

ADVAPAK™ NEO

Continue the journey with ADVAPAK™ NEO.
Innovation through sustainability



ROHM AND HAAS

imagine the possibilities™

DEDICATION TO THE PVC INDUSTRY

Our industry has been working hard to ensure that PVC is a sustainable material that is able to play a full and useful role in society. The complete phase-out of lead stabilisers by 2015 and increasing the use of recycled PVC are two major commitments of the Vinyl 2010 programme. Backed by more than fifty years of experience in the PVC additives and technical know-how in tin stabilisers, Rohm and Haas continues to strive ahead.

Today we introduce Advapak™ NEO products, a range of novel high performing stabilisers to further support your initiatives and contribute to the PVC industry's sustainability.

COST EFFECTIVENESS

Controlling costs is critical to your business and to ours. Advapak™ NEO products offer you a very good cost-performance ratio compared to existing alternatives and thus help you to maintain your cost competitiveness.

BOOSTING RECYCLABILITY

Advapak™ NEO products are compatible with all standard stabiliser systems. As a result, Advapak™ NEO stabilised PVC can be safely combined with recycled PVC containing all other types of stabiliser. By inhibiting cross-linking, they bring a significant advantage when using recycled PVC in your manufacturing process.

REPUTATION FOR COMPLIANCE

The Advapak™ NEO products are heavy metal free one pack solutions. Today our Advapak™ NEO one-packs offer a stabiliser solution with one of the lowest overall metal contents. Rohm and Haas is continuously working for a brighter tomorrow. A tomorrow with safer materials and better working conditions.





Advapak™ NEO

- A range of cost-effective stabiliser one-packs
- Recyclability boosters
- Heavy metal free technology



Advapak™ NEO, stabiliser one-packs for PVC pipes

	Toxicity Profile	Total metal content	Early colour	Long term stability	Processing window	Recycling
Lead	●	●●	●	●●	●●	●●
Ca-Zn	●	●	● / ●	●	● / ●	● / ●
Advapak™ NEO	●●	●●	● / ●●	●	●	●●

Advapak™ NEO products demonstrate very good colour in pipes.

Advapak™ NEO products have good residual / long term stability.

Advapak™ NEO products offer faster fusion and lower back pressure than typical Ca/Zn stabiliser systems. With this wider processing window, production output can be easily optimised and increased. Due to its delayed crosslinking, consistent colour and rheology, Advapak™ NEO products offer enhanced recycling properties compared to typical Ca/Zn stabilisers.

Advapak™ NEO products are compatible with any type of stabilising systems.

Advapak™ NEO products have no offensive odour. Advapak™ NEO products are available as pastilles and flakes and allow safe and easy handling.

Advapak™ NEO products are non toxic, contain no heavy metals, a low total amount of metals and no harmful co-stabilisers such as bisphenol A.

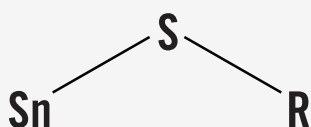
PVC dry-blends stabilised with Advapak™ NEO products demonstrate good powder properties, with improved flowability and higher bulk density than typical Ca/Zn stabilisers.

Advapak™ NEO, stabiliser one-packs.

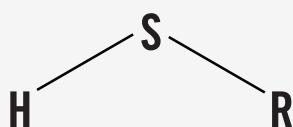
The Technology

Advapak™ NEO products are based on a derivative of the mercaptan chemistry which has been used for decades with conventional tin stabilisers. The patented “blocked thiols” technology includes organic based, heavy metal free compositions which under vinyl processing conditions, generate highly active stabilising components.

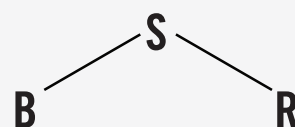
The “blocked thiols” technology takes advantage of the efficiency of mercaptans as heat stabilisers, and links the mercaptan to an organic portion to suppress adverse effects of free mercaptans:



Tin mercaptides

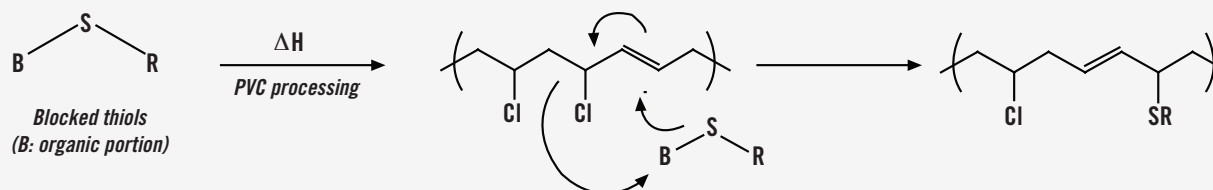


Free mercaptans

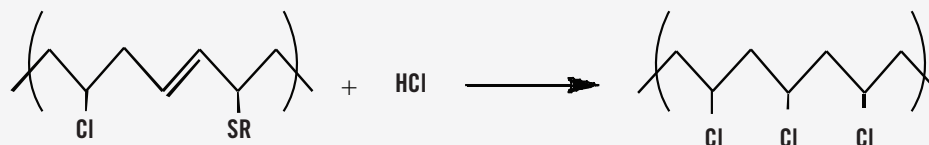


Blocked thiols
(B: organic portion)

During processing of PVC, shear and temperature induce the generation of the highly active stabilising components that immediately react with the PVC chain (concerted mechanism):

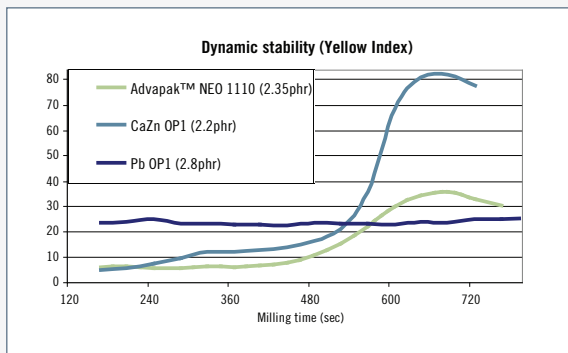


In addition to the substitution of the labile chlorines, the reverse reaction mechanism is widely admitted as part of the mercaptan derivatives stabilising role:

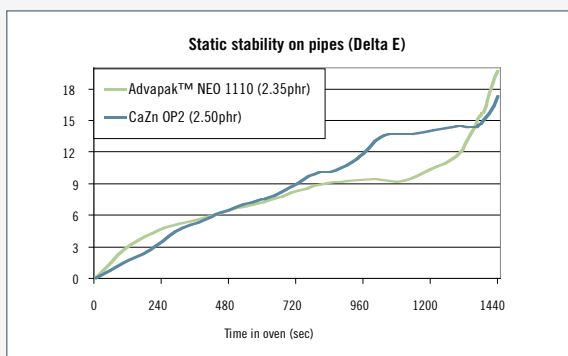




Advapak™ NEO: Efficient thermal stabiliser for PVC pipe applications

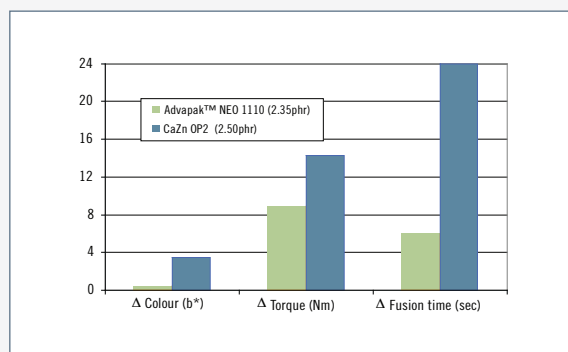


Thermal stability tests performed on a 2-roll mill and in a Metrastat oven. Advapak™ NEO products demonstrate better early colour and mid term stability compared to the tested commercial Ca/Zn formulation.



Advapak™ NEO: Enhanced recycling properties for pipe processing

to limit impact on colour and rheology when using recycled PVC



Delta colour: b* difference on calendered films using fresh dry-blend and 100% recycled material.

Delta torque: difference of fusion torque after 3 recycling cycles using 100% recycled material.

Delta fusion time: difference of fusion time after 7 recycling cycles using 20% recycled material.

Advapak™ NEO: Pipe extrusion performance

Extruder Bausano MD2 / 46B20-A / Pipe diam. 60 mm / 2mm thick

Formulation: S_PVC EVIPOL K68 (100 parts), TiO₂ KRONOS CL2220 (0.2phr), and CaCO₃ OMYALITE 95T (2phr).

Extrusion #1

	Screw rpm	Back P bar	Torque Nm	Melt T °C	Temp set/act (zones/°C)						
					1	2	3	4	5	6	7
Advapak™ NEO 1110 (2.35 phr)	34	165	294	191	179	180	182	185	185	193	198
CaZn OP2 (2.5phr)	34	170	305	190	177	180	182	185	188	196	202

Extrusion #2

	Screw rpm	Back P bar	Torque Nm	Melt T °C	Temp set/act (zones/°C)							L*	a*	b*
					1	2	3	4	5	6	7			
Advapak™ NEO 1210 (2.54phr)	30	195	286	192	187	185	187	191	195	198	201	88.2	-0.6	10.4
CaZn OP3 (2.5phr)	27	225	318	190	185	185	184	190	192	196	200	85.7	-2.9	18.0

Under similar extrusion conditions, Advapak™ NEO products demonstrate faster fusion and lower melt-pressure compared to the Ca/Zn stabilisers tested. Further extrusion trials have shown that this lower melt pressure allows for significantly increased output rates. Advapak™ NEO 1210 allows excellent colour hold for pipes and thus brings technical advantages for white pipes and light colour applications.

Extruder Bausano MD2 / 52/23-A / Pipe diam. 72 mm / 3.3mm thick

Formulation: S_PVC K65 Oxyvinyls 216 (100 parts), TiO₂ KRONOS CL2220 (0.5phr), and CaCO₃ OMYA FT (5phr).

Extrusion #3

	Screw rpm	Back P bar	Amps	Melt T °C	Temp set/act (zones/°C)						Adap	Die	b*	Gelation DSC
					1	2	3	4	5	6				
Advapak™ NEO 1110 (2.35 phr)	40	135	19.2	183	180	179	176	166	162	169	180	185/195/195	15.4	93%
Advapak™ NEO 1210 (2.54phr)	40	110	19.7	184	180	179	176	166	162	169	180	185/195/195	5.8	86%
CaZn OP4 (2.8phr)	40	155	20.5	185	180	180	177	165	163	170	180	184/190/195	16.0	91%

Advapak™ NEO 1210 is providing excellent early colour and is the preferred stabiliser for white pipe applications. Advapak™ NEO 1110 is designed to provide excellent mid and long term stability for all types of PVC pipes. The colour of the pipes developed using Advapak™ NEO 1110 is equivalent to the colour developed using the Ca/Zn formulation even with a significantly lower dosage level. Advapak™ NEO 1110 and the Ca/Zn formulation have equivalent levels of gelation, close melt temperatures and generate similar pipe colour. However, the melt pressure is lower with Advapak™ NEO 1110. This low melt pressure is clearly an advantage when increasing output rates.

Extruder Bausano MD2 / 72/24 / Pipe diam. 114 mm / 5mm thick

Formulation: S_PVC Etinox K67 (100 parts), TiO₂ KRONOS CL2220 (0.5phr), CaCO₃ OMYA 2T-AV (5/16/50phr), Advalube™ C109 (0/0. 2/0.6phr)

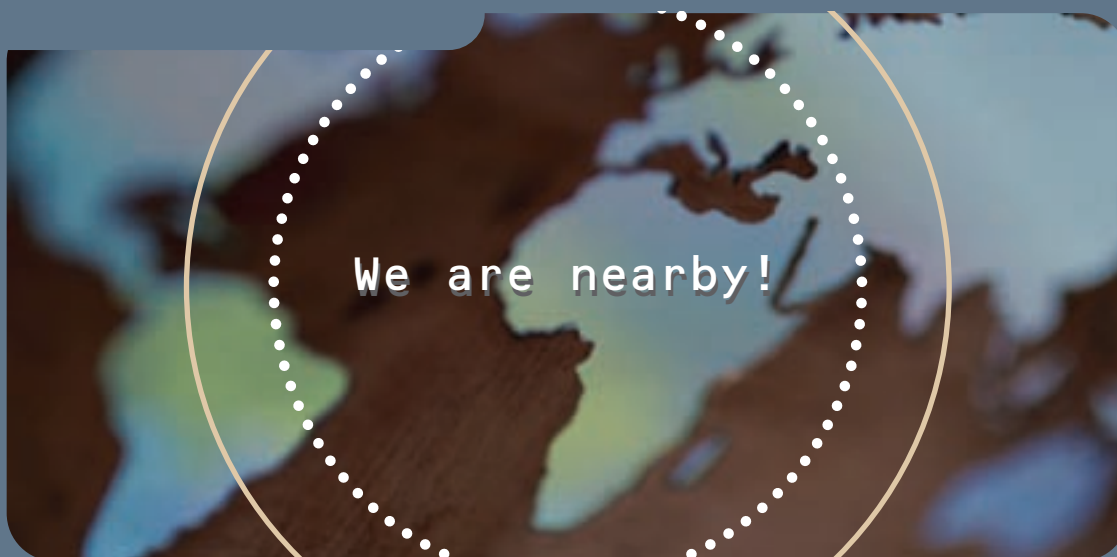
Extrusion #4

Advapak™ NEO 1110 (2.35phr)	Screw rpm	Back P bar	Amps	Temp set/act (zones/°C)										Die	Screw	Vicat °C	Gelation DSC
				1	2	3	4	5	6	7	8	9					
CaCO ₃ - 5phr	40	135	41	170/169	180/179	190/190	175/170	165/170	175/175	185/185	185/196	185/190	190/190	135	> 80	94%	
CaCO ₃ - 16phr	40	100	35	170/170	180/179	190/190	175/181	170/172	180/179	190/189	190/191	190/189	195/194	140	> 80	81%	
CaCO ₃ - 50phr	40	180	35	170/169	180/179	190/189	175/179	170/173	180/180	190/189	190/193	190/189	195/193	140	> 80	81%	

Formulations with 5, 16 and 50phr of filler have been extruded using similar settings and limited lubricant adjustment. On extrusion, all of the pipes had immediately correct and stable dimensions (no thickness variations), showing good melt flow properties. Output rates from 200kg to 230kg/hr were achieved. Good gelation levels were obtained even for the formulations containing 50phr of calcium carbonate filler.

ABOUT US

Rohm and Haas is a worldwide supplier of plastic additives and acrylic resins used in a large variety of applications for Vinyl, polyester, polycarbonate and other engineering plastics or blends. Rohm and Haas Plastics additives impart significant performance attributes like impact strength, clarity, chemical resistance, color retention, heat resistance, heat stability and weatherability. Our global presence, extensive technology portfolio, worldwide infrastructure and network of plants, technical service and sales offices provide customers with a wide range of capabilities and depth of resource unmatched by any other chemical company.



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