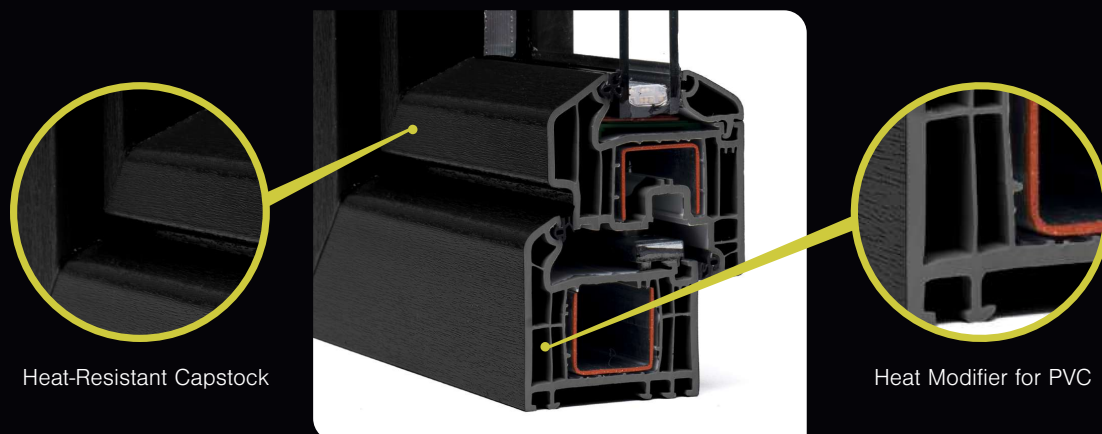# Heat Management Solutions
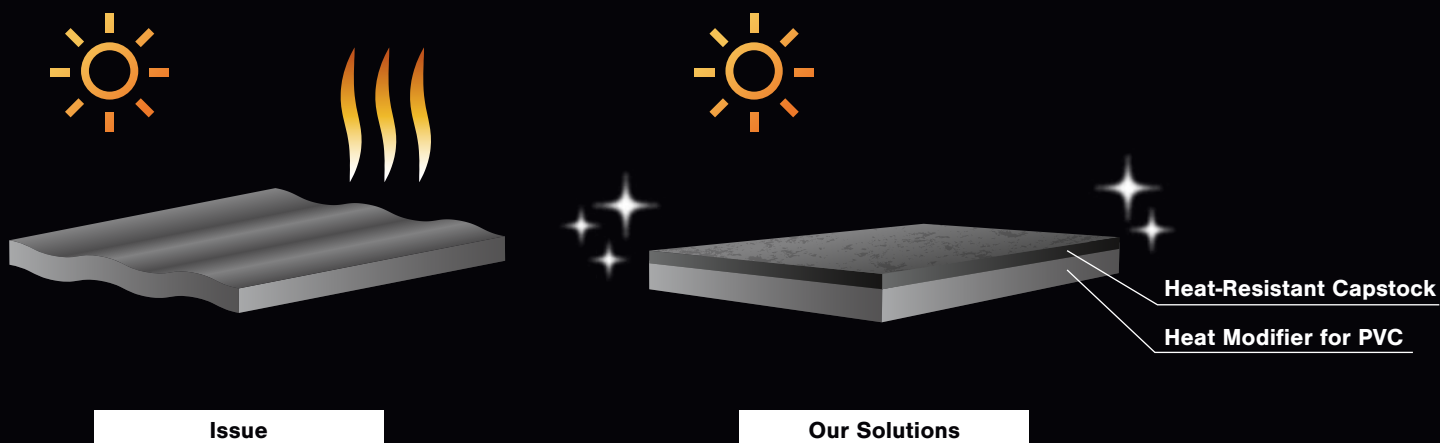
Techno-UMG
Heat Management Solutions

PVC is the ubiquitous choice for resin window sashes, but its heat resistance in dark colors can leave something to be desired. As design trends shift to favor darker colored windows that absorb more heat from the sun, a new solution is needed, and Techno-UMG is here to help.

Heat-Resistant Capstock

Heat Modifier for PVC

Product Concept

Heat-Resistant Capstock

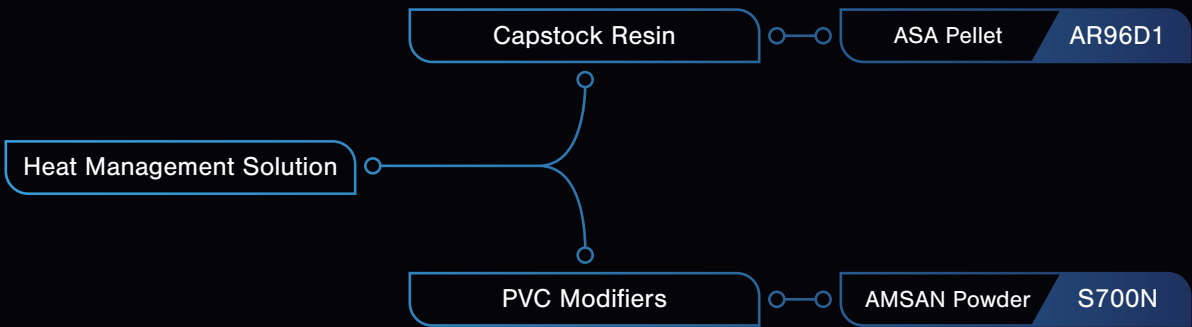Heat Modifier for PVC

Issue

Our Solutions

Dark colored profiles absorb heat resulting in visual and quality problems such as warping (left).
Techno-UMG is your one-stop shop that offers heat protection in two ways:

1. Techno-UMG ASA offers better heat protection than PVC in dark colors.
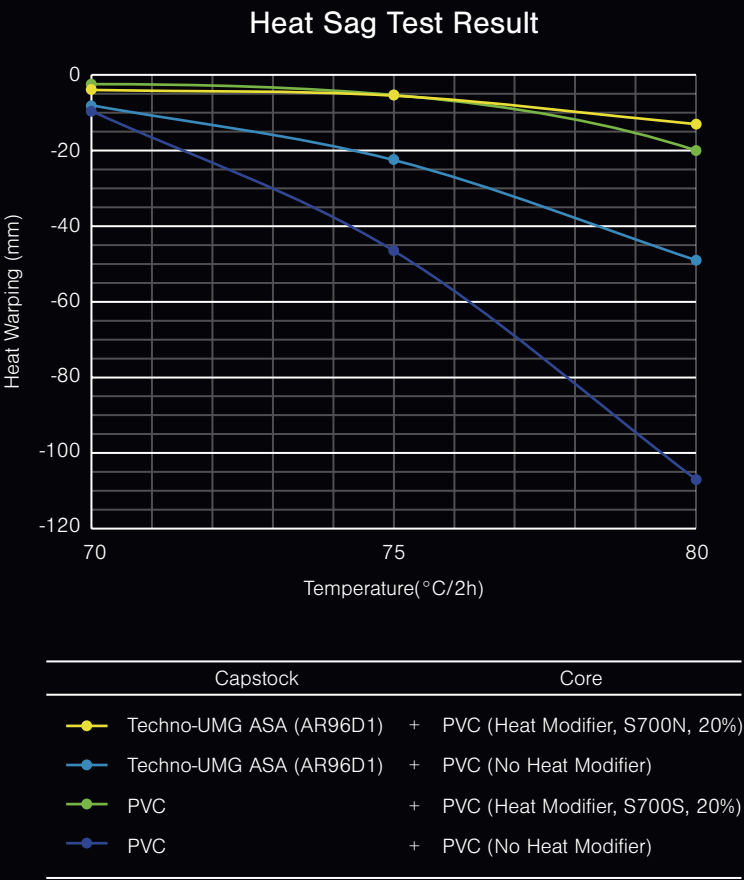2. Our PVC modifiers increase the heat resistance of the substrate.

Grade Lineup

A thin layer of capstock resins can be coextruded with PVC and other materials to protect your core material and increase product performance and longevity. Modifiers can be added to PVC to increase heat resistance. Use one or both to suit your needs!

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                                    ┌─────────────────────┐   o─o   ┌──────────────────────────────┐
                                    │   Capstock Resin    │─────────│  ASA Pellet    │   AR96D1    │
                                    └─────────────────────┘         └──────────────────────────────┘
┌──────────────────────────┐   o
│ Heat Management Solution │──┤
└──────────────────────────┘   o
                                    ┌─────────────────────┐   o─o   ┌──────────────────────────────┐
                                    │    PVC Modifiers    │─────────│  AMSAN Powder  │   S700N     │
                                    └─────────────────────┘         └──────────────────────────────┘
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Test Result - Capstock

Heat Management Solutions have proven remarkable results in multiple heat testings. ASA withstands higher heat than dark PVC and show minimal warping even when heated to 80℃+. PVC modifiers can also be added to the substrate for an extra boost.
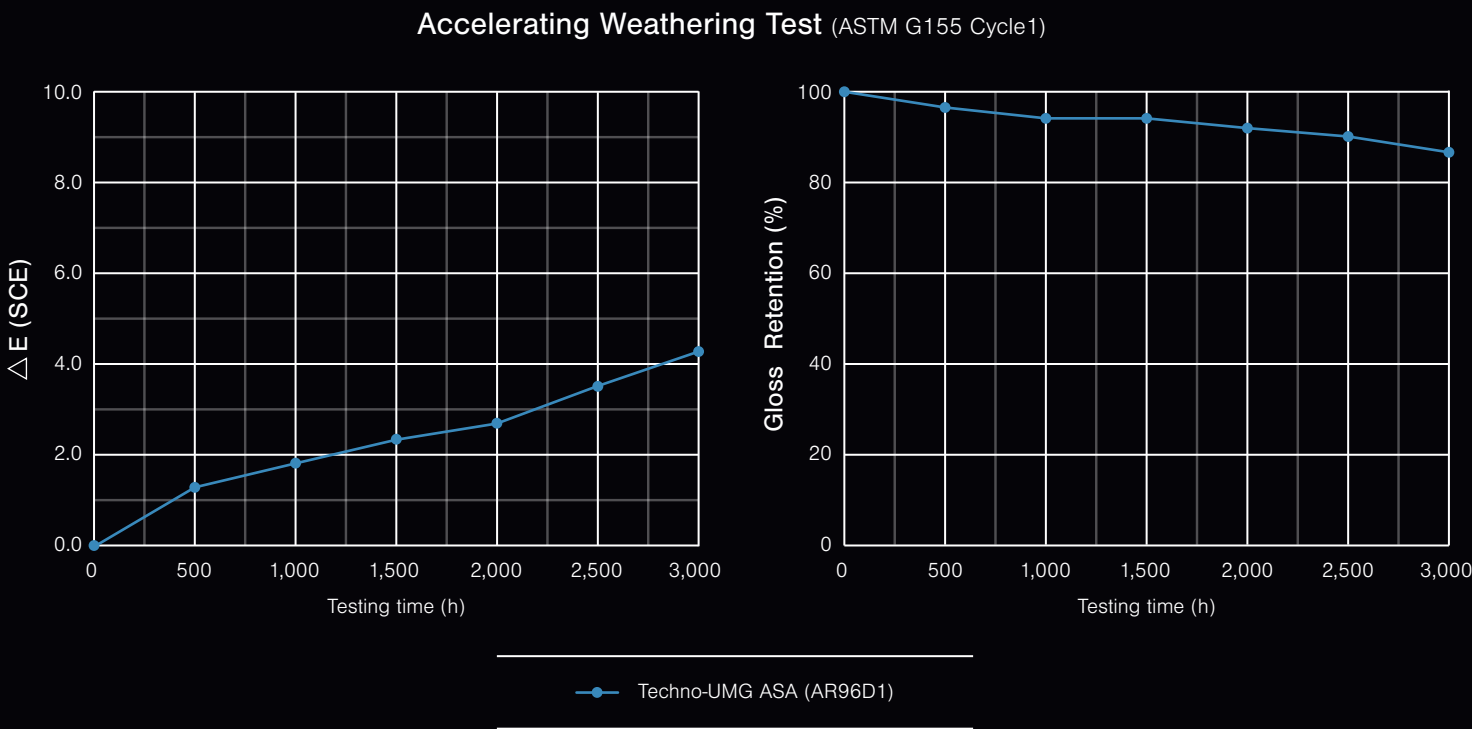
Heat Sag Test Result

Heat Warping (mm) vs Temperature(°C/2h)

Capstock		Core
●── Techno-UMG ASA (AR96D1)	+	PVC (Heat Modifier, S700N, 20%)
●── Techno-UMG ASA (AR96D1)	+	PVC (No Heat Modifier)
●── PVC	+	PVC (Heat Modifier, S700S, 20%)
●── PVC	+	PVC (No Heat Modifier)

*Sample Thickness : 4.06mm

Good Result

Bad Result

Samples were affixed at one end and put into an oven for 2 hours at different temperatures. Heat sag was measured in negative mm from a baseline of zero. Lower numbers correlate with more heat sagging and warping.

Test Result - Capstock

Accelerated weathering results of Techno-UMG ASA shows just a minimal change in color and gloss reduction, often undetectable to the human eye. This excellent weatherability and the associated post-weathering physical properties of Techno-UMG ASA, make it a clear choice for demanding exterior building applications when used as a capstock for PVC.

Accelerating Weathering Test (ASTM G155 Cycle1)

Left chart: Y-axis $\triangle E$ (SCE) 0.0 to 10.0, X-axis Testing time (h) 0 to 3,000.
Right chart: Y-axis Gloss Retention (%) 0 to 100, X-axis Testing time (h) 0 to 3,000.

— Techno-UMG ASA (AR96D1)

Test Result - PVC Heat Modifier

Our S700N heat modifiers for PVC improve the heat resistance of PVC allowing for use in higher temperature climates.
The more S700N added, the better the heat resistance.

Grade	**S700N** (Heat resistance modifier)
Chemical name	Acrylonitrile-alpha Methyl styrene copolymer
CAS number	25747-74-4
Appearance	White Powder
TSCA	Listed

Item	Spec	Unit	Addition Quantity for S700N (PHR)			
			0 (PVC only)	10	30	50
Vicat Softing Temp.	ISO 306	°C	82	86	92	96
Tensile Yield Stress	ISO 527	MPa	54	58	63	66
C-Imp.	ISO 179	kJ/m2	7	6	4	3

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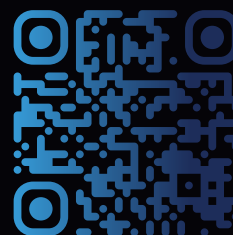TEL: +852-2521-7622
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