LG MMA

SolutionPartner

# Acrylic Coating Resin

# Introduction

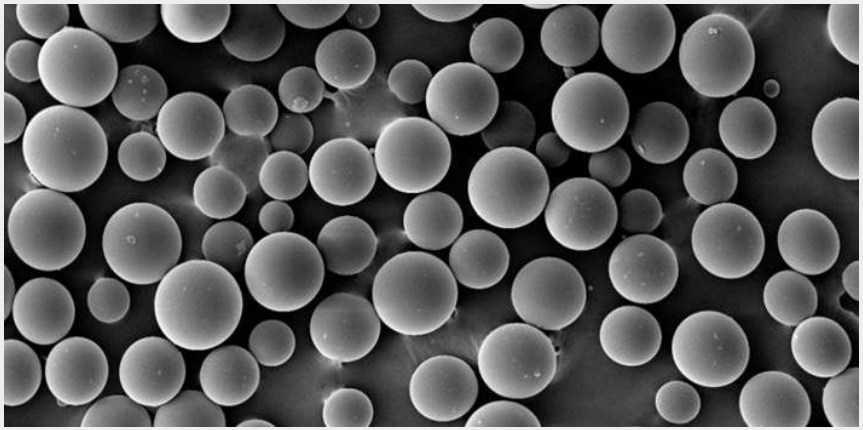
With its unique polymerization technology, LG MMA Corp. produces acrylic coating resin used for artificial marbles, acryl coatings, acrylic adhesives and paints.

## Features of Acrylic Coating Resin

- ✓ Extreme Weather Resistance & Durability
- ✓ Superior Optical Quality & High Gloss
- ✓ Excellent Scratch Resistance & Abrasion Resistance
- ✓ Large Range of Solubility
- ✓ Good Pigment Dispersion

  & Generally Low Pigment Reactivity

*SEM Image (×100)*



▲ Appearance : Solid, Bead polymer

(average particle size : 200~300㎛)

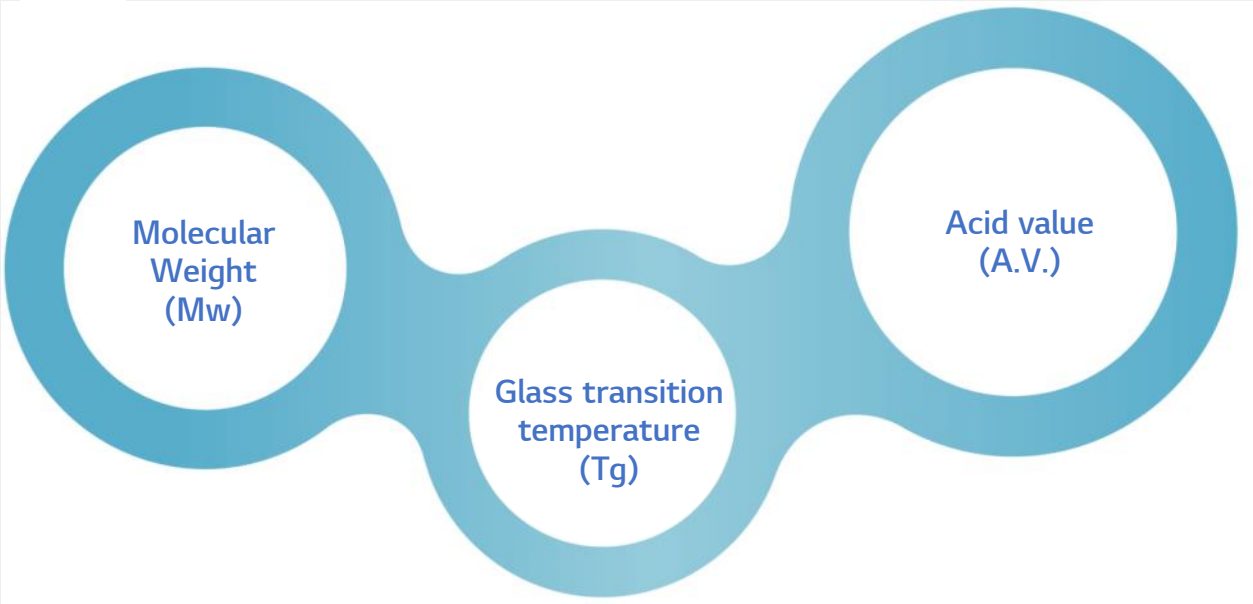
# Introduction

We can change major properties of acrylic coating resin (molecular weight, glass transition temperature, acid value) for customer's needs.

## Major Properties of Acrylic Coating Resin

- We can change acid value (A.V) to improve adhesion with the polar substrate and dispersion of polar colorants.
- A.V : 0~200 mg KOH/g

- The higher molecular weight, the higher viscosity.
- Mw : 20,000~200,000




- We can change glass transition temperature (Tg) to improve hardness and flexibility.
- Tg : 35℃~120 ℃

# Introduction

It is important to select a grade that meets customer's needs, and it is necessary to know followings beforehand.

## Things to consider when selecting grades

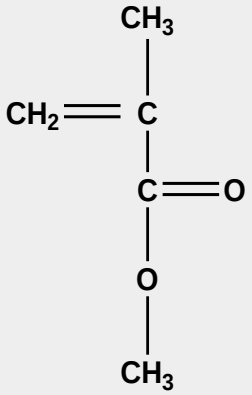
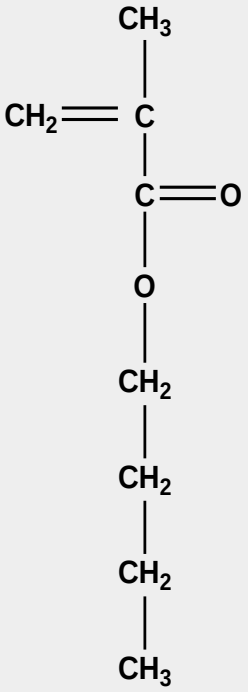
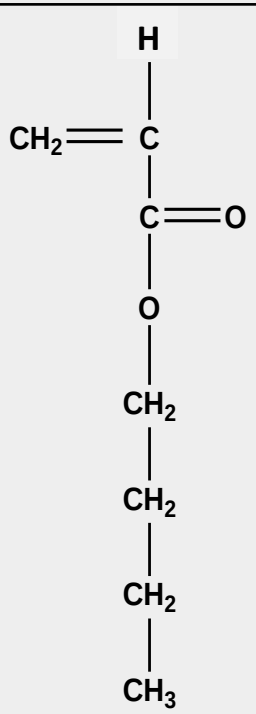
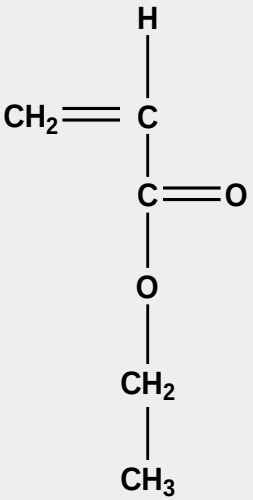
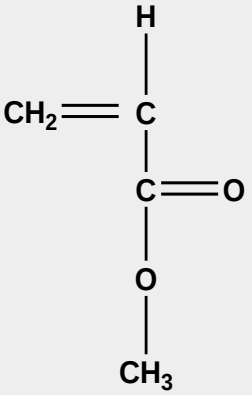
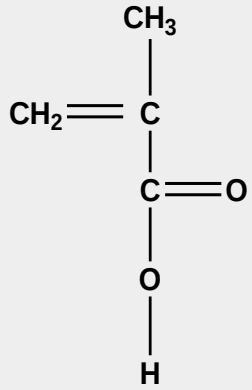
1. Application (Paint, Ink, Binder, Adhesive, etc.)
2. Customer's current product (Company and grade name)
3. Major properties (Mw, Tg, Acid value)
4. What kinds of Substrates (Metal, Vinyl, Plastics, Woods, Concrete etc.)
5. Solvent or monomer used in manufacturing syrup

   (Methyl ethyl ketone, Acetone, Toluene, Xylene, Ethyl acetate etc. / MMA, SM, EA)
6. Dissolution method and conditions
7. Required viscosity of syrup

# Properties

We produce various grades with various acrylic monomers as follows for customer's needs.

## Various Acrylic Monomers

| Chemical name | MMA | n-BMA | BA | EA | MA | MAA |
|---|---|---|---|---|---|---|
| | Methyl methacrylate | n-Butyl methacrylate | Butyl acrylate | Ethyl acrylate | Methyl acrylate | Methacrylic acid |
| Chemical structure |  |  |  |  |  |  * to improve adhesion and dispersion of polar colorants |
| Tg of Polymer | 120℃ | 20℃ | -54℃ | -24℃ | 10℃ | 228℃ |

# Properties

| Grade | Monomer composition | Major properties | | | Competitor's | | | | Application |
|---|---|---|---|---|---|---|---|---|---|
| | | Tg | Mw | Acidity | Dow (PARALOID) | Evonik (DEGALAN) | MRC (DIANAL) | Lucite (ELVACITE) | |
| BA030 | MMA/EA | 38 | 80,000 | 2.0 | B-82 | | | | Print, Gravure ink |
| BA122 | MMA/n-BMA | 60 | 60,000 | 4.0 | B-66 | 64/12, PM381N | BR-106 | 2016 | Gravure ink, Road marking paint |
| BA123 | MMA/n-BMA | 60 | 65,000 | 3.5 | | | | | |
| BA140 | MMA/EA | 55 | 100,000 | 3.5 | B-64 | | | | Container coating |
| BA141 | MMA/n-BMA | 58 | 100,000 | 3.0 | B-44 | | | | Road marking paint |
| BA410 | MMA/n-BMA | 80 | 40,000 | 3.5 | B-60 | LP67/11 | BR-116, MB-7017, MB-2543 | 2013 | Road marking paint, Gravure ink |
| BA525 | MMA/EA | 90 | 70,000 | 16 | | | BR-77 | | Low profile additive |
| BA531 | MMA | 105 | 100,000 | 2.0 | A-11 | M748, M825 | BR-73, BR-80 | 2010 | Gravure ink |
| BA611 | MMA | 105 | 40,000 | 2.0 | | | BR-83 | 2008 | Gravure ink, PVC calendaring modifier |
| BN600 | MMA | 101 | 20,000 | <1 | | | | | PVC calendaring modifier |
| BA720 | MMA | 116 | 50,000 | 2.0 | | LP50/02, LP53/13 | | | Gravure ink |

# Properties

## Viscosity in Various Solvents

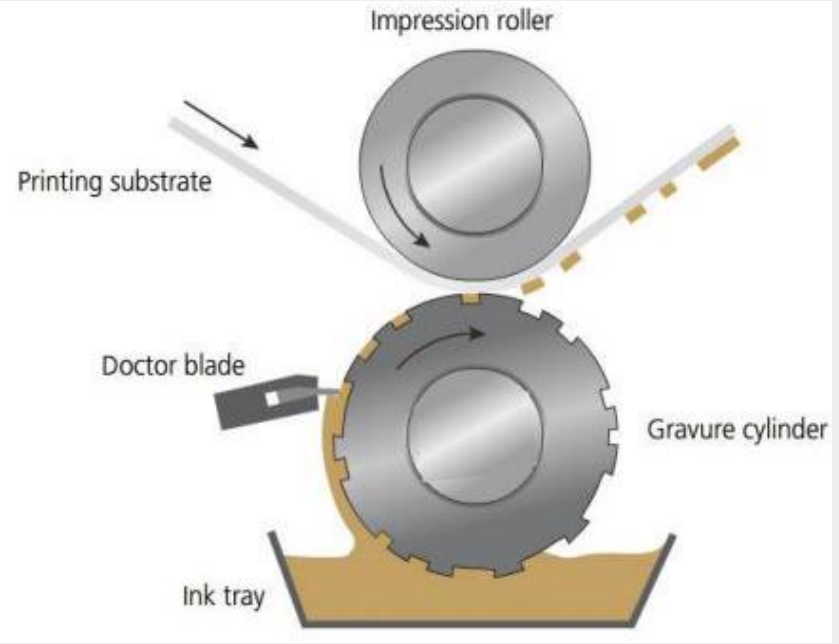
| Grade | Alcohol | | Ester | | Hydrocarbon | | Ketone | |
|---|---|---|---|---|---|---|---|---|
| | Ethanol | Methanol | Methyl Acetate | Ethyl Acetate | Toluene | Xylene | Acetone | MEK |
| BA030 | I.S. | I.S. | $100^{30}$ | $105^{30}$ | 700 | $170^{30}$ | 250 | 260 |
| BA122 | I.S. | I.S. | 290 | 410 | 310 | 480 | 150 | 140 |
| BA123 | I.S. | I.S. | 300 | 410 | 350 | 555 | 150 | 140 |
| BA140 | I.S. | I.S. | $170^{30}$ | 2,340 | 2,300 | $75^{20}$ | 490 | 610 |
| BA141 | I.S. | I.S. | $100^{30}$ | 1,150 | 830 | 1,400 | 360 | 350 |
| BA410 | I.S. | I.S. | 315 | 445 | 340 | 600 | 160 | 160 |
| BA525 | I.S. | I.S. | $200^{30}$ | $280^{30}$ | $130^{20}$ | P.S. | 970 | 1,050 |
| BA531 | I.S. | I.S. | $770^{30}$ | $80^{20}$ | 8,500 | $90^{20}$ | 7,280 | 6,600 |
| BA611 | I.S. | I.S. | $110^{30}$ | 1,600 | 1,070 | $50^{20}$ | 530 | 520 |
| BA720 | I.S. | I.S. | $270^{30}$ | $440^{30}$ | 2,430 | $65^{20}$ | $155^{30}$ | 2,130 |

- Superscript indicates % solids.
- Values are viscosity, cP, at 23℃ of a 40% solids solution, except as noted.
- Solubility of 20% resin solution at room temperature. (I.S. : Insoluble, P.S. : Partially soluble)

# Applications : 1. Gravure Ink

✓ What is a gravure printing?

- A type of intaglio printing process which uses a rotary printing press.
- Inks used in gravure printing have a high drying speed and low viscosity.




✓ Formulation

| Chemical | Content (wt%) | Form | Function |
|---|---|---|---|
| Pigment | 5~40 | Powder | color, tolerance (heat, light, acid, alkali, migration) |
| Resin | 10~20 | Solid | adhesion, processability, pigment dispersion, coating properties |
| Solvent | 40~85 | Liquid | Resin dissolution, drying speed & viscosity control |
| additive | 1~5 | Liquid/solid | Improvement of coating property, printing suitability |

# Applications : 1. Gravure Ink

✓ Applications

1) Heat transfer printing (Reverse type)

- After printing several ink layer on film, heat transfer the print layer of the film to the final product.
- Acryl resin, vinyl resin mainly used.

ex. stationery, cosmetic container, personal care goods (tooth brush, soap case)

- for Protection (top coating) : BA531, BA720
- for Pigment dispersion : BA123, BA410
- for Adhesion : BA030


2) Flexible package (Non-reverse type)

- Printed ink on various film such as PET, PP, PE, etc., and used as final product.
- Mainly vinyl resin, urethane resin used

ex. food package (noodles, snack foods)


# Applications : 2. Paint & Coating

- ✓ Road marking paint
  - for Road marking : BA122, BA141
  - for Concrete : BA122, BA140, BA410

- ✓ Marine & Container paint
  - BA122, BA123 (sub-resin)

- ✓ Etc.
  - for PVC (synthetic leather) : BA531, BA525
  - for Automotive : BA123, BA410,
  - for Automotive underbody clear coating : BA141
  - for Wood : BA122, BA410
  - Hard coating for plastic : BA531, BA720

# Applications : 3. Low Profile Additive

- ✓ BA525 : To improve adhesion with metal and dispersing of colorant
- ✓ BA611, BN600 : To increase solid contents for zero shrinkage

| Materials of BMC | | | Content |
|---|---|---|---|
| ① Unsaturated polyester resin | | | 20~30% |
| ② Low profile additive | Styrene monomer | 65~70% | 20~30% |
| | Acryl resin | 30~35% | |
| ③ Filler | | | 50% |

| Grade | Brookfield Viscosity (cPs, @ 23℃) | | |
|---|---|---|---|
| | 30% solid in SM | 40% solid in SM | 50% solid in SM |
| BA525 | 7,140 | 8,200 | - |
| BA611 | 140 | 1,200 | 31,400 |
| BN600 | 60 | 240 | 3,800 |

▼ Automotive reflector

▼ Bike reflector

▶ Automotive parts

# Applications : 4. Plastic Modifier for ASA or PVC

✓ BA611, BN600

- Improvement Weather Resistance & Durability
- Improvement Surface Gloss
- Improvement Scratch Resistance & Abrasion Resistance
- Improvement Pigment Dispersion

▶ ASA window profile

▼ PVC Floor


LG MMA

**Seoul Office** 23F, LG Seoulstation Bldg., 98, Huam-ro, Jung-gu, Seoul, 04637, Korea
Phone : +82-2-6930-3872,3873 / FAX +82-26930-3802
**TS&D Team** 104-1, Munji-dong, Yuseong-gu, Daejeon
Phone : +82-42-870-6233 / FAX (042)866-5799
www.lgmma.com