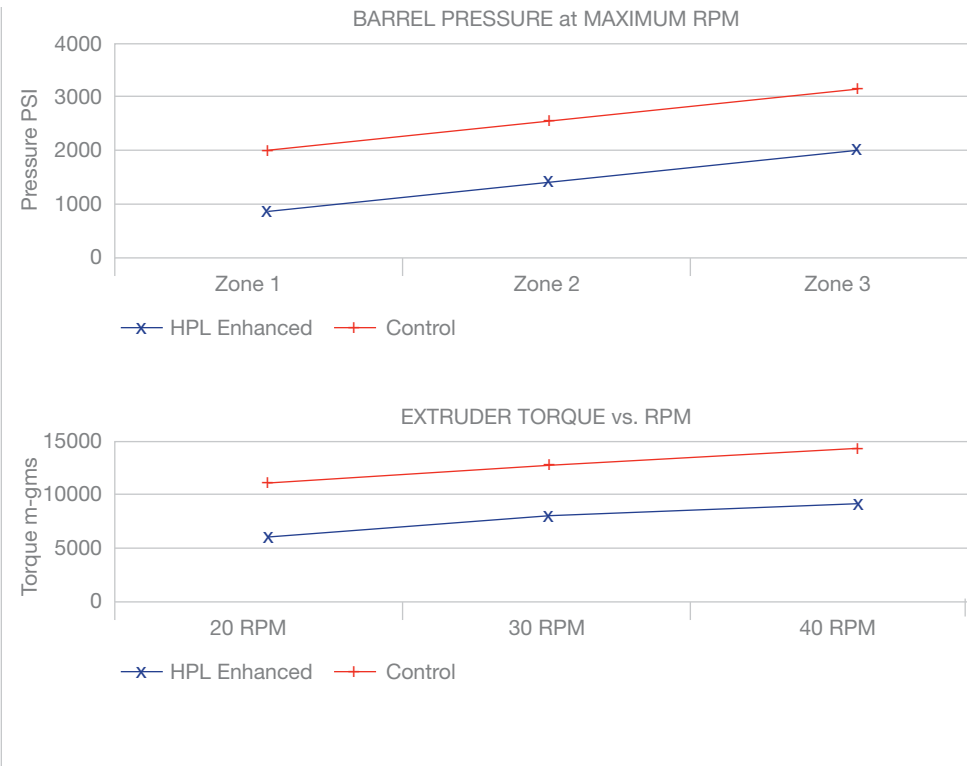
Brabender torque rheometer studies indicate that HPL maintains lubricity comparable to commercially available window profile dry blends while significantly reducing fusion torque without negatively affecting equilibrium torques. Overall energy consumption was reduced by 24% over the processing range of the torque rheometer test. In additional testing significant improvement in dynamic heat stability was also observed with the HPL package. This means the formulator may reduce stabilizer dosage without concern for compromising the process window of the formulation.



Increased color stability of High Performance Lubricant formulations suggests that there may be opportunities to reduce discoloration due to burning during the extrusion process in conjunction with increased extrusion rates.

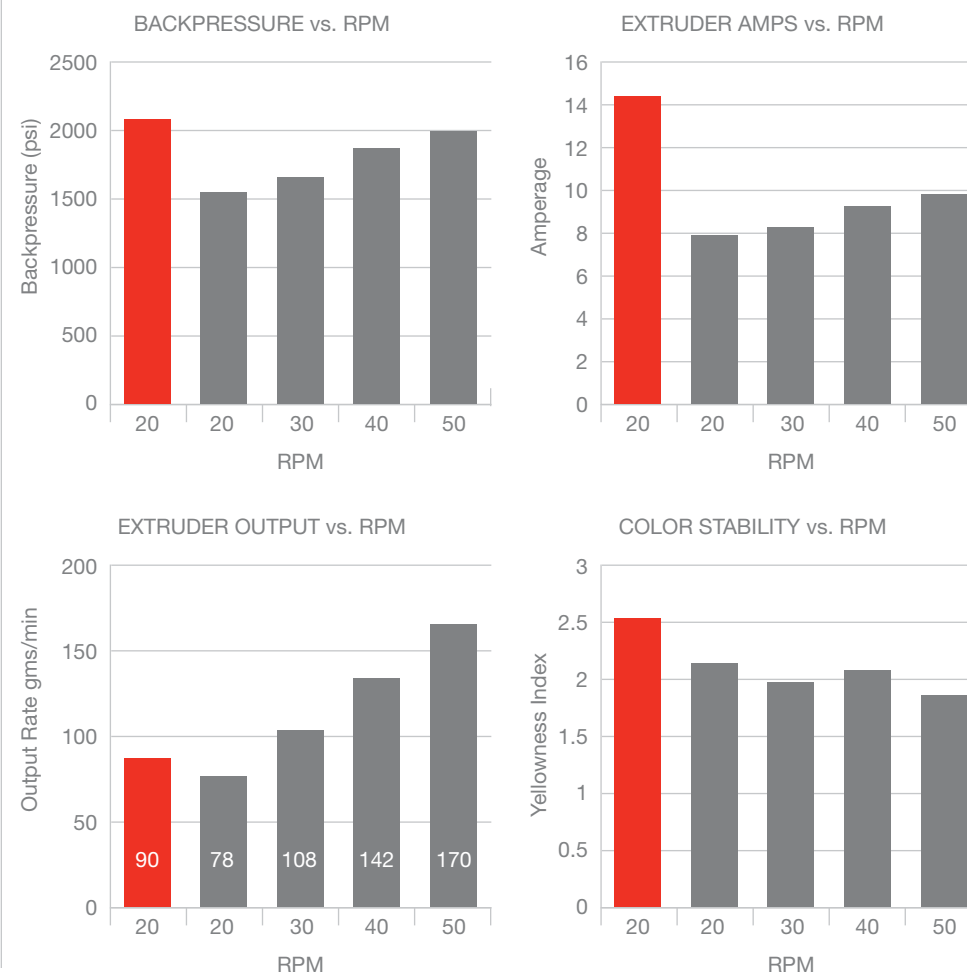
## Extrusion Trials

The reduction in the energy required for fusion has several benefits during the extrusion process. Less energy means that the compound processes with less torque or amperage in the extruder. The graph shown below illustrates the resulting reduction in extruder torque when our two test compounds were compared. Pressures along the barrel wall are also reduced as illustrated in graph 8. This reduction in energy consumption can result in a stable processing window, allowing changes in the extrusion conditions to optimize productivity. A reduction in amperage can also provide an opportunity to increase output rates if other factors such as downstream equipment are able to accommodate the increase in production. Lastly, the reduction in energy consumption can increase the dynamic stability of the PVC compound and allow for a wider processing window. The next two graphs demonstrate the advantages that can be obtained by using HPL lubricants from Honeywell.



## Output Rate Study

A benefit of lower extrusion amps and backpressure is to give the processor the opportunity to increase the extruder speed and therefore increase output rates. Testing conducted on a 30mm parallel extruder evaluated the possibility of increasing the output rate until either the amperage or the backpressure matched the control compound. The chart below shows that we were able to increase the rpm from 20 to 50 RPM before reaching equivalent backpressure while still not reaching the amp load of the commercial compound. At this higher rpm, the HPL formulation was able to almost double the output rate of the control compound while maintaining good physical properties and color.



Speed Up Vinyl Extrusion Processing with Honeywell High Performance Lubricants

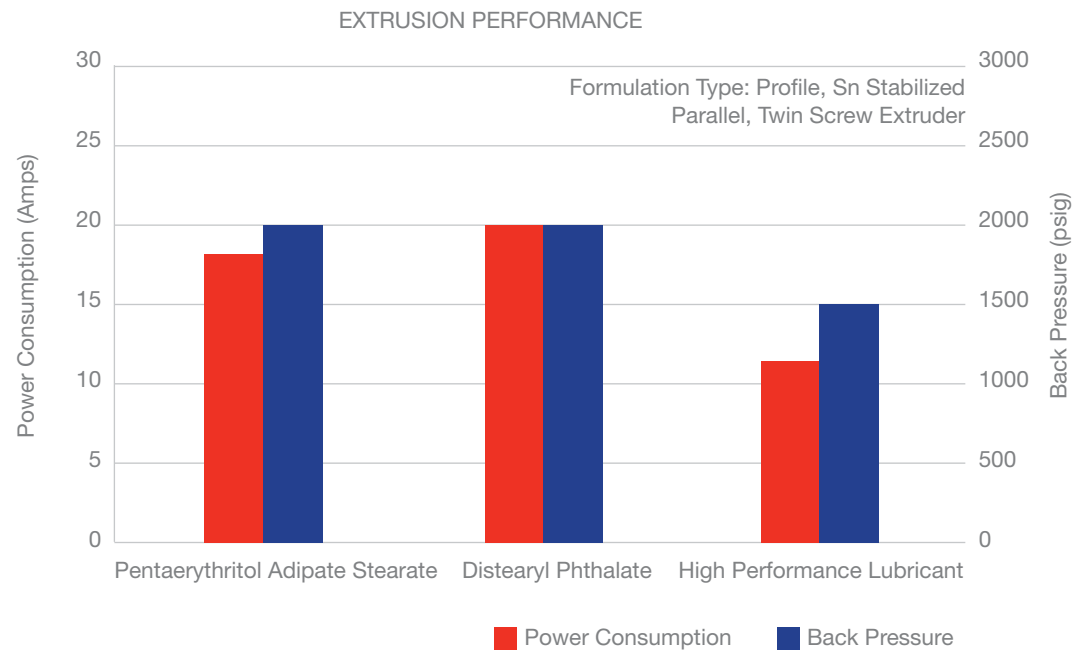
Cut operating costs and increase profits

Honeywell's High Performance Lubricants take the exertion out of the extrusion process and virtually eliminate production headaches.

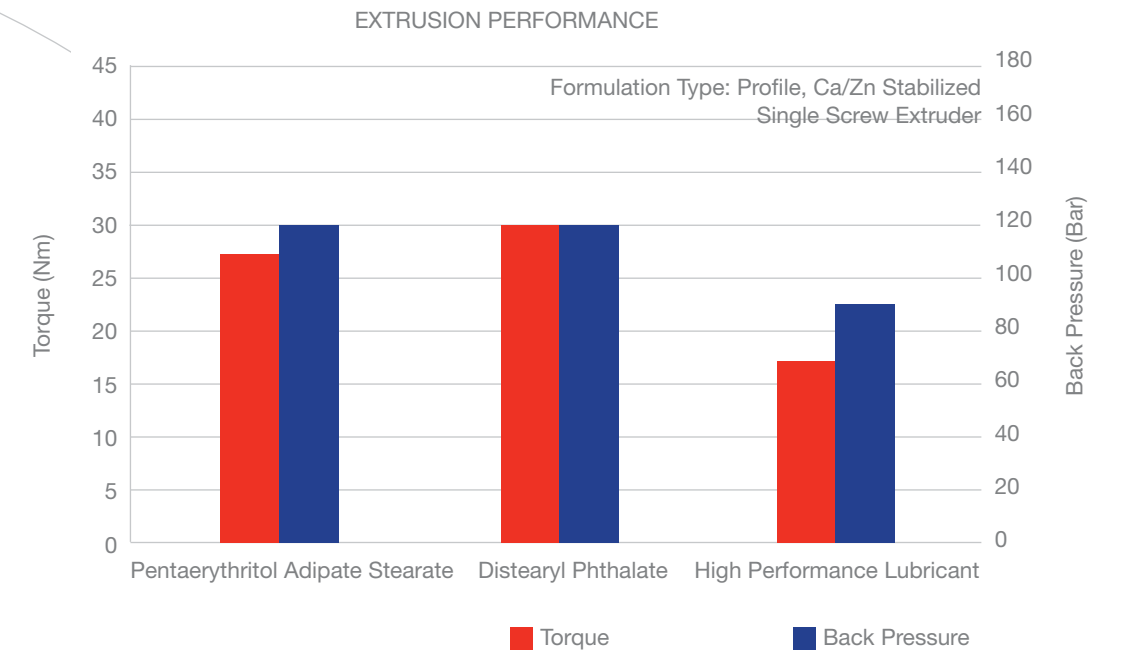
They let the PVC processor :

- Significantly increase output rates
- Operate extrusion machinery at peak efficiency
- Extrude PVC compounds at lower melt temperatures
- Reduce burning and discoloration
- Reduce plate-out
- Lower the frequency of maintenance shutdowns
- Reduce power consumption
- Reduce scrap rates
- Cut operating costs and increase profits

The following data demonstrate how typical Honeywell High Performance Lubricant (HPL) packages can increase production rates by improving control over melt viscosity, melt temperature and film color.



Reduced pressure, amps and temperature result in increased production capacity and operating latitude. In addition, reduced melt temperatures have been observed on full scale extrusion lines.



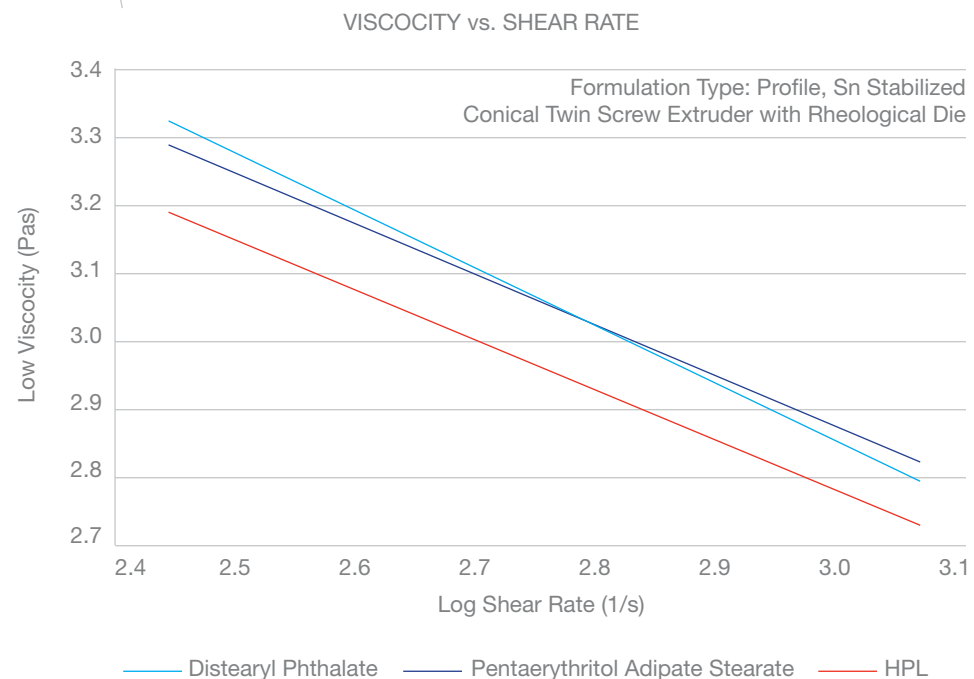
Dramatic reductions in torque and back pressure are also observed in Ca/Zn stabilized formulations as a result of the rheological effects of High Performance Lubricants.

LOWER AMP LOADS & PRESSURE

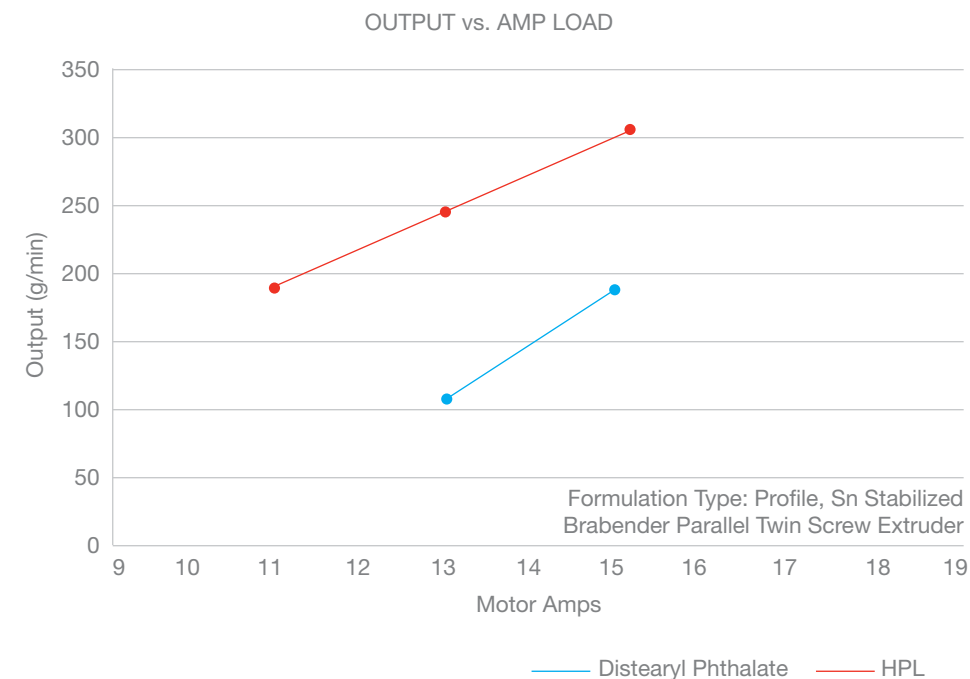
Improved

Melt Flow

GREATER OUTPUT



The reduction in apparent viscosity provides increased operating latitude in the extrusion process.



High Performance Lubricants increase output for equivalent amp loads.

Whether the extruded product is vinyl siding, pipe, fencing, decking or profile, whether the application is filled or unfilled, whether the formulation is stabilized with tin or calcium/zinc, Honeywell can develop a Rheochem High Performance Lubricant package that will do the job.

Let Honeywell help make peak vinyl extrusion efficiency a reality. Call us at the regional office on the back of this brochure or visit us at [www.rheochem.com](http://www.rheochem.com).