

## Enhancing Adhesion with Myribond® DX

*Adhesion Promoting Resin for Overprint Varnish, UV Coating, and Thermoset*



*“Golden Performance and Greener Solution without Price Premium”*

# Enhancing Adhesion with Myribond® DX

**Myribond® DX** adhesion-promoting resin is made from Myriant's renewable **bio-succinic acid** and is a cost effective resin for use in coating systems. It provides enhanced adhesion to both low energy and high energy substrates including polyester, polyolefins, glass, metal, and aluminum. Myribond® DX offers a combination of resilience, flexibility and yellowing resistance coupled with adhesion and bears no "green" price premium.

## Applications

### UV-Cure Coating

UV-curable coatings involve an unsaturated resin(s) formulated in combination with acrylate/methacrylate monomers and a photoinitiator. Traditional UV-curable coatings have difficulty adhering low-energy substrates such as polyester, polypropylene, and polyethylene as well as high-energy substrates like glass and metal or metallized foil. **Myribond® DX is an excellent choice for adhesion in UV systems, particularly in applications with low- and high-energy substrates.**

Myribond® DX can be used as the main resin or in combination with traditional acrylate/methacrylate systems. While this resin cures easily with UV irradiation, Myribond® DX also responds well to thermal or oxidative curing mechanisms, especially when combined with metal driers and/or peroxide catalysts.

Representative formulations are shown below as examples; formulations should be verified by the user. All formulations were drawn down with a 3 Mayer Rod and cured with 3 passes at 100 ft/min.

### Myribond® DX: Low-Energy Substrate Formulations

Formulation Percentage						Tape Adhesion Test				
	Oligomer	Isobornyl Acrylate	Mirammer M4044	Genocure LTD	Genorad 40	Polyester	Polypropylene	Polyethylene	Glass	Steel
Myribond® DX	35	38	22	5	-	Pass	Pass	Pass	Fail	Fail
Myribond® DX	35	33	22	5	5	Pass	Pass	Pass	Pass (95%)	Pass

\*Miramer M4004, Genocure LTD, and Genorad 40 are commercially available products supplied by RAHN, USA, Ltd.

The use of Myribond® DX formulated with acrylate monomers allows for adhesion to low-energy substrates such as polyester, polypropylene, and polyethylene. An additional adhesion promoting additive such as Genorad 40 is necessary to adhere to high energy substrates when using acrylate monomers.

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## Myribond® DX: High-Energy Substrate Formulations

Alternatively, methacrylate monomers tend to crosslink with Myribond® DX more effectively than acrylate monomers, resulting in enhanced adhesion to high energy substrates.

Formulation Percentage					Tape Adhesion Test	
	Oligomer	Trimethylolpropane Trimethacrylate	Genocure LTD	TBPB (phr)	Glass	Steel
Myribond® DX	70	30	5	-	Pass (95%)	Fail (75%)
Myribond® DX	70	30	5	2	Pass (90%)	Pass (100%)

Formulation Percentage					Tape Adhesion Test		Flexibility	
	Oligomer	Triethyleneglycol Trimethacrylate	Genocure LTD	TBPB (phr)	Aluminum	Steel	90°	180°
Myribond® DX	85	15	5	-	Pass (95%)	Fail (75%)	Pass	Pass
Myribond® DX	70	30	5	2	Pass (90%)	Pass (100%)	Pass	Pass

\*TBPB is tert-Butyl peroxybenzoate peroxide, a commercially available, thermally decomposing free radical initiator.

Myribond® DX at high loadings cures and adheres successfully on aluminum and steel, revealing an economical coating with a cycloaliphatic backbone and a high degree of flexibility.

## Thermoset

When added to a curable thermoset system, Myribond® DX incorporates into the cross-linked matrix through free radical polymerization. This is especially true when methacrylate monomer and/or peroxide initiator is included in the formulation. Myribond® DX is stable at room temperature even with peroxide present. This capability allows Myribond® DX to also be used as a depth cure additive in UV systems, particularly when combined with a peroxide and a photoinitiator.

Formulation Percentage							Heat Curing Result: 70°C, 10h, dark
	Oligomer	Isobornyl Acrylate	Triethyleneglycol Trimethacrylate	Miramer 4004	Genocure LTD	TBTB (phr)	
Myribond® DX	60	-	35	-	5	2	Solid (100% cure)
Myribond® DX	35	38	-	22	5	2	Solid (100% cure)
Polyester Acrylate	60	-	35	-	5	2	Liquid (0% cure)
Aliphatic Urethane Acrylate	35	38	-	22	5	2	Stringy Liquid

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## Summary

Myribond® DX can be used to increase adhesion to both low- and high-energy substrates. Additional adhesion to high-energy substrates can be obtained with the use of methacrylate monomers and/or methacrylated phosphate ester adhesion promoters. Acrylate monomers are preferred for enhanced adhesion to low-energy substrates.

In addition, Myribond® DX brings ancillary benefits including a thermal/oxidative curing response as well as depth curing, especially when combined with a metal drier and/or a peroxide.

### Myribond® DX

- ◇ Adheres to a variety of substrates
- ◇ Contributes to tough, flexible coatings with cycloaliphatic character
- ◇ Contains substantial bio-renewable content with no price premium

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