

# Eastman™ IBIB vs. PM acetate in industrial wood coatings

Formulators of industrial wood coatings often utilize “retarder” solvents with relatively slow evaporation rates, such as PM acetate, to help alleviate problems like blushing which can occur in high humidity and other adverse climatic conditions during coating application. Using Eastman™ IBIB (isobutyl isobutyrate) solvent to replace PM acetate in such applications provides a variety of benefits which include lower formulation cost and less risk of solvent attack on sensitive plastic substrates, such as ABS, which are often encountered alongside wood in furniture applications.

**Table 1**  
Property comparison

Property	Eastman™ IBIB	PM acetate <sup>a</sup>
Evaporation rate, (n-BuOAc = 1)	0.4	0.4
Blush resistance, % RH	92	92
Weight/volume, kg/L	0.86	0.97
Water miscibility, wt % (water in)	<0.2	5.9
Surface tension, dynes/cm	23.2	26.4
Electrical resistance, megohms	>20	5

<sup>a</sup>Propylene glycol monomethyl ether acetate

## Benefits of using Eastman™ IBIB solvent

- **Excellent solubility in a wide variety of resin types** (See Appendix)
- **Slow evaporation rate of 0.4** – provides good flow and leveling and relatively fast dry-to-touch time combined with excellent blush resistance
- **Urethane grade suitable for use with moisture sensitive polymers** – offers good blush resistance and excellent application in high-humidity conditions
- **Low surface tension** – improves atomization, wetting, and flow and leveling
- **Low water miscibility** – minimizes water pick-up on storage
- **Low density** – reduces VOC content (volatile organic compound)
- **High electrical resistance** – helps in adjusting the resistivity of an electrostatically-applied coating

## Experimental data

To confirm the suitability of Eastman™ IBIB as an effective replacement for PM acetate, a series of wood-coating formulations with both solvents were prepared and the physical properties compared.

The three types of formulations used in these comparisons were

1. A clear thermoplastic nitrocellulose lacquer for open-pore effects
2. A clear thermoplastic CAB acrylic air-drying lacquer
3. A 2K polyurethane clearcoat

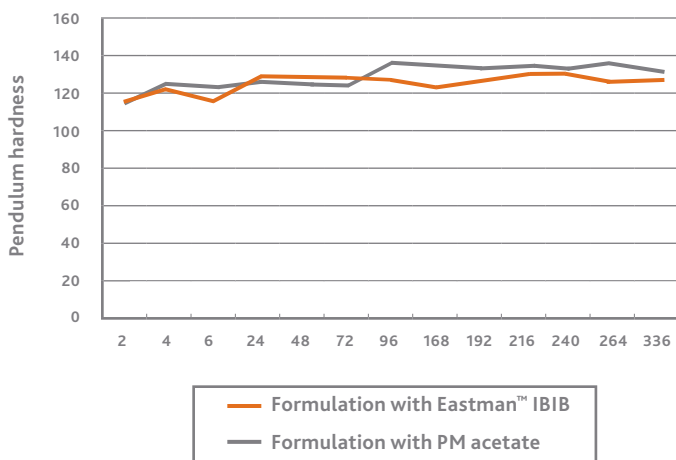
**Table 2**  
**Clear thermoplastic nitrocellulose lacquer formulation #1 — for open-pore effects**

Component	With Eastman™ IBIB (Weight %)	With PM acetate (Weight %)
NC E560 i-propanol 30% <sup>a</sup>	14.3	14.3
Alkydal F26X resin (60% in xylene) <sup>b</sup>	16.7	16.7
Diisobutyl phthalate	1.5	1.5
Benzylbutyl phthalate	1.5	1.5
Ethyl acetate	18.2	18.2
Butyl acetate	11.1	11.1
PM acetate	—	5.0
Eastman™ IBIB	5.0	—
Ethyl glycol	3.0	3.0
Toluene	12.0	12.0
Xylene	12.0	12.0
Acematte 412 matting agent <sup>c</sup>	1.2	1.2
Baysilone-Lackadditiv OL 17 (1% in xylene) <sup>d</sup>	3.5	3.5

<sup>a</sup>Wolf Walsrode, <sup>b</sup>Bayer, <sup>c</sup>Degussa, <sup>d</sup>Bayer (flow and leveling additive)

**Graph 1**

**Eastman™ IBIB vs. PM acetate König pendulum hardness comparison in clear thermoplastic NC lacquer formulation**



**Comments**

- Non volatile content = 24%
- Formulation with Eastman™ IBIB has <10% higher viscosity in the finished paint which did not appear to be excessive
- Gloss readings on black Lenata PVC panels show only marginal difference
- No significant difference in hardness development over 350 hours

**Table 3**  
**Clear thermoplastic CAB acrylic air-drying lacquer formulation #2**

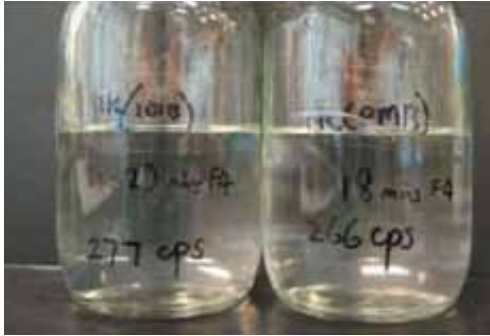
Component	With Eastman™ IBIB (Weight %)	With PM acetate (Weight %)
Paraloid B-66, 50% in xylene <sup>a</sup>	30	30
Eastman™ cellulose acetate butyrate (CAB-381-2) 20% in butyl acetate	35	35
MIBK	10	10
Butyl acetate	10	10
Ethanol	5	5
Eastman™ IBIB	10	—
PM acetate	—	10

<sup>a</sup>Rohm & Haas

**Table 4**  
**Measurements and results**

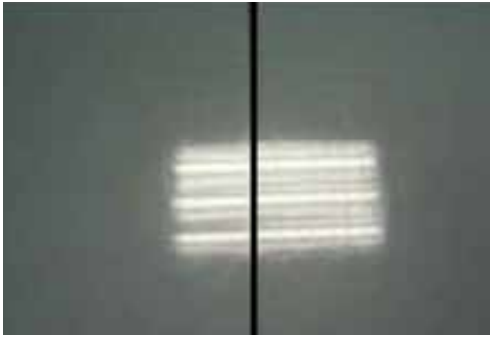
Component	With Eastman™ IBIB (Weight %)	With PM acetate (Weight %)
Viscosity, Ford 4	83 seconds	78 seconds
Viscosity, Brookfield	277 m•P as	266 m•P as
Appearance in wet paint	Clear	Clear
Appearance in dry film	Clear	Clear

**Photo 1**  
Clarity comparison  
Thermoplastic CAB acrylic



With Eastman™ IBIB      With PM acetate

**Photo 2**  
Gloss comparison  
Thermoplastic CAB acrylic



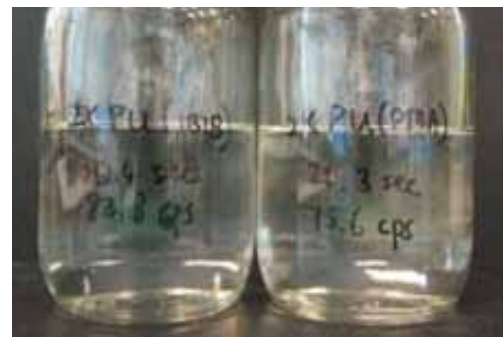
With Eastman™ IBIB      With PM acetate

**Table 6**  
Measurements and results

Component	With Eastman™ IBIB (Weight %)	With PM acetate (Weight %)
Viscosity, Ford 4	26.4 seconds	25.3 seconds
Viscosity, Brookfield	83.8 m·P as	75.6 m·P as
Appearance in Part 1	Clear	Clear
Appearance in dry film with Part 2 - Tolonate HDB <sup>a</sup>	Clear	Clear

<sup>a</sup>Rhodia

**Photo 3**  
Clarity comparison  
2K Polyurethane



With Eastman™ IBIB      With PM acetate

**Photo 4**  
Gloss comparison  
2K Polyurethane



With Eastman™ IBIB      With PM acetate

**Comments**

- Solution viscosities are almost identical
- Similar gloss and film clarity

**Table 5**  
2K Polyurethane clearcoat formulation #3

Component	With Eastman™ IBIB (Weight %)	With PM acetate (Weight %)
Setalux 1753-65xs <sup>a</sup>	61.5	61.5
Eastman™ cellulose acetate butyrate (CAB-551-0.01) 20% in butyl acetate	10	10
Butyl acetate	18.5	18.5
Eastman™ IBIB	10	—
PM acetate	—	10

<sup>a</sup>Nuplex

**Comments**

- Solution viscosities are almost identical
- Similar gloss and film clarity

## Conclusion

Eastman™ IBIB (isobutyl isobutyrate), a versatile “retarder” solvent with a relatively slow evaporation rate, is ideally suited for use in industrial wood coatings. The information detailed in this technical tip illustrates that it can be used as a cost-effective replacement for PM acetate in high-quality wood finishes for a variety of wood coatings applications. For further information on Eastman™ IBIB solvent or any of Eastman's specialty coatings additives, please talk with your Eastman representative.

### Appendix Eastman™ IBIB vs. PM acetate solubility data

Resin type	Resin	Wt %	Eastman™ IBIB	PM acetate
Cellulose nitrate	R 1/2-sec NC	8	100	64
Cellulose acetate butyrate	CAB 381-0.5 <sup>a</sup>	8	I <sup>1</sup>	43
Alkyd	Duramac HS 5720 <sup>b</sup>	65	898	785
Polyester	Polymac HS 5776 <sup>b</sup>	65	212	254
Acrylic	Acrylamac HS 2980 <sup>b</sup>	70	681	671
Acrylic	Paraloid B-66 <sup>c</sup>	40	4150	3000
Urea formaldehyde	Resimene 980 <sup>d</sup>	75	88	86
Melamine formaldehyde	Cymel 303 <sup>e</sup>	50	8	10
Isocyanate	Desmodur N-100 <sup>f</sup>	50	15	18
Hydrocarbon	Eastotac™ 130 <sup>a</sup>	60	73	I <sup>1</sup>
Rosin ester	Pentalyn™ G <sup>a</sup>	40	25	35
Phenolic	Bakelite CK 2400 <sup>g</sup>	40	90	110
Polyvinyl butyral	Butvar B-76 <sup>h</sup>	10	I <sup>1</sup>	PS <sup>2</sup>
Ethylene vinyl acetate	Elvax 40W <sup>i</sup>	20	I <sup>1</sup>	I <sup>1</sup>
Vinyl chloride/vinyl acetate	Ucar VYHH <sup>j</sup>	10	I <sup>1</sup>	I <sup>1</sup>
Epoxy	Epon 1001F <sup>k</sup>	50	I <sup>1</sup>	240
Epoxy	Epon 1007F <sup>k</sup>	40	I <sup>1</sup>	800
Polyamide	Versamid 115 <sup>l</sup>	75	3300	3250

<sup>a</sup>Eastman Chemical Company, <sup>b</sup>Hexion Specialty Chemicals, <sup>c</sup>Rohm & Haas, <sup>d</sup>Ineos, <sup>e</sup>Cytec, <sup>f</sup>Bayer, <sup>g</sup>Union Carbide, <sup>h</sup>Solutia, <sup>i</sup>DuPont, <sup>j</sup>Dow, <sup>k</sup>Resolution Performance Products, <sup>l</sup>Cognis

<sup>1</sup>Incompatible

<sup>2</sup>Partially soluble



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