

# Product Solutions

## FOR BETTER LIVING





Because our plastic and chemical products are all around you,  
we take utmost care in every step throughout their journey  
to deliver only the best for you.





# About GC

PTT Global Chemical Public Company Limited (GC) is PTT Group's petrochemical flagship. We are committed to strengthening our leading position in the chemicals business by combining environmentally-friendly innovations with advanced technologies to develop products for people's better living.

GC comprises diversified and comprehensive petrochemical businesses, including manufacturing and distribution of upstream, intermediate, and downstream petrochemical products.

These products can be converted into other chemical products and serve as basic feedstock for downstream industries such as packaging, apparel, communications and electronic equipment, electrical appliances, vehicles, construction materials, engineering-based plastics, agricultural equipment, and much more. These products are not only part of our daily lives but they also enhance the way we live.



## Shareholder

We deliver the best business performance through trustworthiness to create fair and sustainable value for shareholders.

## Business Partner

We provide superior solutions from innovative and sustainable products and services to be the best choice for our business partners.

# Mission

# Vision

To be a Leading  
Global Chemical Company  
for Better Living



## Society

We integrate social and environmental responsibility into our business practices to achieve sustainable development.

## Employee

We build an organization that is prepared for dynamic change and learning by providing a happy working environment promoting the development of employees' capabilities and enabling them to meet new challenges with dedication to the organization and to professional excellence.



# Product Overview & Certificate



InnoPlus by GC is a registered trademark of PTT Global Chemical Public Company Limited (GC). GC manufactures Polyethylene (PE), nameplate capacity at 1,850,000 MTA and Polyethylene Terephthalate (PET) nameplate capacity at 200,000 MTA



## HDPE

InnoPlus by GC High Density Polyethylene (HDPE) has a total production capacity at 850,000 MTA. InnoPlus HDPE is made from the low-pressure polymerization using the slurry process of Mitsui Technology. InnoPlus HDPE offers high certainty of specific properties to meet all particular needs and complies with international standards regulations.

## LLDPE

InnoPlus by GC Linear Low Density Polyethylene (LLDPE) is produced within a combined LLDPE & mPE production capacity of 800,000 MTA, using gas phase Unipol Process technology under the license of Univation Technology, a leading global technology licensor. This technology can provide a wide range of LLDPE products.

## LDPE

InnoPlus by GC Low Density Polyethylene (LDPE) has a total production capacity of 300,000 MTA. InnoPlus LDPE is produced by a high pressure tubular process, a technology licensed by LyondellBasell.

## Certificate of HDPE, LDPE, LLDPE



**ISO 9001**  
Quality Management System by MASCI



**ISO 50001**  
Energy Management System by MASCI



**GHPs**  
Good Manufacturing Practice System by MASCI



## mPE

InnoPlus by GC  
Metalocene Polyethylene (mPE) is produced within a combined LLDPE & mPE production capacity of 800,000 MTA, using low-pressure polymerization via gas-phase Unipol Process technology under the license of Univation Technology, a leading global technology licensor of proven metalocene PE technology.

This advanced catalyst technology provides superior puncture and dart impact resistance, excellent sealability, and outstanding optical properties.  
InnoPlus mPE is widely used for cast and blown film applications.

## PET

InnoPlus by GC  
Polyethylene Terephthalate (PET)  
has total production capacity at 219,000 MTA  
InnoPlus PET is produced by the leading technological know-how of T.EN Zimmer GmbH (Germany) and Polymetrix AG (Switzerland)



**ISO 14001**  
Environment  
Management  
System by MASCI



**ISO45001**  
Occupational  
Health and Safety  
Assessment  
Series by MASCI



**HACCP**  
Hazard Analysis  
Critical Control  
Point System  
by MASCI



# GC Product Brand of Other Polymers



PlastMate by GC is registered trademark of PTT Global Chemical Public Company Limited (GC) for various type of compound resin such as PE compound, PP compound, PS compound, PC compound, ABS compound and Bioplastics Compound.



InnoEco by GC is registered trademark of PTT Global Chemical Public Company Limited (GC) for high quality recycled plastic resin products. (Post-consumer recycled: PCR) of the GC group.

Maximum production capacity of 45,000 MTA of recycled plastic resins. Consisting of 30,000 MTA of PCR PET resin and 15,000 MTA of PCR HDPE resin.



DIAREX by GC is a registered trademark of PTT Global Chemical Public Company Limited (GC) for Polystyrene

The capacity of HIPS is 30,000 MTA. We offer a wide range of Diarex grades with various properties for using in injection.



X PURGE by GC is registered trademark of PTT Global Chemical Public Company Limited (GC) for Purging compound.

X PURGE by GC is a high efficiency ready-to-use purging compound which provides fast and effective color, material change and contaminant removal in the machine without disassembly. X PURGE by GC will reduce machine downtime and/or maximize productivity. This product is designed for cleaning various types of the machines i.e., injection molding machines, blow molding machine, blown film machine, sheet casting machine.



InnoSis is a registered trademark of GC Marketing Solutions Company Limited, a subsidiary of PTT Global Chemical Public Company Limited (GC) for polyethylene trading.

Trading polyethylene of InnoSis is the product under the concept of being a leading distributor of plastic resin who is developing products to meet customer needs and create better quality products.

## GC Product Label

Bioplastics are plastics derived from agricultural raw materials (Biobased) or petroleum (Petrobased). Bioplastics have a plastic-like quality and characteristics. They can be melted and formed by general processes with general machines; only slight adjustments may be needed. For bioplastics made from agricultural raw materials, they are produced by a fermentation process that converts agricultural raw materials into monomers, which are then used to produce plastic pellets. Currently, the raw materials used in bioplastics production are corn, sugarcane, and cassava.













# Solutions

## For Every Product Applications

GC commits to continually develop plastic resins covering all applications various market to support all needs, reinforce efficiency including adding value to products for all industries such as packaging, agriculture, home goods and personal care, construction, electrical appliances, automotive and others.



# Rigid Packaging



## Caps and Closures<sup>(\*)</sup>

Caps and Closures application is innovated under the concept of Connected Packaging Development to deliver an identical proposition of brand owners, or conversion players and to experience on closure functions for supporting consumers trend such as lightweight, easy opening, complicated closure design for niche. GC offers wide range of product grades to serve packaging trend and carbon reduction goal with caring environmental change.



## Large Blow Molding

Large blow molding application is commonly used in the packaging containers of household and industrial sectors. GC products can serve from 20 up to 3,000 liters covering jerry cans, chemical and industrial drums, intermediate bulk container (IBC) with product durability and various design. By the durability performance of the material, consumers can gain the benefit from extending of the product lifetime which can be engaged in supporting the environmental care and sustainability aspects.



## Small Blow Molding

Blow molding is typically used to produce containers or bottles in the liquid bottle segment. The market for HDPE blow-molded products uses machines and materials that deliver faster cycle times and lightweight products. HDPE blow-molded products require a balance of easy processing and good mechanical strength to enhance the combination of productivity, cost-effectiveness, and bottle-strength performance. GC's blow molding product portfolio offers a comprehensive range of grades to meet a wide variety of performance requirements.



## Injection Molding

Injection moulding (IM) is widely known as a common manufacturing process for producing identical parts in large volumes by injecting molten material into a mold cavity where it cools and solidifies. It is used across many industries to produce a wide array of products, including: automotive parts, E&E industries, packaging lid and enclosure, toys, pallet, household items like garbage bin, medical devices, etc. Raw materials for the finished part are the foundational components, which are generally chosen based on the function and specifications of the final product part. GC's consumer goods product portfolio offers a wide range of product grades in a broad processing window in order to support versatile product performance and needed design.



## Injection Blow Molding

Injection blow molding (IBM) involves injecting the molten plastic into a mold to create a parison or preform, which is a hollow tube with a fully formed neck finish. It is excellent for the products with high-tolerance, precise parts with a neck finish that requires exact dimensions as well as high-volume production runs of small- to medium-sized containers, like food & beverage bottles, water bottles, pharmaceuticals, and other precision household containers. Apart from polyolefins like high-density polyethylene (HDPE) and polypropylene (PP), polyethylene terephthalate (PET) is most common material and widely wellknown for IBM process of this segment.

## International Standard Compliances

|  |                                                                                         |  |                                                                   |  |                                                                                                                                                                 |  |                                                                                                                                         |
|--|-----------------------------------------------------------------------------------------|--|-------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>RoHS</b><br>Restriction of Hazardous Substances EU Directive 2011/65/EU              |  | <b>TIS 816-2565 (มอก.816)</b><br>Polyethylene industrial standard |  | <b>Halal</b><br>Islamic law for food relate goods/product                                                                                                       |  | <b>US FDA</b><br>Food and Drug Administration (FDA)<br>Specification according to US FDA 21 code of Federal regulations part 177.1520 © |
|  | <b>EU FDA</b><br>Plastic Materials and Articles intended to Come into contact with food |  | <b>Phthalate Content</b><br>According to ASTM D3421-1975          |  | <b>GB4806.1-2016 GB4806.7-2023 (Chinese FDA)</b><br>The Hygienic Standards for Uses of Additives in Food Containers and Packaging Materials* under GB31603-2015 |  | <b>JCII</b><br>Japan Chemical Innovation and Inspection Institute.                                                                      |

## Certified only for<sup>(\*)</sup>

|                     |                                                                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Organoleptic</b> | <b>Organoleptic</b><br>German Food Articles of Daily Use and Feed Code of September 1,2005 (LFGB), Section 31- Sensory Examination Odour and Taste Test |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|





# Caps & Closures

## Rigid Packaging



Bottled Water



Carbonated  
Soft Drinks  
(CSD)



Non- Carbonated  
Soft Drinks  
(Non-CSD)



Food



Home and  
Personal Care  
(HPC)

| InnoPlus by GC: HDPE              |             |          |                                                                                                                                                            |                                                                                                                                                                          |          |          |          |          |
|-----------------------------------|-------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|
| Properties                        | Test Method | Unit     | Caps & Closures                                                                                                                                            |                                                                                                                                                                          |          |          |          |          |
|                                   |             |          | HD1010J                                                                                                                                                    | HD1600JP                                                                                                                                                                 | HD2401C  | HD2200JP | HD2502C  | HD3200C  |
| MFR (190 °C, 2.16 kg)             | ASTM D1238  | g/10 min | 20                                                                                                                                                         | 12                                                                                                                                                                       | 6.5      | 3.5      | 0.86     | 2.3      |
| Density                           | ASTM D1505  | g/cm³    | 0.956                                                                                                                                                      | 0.958                                                                                                                                                                    | 0.962    | 0.961    | 0.962    | 0.967    |
| Melting Temperature               | ASTM D3418  | °C       | 130                                                                                                                                                        | 132                                                                                                                                                                      | 135      | 135      | 132      | 132      |
| Tensile Strength at Yield         | ASTM D638   | kg/cm²   | 290                                                                                                                                                        | 290                                                                                                                                                                      | 313      | 310      | 305      | 310      |
| Tensile Strength at Break         | ASTM D638   | kg/cm²   | 140                                                                                                                                                        | 200                                                                                                                                                                      | 252      | 210      | 262      | 200      |
| Elongation at Break               | ASTM D638   | %        | 200                                                                                                                                                        | 230                                                                                                                                                                      | >1,000   | >1,000   | >1,000   | 600      |
| Flexural Modulus                  | ASTM D790   | kg/cm²   | 12,000                                                                                                                                                     | 12,500                                                                                                                                                                   | 15,800   | 14,500   | 15,500   | 17,000   |
| Notched Izod Impact Strength      | ASTM D256   | kg.cm/cm | 4 (C*)                                                                                                                                                     | 3 (C*)                                                                                                                                                                   | 5.3 (C*) | 5 (C*)   | 4.4 (C*) | 2.5 (C*) |
| Durometer Hardness                | ASTM D2240  | shore D  | 64                                                                                                                                                         | 64                                                                                                                                                                       | 67       | 66       | 65.5     | 67       |
| Vicat Softening Point             | ASTM D1525  | °C       | 122                                                                                                                                                        | 120                                                                                                                                                                      | 127.5    | 126      | 126      | 123      |
| ESCR; 10% Igepal, F <sub>50</sub> | ASTM D1693  | Hours    | Initial                                                                                                                                                    | 3                                                                                                                                                                        | 7        | 4        | 74       | 15       |
| Slip Agent                        |             |          | No                                                                                                                                                         | No                                                                                                                                                                       | No       | No       | No       | No       |
| End Product                       |             |          | Non-CSD/Food/<br>HPC                                                                                                                                       | Bottled Water/ Non-CSD                                                                                                                                                   |          |          |          |          |
| Product Highlight                 |             |          | Over caps, Screw<br>spout caps, Flip<br>spout caps.<br>Excellent<br>processability<br>for high complexity<br>mold design with<br>organoleptic<br>property. | Beverage caps and closures for mineral and still water, juice, tea or liquid dairy<br>with organoleptic property. Compatible with injection and compression processings. |          |          |          |          |

Note : \*C = Complete Break      \*P = Partial Break      \*NB = Non Break

| InnoPlus by GC: HDPE              |             |          |                                                                                                                                                                       |         |         |                                                                                                                                                                                   |           |  |
|-----------------------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--|
| Properties                        | Test Method | Unit     | Caps & Closures                                                                                                                                                       |         |         |                                                                                                                                                                                   |           |  |
|                                   |             |          | HD3000C                                                                                                                                                               | HD3001C | HD3500C | HD3502C                                                                                                                                                                           | HD4502C   |  |
| MFR (190 °C, 2.16 kg)             | ASTM D1238  | g/10 min | 2                                                                                                                                                                     | 2       | 1       | 1                                                                                                                                                                                 | 0.5       |  |
| Density                           | ASTM D1505  | g/cm³    | 0.954                                                                                                                                                                 | 0.954   | 0.956   | 0.956                                                                                                                                                                             | 0.957     |  |
| Melting Temperature               | ASTM D3418  | °C       | 132                                                                                                                                                                   | 132     | 130     | 130                                                                                                                                                                               | 130       |  |
| Tensile Strength at Yield         | ASTM D638   | kg/cm²   | 260                                                                                                                                                                   | 260     | 240     | 240                                                                                                                                                                               | 270       |  |
| Tensile Strength at Break         | ASTM D638   | kg/cm²   | 320                                                                                                                                                                   | 320     | 270     | 270                                                                                                                                                                               | 300       |  |
| Elongation at Break               | ASTM D638   | %        | 900                                                                                                                                                                   | 900     | >1,000  | >1,000                                                                                                                                                                            | 900       |  |
| Flexural Modulus                  | ASTM D790   | kg/cm²   | 11,300                                                                                                                                                                | 11,300  | 11,500  | 11,500                                                                                                                                                                            | 11,800    |  |
| Notched Izod Impact Strength      | ASTM D256   | kg.cm/cm | 5 (P*)                                                                                                                                                                | 5 (P*)  | 6 (NB*) | 6 (NB*)                                                                                                                                                                           | 6.8 (NB*) |  |
| Durometer Hardness                | ASTM D2240  | shore D  | 62                                                                                                                                                                    | 62      | 62      | 62                                                                                                                                                                                | 62        |  |
| Vicat Softening Point             | ASTM D1525  | °C       | 122                                                                                                                                                                   | 122     | 120     | 120                                                                                                                                                                               | 120       |  |
| ESCR; 10% Igepal, F <sub>50</sub> | ASTM D1693  | Hours    | 24                                                                                                                                                                    | 24      | 460     | 460                                                                                                                                                                               | >1,000    |  |
| Slip Agent                        |             |          | Yes                                                                                                                                                                   | No      | Yes     | No                                                                                                                                                                                | No        |  |
| End Product                       |             |          | Bottled Water/Non-CSD                                                                                                                                                 |         |         | CSD                                                                                                                                                                               |           |  |
| Product Highlight                 |             |          | Beverage caps and closures for drinking<br>mineral water, tea and fruit juice with<br>organoleptic property. Compatible with<br>injection and compression processing. |         |         | Beverage caps and closures for CSD and<br>Functional Sparking with organoleptic<br>property. Compatible with injection and<br>compression processing.                             |           |  |
|                                   |             |          |                                                                                                                                                                       |         |         | Lightweight CSD<br>caps and closures<br>with organoleptic<br>property, superior<br>stress cracking<br>resistance. Compatible<br>with injection and<br>compression<br>processings. |           |  |

Note : \*C = Complete Break      \*P = Partial Break      \*NB = Non Break

| InnoPlus by GC: LLDPE           |             |                   |                                                                                                           |
|---------------------------------|-------------|-------------------|-----------------------------------------------------------------------------------------------------------|
| Properties                      | Test Method | Unit              | Caps & Closures                                                                                           |
|                                 |             |                   | LL8420A                                                                                                   |
| MFR (190 °C, 2.16 kg)           | ASTM D1238  | g/10 min          | 20                                                                                                        |
| Density                         | ASTM D792   | g/cm <sup>3</sup> | 0.924                                                                                                     |
| <b>Molded Plague Properties</b> |             |                   |                                                                                                           |
| Tensile Strength at Yield       | ASTM D638   | Mpa               | 14                                                                                                        |
| Tensile Strength at Break       | ASTM D638   | Mpa               | 10                                                                                                        |
| Elongation at Break             | ASTM D638   | %                 | 700                                                                                                       |
| Vicat Softening Point           | ASTM D1525  | MPa               | 92                                                                                                        |
| Durometer Hardness              | ASTM D2240  | Shore D           | 52                                                                                                        |
| <b>Slip Agent</b>               |             |                   | No                                                                                                        |
| <b>End Product</b>              |             |                   | Food/HPC                                                                                                  |
| <b>Product Highlight</b>        |             |                   | Flip top caps, Lids, Pull Ring caps for Edible Oils, Dairy etc.,<br>Hinge caps. Excellent processability. |

| InnoPlus: LDPE           |             |                   |                                                                                                           |         |
|--------------------------|-------------|-------------------|-----------------------------------------------------------------------------------------------------------|---------|
| Physical Properties      | Test Method | Unit              | Caps & Closures                                                                                           |         |
|                          |             |                   | LD2026K                                                                                                   | LD2426K |
| MFR (190 °C, 2.16 kg)    | ISO 1133    | g/10 min          | 4                                                                                                         | 4       |
| Density                  | ISO 1183    | g/cm <sup>3</sup> | 0.920                                                                                                     | 0.924   |
| Melting Temperature      | ISO 11357   | °C                | 109                                                                                                       | 112     |
| Vicat Softening Point    | ASTM D1525  | °C                | 88                                                                                                        | 92      |
| <b>Slip Agent</b>        |             |                   | Yes                                                                                                       | Yes     |
| <b>End Product</b>       |             |                   | Food/HPC                                                                                                  |         |
| <b>Product Highlight</b> |             |                   | Flip top caps, Lids, Pull Ring caps for Edible Oils, Dairy etc.,<br>Hinge caps. Excellent processability. |         |

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose. All above values are typical values, not to be construed as specification.





# Large Blow Molding

## Rigid Packaging



< 200L Drum



IBC



≥ 200L Drum



Floating Solar  
Pontoon

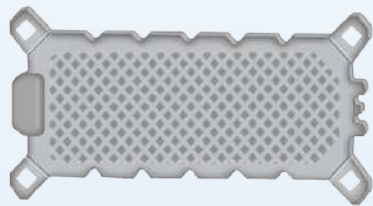


Others



| InnoPlus by GC: HDPE              |             |          |                                                                                                                                                                                               |                                                                                                                                                                                                                                                            |                                                                                                                                                                                                               |          |
|-----------------------------------|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Properties                        | Test Method | Unit     | Large Blow Molding                                                                                                                                                                            |                                                                                                                                                                                                                                                            |                                                                                                                                                                                                               |          |
|                                   |             |          | HD7200B                                                                                                                                                                                       | HD7808B                                                                                                                                                                                                                                                    | HD8200B                                                                                                                                                                                                       | HD9100B  |
| MFR (190 °C, 2.16 kg)             | ASTM D1238  | g/10 min | 0.05                                                                                                                                                                                          | 0.04                                                                                                                                                                                                                                                       | 0.03                                                                                                                                                                                                          | 0.01     |
| MFR (190 °C, 21.6 kg)             | ASTM D1238  | g/10 min | 8.5                                                                                                                                                                                           | 6                                                                                                                                                                                                                                                          | 4                                                                                                                                                                                                             | 2.5      |
| Density                           | ASTM D1505  | g/cm³    | 0.956                                                                                                                                                                                         | 0.950                                                                                                                                                                                                                                                      | 0.955                                                                                                                                                                                                         | 0.952    |
| Melting Temperature               | ASTM D3418  | °C       | 134                                                                                                                                                                                           | 130                                                                                                                                                                                                                                                        | 134                                                                                                                                                                                                           | 134      |
| Tensile Strength at Yield         | ASTM D638   | kg/cm²   | 300                                                                                                                                                                                           | 300                                                                                                                                                                                                                                                        | 300                                                                                                                                                                                                           | 250      |
| Tensile Strength at Break         | ASTM D638   | kg/cm²   | 350                                                                                                                                                                                           | 370                                                                                                                                                                                                                                                        | 370                                                                                                                                                                                                           | 400      |
| Elongation at Break               | ASTM D638   | %        | 800                                                                                                                                                                                           | 850                                                                                                                                                                                                                                                        | 850                                                                                                                                                                                                           | 720      |
| Flexural Modulus                  | ASTM D790   | kg/cm²   | 12,000                                                                                                                                                                                        | 12,000                                                                                                                                                                                                                                                     | 12,000                                                                                                                                                                                                        | 10,000   |
| Notched Izod Impact Strength      | ASTM D256   | kg.cm/cm | 25 (NB*)                                                                                                                                                                                      | 72 (NB*)                                                                                                                                                                                                                                                   | 64 (NB*)                                                                                                                                                                                                      | 85 (NB*) |
| Durometer Hardness                | ASTM D2240  | shore D  | 63                                                                                                                                                                                            | 61                                                                                                                                                                                                                                                         | 64                                                                                                                                                                                                            | 62       |
| Vicat Softening Point             | ASTM D1525  | °C       | 124                                                                                                                                                                                           | 125                                                                                                                                                                                                                                                        | 128                                                                                                                                                                                                           | 126      |
| ESCR; 25% Igepal, F <sub>50</sub> | ASTM D1693  | Hours    | >1,000                                                                                                                                                                                        | >1,000                                                                                                                                                                                                                                                     | >1,000                                                                                                                                                                                                        | >1,000   |
| UV Stabilizer                     |             |          | No                                                                                                                                                                                            | Yes                                                                                                                                                                                                                                                        | No                                                                                                                                                                                                            | No       |
| End Product                       |             |          | < 200L Drum                                                                                                                                                                                   | IBC                                                                                                                                                                                                                                                        | ≥ 200L Drum and Floating Pontoon                                                                                                                                                                              |          |
| Product Highlight                 |             |          | Excellent Processability, Extremely High Stacking Performance, High Impact Strength, where Recommended Applications for Large Blow Molding Products e.g. Drums, Jerry Cans, Water Tanks, etc. | UV Added Grade with Excellent Processability, Extremely High Impact Strength and Good Stacking Performance, suitable for Large Blow Molding Product e.g. Intermediate Bulk Containers (IBC), Liner for 200L-Drum, Pontoons, and Outdoor Applications, etc. | Excellent Processability, Extremely High Impact Strength and Stacking Performance, where Recommended Applications for Large Blow Molding Products e.g. 200 L-Drums, Pontoon and Heavy Duty Applications, etc. |          |

Note: \*C = Complete Break \*P = Partial Break \*NB = Non Break



# Small Blow Molding

## Rigid Packaging



Personal Care Bottle



Food & Beverage Bottle



Lubricant Container



Home & Household Cares



| InnoPlus by GC: HDPE         |             |          |                                                    |         |                                                                                         |         |                        |
|------------------------------|-------------|----------|----------------------------------------------------|---------|-----------------------------------------------------------------------------------------|---------|------------------------|
| Properties                   | Test Method | Unit     | Blow Molding                                       |         |                                                                                         |         |                        |
|                              |             |          | HD4200B                                            | HD5200B | HD6200B                                                                                 | HD6600B | HD6900B <sup>(1)</sup> |
| MFR (190 °C, 2.16 kg)        | ASTM D1238  | g/10 min | 0.67                                               | 0.45    | 0.45                                                                                    | 0.40    | 0.21                   |
| Density                      | ASTM D1505  | g/cm³    | 0.966                                              | 0.966   | 0.962                                                                                   | 0.957   | 0.966                  |
| Melting Temperature          | ASTM D3418  | °C       | 135                                                | 135     | 135                                                                                     | 135     | 135                    |
| Tensile Strength at Yield    | ASTM D638   | kg/cm²   | 310                                                | 320     | 330                                                                                     | 320     | 320                    |
| Tensile Strength at Break    | ASTM D638   | kg/cm²   | 230                                                | 350     | 350                                                                                     | 400     | 330                    |
| Elongation at Break          | ASTM D638   | %        | >1,000                                             | >1,000  | >1,000                                                                                  | >1,000  | >1,000                 |
| Flexural Modulus             | ASTM D790   | kg/cm²   | 18,000                                             | 17,500  | 15,000                                                                                  | 14,000  | 16,500                 |
| Notched Izod Impact Strength | ASTM D256   | kg.cm/cm | 13 (P*)                                            | 15 (P*) | 12 (P*)                                                                                 | 10 (P*) | 12 (P*)                |
| Durometer Hardness           | ASTM D2240  | shore D  | 65                                                 | 66      | 65                                                                                      | 65      | 66                     |
| Vicat Softening Point        | ASTM D1525  | °C       | 125                                                | 127     | 125                                                                                     | 125     | 127                    |
| ESCR; 25% Igepal, F50        | ASTM D1693  | Hours    | 25                                                 | 30      | 60                                                                                      | 400     | 60                     |
| End Product                  |             |          | Food Bottle, Drinking Water Bottle and Milk Bottle |         | Food Bottle, Drinking Water Bottle, Milk Bottle, Personal Cares and Lubricant Container |         |                        |

Note : \*C = Complete Break      \*P = Partial Break      \*NB = Non Break  
<sup>(1)</sup> Downgauging & Lightweight

| InnoPlus by GC: LDPE  |             |          |                                                          |
|-----------------------|-------------|----------|----------------------------------------------------------|
| Properties            | Test Method | Unit     | Blow Molding                                             |
|                       |             |          | LD2420F                                                  |
| MFR (190 °C, 2.16 kg) | ASTM D1238  | g/10 min | 0.75                                                     |
| Density               | ASTM D792   | g/cm³    | 0.922                                                    |
| Melting Temperature   | ASTM D3418  | °C       | 112                                                      |
| Vicat Softening Point | ASTM D1525  | °C       | 95                                                       |
| Slip Agent            |             |          | No                                                       |
| End Product           |             |          | Small Containers e.g. Personal Cares and Squeeze Bottles |

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# Injection Molding

## Rigid Packaging



Pallet



Food Box



Crate

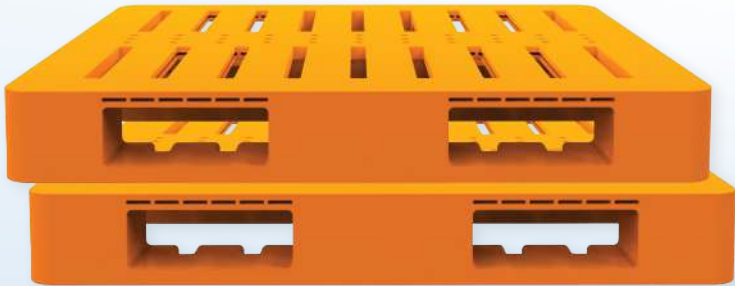


Bin

| InnoPlus by GC: HDPE              |             |          |                                                  |         |                                                                  |         |
|-----------------------------------|-------------|----------|--------------------------------------------------|---------|------------------------------------------------------------------|---------|
| Properties                        | Test Method | Unit     | Injection Molding                                |         |                                                                  |         |
|                                   |             |          | HD1010J                                          | HD1600J | HD2208J                                                          | HD2308J |
| MFR (190 °C, 2.16 kg)             | ASTM D1238  | g/10 min | 20                                               | 12      | 3.7                                                              | 6       |
| Density                           | ASTM D1505  | g/cm³    | 0.956                                            | 0.958   | 0.961                                                            | 0.962   |
| Melting Temperature               | ASTM D3418  | °C       | 130                                              | 132     | 134                                                              | 136     |
| Tensile Strength at Yield         | ASTM D638   | kg/cm²   | 290                                              | 280     | 310                                                              | 300     |
| Tensile Strength at Break         | ASTM D638   | kg/cm²   | 140                                              | 150     | 220                                                              | 170     |
| Elongation at Break               | ASTM D638   | %        | 200                                              | 210     | >1,000                                                           | >1,000  |
| Flexural Modulus                  | ASTM D790   | kg/cm²   | 12,000                                           | 12,500  | 13,000                                                           | 15,000  |
| Notched Izod Impact Strength      | ASTM D256   | kg.cm/cm | 4 (C*)                                           | 3 (C*)  | 5 (C*)                                                           | 4 (C*)  |
| Durometer Hardness                | ASTM D2240  | shore D  | 64                                               | 64      | 65                                                               | 65      |
| Vicat Softening Point             | ASTM D1525  | °C       | 122                                              | 118     | 122                                                              | 125     |
| ESCR; 10% Igepal, F <sub>50</sub> | ASTM D1693  | Hours    | N/A                                              | N/A     | N/A                                                              | N/A     |
| ESCR; 25% Igepal, F <sub>50</sub> | ASTM D1693  | Hours    | Initial                                          | Initial | 6                                                                | 5       |
| UV Stabilizer                     |             |          | No                                               | No      | Yes                                                              | Yes     |
| End Product                       |             |          | Small part, Stationery, Household products, Toys |         | UV added for outdoor applications, Garbage bins, Pallets, Crates |         |

Note : \*C = Complete Break      \*P = Partial Break      \*NB = Non Break

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# Injection Blow Molding

## Rigid Packaging



| InnoPlus by GC: PET             |               |         |                                     |                                                              |                 |             |             |             |
|---------------------------------|---------------|---------|-------------------------------------|--------------------------------------------------------------|-----------------|-------------|-------------|-------------|
| Properties                      | Test Method   | Unit    | Injection Blow Molding              |                                                              |                 |             |             |             |
|                                 |               |         | SA125T                              | SA135T / SA135T(B)                                           | SA135T(H)       | SA145T      | SA150T      | SE030T      |
| Intrinsic Viscosity             | MCI Method    | dl/g    | 0.77 ± 0.02                         | 0.82 ± 0.02                                                  | 0.80 ± 0.02     | 0.86 ± 0.02 | 0.90 ± 0.02 | 0.80 ± 0.05 |
| Acetaldehyde                    | MCI Method    | ppm     | 2 max                               | 1 max                                                        | 1 max           | 1 max       | 1 max       | 1 max       |
| Color-L                         | MCI Method    | -       | 75 min.                             | 75 min.                                                      | 75 min.         | 75 min.     | 75 min.     | 75 min.     |
| Color-b                         | MCI Method    | -       | 1.0 max                             | 1.0 max                                                      | 1.0 max         | 1.0 max     | 1.0 max     | 1.0 max     |
| Diethylene Glycol               | MCI Method    | %wt     | 1.10 - 1.60                         | 1.10 - 1.60                                                  | 1.30 max        | 1.10 - 1.60 | 1.10 - 1.60 | 1.10 - 1.60 |
| Powder                          | MCI Method    | ppm     | 100 max                             | 100 max                                                      | 100 max         | 100 max     | 100 max     | 100 max     |
| Appearance                      | MCI Method    | -       | Conformity                          | Conformity                                                   | Conformity      | Conformity  | Conformity  | Conformity  |
| Foreign Matters in chip <0.2 mm | MCI Method    | pc/100g | 5 max                               | 5 max                                                        | 5 max           | 5 max       | 5 max       | 5 max       |
| Foreign Matters in chip ≥0.2 mm | MCI Method    | pc/100g | 0 max                               | 0 max                                                        | 0 max           | 0 max       | 0 max       | 0 max       |
| Metallic Foreign Matters        | MCI Method    | pc/100g | 0 max                               | 0 max                                                        | 0 max           | 0 max       | 0 max       | 0 max       |
| Moisture                        | ZIMMER Method | ppm     | 2,000 max                           | 2,000 max                                                    | 2,000 max       | 2,000 max   | 2,000 max   | 2,000 max   |
| Metling Point                   | ASTM D3418    | °C      | 245 - 249                           | 243 - 251                                                    | 250 - 255       | 245 - 249   | 245 - 249   | 243 - 251   |
| End Product                     |               |         | Water, Cosmetic, Fruit Juice Bottle | Water, Cosmetic, Fruit Juice Bottle, Edible Oil, Sheet, Tray | Hot Fill Bottle | CSD Bottle  | 5 Gallons   | Sheet/Tray  |

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# PCR HDPE

## Rigid Packaging



Home and  
Personal Care



Chemical and  
Lubricant Container



High-quality and 100% PCR resins which comply with global standard to the market under brand InnoEco.

| InnoPlus by GC: PCR HDPE                               |             |          |                                                                                                    |                                                                                                   |                                                                                               |                                                                                                   |                                                                                                      |
|--------------------------------------------------------|-------------|----------|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Properties                                             | Test Method | Unit     | Grade                                                                                              |                                                                                                   |                                                                                               |                                                                                                   |                                                                                                      |
|                                                        |             |          | HN035NB                                                                                            | HW035NB                                                                                           | HM035NB                                                                                       | HX035NB                                                                                           | HM035NJ                                                                                              |
| Physical Properties                                    |             |          |                                                                                                    |                                                                                                   |                                                                                               |                                                                                                   |                                                                                                      |
| MFR (190 °C, 2.16 kg)                                  | ASTM D1238  | g/10 min | 0.35                                                                                               | 0.46                                                                                              | 0.58                                                                                          | 0.4                                                                                               | 2                                                                                                    |
| Density                                                | ASTM D1505  | g/cm³    | 0.963                                                                                              | >0.970                                                                                            | 0.959                                                                                         | 0.961                                                                                             | 0.957                                                                                                |
| Mechanical Properties (Based on compression specimens) |             |          |                                                                                                    |                                                                                                   |                                                                                               |                                                                                                   |                                                                                                      |
| Tensile Strength at Yield                              | ASTM D638   | kg/cm²   | 300                                                                                                | 277                                                                                               | 270                                                                                           | 300                                                                                               | 270                                                                                                  |
| Tensile Strength at Break                              | ASTM D638   | kg/cm²   | 173                                                                                                | 157                                                                                               | 160                                                                                           | 176                                                                                               | 140                                                                                                  |
| Elongation at Break                                    | ASTM D638   | %        | 460                                                                                                | 490                                                                                               | 330                                                                                           | 430                                                                                               | 200                                                                                                  |
| Flexural Modulus                                       | ASTM D790   | kg/cm²   | 13,800                                                                                             | 13,700                                                                                            | 12,600                                                                                        | 14,000                                                                                            | 12,600                                                                                               |
| Notched Izod Impact Strength                           | ASTM D256   | kg.cm/cm | 9.3                                                                                                | 6                                                                                                 | 6                                                                                             | 10                                                                                                | 4                                                                                                    |
| ESCR; 25% Igepal, F <sub>50</sub>                      | ASTM D1693  | Hours    | 24                                                                                                 | 24                                                                                                | -                                                                                             | -                                                                                                 | -                                                                                                    |
| Color                                                  |             |          | <br>Natural White | <br>Opaque white | <br>Purple | <br>Light Grey | <br>Grayish-Green |
| Application                                            |             |          | Extrusion blow molding, Home & personal care bottles, Lubricant Container                          |                                                                                                   |                                                                                               | Personal care containers, Extrusion profile, Detergent containers, Lubricant oil containers       | Injection molding applications of household product                                                  |

Recommendation: Injection Molding Temperature : 170 - 220 °C  
Extruder Temperature : 165 - 190 °C  
Die Temperature : 180 - 195 °C

# PCR PET

## Rigid Packaging



Bottled Water



Carbonated  
Soft Drinks  
(CSD)



Non- Carbonated  
Soft Drinks  
(Non-CSD)



Personal Care  
Bottle



Food Box



High-quality and 100% PCR resins which comply with global standard to the market under brand InnoEco.

| InnoPlus by GC: PCR PET  |                        |      |                                               |                                                    |                                               |
|--------------------------|------------------------|------|-----------------------------------------------|----------------------------------------------------|-----------------------------------------------|
| Properties               | Test Method            | Unit | Grade                                         |                                                    |                                               |
|                          |                        |      | TN080FB                                       | TN085FB                                            | TN080FBP                                      |
| Physical Properties      |                        |      |                                               |                                                    |                                               |
| Intrinsic Viscosity (IV) | Relative to ASTM D4603 | dl/g | 0.80±0.03                                     | 0.85±0.03                                          | 0.80±0.03                                     |
| Acetaldehyde (AA)        | ENV-Method             | ppm  | Max 1                                         | Max 1                                              | Max 1                                         |
| Moisture content         | ENV-Method             | %    | Max 0.2                                       | Max 0.2                                            | Max 0.2                                       |
| Color Properties         |                        |      |                                               |                                                    |                                               |
| L*                       | CIELAB                 | -    | Min 63                                        | Min 70                                             | Min 68                                        |
| b*                       | CIELAB                 | -    | Max 1.0                                       | Max 1.0                                            | Max 1.0                                       |
| Application              |                        |      | Food & Beverage, Home & Personal Care Bottles | CSD, Food & Beverage, Home & Personal Care Bottles | Food & Beverage, Home & Personal Care Bottles |

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# PCR PET Content

## Rigid Packaging

25-30% PCR PET content, they are used for bottle applications such as drinking water, beverage, cosmetic bottle applications

| InnoPlus by GC: PCR PET  |                        |      |                                                        |             |
|--------------------------|------------------------|------|--------------------------------------------------------|-------------|
| Properties               | Test Method            | Unit | Grade                                                  |             |
|                          |                        |      | TD080FB-30A                                            | TD080FB-25B |
| Physical Properties      |                        |      | TN080FB                                                | TN080FB     |
| Intrinsic Viscosity (IV) | Relative to ASTM D4603 | dl/g | 0.80±0.03                                              | 0.80±0.03   |
| Acetaldehyde (AA)        | ENV-Method             | ppm  | Max 1.0                                                | Max 1.0     |
| Color Properties         |                        |      |                                                        |             |
| L*                       | CIELAB                 | -    | Min 63                                                 | Min 63      |
| b*                       | CIELAB                 | -    | Max 1.0                                                | Max 1.0     |
| Physical Properties      |                        |      | SA135T                                                 | SA135T (H)  |
| Intrinsic Viscosity (IV) | MCI-Method             | dl/g | 0.82±0.02                                              | 0.82±0.02   |
| Acetaldehyde (AA)        | MCI-Method             | ppm  | Max 1.0                                                | Max 1.0     |
| Color Properties         |                        |      |                                                        |             |
| L*                       | MCI-Method             | -    | Min 75                                                 | Min 75      |
| b*                       | MCI-Method             | -    | Max 1.0                                                | Max 1.0     |
| Moisture Content         |                        |      | TD080FB-30A                                            | TD080FB-25B |
| Moisture Content         | Inhouse-Method         | %    | Max 0.25                                               | Max 0.25    |
| Application              |                        |      | Drinking water, Beverage, Cosmetic Bottle applications |             |







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**Date as of 30 June 2026**