



#### CYTECH COATINGS PVT. LTD.

SHED NO C-1/3221 & 3223, GIDC  
SARIGAM - 396 195  
TALUKA: UMBERGAON  
DIST: VALSAD, GUJARAT (INDIA)  
T: +91 260 2781321  
E: admin@cytechgroup.in

#### CYTECH COATINGS NIGERIA LTD.

PLOT NO. 76, N.B.C.  
IPAKODO, IGBOGBO ROAD,  
IKORODU LAGOS, NIGERIA.  
T: +234 8109601750 /  
+234 7087034001  
E: admin@cytechgroup.in

#### CYTECH COATINGS FZE.

WARE HOUSE NO. 2, 3 & 4, SHED NO. 24  
INDUSTRIAL PARK, NEAR AL SAQR PORT,  
RAK FREE TRADE AUTHORITY,  
RAK - UAE. P.O. BOX 50355  
E: admin@cytechgroup.in

#### HI-TECH INKS & COATING LTD.

7, CELOSOI ROAD,  
OFF LUNGA-LUNGA ROAD INDUSTRIAL AREA,  
NAIROBI - KENYA  
T: +257 19550019 / + 254 701079317  
E: admin@hi-cl.co.ke



WWW.CYTECHGROUP.IN



Breathtakingly  
Attractive Ink **Colours**

GRAVURE

Flexo  
Inks

Flexible  
Packaging

Resins

SPECIALITY COATINGS

Lamination  
Adhesive

UV  
Coating



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We believe we are well prepared to stand firm and confront challenges ahead despite the intense competition, to create another high peak in our continual growth.



In terms of safety management, put industrial safety, hygiene and fire control as our priority. In addition to continuously improving the safety of the production process.

**SAFETY, HEALTH AND ENVIRONMENTAL POLICY**

Effective training & communication to promote business culture.







## 4 Countries

in our expanding export portfolio

### Sectors catering to

Printing Inks  
Packaging  
Adhesive

### Our key strengths

Stringent adherence to quality standards.

Continuous improvement of the Quality Management System.

Ability to rapidly leverage capacities to manufacture new products.

Unique innovative and highly systematized production technology.

### A SNAPSHOT VIEW



## GRAVURE & FLEXO

### HIPRINT ADONIS INKS

NC based high heat resistance inks suitable for surface printing where oil and deep freeze resistance are required on substrate like treated BOPP, LDPE & PP.

### HIPRINT ATAX INKS

Solvent based surface printing inks suitable for paper printing.

### HIPRINT ASIS INKS

Gravure and Flexo Inks for reverse printing of monoaxially oriented shrinkable PVC films.

### HIPRINT PEONY INKS

Gravure and Flexo surface printing inks on treated films specially for milk pouches, oil pouches and carry bags.

### HIPRINT TULIP INKS

Gravure and Flexo surface printing inks for treated films like treated PP & PE, PVC, Pearlsided BOPP etc.

### HIPRINT AXONA INKS

Flexo surface printing inks for application of HDPE woven sack bags especially for fertilizer grade packing and suitable for roll to bag and bag to bag printing on untreated and treated HDPE.

### HIPRINT AVENS INKS

Water base ink suitable for Flexo printing on various types of paper and board

### HIPRINT AMAZON INKS

PU based Gravure Lamination Inks for various substrate viz PET, CTPET & BOPP.

### HIPRINT AMAZE INKS

Vinyl based Gravure Inks for reverse printing lamination on various substrate viz PET, CTPET, treated BOPP, Coated PVC films etc.

### HIPRINT ALPINE INKS

MEK and Toluene free gravure lamination inks for reverse(with additive) surface printing on substrate like chemically treated BOPP and chemically coated PET.

### HIPRINT AMBER INKS

Gravure Inks for reverse printing and PP extrusion lamination on various substrate like corona treated PET & BOPP films.

### HIPRINT TEMP INKS

NC based gravure surface printing inks where heat resistance are required on various substrate like Foils, Chromo paper, metalised paper, treated BOPP





## HIPRINT AMAZON

PU based lamination ink for various substrate viz PET, CT PET, BOPP.

**Colours:** Standard colours with ARSR and Non-ARSR properties which can be intermixed to get desired shade at the press room level.

**Substrate:** Plain PET, CT PET, Treated BOPP, Nylon & PVC coated films

**Process:** Gravure

**Lamination:** Suitable for solvent-less & solvent-based adhesive lamination.

**Bond Strength:** Excellent bond strength on all laminate structure.

**Solvent Retention:** Amazon is formulated to have the lowest solvent retention confirming to international standards & is suitable for food grade application.

**Solvent System:**

**Reducer:** Ethyl Acetate: N-Propyl Acetate (80:20)

**Retarder:** Methoxy Propanol

**NTNK Ink System**

**Reducer:** Ethyl Acetate: N-Propyl Acetate (60:40)

**Retarder:** Methoxy Propanol

**BOPP Additive:** 6% of this additive is recommended to be added to ink & medium during treated BOPP printing (38-42 Dynes/cm).



### Key Features:

- High colour strength
- High bond strength
- Extremely stable & excellent resolubility, low wastage
- Confirm to International Standard & Specification
- Good Doctor Blade Life
- Suitable for food packaging
- Suitable for higher speed resulting in higher productivity
- Excellent halftone reproduction

## GRAVURE Lamination Inks



## HIPRINT AMAZE

Vinyl based printing ink system for reverse printing lamination.

**Colours:** Standard colours with ARSR and Non-ARSR properties which can be intermixed to get desired shade at the press room level.

**Substrate:** Plain PET, Corona treated PET, Tchemically coated PET, treated BOPP (38 to 42 Dynes/cm), Nylon (38 to 42 Dynes/cm), PVC coated films.

**Process:** Gravure

**Lamination:** Suitable for solvent-less & solvent-based adhesive lamination.

**Bond Strength:** Excellent bond strength on all laminate structure.

**Solvent System:** Reducer: Ethyl Acetate: Toluene (50:50)

**Retarder:** MIBK

**Toluene Free Ink:**

**Solvent System:** Reducer: Ethyl Acetate: N-Propyl Acetate (60:40)

**Retarder:** Methoxy Propanol

### Key Features:

- Excellent printability & resolubility & low wastage
- Excellent halftone reproduction
- High bond strength
- Low solvent retention / low odour
- High strength ink
- Suitable for food packaging
- Excellent doctor blade wipes performance eliminating streaking and haze phenomena.
- Clean and sharp image

## HIPRINT ALPINE

MEK & Toluene free printing ink system for reverse (with additive) surface printing.

**Colours:** Standard colours with ARSR and Non-ARSR properties which can be intermixed to get desired shade at the press room level.

**Substrate:** Corona treated BOPP, MET BOPP, MET PET, Chemically coated PET

**Process:** Gravure

**Lamination:** Suitable for solvent-less & solvent-based adhesive lamination.

**Bond Strength:** Excellent bond strength

**Solvent System:**

**Gravure**

**Reducer:** Ethyl Acetate: IPA (80:20)

**Retarder:** Methoxy Propanol



### Key Features:

- Designed for both reverse printing and surface printing
- Good tape release
- Heat resistant up till 180 deg C/1"
- Good bond strength
- Low solvent retention / low odour
- Excellent reproduction of halftone printing
- Good crinkle and scratch resistance
- Low inventory being common ink system for both reverse and surface printing

## GRAVURE Lamination Inks



## HIPRINT AMBER

Gravure printing ink system for reverse printing and PP Extrusion lamination.

**Colours:** Standard colours with ARSR and Non-ARSR properties which can be intermixed to get desired shade at the press room level.

**Substrate:** Applicable on Corona treated PET & BOPP films

**Process:** Gravure

**Lamination:** Suitable for PP extrusion lamination

**Bond Strength:** Superior bond strength on PP extrusion lamination

**Solvent System:**

**Gravure**

**Reducer:** Ethyl Acetate: Toluene (50:50)

**Retarder:** MIBK

### Key Features:

- Extremely stable & reusable features, low wastage
- Excellent printability
- High bond strength
- Excellent halftone reproduction
- Low solvent retention / low odour
- High colour strength
- Suitable for extrusion lamination



## HIPRINT TEMP

N C based printing ink system for surface printing where Heat resistance is required

**Colours:** Standard process colours with all Pantone shade which can be further intermixed to get desired shade at the press room level.

**Substrate:** Foils, Chromo paper, Glassine paper, Metalized Paper, Poster paper, treated BOPP, Pearliest BOPP, treated PE, PP, Nylon

**Process:** Gravure

**Solvent System:**

Reducer: Ethyl Acetate : IPA (80:20)

Retarder: Methoxy Propanol

### Key Features:

- High colour strength
- Excellent scuff resistance
- High-Gloss
- Good doctor blade life
- High heat resistance properties (200 deg C)
- Excellent printability and resolubility
- Confirms to international standards and specifications.

## HIPRINT ADONIS

N C based High heat resistance ink suitable for surface printing where oil resistance, deep freeze resistance is required.

**Colours:** Standard process colours with all Pantone shade which can be further intermixed to get desired shade at the press room level.

**Substrate:** Treated BOPP, LDPE, PP

**Process:** Gravure/Flexo(On request the same can be made suitable for printing by Flexo process)

**Lamination:** Suitable for solvent-less & solvent-based adhesive lamination.

**Solvent System:**

a) Gravure

Reducer: Ethyl Acetate : IPA (80:20)

Retarder: Methoxy Propanol

b) CI Flexo

Reducer: N-Propyl Acetate : N-Propanol (60:40)

Retarder: Methoxy Propanol

**Remark:**

a) We recommend to apply overcoat after printing for enhanced resistance properties

b) Keep the printed matter for curing for 12-24 hrs

### Key Features:

- High colour strength
- Excellent scuff resistance
- High-Gloss
- Good doctor blade life
- High heat resistance properties (180°C)
- Excellent printability and resolubility
- Confirms to international standards and specifications.

## HIPRINT ATAX

This ink is formulated for solvent-based suitable for paper printing and label printing.

**Colours:** Standard process colours with all Pantone shade which can be further intermixed to get desired shade at the press room level.

**Substrate:** Paper & Metalized paper

**Application:** Cigarette packs, Label printing, paper bags, chocolate & food wrappers

**Process:** Gravure

### Key Features:

- High colour strength
- Excellent Dot reproduction
- High quality & fine line printing
- Bright & excellent print sharpness
- Confirms to international standards and specifications





## HIPRINT ASIS

Printing ink system for reverse printing PVC shrink films.

**Colours:** Besides the standard process and standard colours, matching can be made available.

**Substrate:** Applicable on mono axially oriented shrinkable PVC films.

**Process:** Gravure System

**Application:** Flexible packaging for confectionery and general purpose product shrink sleeves printing on Shrink PVC.

### Solvent System:

#### a) Gravure

Reducer: Toluene : Ethyl Acetate : IPA (60:20:20)

Retarder: Butyl Acetate / Methoxy Propanol

#### b) Toluene Free NK

Reducer: Ethyl Acetate : N-Propyl Acetate (60:40)

Retarder: Butyl Acetate / Methoxy Propanol

### Key Features:

- Excellent reproduction of halftone
- Clean sharp image
- Good flow of ink
- Good solvent release



## HIPRINT AVENS

For Flexo printing ink systems. Water-based ink suitable for printing on various types of paper and boards.

**Colours:** Besides the standard process and standard colours, matching can be made available.

**Substrate:** Paper (Coated & Uncoated), Kraft Paper

**Process:** Flexo

### Solvent System:

Reducer: Water

Retarder: Glycols



### Key Features:

- Good ink transfer
- Rapid drying
- High colour strength
- Confirming to International standards and specifications

## HIPRINT PEONY

Flexo/Gravure surface printing ink system on treated films specifically for milk pouches, oil pouches & carry bags

**Colours:** Besides the standard process and standard colours, matching can be made available.

**Substrate:** Applicable on treated, multi-layer polyethylene films, PP, PE, MET PVC, MET BOPP, MET PET, Pearlsed BOPP

### Solvent System:

#### a) Gravure

Reducer: Toluene : IPA (60:40)

Retarder: N-Propanol / N-Butanol

#### b) Flexo

Reducer: IPA : N-Propanol (70:30)

Retarder: N-Propanol / N-Butanol

**Overprint Varnish:** OPV is recommended for better product resistance.



### Key Features:

- Good wrinkle and scratch resistance
- Designed especially for fat resistance/milk resistance
- Good gloss and press stability
- Heat resistance: 110 deg C
- Suitable for snacks & milk packaging on treated PE
- Excellent reproduction of halftone even at high speed. Clean and sharp image
- Good solvent release, quick-drying and excellent blocking resistance

## Surface inks for Nylon Surface



## HIPRINT TULIP

Printing ink system for reverse printing PVC shrink films.

**Colours:** Besides the standard process and standard colours, matching can be made available.

**Substrate:** Treated PP & PE, PVC, Cellophane, Metallic PVC / BOPP / PET, Pearlsed BOPP

### Solvent System:

#### a) Gravure

Reducer: Toluene : IPA (70:30)

Retarder: N-Propanol / N-Butanol

#### b) Flexo

Reducer: Toluene : IPA (70:30)

Retarder: N-Propanol / N-Butanol

### Key Features:

- Designed especially for good adhesion to several substrates
- Good wrinkle and scratch resistance
- Good water resistance on treated substrates
- Excellent printability and resolubility
- Excellent reproduction of halftone even at high speed
- Clean and sharp image.



## HIPRINT AXONA

For Flexo printing ink systems, Surface printing application on HDPE woven sacks especially for fertilizer grade packing, suitable for roll to bag and bag to bag printing.

**Colours:** Beside the standard process and standard colours, matching can be made available.

**Substrate:** Untreated & treated HDPE

**Process:** Flexo

**Solvent System:**

Reducer: IPA : N-Butanol (50:50) or Axona Reducer CCPL-8643

Retarder: N-Propanol / N-Butanol



### Key Features:

- Good printability and resolubility
- Good nail and scuff resistance
- Good gloss
- High colour strength
- Confirming to International standards and specifications
- Adhesion on treated and untreated substrate HDPE



### Healthy & Safety

Read the Health & Safety Guideline before using these products. The user is responsible for all local requirements and packaging conditions.

### Ink Handling

Please refer to general guidelines for handling inks for all packaging.



## Lamination Adhesives

### LAMINATION ADHESIVE- SOLVENT BASE

**PRODUCT:** HILAM GP-50, HILAM GP-100, HILAM HP-200  
Two component solvent based polyurethane adhesive system for general lamination of various films like aluminium foil, paper etc

### LAMINATION ADHESIVE- SOLVENT LESS

**PRODUCT:** HILAM SL-300, HILAM SL-400  
Two component solventless polyurethane eco-friendly, nontoxic adhesive system for general lamination of various films and aluminium foil.

### LAMINATION ADHESIVE- WATER BASE

**PRODUCT:** HILAM WB-300  
Single component aqueous acrylic resin based dry bond lamination adhesive.



## HILAM GP-50

### Description

HILAM GP-50 + GP-50H system is two-component solvent bases polyurethane adhesive system for general lamination of various films, aluminium foil and paper etc. HILAM GP-50 offers excellent adhesion and good bond strength on metalized films. It is very suitable for food packaging and non-aggressive dry products packaging.

| Physical Properties                     | HILAM GP-50               | HILAM GP-50H              |
|---|---------------------------|---------------------------|
| Product Description                     | Main Adhesive             | Hardener (Curing Agent)   |
| Appearance                              | Colourless to Pale Yellow | Colourless to Pale Yellow |
| Solid Contents                          | 80±2%                     | 75±2%                     |
| Typical Properties                      | OH.                       | NCO.                      |
| Viscosity by Brookfield Viscometer 25°C | 4000-5000 cps             | 500-700 cps               |
| Diluents                                | Ethyl Acetate             | Ethyl Acetate             |
| Clarity                                 | Clear                     | Clear                     |
| Odour                                   | Odourless once dried      | Odourless once dried      |
| Mixing Ratio                            | 100 part by weight        | 15 part by weight         |
| Shelf life                              | 6 months                  | 6 months                  |

### Mixing ratio:

It is recommended that the mixing ratio and mixed adhesive be diluted with ethyl acetate or acetone and MEK with the minimum water content of 0.1% to a solid content as such as: 1. Especially provides for lamination PET to Paper is mixing ratio 100 parts by weight of GP-50 to 15 parts by weight of GP-50H with a solid content of 25-35%



| Solid Content (%) | HILAM GP-50 | Hardener GP-50H | Ethyl Acetate | Viscosity Fc84.5 sec | Total |
|-------------------|-------------|-----------------|---------------|----------------------|-------|
| 60                | 100         | 15              | 38            | 23-28                | 153   |
| 30                | 100         | 15              | 188           | 15-18                | 303   |
| 25                | 100         | 15              | 250           | 14-16                | 365   |

2. For general Lamination of OPP//PET, PET//LLDPE, PET//Alu//CPP, etc. That the mixing ratio should be 100 parts by weight of GP-50 to 15 parts by weight of GP-50H with a solid content of 30-40%.

### Application areas

HILAM GP-50 + GP-50H is recommended for laminating substrates for flexible packaging for soap wrappers, snack foods, bread, coffee, chocolate, milk, meat, cheese and non-aggressive dry products packaging, etc. Lamine substrates used are BOPP, PET, Metalized film, CPP, LLDPE, Aluminum foil paper etc.



## HILAM GP-100

### Description

HILAM GP-100 + GP-100H system are two component solvent bases polyurethane adhesive system for general lamination of various films, aluminum foil and paper etc. HILAM GP-100 especially provides for metalized film lamination by excellent adhesion and good bond strength, its very suitable for food packaging and non aggressive dry products packaging.

| Physical Properties                     | HILAM GP-100              | HILAM GP-100H             |
|---|---------------------------|---------------------------|
| Product Description                     | Main Adhesive             | Hardener (Curing Agent)   |
| Solid Contents                          | 80±2%                     | 75±2%                     |
| Appearance                              | Colourless to Pale Yellow | Colourless to Pale Yellow |
| Typical Properties                      | OH.                       | NCO.                      |
| Viscosity by Brookfield Viscometer 25°C | 5000-8000 cps             | 500-700 cps               |
| Diluents                                | Ethyl Acetate             | Ethyl Acetate             |
| Clarity                                 | Clear                     | Clear                     |
| Odour                                   | Odourless once dried      | Odourless once dried      |
| Mixing Ratio                            | 100 part by weight        | 12 part by weight         |
| Shelf life                              | 6 months                  | 6 months                  |

### Mixing ratio:

It is recommended that the mixing ratio and mixed adhesive be diluted with ethyl acetate or acetone and MEK with the minimum water content of 0.1% to a solid content as such as: 1. Especially provides for lamination film to metalized film is mixing ratio 100 parts by weight of GP-100 to 12 parts by weight of GP-100H with solid content of 25-35%



| Solid Content (%) | HILAM GP-100 | Hardener GP-100H | Ethyl Acetate | Viscosity Fc84.5 sec | Total |
|-------------------|--------------|------------------|---------------|----------------------|-------|
| 25                | 100          | 12               | 244           | 13-14                | 356   |
| 30                | 100          | 12               | 185           | 14-15                | 297   |
| 25                | 100          | 12               | 143           | 15-16                | 255   |

2. For general Lamination of OPP//PET, PET//LLDPE, PET//Alu//CPP, etc. That the mixing ratio should be 100 parts by weight of GP-100 to 15 parts by weight of GP-100H with a solid content of 30-40%.

### Application areas

HILAM GP-100 + GP-100H is recommended for laminating substrates for flexible packaging for snack foods, bread, coffee, chocolate, milk, meat, cheese and non aggressive dry products packaging, etc. Lamine substrates used are BOPP, PET, Metalized film, CPP, LLDPE, Aluminum foil, paper etc.





## HILAM HP-200

### Description

HILAM HP-200 + HP-200H is highly versatile of two component solvent bases polyurethane adhesive system for high Performance laminates of various films including OPP, PET, Nylon, Cellophane, PS, PVC, Foil, LLDPE, PVDC coated film and paper etc. It offers excellent chemicals and heat resistance with very high bond strength and especially provides excellent performance for boil, hot fill and retort packaging.

| Physical Properties                     | HILAM HP-200              | HILAM HP-200H             |
|---|---------------------------|---------------------------|
| Product Description                     | Main Adhesive             | Hardener (Curing Agent)   |
| Solid Contents                          | 80±2%                     | 75±2%                     |
| Appearance                              | Colourless to Pale Yellow | Colourless to Pale Yellow |
| Typical Properties                      | OH.                       | NCO.                      |
| Viscosity by Brookfield Viscometer 25°C | 4000-6000 cps             | 500-700 cps               |
| Diluents                                | Ethyl Acetate             | Ethyl Acetate             |
| Clarity                                 | Clear                     | Clear                     |
| Odour                                   | Odourless once dried      | Odourless once dried      |
| Mixing Ratio                            | 100 part by weight        | 12 part by weight         |
| Shelf life                              | 6 months                  | 6 months                  |

### Mixing ratio:

Its recommended that the mixed adhesive be diluted to a solid content as such as:

For dry lamination the mixed adhesive to be diluted to a solid content of 30 to 40%, mixing and dilution chart with viscosities (in kilograms)



| Solid Content (%) | HILAM HP-200 | Hardener HP-200H | Ethyl Acetate | Viscosity FcB4.5 sec | Total |
|-------------------|--------------|------------------|---------------|----------------------|-------|
|                   | 100          | 15               | 189           | 13-14                | 304   |
|                   | 100          | 15               | 147           | 18-19                | 261   |
|                   | 100          | 15               | 113           | 28-29                | 228   |

### Application areas

HILAM HP-200 + HP-200H is recommended high performance lamination especially for flexible packaging used for boil, hot fill, retort, acidic liquids, chemicals, paste pouching and aggressive goods packed in film to film to foil lamination.



## HILAM SL-300

### Description

HILAM SL-300+ SL-300H solvent less adhesive system based on polyurethane is a two component, its typical application for general lamination of various films and aluminum foil and it especially provides eco friendly performance, non toxic, has good adhesion and suitable for packaging snack, coffee, chocolate, milk cheese, meat and other non aggressive dry products.

| Physical Properties                     | HILAM SL-300           | HILAM SL-300H             |
|---|------------------------|---------------------------|
| Product Description                     | Main Adhesive          | Hardener (Curing Agent)   |
| Solid Contents                          | 100%                   | 100%                      |
| Appearance                              | Colourless transparent | Colourless to Pale Yellow |
| Typical Properties                      | NCO.                   | OH.                       |
| Viscosity by Brookfield Viscometer 25°C | 800-1200 cps           | 800-1200 cps              |
| Clarity                                 | Clear                  | Clear                     |
| Odour                                   | Low Odour              | Low Odour                 |
| Mixing Ratio                            | 100 part by weight     | 40-60 parts by weight     |
| Shelf life                              | 6 months               | 6 months                  |



### Application areas

- Oriented Polypropylene / Metalized oriented polypropylene
- Oriented Polyamide / Polyethylene
- Metalized Polyester / Polyethylene
- Metalized Polypropylene / Polyethylene
- Polyester / Aluminum foil
- Aluminum foil / Low density polyethylene
- Polyester / Low density polyethylene



## HILAM SL-400

### Description

HILAM SL-400+ SL-400H solvent less adhesive system based on polyurethane is a two component, its typical application for general lamination of various films and it especially provides eco friendly performance, non toxic, has good adhesion and suitable for packaging snack, coffee, chocolate, milk cheese, meat and other non aggressive dry products.

| Physical Properties                     | HILAM SL-400              | HILAM SL-400H             |
|---|---------------------------|---------------------------|
| Product Description                     | Main Adhesive             | Hardener (Curing Agent)   |
| Solid Contents                          | 100%                      | 100%                      |
| Appearance                              | Colourless to Pale Yellow | Colourless to Pale Yellow |
| Typical Properties                      | NCO                       | OH                        |
| Viscosity by Brookfield Viscometer 25°C | 1500-2000 cps             | 1000-1500 cps             |
| Residual Solvents                       | No                        | No                        |
| Clarity                                 | Clear                     | Clear                     |
| Odour                                   | Low Odour                 | Low Odour                 |
| Mixing Ratio                            | 100 part by weight        | 40-60 part by weight      |
| Shelf life                              | 6 months                  | 6 months                  |



### Application areas:

- Oriented Polypropylene / Metalized oriented polypropylene
- Oriented Polyamide / Polyethylene
- Metalized Polyester / Polyethylene
- Metalized Polypropylene / Polyethylene
- Polyester / Low density polyethylene

### Application Guide

#### 1. Coating Method

HILAM adhesive is applied on all dry laminating machines with gravure roll coating or cylinder coating. Only in case of HILAM SL-300, SL-400 solventless adhesive is applied on special laminating machines with Roller.

#### 2. Drying / Adhesive Temperature

With dry chamber temperature or drying web temperature of 65°C and combining with Nip roll temperature of 65°C - 95°C are recommended to completely remove the solvent carrier. Ensure complete removal of solvent. To prevent retention, drying condition has to be adjusting to a substrate, application weight and machine speed. In case of HILAM SL-300, SL-400 the thermostatic temperature control on the metering rollers should be set to 40°C - 45°C and the temperature transferring roll is about 45 deg C - 50°C, the adhesive temperature must be checked with a thermometer to ensure the temperature of adhesive also remains 40°C - 45°C. High laminating temperatures together with a high line pressure of calendar improve the bond strength and optimal appearances of laminated properties.

#### 3. Coating weight / Deposit weight

##### a) Coating weight for Dry Lamination:

For normal applications, the dry adhesive coating weight may range from 2-2.8 gsm for HILAM GP-50, 2-2.5 gsm for HILAM GP-100, 2.5-3.0 gsm for HILAM HP-200, 1.0-3.0 gsm for HILAM SL-300 & SL-400, depending on the film or foil combination and the end-use of the laminates. However, for the specific application like in thicker / porous substrate (such as paper and board), higher coating weight from 3.0 to 3.5gsm of dry adhesive recommended for GP-50, GP-100, HP-200. However SL-300, in printed laminates the weight has to be adjusted accordingly.

If the coating weight of the adhesive which is coated on films is too small, then the appearance will not be clear and will look like bubble, floating, roll mark, the bond strength will not be enough either; and just the opposite, if the coating weight is too-much than the appearance of the film, will be blur and will look like tunnelling, wrinkled, shrunk etc.



### Substrate

Deposit: Unprinted or lightly webs

Heavily printed webs or thicker substrate

### Recommended dry Adhesive

2-2.5 gsm (for HILAM GP-50, GP-100)  
2.5-3.5 gsm (for HILAM HP-100, HP-200)  
up to 3-3.5 gsm (for HILAM GP-50, GP-100)  
up to 3.5-4.5 gsm (for HILAM HP-100, HP-200)

### b) Coating weight for extrusion coating lamination in case of HP Series:

The adhesion coating weight may range from 1.0-1.5 gsm.

### 4. Speed Line

Fastest line speed 60-150 m/min (for HILAM GP-50, GP-100, HP-100, HP-200) Fastest line speed 150-250 m/min (for HILAM SL-300, SL-400)

### 5. Ageing Time

48 hours at approx 50 deg C - 60°C at ageing room for HILAM GP-50, GP-100, SL-300 & SL-400 and in case of HILAM HP-100 & HP-200 48 hours at approx 50 deg C - 60°C at ageing room for snacks food or dry products packaging 72-96 hours at 50 deg C-60 deg C at ageing room for boil and retort packaging.

### 6. Curing time

The laminate can be process rewound and slit after 1-2 days for triplex laminates is possible 24 hours after the duplex production. Good lamination bond is achieved within 7-12 days after lamination of storage at room temperature.



## 7. Use recommendation

For HILAM GP-50, GP-100, HP-100, HP-200, SL-300, SL-400:

The bonding strength makes a difference according to each film, even the source materials of film are same, but their bonding strength can be quite different and beside additives and slip agents on polyethylene and polypropylene film, aggressive ingredients, printing inks, corona treatment and film coating are of significant importance for the final performance properties.

All the polyolefin films must be treated before lamination and treated surface to used lamination. The recommended treatment level is 38-40 dynes per centimetre to achieve minimum required surface wet ability level.

Since the ingredients in films and inks may interfere with the good performance of this adhesive, customers are strongly recommended to carefully test before using it in production, to check its suitability for every end-user requirement.

Only for SL-300, SL-400, Precise web tension control together with a suitable winding avoids delaminations as well as telescoping and curling etc.

Please use after completed mixing of adhesive & hardener. Should not reuse leftover mixed adhesive. Avoid contamination of alcohol and water from adhesive.

## 8. Pot Life:

For HILAM GP-50, GP-100, HP-100: The pot life of mixed adhesive is 12-24 hours depending on the temperature and the quantity of the mixture. For SL-300, SL-400: The pot life of mixed adhesive is more than one hour.



## 9. Cleaning

For HILAM GP-50, GP-100, HP-100: The application system of the equipment should be cleaned with a solvent after every operation. Special care should be taken to avoid adhesives drying and curing in the cells of the gravure application cylinder.

For SL-300, SL-400: When the lamination machine stops for more than 30 mins, the coating unit has to be cleaned with solvent to observe safety precautions of roller coating from damage.

## 10. Storage / Caution & Safety

The adhesive and hardener must be stored in direct sunlight or flame or spark source and stored in the place where cool, dry and well ventilated and keep stored in the original unopened and undamaged container. Opened containers of the material have to be closed immediately and the material should be consumed within a short period. Avoid contact with skin and eyes. Safety regulations concerning handling of materials as well as material safety data sheets have to be followed.

## 11. Standard packing

Available in 200 kgs/barrel or 50 kgs/barrel and H-series in 24 kgs/pail or 6 kgs/can.



## HILAM WB-300

### Description

HILAM WB adhesive is formaldehyde free acrylic or water based acrylic adhesive designed for dry bond laminating adhesive. Dry bond lamination is the process of coating an adhesive with heat and air flow and then laminating the adhesive to a second substrate via a heat compression nip. Specially designed for manufacture of flexible laminates used for dry food and beverage packaging. Its also recommended for non food packaging that similar film and performance requirements apply.

HILAM WB 300 is single component that has good adhesion and flexible film. It has low viscosity that is very suitable for high speed machine.

| Physical Properties          | HILAM WB    |
|------------------------------|-------------|
| Ph                           | 6.5-7.5     |
| Viscosity, cps, Brookfield   | Max 50      |
| Solid content, %by wt        | 44+/-1      |
| Specific gravity (25°C)      | 1.045-1.065 |
| Storage stability 72°F(22°C) | 6 Months    |
| Toxicity                     | Non Toxic   |



### Features and Benefits

- Formaldehyde free
- FDA 175.105 compliance
- Good adhesion to metalized film
- High bonding strength
- Adhesion to wide variety of films
- Excellent film clarity
- Low odour
- Exhibit very low foaming
- Compatible with PVDC coated films
- Fast in line speed
- Dry laminating adhesive
- Can be run in general at lower coat weight compared with solvent-based adhesive

### Application areas

- PET / VMCPP
- PET / Art paper
- OPP / VMCPP
- OPP / Art paper



## HILAM WB-200

### Description

HILAM WB 200 adhesive is formaldehyde free acrylic or water based acrylic adhesive designed for dry bond laminating adhesive. Dry bond lamination is the process of coating an adhesive with heat and air flow and then laminating the adhesive to a second substrate via a heat compression nip. Specially designed for manufacture of flexible laminates used for dry food and beverage packaging. Its also recommended for non food packaging that similar film and performance requirements apply.

HILAM WB 300 is single component that has good adhesion and flexible film. It has low viscosity that is very suitable for high speed machine.

| Physical Properties          | HILAM WB    |
|------------------------------|-------------|
| Ph                           | 6.5-7.5     |
| Viscosity, cps, Brookfield   | Max 50      |
| Solid content, %by wt        | 43+/-1      |
| Specific gravity (25°C)      | 1.045-1.065 |
| Storage stability 72°F(22°C) | 6 Months    |
| Toxicity                     | Non Toxic   |

### Use recommendation

Hilam WB recommended dry coating weight of 2.5-3.0gr/m<sup>2</sup> for laminations, higher coating weight will be necessary for various demanding applications. Temperature is necessary to remove water and exiting web temperature of 70-100 deg C is recommended.

### Storage / Caution & Safety

The adhesive and hardener must be stored in direct sunlight or flame or spark source and stored in the place where cool, dry and well ventilated and keep stored in the original unopened and undamaged container. Opened containers of the material have to be closed immediately and the material should be consumed within a short period. Avoid contact with skin and eyes.

### Standard packing

HILAM WB is available in 200 kgs/barrel or 50 kgs/barrel

## Lamination Adhesives

### Water Based



### Features and Benefits

- Formaldehyde free
- FDA 175.105 compliance
- Good adhesion to metalized film
- High bonding strength
- Adhesion to wide variety of films
- Excellent film clarity
- Low odour
- Exhibit very low foaming
- Compatible with PVDC coated films
- Fast in line speed
- Dry laminating adhesive
- Can be run in general at lower coat weight compared with solvent-based adhesive

### Application areas

- PET / VMCP
- OPP / VMCP



# RESINS

### HIPACK PLASTICIZING POLYURETHANE RESIN

**PRODUCT : HIPACK 115, HIPACK 116, HIPACK 118, HIPACK 119 & HIPACK 171L**

Hipack plasticizing polyurethane resins are used in Flexo and Gravure Inks for adhesion promoting and flexibility to resins for other film forming binders. The resins improves hardness, gloss, blocking resistance and colour strength of inks.

### HIFILM FILM FORMING POLYURETHANE RESIN

**PRODUCT : HIFILM 135, HIFILM 140, HIFILM 141, HIFILM 142**

Hifilm polyurethane resins are used in Flexo and Gravure Inks for high flexibility, low tack property and reducibility with alcohol and esters.

### POLYKETONE RESIN

**PRODUCT : HIREZ KR-100, HIREZ KR-SP, HIREZ KR-500, HIREZ KR-1000, HIPLEX 1717H**

Polyketone resins are clean, pale and straw to water white resins soluble in ethanol and exceptionally compatible with film forming polymers like Nc, Vinyl, Acrylics etc. It is widely used in inks and coatings to impart pigment wetting and enhance adhesion and gloss.

### POLYAMIDE RESIN

**PRODUCT : HIMIDE 2010, HIMIDE 9030, HIMIDE 6010, HIMIDE 1002/H**

Polyamide resins are traditionally inks binder particularly suitable for gravure inks for improving block resistance, water resistance and solvent release.

### MALEIC RESIN

**PRODUCT : MR150, MR 190, MR 200**

Maleic resin are soluble in alcohol and highly compatible with various solvents including coal tar oil, ester, vegetable oil and turpentine oil. Resins are used in flexo and gravure inks to improve gloss, hardness drying speed and abrasion resistance

### ADHESION PROMOTER

**PRODUCT : HIAID 250**

Adhesion promoter is suitable for high quality printing application with special advantage of low odour and colour.



## General Properties of Series of Polyketone Resins

### Polyketones:

Cytech's Polyketones are clear, pale, straw to water white resins which are very soluble in ethanol and exceptionally compatible with film-forming polymers such as nitrocellulose, vinyl, acrylics and polyamide resin.

### Structure:

As polymeric condensation products of cyclohexanone and formaldehyde, these resins exhibit certain distinctive qualities based upon their chemical structure. The saturated ring structures that form during condensation account for gloss, hardness and for resistance to degradation and colour loss in sunlight. Besides, the reaction with formaldehyde introduces polarity in the form of hydroxyl groups which accounts for desirable solubility and compatibility characteristics. Hydroxyl polarity introduces qualities of pigment wetting and adhesion, as well as reactive sites of interest in various curing systems.

### In Coatings:

Especially useful in clear colour stable lacquers. Quality of adhesion, gloss, levelling and percent nonvolatile in nitrocellulose lacquers can be materially improved. Improves the general utility and performance of paper coating lacquers. Extra hardness and faster solvent release are favoured by the higher melt point type.

### In Inks:

Improved pigment wetting, gloss, adhesion, printability and higher solids can be expected when Polyketones are included in gravure and flexographic ink formulations. Gel points of polyamides are reduced and may permit more latitude in the choice of resins. Many adhesion problems on difficult substrates are overcome by the addition of Polyketones. Printing on PVDC-treated cellophane is notable in this respect. Ball-point pen inks are reportedly improved in terms of flow and set. Suggested usage levels are 3-15% of total solids.

### Typical Properties

| Particulars                            | Hi-Rez KR-100       | Hi-Rez KR-SP        | Hi-Rez KR-500       | Hi-Rez KR-1000        |
|--|---------------------|---------------------|---------------------|-----------------------|
| Colour                                 | 1-2                 | 1-2                 | 1-2                 | 1-2                   |
| Appearance                             | Granules            | Granules            | Granules            | Pearl shaped Granules |
| Viscosity (50% in ethanol) Ford Cup #4 | 21 +/- 5 sec @ 30°C | 21 +/- 5 sec @ 30°C | 21 +/- 5 sec @ 30°C | 21 +/- 5 sec @ 30°C   |
| Softening Range                        | 95-105°C            | 95-105°C            | 105-110°C           | 105-110°C             |
| Hydroxyl Value                         | 160-180             | 180-200             | 160-180             | 160-180               |
| Add Value                              | <1.0                | <1.0                | <1.0                | <1.0                  |

### Compatibility's Series of Polyketone Resins

|  | Hi-Rez KR-100 | Hi-Rez KR-SP | Hi-Rez KR-500 | Hi-Rez KR-1000 |
|--|---------------|--------------|---------------|----------------|
| Polyvinyl Chloride or Acetate              | ✓             | ✓            | X             |                |
| Polyvinyl Butyral                          | ✓             | ✓            | ✓             | ✓              |
| Copolymer of Vinyl Chloride Acetate        | X             | X            | ✓             | ✓              |
| Nitrocellulose, Ethyl                      | ✓             | ✓            | ✓             | ✓              |
| Cellulose Acetate, Cellulose Acetobutyrate | X             | X            | X             | X              |
| Natural and Synthetic Rubber               | ✓             | ✓            | ✓             | ✓              |
| Chlorinated Rubber                         | X             | X            | ✓             | ✓              |
| Short Oil Alkyds, Ureas and Melamines      | ✓             | ✓            | X             | X              |
| Chlorinated Rubber Epens                   | ✓             | ✓            | X             | X              |
| Acryloid A-10, B-44                        | ✓             | ✓            | X             | X              |
| Acryloid B-66                              | ✓             | ✓            | X             | X              |
| Polyamide Resin                            | ✓             | ✓            | ✓             | ✓              |

✓ Compatible  
X Non Compatible

## Polyketone Resin - Hi-Rez KR-100, Hi-Rez KR-SP, Hi-Rez KR-500, Hi-Rez KR-1000, HIPLEX 1717H

### Introduction:

**Hi-Rez KR-100** is a transparent solid granules, alcohol soluble, aldehyde-ketone resin having a broad range of compatibility. Hi-Rez KR-100 offers very good solubility in spirit & very good compatibility with shellac. **Hi-Rez KR-SP** is a pale coloured, alcohol soluble, aldehyde-ketone resin having a broad range of compatibility. Hi-Rez KR-SP is an improved version of Hi-Rez KR-100, with a low hydroxyl value. Hi-Rez KR-SP offers very good solubility in spirit. Both Hi-Rez KR-100 & Hi-Rez KR-SP are suitably formulated combination of Hi-Rez KR-100 & Hi-Rez KR-SP respectively with nitrocellulose resin and addition of phthalate plasticizers with a certain proportion of polyurethane resin can be used for flexographics & gravure printing inks, ball point inks, preparation of polishers, polishing varnishes and lacquers for the surface treatment of wood & paper lacquers. This unique chemistry significantly improves adhesion, pigment wetting & gloss. Typical usage levels range from 3% to 15% of total formulation. Inks and coatings utilizing Hi-Rez KR-100 show improved inner-coat adhesion, offers a good light fastness to inks, ideal for base primers or coatings. Being low in viscosity, it permits the formulation of high solids, coating and the reduction of high viscosity polymers.

**Hi-Rez KR-500** is a ketone with higher hydroxyl value. It imparts improved heat resistance & better blocking resistance. Its high degree of polarity & the unique chemistry significantly improves adhesion, pigment wetting & gloss. The solvent release is the fastest with Hi-Rez KR-500. Typical usage levels range from 3% to 15% of the total formulation. Inks and coatings utilizing Hi-Rez KR-500 show improved inner-coat adhesion, offers a good light fastness to inks, ideal for base primers or coatings.



**Hi-Rez KR-1000** is a pearl shaped solid granule, which offers very good light fastness, neutral reaction and resistance to saponification of synthetic resin. Hi-Rez KR-1000 is very much suitable for flexographic inks, gravure inks & ball point pen inks due to its high viscosity, high softening range, excellent thixotropic property & excellent solubility. Compatibility with shellac and hardness are the useful factors of Hi-Rez KR-1000 for the preparation of paper lacquers, polishers, polishing varnishes and lacquers for the surface treatment of wood; suitable formulated combination of synthetic resin Hi-Rez & nitrocellulose containing in addition to phthalate plasticizers. A certain proportion of alkyd resins are suitable for wood lacquers and distinguished for their elasticity and resistance to the cold check test.

**HIPLEX 1717H** is widely used in flexographic and gravure inks due to its high viscosity, high softening range, excellent thixotropic property & excellent compatibility with shellac, nitrocellulose and Polyurethane.



## Typical Applications

### Hi-Rez KR-100 & Hi-Rez KR-SP

- Hi-Rez KR-100 is the best option & is very suitable for use in lamination inks, paper inks, paper coating, flexographic & gravure ink formulations.
- Flexo & gravure inks
- Paper inks
- Ballpoint pen inks
- Wood primer
- Paper coatings
- Surface coatings
- Nail varnishes
- Vinyl sealers & coatings

### Hi-Rez KR-500

- Hi-Rez KR-500 is the best option & is very suitable for use in lamination inks, paper inks, paper coating, flexographic & gravure ink formulations.
- Cellulose lacquers
- Nail varnishes
- Vinyl sealers
- Ballpoint inks
- Surface coatings

### Hi-Rez KR-1000

- Hi-Rez KR-SP is the best option & is very suitable for use in lamination inks, paper inks, paper coating, flexographic & gravure ink formulations.
- Flexographic inks
- Gravure inks
- Ball point inks
- Paper coatings
- Wood lacquers & polishing varnishes
- Surface coatings

### HIPLEX 1717H

- Best suitable for use in flexographic inks, gravure inks, paper coating & wood lacquers.

## Typical Properties

### Hi-Rez KR-100, Hi-Rez KR-SP & Hi-Rez KR-500

| Properties                              | Results                 |
|---|-------------------------|
| Colour (Gardener Scale)                 | 1-2                     |
| Appearance                              | Solid granules          |
| Viscosity (50% in ethanol) Ford Cup B-4 | 21 +/- 5 sec @ 30 deg C |
| Softening range (Capillary method)      | 95-110 deg C            |
| Hydroxyl value                          | 160-200                 |
| Acid value                              | <1                      |

### Hi-Rez KR-1000

| Properties                              | Results                 |
|---|-------------------------|
| Colour (Gardener Scale)                 | 1-2                     |
| Appearance                              | Pearl shaped granules   |
| Viscosity (50% in ethanol) Ford Cup B-4 | 25 +/- 5 sec @ 30 deg C |
| Softening range (Capillary method)      | 105-110 deg C           |
| Hydroxyl value                          | 160-180                 |
| Acid value                              | <1                      |

### HIPLEX 1717H

| Properties                              | Results                 |
|---|-------------------------|
| Colour (Gardener Scale)                 | 2-3                     |
| Appearance                              | Pearl shaped flakes     |
| Viscosity (50% in ethanol) Ford Cup B-4 | 30 +/- 5 sec @ 30 deg C |
| Softening range (Capillary method)      | 125-135 deg C           |
| Hydroxyl value                          | 350-370                 |
| Acid value                              | <1                      |

**Solubility of Hi-Rez KR-100, Hi-Rez KR-SP, Hi-Rez KR-500, Hi-Rez KR-1000, HIPLEX 1717H:**  
Ethanol, N-Butanol, Iso-Butanol, Acetone, MEK, Cyclohexanone, MIBK, Phenoxy Glycol, Xylene

**Packaging of Hi-Rez KR-100, Hi-Rez KR-SP, Hi-Rez KR-500, Hi-Rez KR-1000, HIPLEX 1717H:**  
25 kgs sealed packed paper or plastic bags.

**Safety & Handling of Hi-Rez KR-100, Hi-Rez KR-SP & Hi-Rez KR-500 & Hi-Rez KR-1000:**  
All relevant data have been brought up-to-date in the Material Safety Datasheet.



## Introduction to the Himide Range of Non-reactive polyamide Resins

### Himide 2010 Series - Co-solvent Resins

The Himide 2010 series of resins may be considered as the traditional polyamide ink binder. This range is particularly suited for the production of gravure inks and the resins are characteristically be their:

- Excellent resistance to blocking
- Good solvent release
- Poor tolerance to polar solvents
- Poor gelation recovery

### Himide 4030 series - Co-solvent resins

The Himide 4030 series of resins may be considered as the traditional polyamide ink binder. This range is particularly suited for the production of gravure inks and the resins are characterised by their:

- Excellent resistance to blocking
- Good solvent release
- Good water resistance
- Poor tolerance to polar solvents
- Poor gelation recovery

### Himide 6010 Series - Alcohol Reducible Resins

The Himide 6010 series of resins offer properties intermediate between co-solvent and alcohol soluble resins. The range is suited for the production of both gravure and flexographic inks. Compared to co-solvent resins, these resins have:

- Improved tolerance to polar solvents
- Improved gelation resistance
- Good blocking resistance
- Improved compatibility with nitrocellulose



### Himide 9030 series - Alcohol Soluble Resins

The Himide 9030 series of resins offer a wider variety of properties than the co-solvent and alcohol reducible resins. These resins are particularly suitable for the production of flexographic inks but generally require the incorporation of nitrocellulose to optimize performance. The resins offer:

- Excellent tolerance to polar solvents
- Very good compatibility with nitrocellulose
- Poor to good blocking resistance
- Poor to good water resistance
- Low solution viscosities
- High melting points

### Himide 1002/H Series - Alcohol Soluble resins

The Himide 1002/H series of resins offer a wider variety of properties than the co-solvent and alcohol reducible resins. These resins are particularly suitable for the production of flexographic inks but generally require the incorporation of nitrocellulose to optimize performance. The resins offer:

- Excellent tolerance to polar solvents
- Excellent compatibility with nitrocellulose
- Poor to good blocking resistance
- Poor to good water resistance
- Low solution viscosities
- High melting points





## Introduction to the Himide Range of Non-reactive polyamide Resins

### Himide 2010 Series - Co-solvent Resins

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- Good solvent release
- Poor tolerance to polar solvents
- Poor gelation recovery

#### Himide 4030 series - Co-solvent resins

The Himide 4030 series of resins may be considered as the traditional polyamide ink binder. This range is particularly suited for the production of gravure inks and the resins are characterised by their:

- Excellent resistance to blocking
- Good solvent release
- Good water resistance
- Poor tolerance to polar solvents
- Poor gelation recovery

#### Himide 6010 Series - Alcohol Reducible Resins

The Himide 6010 series of resins offer properties intermediate between co-solvent and alcohol soluble resins. The range is suited for the production of both gravure and flexographic inks. Compared to co-solvent resins, these resins have:

- Improved tolerance to polar solvents
- Improved gelation resistance
- Good blocking resistance
- Improved compatibility with nitrocellulose

#### Himide 9030 series - Alcohol Soluble Resins

The Himide 9030 series of resins offer a wider variety of properties than the co-solvent and alcohol reducible resins. These resins are particularly suitable for the production of flexographic inks but generally require the incorporation of nitrocellulose to optimize performance. The resins offer:

- Excellent tolerance to polar solvents
- Very good compatibility with nitrocellulose
- Poor to good blocking resistance
- Poor to good water resistance
- Low solution viscosities
- High melting points

#### Himide 1002/H Series - Alcohol Soluble resins

The Himide 1002/H series of resins offer a wider variety of properties than the co-solvent and alcohol reducible resins. These resins are particularly suitable for the production of flexographic inks but generally require the incorporation of nitrocellulose to optimize performance. The resins offer:

- Excellent tolerance to polar solvents
- Excellent compatibility with nitrocellulose
- Poor to good blocking resistance
- Poor to good water resistance
- Low solution viscosities
- High melting points

## Physical Properties and Applications

| Grade         | Melting Point °C | Viscosity: Sec Ford cup B-4 @ 30°C | Uses                                   | Features   |
|---------------|------------------|------------------------------------|--|--|
| Himide 2010   | 105-115          | 40-60                              | Gravure Inks & Lacquers                | Excellent Solvent Release                            |
| Himide 4030   | 105-115          | 35-60                              | Gravure Inks & Lacquers                | Improved Solubility                                  |
| Himide 6010   | 110-120          | 20-25                              | Gravure & Flexographic Inks & Lacquers | Good gelation resistance and antiblocking properties |
| Himide 9030   | 105-115          | 20-25                              | Flexographic inks                      | Good water resistance and low odour                  |
| Himide 1002/H | 105-115          | 16-24                              | Flexographic inks                      | Good Adhesion on Untreated PP & HDPE                 |

### Information Sheets

#### Himide 2010

##### Description:

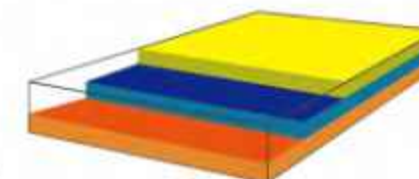
Himide 2010 is a co-solvent thermoplastic polyamide resin designed for use in gravure inks and lacquers. Himide 2010 is the highest viscosity grade of the standard range of Himide non-reactive polyamide resins. The composition of Himide 2010 is similar to that approved under FDA 175.320 - "Resinous and polymeric coatings for polyolefin films."

##### Typical Properties:

|  |                      |
|--|----------------------|
| Acid Value   | max 6 mg KOH/g       |
| Amine Value  | max 6 mg HCL/g       |
| Softening Point (Ball & Ring)  | 105 - 115°C          |
| Solution Viscosity (40% Toluene, 10% IPA & 10% Butanol Ford cup B-4) | 40-60 seconds @ 30°C |

##### Application

Himide 2010 exhibits the properties of the traditional co-solvent group in resins with poor resistance to gelation and low tolerance to polar solvents but excellent solvent release and a good lay. Incorporation of phenolic resin will improve the performance characteristics of the resulting inks or lacquers. For optimum solubility, blends of alcohols and hydrocarbons are recommended.



### Information Sheets

#### Himide 4030

##### Description:

Himide 4030 is an alcohol reducible thermoplastic resin containing wax for specialist applications.

##### Typical Properties:

|  |                        |
|--|------------------------|
| Acid Value   | max 6 mg KOH/g         |
| Amine Value  | max 6 mg HCL/g         |
| Softening Point (Ball & Ring)  | 105 - 115°C            |
| Solution Viscosity (40% Toluene, 10% IPA & 10% Butanol Ford cup B-4) | 35 - 60 seconds @ 30°C |

##### Application

Himide 4030 exhibits good relation resistance and anti-blocking characteristics. Alcohol dilutability is excellent with Himide 4030 being borderline between the alcohol reducible and alcohol soluble types. Himide 4030 has an extremely low odour making it suitable for inks and lacquers where the odour is critical. Coefficient of friction for lacquers made from this resin is typically 0.31 static; 0.295 dynamic.



## Himide 6010

## Description:

Himide 6010 is a medium viscosity alcohol soluble polyamide resin for use in flexographic inks and lacquers, where water resistance is less important.

## Typical Properties:

|   |                      |
|---|----------------------|
| Acid Value  | max 6 mg KOH/g       |
| Amine Value                                       | max 6 mg HCL/g       |
| Softening Point (Ball & Ring)                     | 110 - 120°C          |
| Solution Viscosity                                | 20-25 seconds @ 30°C |
| (IPA 35%, Toluene 15%, Butanol 10%; Ford cup B-4) |                      |

## Application

Himide 6010 exhibits good gelation resistance, compatibility with nitrocellulose and low odour. However, the good anti-blocking characteristics of Himide 6010 allow its use for inks and overprint lacquers where water resistance is not critical.



## Himide 9030

## Description:

Himide 9030 is a co-solvent thermoplastic polyamide resin designed for use in packaging inks and lacquers. Compared to Himide 4030, Himide 9030 has much-improved solubility characteristics, compatibility with nitrocellulose and greater tolerance to alcohol and polar solvents.

## Typical Properties:

|   |                      |
|---|----------------------|
| Acid Value  | max 6 mg KOH/g       |
| Amine Value                                       | max 6 mg HCL/g       |
| Softening Point (Ball & Ring)                     | 105 - 115°C          |
| Solution Viscosity                                | 20-25 seconds @ 30°C |
| (IPA 35%, Toluene 15%, Butanol 10%; Ford cup B-4) |                      |

## Application

Himide 9030 retains the beneficial properties of the traditional co-solvent polyamide resins with the added advantage of improved resistance to gelation and greater tolerance to polar solvents. The compatibility of Himide 9030 with nitrocellulose is much improved to that of other Himide range of products. Incorporation of a phenolic resin will also improve some of the performance characteristics of Himide 9030. For optimum solubility blends of alcohols and hydrocarbons, solvents are required.

## Himide 1002/H

## Description:

Himide 1002/H is a general-purpose low odour alcohol soluble polyamide resin for flexographic packaging inks. Optimum performance requires higher levels of nitrocellulose than Himide 9030.

## Typical Properties:

|   |                        |
|---|------------------------|
| Acid Value  | max 10 mg KOH/g        |
| Amine Value                                       | max 6 mg HCL/g         |
| Softening Point (Ball & Ring)                     | 105 - 115°C            |
| Solution Viscosity                                | 16 - 24 seconds @ 30°C |
| (40% IPA, 10% Toluene, 10% Butanol; Ford cup B-4) |                        |

## Application

Himide 1002/H has excellent nitrocellulose compatibility and optimum performance of ink is obtained with relatively high levels of nitrocellulose. The low odour of Himide 1002/H makes it suitable for food packaging inks. Himide 1002/H complements Himide 9030 and between them they span the normally encountered levels of nitrocellulose with Himide 9030 being suitable for lower levels. A solubility characteristic of Himide 1002/H is excellent and is gelation resistance. Himide 1002/H can be considered as a general-purpose, alcohol soluble resin for flexographic inks.

## Packaging of all Himide Brands:

Available in 25 kg bags normally 500 kg per pallet.

## Shelf life of all Himide Brands:

Store under cool, dry conditions. It is recommended that the material be used within 12 months of certification.

## Handling of all himide Brands:

Himide polyamide resins are not classified as dangerous and present little or no toxic hazard at normal ambient temperatures, providing good standards of industrial and personal hygiene are practised.

However, dust may be produced during handling and the wearing of protective masks and precautions to avoid potential dust explosion etc. are required.

## Properties of Polyamide Ink resins

The properties measured for every development or production resin include those related to the chemistry of resin and those specific to its performance as an ink.

Knowledge of resin chemistry is essential to obtain reproducibility of molecular weight and other physical parameters. Similarly, a knowledge of those properties related to solution and film behaviour is required to ensure that satisfactory ink performance is obtained.

Study of all these properties allows the effect of compositional and process changes on ink performance to be assessed.

All comparisons are made using the resin in unmodified form. For continuity, the modifying resin used is a spirit soluble, 1/8 sec nitrocellulose, which is compatible with all resins at the level used. It is appreciated that many other types of modifying resin is used depending upon the final properties required.

## Resin

## Physical Properties

Melting Point  
Melt Viscosity  
Odour  
Colour

## Chemical Properties

Amine Value  
Acid value

## Ink

## Solution Properties

Viscosity  
Alcohol and Ester Tolerance  
Gelation resistance  
Overnight Stability

## Film Properties

Water Resistance  
(Crinkle and Scratch Resistance)  
Solvent Release  
Anti Blocking  
Tape Adhesion  
Visual Gloss

Full details of the test method are available on request.



## Test Methods for Polyamide Resins

## Softening Point

The softening (or melting) point is measured using the ring and ball method with a heating rate of 5 deg C per minute. The result is expressed in deg C.

## Acid Value

The acid value is determined by titration with 0.1N alcoholic potassium hydroxide solution using phenolphthalein indicator. The results expressed in mg KOH/g of resin.

## Amine Value

The amine value is determined by titration with 0.1N hydrochloric acid using a bromo cresol green indicator. The result is expressed in mg KOH/g of resin.

## Colour

The colour is determined on a 35% nvc solution in n-propanol using a comparator. The results are expressed in terms of the unit on the Gardner scale.



## Test Procedures for Assessing Ink Properties

### Varnish Properties

The varnish properties are determined on a 35% nvc solution of the test resin in n-propanol. The resin is tested unmodified and modified with 20% of an "alcohol soluble" nitrocellulose resin based on resin solids.

### Gel recovery

The gel recovery temperature is the temperature at which the test resin solution becomes liquid after storage at -12 deg C for 16 hours.

### Polar Solvent Tolerance

The solvents used for determining the polar tolerance is either industrial methylated spirit or ethyl acetate. The amount of polar solvent required to precipitate the test resin from solution is determined and the tolerance is expressed as a percentage over the original resin solution (i.e. 1 part resin solution to 1 part polar solvent is 100% tolerance; 1 part resin solution to 1.5 part polar is 150% tolerance).

### Solvent release

The solvent release is measured as the relative drying of the test solution against a fast-drying, high molecular weight co-solvent solution (Himide 831, at 35% nvc in n-propanol). A twin channel grind gauge is used. The result is expressed on an arbitrary scale of 0-10, with the standard expressed as 5.

### Anti Blocking

Anti-blocking is measured as the degree of adhesion between varnish film (varnish to varnish) stored for 16 hours at 40 deg C and 90% relative humidity under a 1 kg weight.

### Ink Properties

the ink properties are determined on flexographic inks made from resin alone and resin-modified with nitrocellulose. The inks are pigmented with phthalocyanine blue at a pigment/binder ratio of 0.36:1

### Water Scratch Resistance

The wet scratch resistance is exposed as the resistance of the film to marring or removal by fingernail after being soaked in water at 25 deg C for 3 hours.

### Water Crinkle Resistance

The wet crinkle resistance is the number of crinkles to remove or damage the film after soaking in water at 25 deg C for 3 hours.



## Recommendations for the Safe Handling of Polyamides

### A. Precautions

#### 1. General

Solid polyamide resins not normally harmful but can present dust hazard.

#### 2. Skin Protection

Not normally harmful

#### 3. Eye Protection

Avoid contact with eyes. Wear eye protection at all times when handling polyamide resins.

#### 4. Respiratory Protection

Avoid breathing dust. Wear suitable dust mask when handling polyamide resins.

#### 5. Protection from Fire and Explosion hazards

The main hazard is represented by dusting from solid polyamide resins. Avoid sources of ignition and take precautions to avoid build-up of static.

Efficient ventilation to minimize dust concentrations is essential. In the event of a fire suitable extinguishers are foam and dry powder carbon dioxide.

Combustion of the resins may yield toxic by-productions; therefore, firefighters should wear suitable protective clothing including breathing apparatus.

#### 6. Environmental considerations

Not normally dangerous for the environment.



## Recommendations for the Safe Handling of Polyamides

### B. first Aid

1. **Skin Contact** - Wash with soap and water.

2. **Eye Contact** - Flush promptly with water for at least 10 minutes. Seek medical attention.

3. **Inhalation** - Immediately take fresh air. seek medical attention.

4. **Ingestion** - Immediately rinse the mouth with plenty of water. Seek medical attention.

### C. Storage

Store away from sources of ignition.

### D. Spillage

Powder spillages should be swept up; avoid causing excessive dust, and placed in closed containers for disposal.

### E. Disposal

All wastage must be disposed of in accordance with the requirements of the Pollution Control Act.

N.B. when the above resins are formulated into end productions, due account must be taken of other constituents of the formulations on their handling hazards.





## Introduction to Polyurethane resins

Polyurethane products first made their appearance in the market place in the late 1930s, these were after an intense investigation by Dr Otto Bayer who was looking for synthetic fibre to replace nylon. Once the basic technology was understood, new applications for foams (1941) and elastomers (1943) were developed. In the early 1950s, commercial applications appeared.

The variety of raw materials, as well as the range of different manufacturing techniques, enabled pioneers to make a seemingly endless of tailor-made products with different physical properties. These include soft foams, rigid structural and insulation foams, soft and hard elastomers and coatings.

Processing techniques include casting, spraying, foaming, reaction injection, moulding injection, moulding extrusion and painting.

OH

II



### Basic Chemistry

Polyurethane is a name that is given to resin that contains urethane groups. the urethane groups in the molecule give the end product certain unique properties.

A urethane group is formed when isocyanate and hydroxyl chemical react together.

The component containing the hydroxyl group is referred to as the polyol component and the component containing the ISO cyanate group is referred to as the isocyanate component, there are a large number of raw materials available and this means polyurethanes are one of the most versatile product in the market.

Most polyurethanes consists of large molecules made by reacting various combination of these basic materials:

1. Diisocyanate: e.g. TDI, MDI, IPDI
2. Polyol: e.g. Long-chain polyether, polyester or polycaprolactone
3. Crosslinker: Such as glycerol or diamine

Note: Prepolymers are resin where the diisocyanate and polyol have been pre-reacted under carefully controlled condition. To make useful polyurethane, very high molecular weight (macromolecules) must be achieved. This means that the OH:NCO:polyol: (ISO) ratio must be correct and component and two components must be mixed thoroughly. (The component react if are in contact with each other)

### Hi-Pack Plasticizing Polyurethane Resin

Hi-Pack plasticizing polyurethane resins are intended for nitrocellulose based inks and coating systems. An extensive range of aromatic based Hi-Pack products is available in a choice of hardness and plasticizing effects, which can be applied to both, rigid and flexible substrates. The grades listed in this document represent the most commonly used products with a choice of non-volatile content, viscosity and solvent release characteristics. All conventional Hi-Pack Products are supplied as isocyanate.

| Product        | Viscosity in brookfield viscometer | Solids     | Solvent                | Description  |
|----------------|------------------------------------|------------|------------------------|--|
| HI-PACK - 115  | 2000-2200                          | 70         | 27% ETAC + 03% NPA     | General purpose semi aliphatic resin, flexographic and gravure inks. This is used in combination with nitrocellulose & vinyl resin for lamination & surface printing inks. |
| HI-PACK - 116  | 2500-3000                          | 95         | 05% NPA                | Very flexible, excellent solvent release.  |
| HI-PACK - 118  | 450-500                            | 40         | 50% ETAC + 10% Ethanol | Very flexible, excellent solvent release.  |
| HI-PACK - 119  | 2000-2200                          | 70         | 27% ETAC + 03% NPA     | Aliphatic resin with very good water resistance. Suitable for both surface & lamination printing inks. Highly recommended for deepfreeze ink application.                  |
| HI-PACK - 171L | 600-800 cps                        | 50% +/- 2% | 50% ETAC               | Improves hardness, gloss and blocking resistance as well as the color strength of organic pigments and the adhesion on many plastics and aluminium                         |

### Hi-Film Film-forming range of Polyurethane Resins

Hi-Film polymer contains both polyether and polyester, high molecular weight structures. Hi-Film comprises a range of solvent-based film-forming urethanes, which can be used on a wide variety of substrates where a demanding performance calls for high-quality inks. Hi-Films polymers have been formulated to lower the non-volatile content for cost-effectiveness. Special grades have been developed for vinyl substrates in combination with vinyl co-polymers. All conventional Hi-Film products are:

| Product       | Viscosity in Brookfield viscometer (25°C) | Solids | Solvent             | Description  |
|---------------|---|--------|---------------------|--|
| HI-FILM - 135 | 1000-1200                                 | 30     | 70% ETAC            | Film forming, non-reactive polyurethane prepolymer designed for use in Flexo or Gravure packaging inks.              |
| HI-FILM - 140 | 1000-1200                                 | 30     | 60% ETAC + 10% IPA  | Film forming, non-reactive polyurethane prepolymer designed for use in Flexo or Gravure packaging inks.              |
| HI-FILM - 141 | 1100-1500                                 | 30     | 20% ETAC + 50% NPAC | Film forming, non-reactive polyurethane prepolymer designed for use in Flexo or Gravure packaging inks.              |
| HI-FILM - 142 | 1100-1500                                 | 30     | 50% ETAC + 20% NPA  | Slow drying, Film forming, non-reactive polyurethane prepolymer designed for use in Flexo or Gravure packaging inks. |

### Hi-Film Aliphatic Film-forming range of polyurethane resins

Resins in this category are 100% aliphatic and prepared by chain extension of pre-polymer and diamine, nitrocellulose compatible and ethanol dilutable in all proportion.

| Product       | Viscosity in Brookfield viscometer (25°C) | Solids | Solvent           | Description                       |
|---------------|---|--------|-------------------|-----------------------------------|
| HI-FILM - 129 | 800-1000                                  | 30     | 67% ETAC + 3% NPA | Suggested for gravure lamination. |





## Product Data Sheet: HI-Pack &amp; HI-Film Series

## Introduction

## Hi-Pack 115, Hi-Pack 116, Hi-Pack 118, Hi-Pack 119, Hi-Pack 171L

Hi-Pack 115 is solvent born non-reactive, thermoplastic polyurethane resin. Hi-Pack 116 is a softer version of Hi-Pack 115. Both are used as adhesion promoting and flexibilising resin for other film-forming ink binders.

Hi-Pack 119 is aliphatic and prepared by the chain extension of Pre-polymer & diamine, this is a typical ink binder & having very good water resistance, hence highly recommended for deep freeze ink systems. It can be used for the surface & reverse printing inks.

All the above three resins give good adhesion on substrates like PE & PP films, Aluminium foils. These resins are used to formulate solvent-based flexo and gravure inks for packaging films, especially poly, polyester, BOPP, polyolefin films. Inks based on these resins are recommended for surface printing as well as laminating applications.

## Hi-Film 135, Hi-Film 140, Hi-Film 141, Hi-Film 142

They are a film-forming, non-reactive urethane pre-polymer designed for use in flexo or gravure packaging inks. The products are compatible in all proportions with nitrocellulose, has excellent reducibility with alcohols and ester sand has a low odour and high flexibility.

|  | HI-PACK                       |                               |                               |                               | HI-FILM                       |                               |                               |                               |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
|  | 115<br>&<br>116               | 118                           | 119                           | 171L                          | 135                           | 140                           | 141                           | 142                           |
| 1. Type                                      | Non-reactive polyurethane     | Non-reactive polyurethane     | Non-reactive polyurethane     | Non-reactive polyurethane     | Film Forming Resin            | Film-Forming Resin            | Film-Forming Resin            | Film-Forming Resin            |
| 2. Appearance                                | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid | Transparent Colourless Liquid |
| 3. Total Solids (%w/w)                       | 70 / 95                       | 40                            | 70                            | 50                            | 30                            | 30                            | 30                            | 30                            |
| 4. Viscosity in Brookfield Viscometer (25°C) | 2000-2200 / 2500-3000         | 450-500                       | 2000-2200                     | 600-800                       | 1000-1200                     | 1000-1200                     | 1100-1500                     | 1100-1500                     |
| 5. Volatiles                                 | 27% ETAC + 3% NPA / 5% NPA    | 50% ETAC + 10% Ethanol        | 27% ETAC + 3% NPA             | 50% ETAC                      | 70% ETAC                      | 60% ETAC + 10% IPA            | 20% ETAC + 50% NPAC           | 50% ETAC + 20% NPA            |
| 6. Flash point°C (C.C)                       | 5                             | 5                             | 5                             | 5                             | 5                             | 5                             | 5                             | 5                             |
| 7. Specific Gravity (25°C)                   | 1.09 / 1.10                   | 0.95                          | 1.07                          | 1.025                         | 0.91                          | 0.91                          | 0.91                          | 0.91                          |
| 8. Acid Value                                | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     | 1.0 (Max)                     |



## Application:

## Hi-Pack 115, Hi-Pack 116

- Flexo & gravure inks with excellent press behaviour for printing common flexible packaging films like polyolefins, PET, aluminum foils, & metalized films.
- Blending with hard resins may be required to eliminate tackiness. The use of nitrocellulose should be in appropriate ratio to ensure the lamination adhesion, low solvent retention.
- At the time of printing on PET films, adhesion promoter is not required.
- Recommended adhesion promoter while printing on polyolefin & BOPP films.

## Hi-Pack 118

- Manufacturing of Flexo & Gravure inks
- Wood coatings & Nail polish

## Hi-Pack 119

- Polymeric plasticizing resin to be used in combination with alcohol soluble nitrocellulose.
- Product is normally used as flexibilising resin for other film-forming binders like NC and/or other hard film formers.
- Flexo & gravure printing inks on PE & PP
- OPV
- Highly recommended for deep freeze inks.
- Use of nitrocellulose must be minimised to ensure adhesion, lamination bond strengths and low solvent retention

## Hi-Pack 171L

- Flexo & Gravure printing inks.
- Wood and furniture coatings

## Hi-Film 135

- High performance flexo and gravure inks for printing on common flexible packaging like PET (Chemically Treated), polyolefin, aluminum foils & metalized films.
- Blending with the hard resins may be required to eliminate residual tackiness
- The use of nitrocellulose must be minimized to ensure adhesion,

## Hi-Film 140, 141, 142

- High performance flexo and gravure inks for printing on common flexible packaging like PET (Chemically Treated), polyolefin, aluminum foils & metalized films.
- Blending with the hard resins may be required to eliminate residual tackiness
- The use of nitrocellulose must be minimized to ensure adhesion, lamination bond strengths and low solvent retention.



## Key Benefits:

## Hi-Pack 115, Hi-Pack 116

- Balance of adhesion & alcohol solubility
- Excellent compatibility with alcohol soluble nitrocellulose
- Good adhesion on aluminium foils
- Very flexible
- Non-blocking films even at high temperatures
- Solvent retention values are very low
- Recommendations for end-use for Hi-Pack 115, hi-Pack 116
- Flexo and gravure inks on films

## Hi-Pack 119

- Balance of adhesion & alcohol solubility
- Very good water resistance
- Good compatibility with nitrocellulose
- High heat resistance of the formulated product
- Fat and grease resistance of the formulated product
- Recommendations for end-use
- Flexo and gravure inks on films

## Hi-Pack 118

- Improve adhesion
- Excellent Compatibility with alcohol soluble resins
- Improve resolubility of inks
- Increases hardness of ink
- Non-blocking films even at high temperatures
- Solvent retention values are very low

## Hi-Film 135, 140, 141, 142

- Film forming resin with low tack property
- Excellent reducibility in alcohol
- Compatible with nitrocellulose, PVB and Maleic resin
- Excellent dot reproduction.
- Solvent retention values are substantially lower than conventional inks

## Packaging

200kgs capacity tight headed, non-returnable drums

## Shelf life

Store under cool dry place. It is recommended that material should be used within 12 months from the date of manufacturing.

## Safety

All relevant data have been brought up-to-date in the Material Safety Datasheet.





## Maleic Resins MR 150, 190 & 200

**Alcohol soluble maleic resin MR-150** is made from Gum rosin and pentaerythritol via esterification with polyhydric alcohol. **Alcohol soluble maleic resin MR 190** is made from Gum rosin and trimethylol propane on esterification. **Alcohol soluble maleic resin MR-200** is made from Gum rosin on esterification.

They are easily compatible with various solvents including coal tar oil, ester, vegetable oil and turpentine oil. Application is done for surface coatings and primers to improve the gloss, hardness, drying speed, abrasion resistance and yellow resistance.

### Applications:

Maleic resins are best suitable for use in laminating inks, paper inks, paper coating, flexo graphic & gravure ink formulations.

- Flexo & gravure inks
- Paper inks
- Ball point pen inks
- Wood primer
- Paper coatings
- Surface coatings
- Nail varnishes
- Vinyl sealers & coatings

### Typical Properties:

| Properties                                       | Specifications     |                    |                    |
|--|--------------------|--------------------|--------------------|
|  | Maleic Resins      |                    |                    |
|  | 150                | 190                | 200                |
| Colour (Gardner Scale)                           | 5-6                | 5-6                | 3-4                |
| Appearance                                       | Pale Yellow Flakes | Dark Yellow Flakes | Pale Yellow Flakes |
| Viscosity (50% in IPA)<br>Ford Cup 8-4 @30 deg C | 30-35 seconds      | 30-35 seconds      | 30-35 seconds      |
| Softening Range<br>(Capillary Method)            | 150-160 deg C      | 160-165 deg C      | 165-175 deg C      |
| Acid Value (mgKOH/gm)                            | 140-150            | 200                | 190-200            |

### Packing:

25 Kgs sealed packed paper or plastic bags.



## Recommendations for the Safe Handling of Polyurethane resin

### A. Precautions

#### 1. General

Liquid non-reactive polyurethane resins are themselves classified as non-hazardous but because of flammable, relevant solvents, relevant handling precaution must be observed.

#### 2. Skin Protection

Avoid contact with skin; wear impervious gloves at all times

#### 3. Eye Protection

Avoid contact with eyes. Wear eye protection at all times.

#### 4. Respiratory Protection

Wear approved suitable vapour mask where vapour may be generated.

#### 5. Protection from Fire

In the event of a fire suitable extinguishers are water carbon dioxide or a dry chemical powder. Combustion of the resins may yield toxic products therefore, firefighters should wear suitable protective clothing including breathing apparatus.

#### 6. Environmental Considerations

Not normally dangerous for the environment.

Recommendations for the Safe Handling of Polyamides

### B. First Aid

#### 1. Skin Contact

Remove all contaminated clothing; wash with plenty of soap and water

#### 2. Eye Contact

Irrigate with eyewash solution or clean water holding the eyelids apart for at least 10 minutes. Obtain medical attention.

#### 3. Inhalation

Remove patient from exposure. Obtain medical attention.

#### 4. Ingestion

Drink plenty of water or milk. Do not induce vomiting. Obtain medical attention if ill-effects occurs.

### C. Storage

1. Solvent containing store away from sources of ignition.

2. Keep containers tightly closed and dry.

### D. Spillage

Ensure suitable personal protection during removal of spillages on to sand earth or any suitable absorbent material and place closed containers for disposal.

### E. Disposal

Do not allow into drains, water courses or where ground/surface waters may be affected. Disposal should be by following regulations made under the special waste Regulation and Environmental Protection Acts or appropriate local/national regulations.



### Adhesion Promoter Hi-Aid 250

#### Description

This preferred product is for the demanding duties of inks in today's quality printing and packaging environment. Hi-Aid 250 is a chelated titanate containing isopropanol and ethanol as solvent. It is a titanium chelate developed in response to the need of the printing industry for a low odour, low colour adhesion promoter. It does not contain acetylacetone. Today Hi-Aid 250 is the leading adhesion promoter for high quality, demanding printing applications.

| Sr. No. | Property                          | Specification           |
|---------|-----------------------------------|-------------------------|
| 1       | Appearance                        | Transparent water white |
| 2       | % of Solid content                | 45 +/- 2                |
| 3       | Solvent                           | Iso Propyl Acetate      |
| 4       | Viscosity by 84 Cup in sec. @30°C | 16 - 20                 |
| 5       | Flash Point                       | 5°C                     |
| 6       | Acid Value                        | <2.0                    |
| 7       | Specific Gravity                  | 1.04 +/- 0.02           |
| 8       | Colour Gardner                    | 1 max.                  |
| 9       | Dry                               | Odour                   |

### Supplier Specification:

Pot Life: pot life of mixed Cross-linking resin is about 6 months

Shelf life: Shelf life of Cross linking resin/unopened/undamaged packing under normal storage condition is 1 year.

**Dilution:** Dilution is recommended by using the recommended solvent.





## Preferred Substrate

### Coextruded oriented polypropylene

Although the impetus for developing HI-AID product was the need to promote adhesion, it was also found that it improved the ink's heat resistance. This allowed the film to be heat sealed in the printed area, helping pave the way for HI-AID 250 to establish a market leader in co-extruded oriented polypropylene applications. To obtain increased adhesion using HI-AID 250, you need to treat the film surface usually by corona discharge.

### Other substrates

HI-AID 250 also works successfully in inks for printing on corona discharge treated polyethylene. The resulting increased water resistance is important for deep-freeze and boil-in-the-bag applications. They are also effective on NC coated cellophane, OPP film, shellac-washed aluminium, pearized polypropylene and on polyethylene coated milk cartons.

### Preferred Resins

#### Polyvinyl Butyral based (PVB) inks

Whilst adhesion of PVB based inks to polypropylene films is good, it can be improved further by the addition of HI-AID product on heat stability depend on the ink formulation and substrate. Improvements can be achieved up to 160 deg C. the addition of a stabilizer such as maleic acid to control the ink viscosity is particularly important.

#### Nitrocellulose/polyurethane and nitrocellulose/polyamide inks

HI-AID 250 is effective in a variety of resin systems which have nitrocellulose (NC) as the principal film former and usually incorporate a co-binder such as a polyamide or fully reacted polyurethane. It brings the following demonstrable benefits:

#### Improved adhesion to OPP film

Improved heat stability depending on the grade of OPP film used  
Reduced yellowing effects with HI-AID 250 compared with titanium acetylacetonates.

#### No reduction in gloss with HI-AID 250

improvement in the performance of acrylics, alkyd and maleic resins used with nitrocellulose

## Preferred Printing Process

### Flexographic

The flexographic process provides good quality printing on to a variety of substrates, including stretchable films, offering versatility and economic cost. Low viscosity liquid inks which dry by absorption or solvent evaporation are used either directly or for producing laminate structures. HI-AID 250 is widely used in solvent-based flexographic inks to improve adhesion to film and increase heat resistance, water resistance, grease resistance and chemical resistance.

### Gravure

The gravure process produces very high-quality graphics on paper, foil and some (non-stretchable) plastic films and is best suited for long production runs. For some flexible packaging applications, properties of the printed ink films are improved by the incorporation of HI-AID 250 in the case of C-type inks containing nitrocellulose which dominate the packaging gravure market, HI-AID product improves the adhesion and grease resistance. With D-type inks based on polyamide resins, HI-AID additives improve adhesion and increase heat resistance.

## HIPRINT UV DUCK VARNISH

PRODUCT CODE – FLX 400

PRODUCT NAME – UV DUCK VARNISH

### Product Features:

- Outstanding Adhesion to variety of Substrate
- Very Good Gloss;
- Excellent Toughness
- Very good dimensional stability
- Excellent Flow.
- Good Scratch Resistance.
- Excellent Print transfer while machine application

### Substrate:

- Coated Paper and printed board
- Adhesion is to be confirmed for non-absorbent substrate

### Application:

- Roller Coater Coating system

### Specification:

|            |                                       |
|------------|---------------------------------------|
| Appearance | Colourless liquid                     |
| Viscosity  | 40 ± 10 sec @ 30°C by Ford Cup No.84. |
| Solid%     | 99+/-1%                               |

### Storage:

UV curing Coatings should be stored in amber glass, baked phenolic lined, stainless steel, or polyethylene lined containers. This material should be stored in the dark and at temperatures not exceeding 30°C. Shelf life of the material is 6 months from the manufacturing date.

# UV COATINGS & RAW MATERIALS

## AMINE SYNERGIST

### Description:

Amine Synergist is a reactive amine additive that is generally used in place of more fugitive Amine Synergist to increase the cure speed of ultraviolet cured coatings. When Amine Synergist is used in combination with other photo initiators an increase in curing speed, especially at the surface, can be observed. Besides the improved stability, other advantages of Amine Synergist are including light colour, low viscosity and low volatility.

### Properties :

|                |                               |
|----------------|-------------------------------|
| Appearance     | Clear Slight yellowish liquid |
| Odor           | Slight amine smell            |
| Freezing point | <5 °C                         |
| Density        | 0.99 g/cm3                    |
| Polymer solids | > 99.5 % by weight            |

### Performance Highlights:

The UV/EB cured products based on Amine Synergist are characterized by the following properties:

- Faster cure response, especially at the surface
- Low Odour Coating
- No Surface migration of amine
- No reaction of amine with organic solvents
- High gloss coating

### Application:

Formulated UV/EB curable products containing Amine Synergist may be applied by lithographic, screen, gravure, direct or reverse roll, and curtain coating methods. Amine Synergist is recommended as a reactive co-initiator in the following applications. Recommended levels are from 5 to 15 % based on the total weight of formulation, usually combined 5 % Amine Synergist.

- Overprint varnishes
- Silkscreen and flexo inks
- Wood fillers and top coats
- Clear coatings in paper and plastics.
- Pigmented coatings



# UV COATINGS & RAW MATERIALS

## EPOXY ACRYLATE

### Description:

Epoxy acrylate is a partially acrylated ester of a bisphenol A type epoxy resin. It contains both acrylate and epoxy functionalities. This resin may be cured by exposure to either ultraviolet light (UV) or electron beam (EB) in conjunction with conventional epoxy curing. It may also be cured with UV radiation using a mixed photoinitiator system consisting of free radical application requiring improved coating performance properties over those obtainable with conventional UV/EB curing alone.

### Properties :

|                                     |        |
|-------------------------------------|--------|
| Viscosity at 60°C, mPa.s            | 1100   |
| Colour, Gardner                     | 5 max. |
| Acid value, mg KOH/gm               | 1 max. |
| Density, g/cm <sup>3</sup>          | 1.12   |
| Molecular weight, theoretical       | 450    |
| Acrylate functionality, theoretical | 1      |
| Weight per epoxide                  | 450    |
| Polymer solids, % by weight         | 100    |

### Performance Highlights:

Epoxy Acrylate is characterized by both epoxy and acrylate functionalities & Good cure response

UV/EB cured products based on Epoxy acrylate are characterized by the following performance properties:

- High gloss finish
- Good solvent resistance
- Good adhesion to metals and other non-porous substrates
- Improved flexibility over other epoxy acrylates

The actual properties of UV/EB cured products also depend on the selection of the other formulation components, such as reactive diluent (s), additives and photo-initiators.

### Viscosity Reduction:

Epoxy Acrylate can be diluted with reactive monomers such as 1,6 hexanediol diacrylate (HDDA) (2), trimethylolpropane triacrylate (TMPTA) (2), tripropyleneglycol diacrylate (TPGDA) (2) and octyl/decyl acrylate (ODA) (2). The specific reactive diluent(s) used will influence performance properties such as hardness and flexibility.



### Application:

Formulated UV/EB curable products containing Epoxy Acrylate may be applied by lithographic, screen, gravure, direct or reverse roll, and curtain coating methods. Epoxy acrylate is recommended for use in:

1. Coatings and inks for metal substrates including aluminium
2. Applications where portions of the curable material are in "shadow" areas
3. Applications where thermal post-curing will enhance coating properties
4. 2-component curing systems

### Handling & Storage for Amine Synergist & Epoxy Acrylate:

Care should be taken not to expose radiation curable oligomers to temperatures exceeding 40°C (100°F) for prolonged periods of time or to direct sunlight. This might cause uncontrollable polymerization of the product with generation of heat. Use dry air to displace material removed from the container. Storage and handling should be in stainless steel, amber glass, amber polyethylene or baked phenolic lined containers.

**Packing:**  
20/200Kg Drum



## TPGDA

### Description:

Tripropylene glycol diacrylate (TPGDA) is a difunctional monomer and polymerisation occurs when TPGDA is exposed to sources of free radicals. TPGDA have good hardness, abrasion resistance and high gloss properties, used in varnishes, inks and coatings.

### Properties :

| Chemical Name          | Tri propylene glycol diacrylate                |
|------------------------|--|
| CAS No.                | 42978-66-5                                     |
| EINECS No.             | 256-032-2                                      |
| Molecular Formula      | C <sub>15</sub> H <sub>24</sub> O <sub>6</sub> |
| Appearance             | Clear liquid                                   |
| Odor                   | Bland  |
| Color, Apha            | 150 max.                                       |
| Boiling point °C       | 120°C min. (1mmHg)                             |
| Specific gravity, 25°C | 1.03-1.05                                      |
| Viscosity, cps, 25°C   | 8-16   |
| Inhibitor (MEHQ ppm)   | 600 max.                                       |
| Moisture, %            | 0.2 max.                                       |
| Residual solvent, %    | 0.1 max.                                       |
| Acid value, mg KOH/G   | 1.0 max.                                       |

### Performance Highlights:

TPGDA is characterized by low viscosity, light color, light odour & good diluent for oligomers. UV/EB cured products based on TPGDA are characterized by good flexibility & good cure speed without brittleness.

### Application:

TPGDA finds application in UV/EB ink and coating system.



### Handling & Storage:

Care should be taken not to expose radiation curable products to temperatures exceeding 40°C for prolonged periods or to direct sunlight. This might cause uncontrollable polymerization of the product with generation of heat. Storage and handling should be in stainless steel, amber glass, amber polyethylene or baked phenolic lined containers. Do not store this material under oxygen free atmosphere. Use dry air to displace material removed from the container.

**Packing:** 20/200Kg Drum

# UV COATINGS & RAW MATERIALS



## TMPTA

### Description:

Trimethylol propane Triacrylate (TMPTA) is a trifunctional monomer which polymerizes when exposed to sources of free radicals. It is compatible with a wide range of acrylated resins. Cured films containing TMPTA provide hardness, good solvent and abrasion resistance and high gloss properties.

### Properties :

| Chemical Name              | Tri methyl propane triacrylate                 |
|----------------------------|--|
| CAS No.                    | 15625-89-5                                     |
| Molecular Formula          | C <sub>15</sub> H <sub>20</sub> O <sub>6</sub> |
| Appearance                 | Clear liquid                                   |
| Color, Apha                | 150 max.                                       |
| Specific gravity, 25°C     | 1.09 - 1.12                                    |
| Viscosity, cps, 25°C       | 70-115   |
| Water Content              | ≤ 0.2%   |
| Acid value, mg KOH/G       | 1 max.   |
| Functionality, theoretical | 3  |
| Inhibitor (MEHQ ppm)       | 100-300  |

### Performance Highlights:

TMPTA is also characterised by low viscosity & light colour while UV/EB cured products based on TMPTA are characterized by good cure response, high crosslinking density, hardness, good solvent and abrasion resistance.

### Application:

TMPTA is a reactive diluent compatible with a wide range of acrylated resins used in Radiation curing applications. Hardness, abrasion resistance and high gloss properties make TMPTA popular for overprint varnishes, inks and coatings.