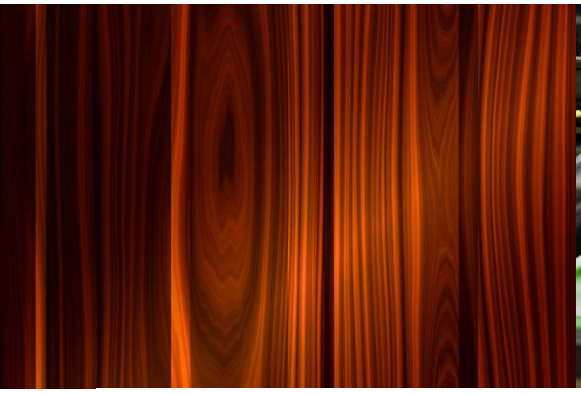
Enhancing Adhesion with Myribond™

Adhesion Promoting Resin for Thermoplastic, Thermoset and UV Cure Systems



"Golden Performance, Greener Solution without Price Premium"

Myribond™ Adhesion Promoting Resin
For 100% solids systems

DERIVED FROM BIO-BASED SUCCINIC ACID

Myribond™ adhesion promoting resin is made from Myriant renewable bio-succinic acid and is a cost effective resin for use in coatings systems. Myribond™ offers enhanced adhesion to both low-energy and high energy substrates. Myribond™ offers a combination of resilience, flexibility and yellowing resistance coupled with adhesion and bears no "green" price premium.

Applications:

UV Cure Coating

Myribond™ is an excellent choice for adhesion in UV systems. It can be used as the main resin system or in additive amounts in combination with other traditional (meth)acrylate systems. Myribond™ will cure with UV irradiation.

UV formulation with Myribond™

The following blend suggestions are effective, but by no means exhaustive or comprehensive. It is imperative that the user find an ideal combination of monomers, additives and photoinitiators to best serve their own application.

For adhesion to low energy substrates, the following blends have proven effective:

		Oligomer	IBOA	Miramer M4004	Genocure LTD	Genorad 40
1	Myribond™	35	38	22	5	
2	Myribond™	35	33	22	5	5

IBOA = Isobornyl acrylate
Miramer M4004, Genocure LTD and Genorad 40 are commercially available products supplied by RAHN, USA, ltd.

The above compositions were drawn down with a 3 Meyer rod and cured with three passes at 100 ft/min, resulting in the following adhesion profile:

Tape Adhesion Result

		Polyester	Polypropylene	Polyethylene	Glass (crosshatch)	Steel (crosshatch)
1	Myribond™	pass	pass	pass	fail	fail
2	Myribond™	pass	pass	pass	pass (95%)	pass

Alternatively, methacrylate monomers tend to crosslink with Myribond™ more effectively than acrylate. The methacrylate systems exhibit adhesion improvements over acrylate systems on higher energy substrates, as demonstrated below:

		Oligomer	TMPTMA	Genocure LTD	TBPB (phr)	Tape Adhesion Result: Glass (crosshatch)	Tape Adhesion Result: Steel (crosshatch)
1	Myribond™	70	30	5		pass (95%)	fail (75%)
2	Myribond™	70	30	5	2	pass (90%)	pass

TMPTMA = Trimethylolpropane Trimethacrylate
TBPB is tert-butyl peroxybenzoate peroxide, a commercially available, thermally decomposing free radical catalyst

		Oligomer	TEGDMA	Genocure LTD	TBPB (phr)	Tape Adhesion Result: Aluminum (crosshatch)	Tape Adhesion Result: Steel (crosshatch)	Flexibility: 90°	Flexibility: 180°
1	Myribond™	85	15	5		Pass (100%)	Pass (100%)	pass	pass
2	Myribond™	85	15	5	2	Pass (100%)	Pass (100%)	pass	pass

TEGDMA = Triethyleneglycol-dimethacrylate

As observed in the previous data, Myribond™ at a high loading cures and adheres effectively on aluminum and steel, revealing an economical coating with a cycloaliphatic backbone and a high degree of flexibility.

Thermoset

Myribond™ can be added to a curable thermoset system as it will cross-link into a free-radical matrix, especially with the addition of methacrylate monomers and/or peroxide catalysts. Myribond™ is stable at room temperature even with the addition of a peroxide. This capability allows Myribond™ to also be used as a depth cure additive in UV systems, especially when combined with a peroxide and a photoinitiator.

		Oligomer	IBOA	TEGDMA	Miramer M4004	Genocure LTD	TBPB (phr)	Heat curing result: 70°C, 10 hours, dark
1	Myribond™	60		35		5	2	solid (100% cure)
2	Myribond™	35	38		22	5	2	solid (100% cure)
3	Polyester Acrylate	60		35		5	2	liquid (0% cure)
4	Aliphatic Urethane Acrylate	35	38		22	5	2	stringy liquid

Summary

While the exact mechanism at present remains undefined, Myribond™ enhances adhesion to low energy substrates. Myribond™ also shows an improved performance over incumbent material on high energy substrates, especially when the experimental oligomer is acid functional. Further adhesion to high energy substrates is gained via inclusion of methacrylate monomers and/or methacrylated phosphate ester adhesion promoters. Conversely, acrylate monomers appear to be the choice for low energy substrates.

In addition, the new oligomers bring ancillary benefits including a thermal/oxidative curing response and depth curing, especially when combined with a metal drier and/or a peroxide.

While the ideal application for this technology remains ambiguous, we leave it to the audience of trained professionals to determine applications that best suit the oligomer's benefits. Wood coatings, polycarbonate substrates and other possibilities are immediate arenas where further investigation should merit positive results. There are many more. In addition, Myriant again defers optimal formulation recommendations to our audience.

In essence, Myribond™:

- adheres to a variety of substrates
- contributes to tough, flexible coatings with cycloaliphatic character
- contains substantial bio-renewable content with no price premium

SAMPLES AVAILABLE! Order today by calling + 1855.MYRIANT or visiting www.myriant.com.

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