

In response to growing demand, TenasiTech has developed a new approach to reducing scuffing of acrylic glass products.



SOLID-TT™ Mar Resistance Additive

Solving surface hardness without losing clarity or impact strength is a high value proposition for end users in electronics, automotive, architectural and beyond. There was no additive solution until now.

Addition of this product to PMMA enhances resistance to marring from polishing or impact of abrasive particles. The data overleaf shows a range of surface tests passed.

An alternative to hard-coating

When hard-coating is too expensive, or impractical, **SOLID-TT™** is the solution.

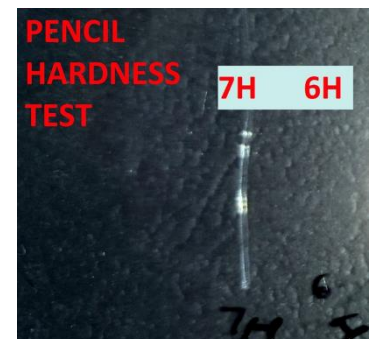
- > No capital expenditure
- > Additive powder simply compounded in PMMA
- > No solvents required – safe to handle



Outstanding surface performance

Pencil hardness test shows PMMA with **SOLID-TT™** doesn't scratch until 7H! The same PMMA scratches at 3H or 4H without our additive.

First scratch at 7H with 1% **SOLID-TT™**



Other physical properties unaffected

Addition of this product to PMMA does not affect other physical properties such as impact strength, flexural modulus or tensile strength. Please see overleaf to learn more.

Versatile

- > No localised rub off, unlike a solvent based hard coat, as **SOLID-TT™** is dispersed in the polymer
- > Thermoforming of PMMA still possible, unlike a solvent based hard coat
- > No weathering concerns – accelerated UV ageing showed no degradation after 1,000 hours

Injection molding or Extrusion

Addition of this product to PMMA does not significantly affect the processing of the polymer.

There is insignificant difference in the viscosity or melt-flow with the addition of 1% by weight of **SOLID-TT™**.

SOLID-TT™ Mar Resistance Additive

PROPERTIES	TEST METHOD OR DEVICE	TYPICAL RESULT	
		Virgin PMMA	With SOLID-TT™ (1% by weight)
Mechanical			
Flexural Modulus (MPa)	ISO 781	3,100	3,300
Flexural Stress (Max.) (MPa)	ISO 781	83	86
Rockwell Hardness (M-scale)	ISO 2039-2	95	94
Impact Strength (J/m) (Unnotched Charpy)	ISO 179/1eU	43	39
Gloss 60°	BYK Micro Tri Gloss	112	97
Physical			
Melt Flow Rate (g/10min) (240°C / 2.3kg)	ASTM D-1238	8.2	7.3
Scratch & Mar			
Pencil hardness (first scratch)	BYK Wolf-Wilburn	4H	7H
Crockmaster – wiping-friction wear ⁽¹⁾	See note below (Lower result is better)	3N: 2 5N: 2 7N :3 10N: 3	3N: 1 5N: 2 7N: 2 10N: 2
Erichsen Scratch (modified) ⁽²⁾	Modified ISO 4586-2	0.7N	2.0N
Falling sand ⁽³⁾	DIN 52 348-A1	Gloss loss: 65	Gloss Loss: 47
Multi-Finger Scratch	General Motors GMW14698 (0.75mm tip, 20N)	Damage	No Damage

Notes

- (1) Crockmaster is a test to demonstrate resistance to polishing/wiping-friction wear. It was performed using a device which allows multi-cycle wiping of a cloth at varying loads. 8,000 and 40,000 cycle tests were performed using a soft cloth held down with 3N, 5N, 7N and 10N loads. These tests we completed at a test rate of 6 double strokes per minute to simulate hand polishing. The rating scale of the Crockmaster test is:
 0 = no scratch marks perceptible 1 = isolated scratches visible 2 = slight scratch mark perceptible
 3 = scratch mark visible 4 = scratch mark clearly visible 5 = strong abrasion
- (2) Erichsen Scratch: Modified version of ISO 4586-2 [1] using an MTM2 mini traction instrumented tribometer. The point of scratch was determined as the load at which the coefficient of friction stabilizes to a plateau after a sharp increase. This method was also correlated during testing with a visual check: a feint scratch could be observed at that specific point.
- (3) Falling sand, also known as the “sand trickling test”, mimics impact-oblique blasting wear. It was is performed using tumbled quartz sand with diameters of less than 0.7mm. The results are expressed in the loss in gloss after depositing 250g of sand.

Welcome to TenasiTech Pty Ltd. We sell unique, high value additives for our customers to make superior plastics. Our patented nano-particle additives allow our customers to develop new plastic products based on improved performance, such as mar/scuff resistance. TenasiTech has offices in Australia and the USA.

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TenasiTech Pty Ltd
info@tenasitech.com
 +1 (518) 572 8572
www.tenasitech.com