Sustainable Biopolymers for Blow Molding

Compounds: PHACT™ CA1670P and CA1680P

Target Applications

Markets
- Personal Care
- Cosmetics

End Products
- Personal care dispensers
- Cosmetic packaging

Bring a New Wave
PHACT

PLA/PHA COMPOUNDS

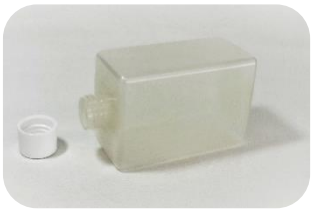
PHACT CA1670P and **PHACT CA1680P** are environmentally friendly semi-crystalline biopolymer compounds that improve functional performance and enable faster composting relative to polylactic acid (PLA). These grades are compounded resins based on PLA and amorphous PHA (aPHA) known as PHACT A1000P. The addition of aPHA to PLA increases flexibility and impact strength and enhances water/oil resistance. It also improves processability during blow molding, allowing greater design flexibility. PHACT CA1670P is an opaque grade, and PHACT CA1680P is suitable for semi-transparent applications.

PHACT CA1670P & CA1680P Features

- 100% bio content
- Industrial compostable
- High surface gloss
- Colorable and printable
- Relative to PLA:
  - Increased flexibility and impact strength
  - Improved processability
  - Enhanced oil and water resistance







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Mechanical Properties

Compound Grades for Blow Molding				
Properties	**Units**	**ASTM**	**CA1670P**	**CA1680P**
Forms	-	-	Pellet	Pellet
Specific Gravity	-	D792	1.26	1.23
Hardness (Max /15s)	Shore D	D2240	76 / 73	81 / 79
Tensile Strength at Peak(1)	MPa	D638	44	57
Elongation at Break(1)	%	D638	70	25
Flexural Strength	MPa	D790	28	-
IZOD Impact Strength (Unnotched, RT)	kJ/m^2	D256	Non-Break	29
IZOD Impact Strength (Unnotched, -20°C)	kJ/m^2	D256	45	-
Heat Deflection Temperature / 0.455 MPa	℃	D648	50	53
Melting Point(2)	℃	D3418	150	150
Glass Transition Temperature(2)	℃	D3418	-17, 57	-15, 57
Melt Flow Rate (190°C, 2.16 kg)	g/10 min	D1238	5 ~ 8	4 ~ 5
Mold Shrinkage(3)	%	-	0.3	0.3

1) Injection specimens conform to ASTM D638. Crosshead speed 50 mm/min for tensile strength.
2) Differential Scanning Calorimeter (DSC), the peak of endotherm. Heating rate 10 ℃/ min.
3) Injection mold temperature was 25 ℃.

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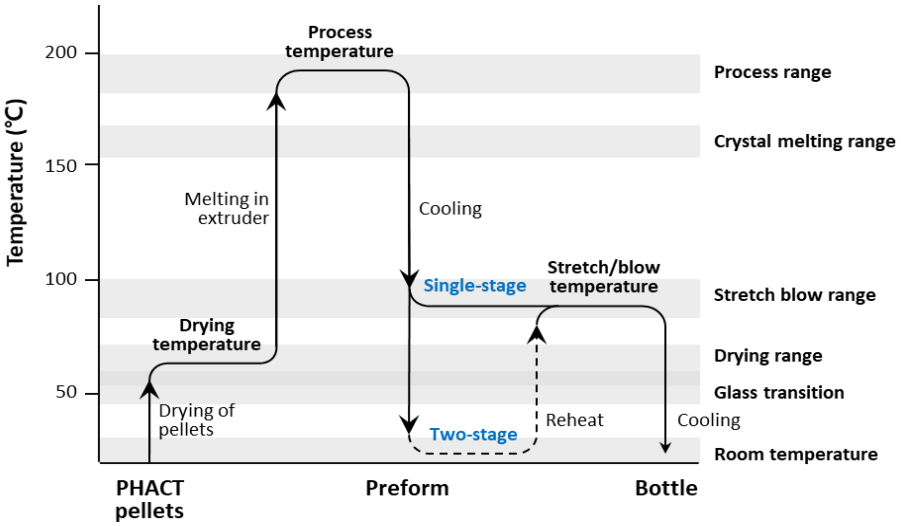
Recommended Processing Conditions

Compound Grades for ISBM	
Preform Temperature	80 ~ 100 ℃
Stretch Rod Speed	1.2 ~ 2.0 m/sec
Stretch Blow Mold Temperature	21 ~ 35 ℃

Process Structure for ISBM



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Drying Process Conditions

- Biodegradable materials are highly hygroscopic. Store in a dry condition.
- Recommended to use all once opened. If an opened bag must be stored for reuse, seal completely, avoid air exposal, and store at a dry, well-ventilated condition/place/location. Avoid long-term storing.
- PHACT Compounds must be dried under 60 °C for over 5 hrs. or caking can happen because the Tg of this compound is around 60 °C.
- PHACT Compounds are preferable to dry with air below -40 °C dew point.
- When exposed to moisture, completely dry in a dehumidifying dryer before use.

Purging Process Conditions (*Following PET, PA, HDPE)

It is critical to clean the material handling systems of PET, nylon, and high molecular weight HDPE to assure that these materials do not inadvertently feed into the extruder during or after the purging process.

1) Purge with low MFR (e.g., <1) transition resin at normal PET operating temperatures. PET and PHACT are temperature incompatible, so the transition resin is one that can be processed at the high temperatures of PET and the low temperatures of PHACT.
   Suggested transition resins include PP, crystal PS, and PETG. Purge for at least 7x average residence time, much of the time at the typical PET production rate (~30 minutes).
2) Let the system empty as much as possible. Clean out the hopper as much as possible.
3) Introduce higher melt flow transition resin (PP, PS, PETG) and change to normal PHACT operating temperatures.
4) Let the system empty as much as possible. Then transition to pure PLA resin or PHACT and purge, again, for a minimum 7x average residence time. Change the screen pack when it becomes obvious that primarily PLA (or PHACT) is exiting the die.
5) At the completion of run, purge all PHACT from the extrusion system, using low melt index PP or PS.

*Notes: It is critical that all drying and conveying/receiving systems be free of all PET and vacuumed to ensure there is no remaining polymer dust before adding PHACT. PET will not melt at PHACT operating temperatures and will block screens if it is present in the system.

CJ Biomaterials Inc., 19 Presidential Way – Suite 301, Woburn MA 01801

For additional information or specific recommendations for your intended applications, please contact us at:

cj.biomaterials@cj.net or 339-999-2693