



Cellulose Acetate Resin

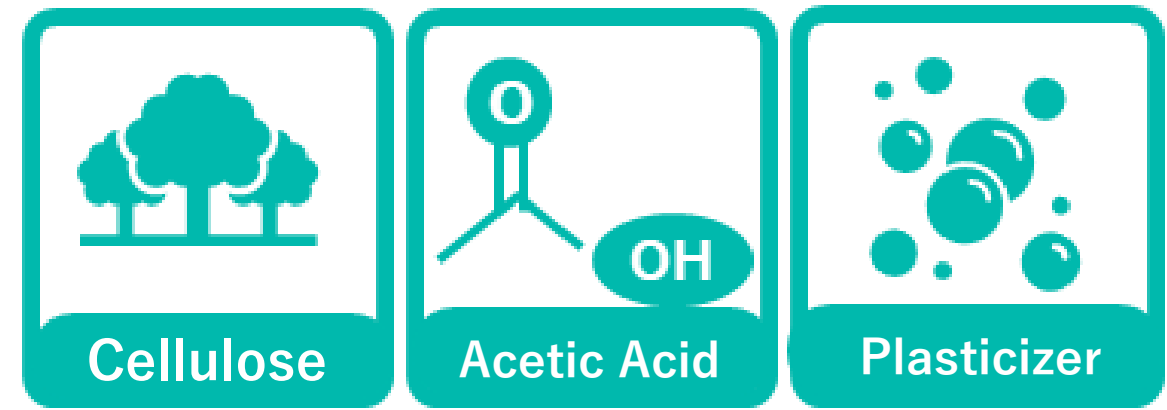
CAFBL® 



- ✓ 「CAFBLO®」 is made from cellulose, acetic acid and plasticizer that have biodegradability, therefore it is recognized the eco-friendly material.
- ✓ 「CAFBLO®」 is featured as natural material and highly biodegradable, it has the characteristics “transparency” and “recyclability”.

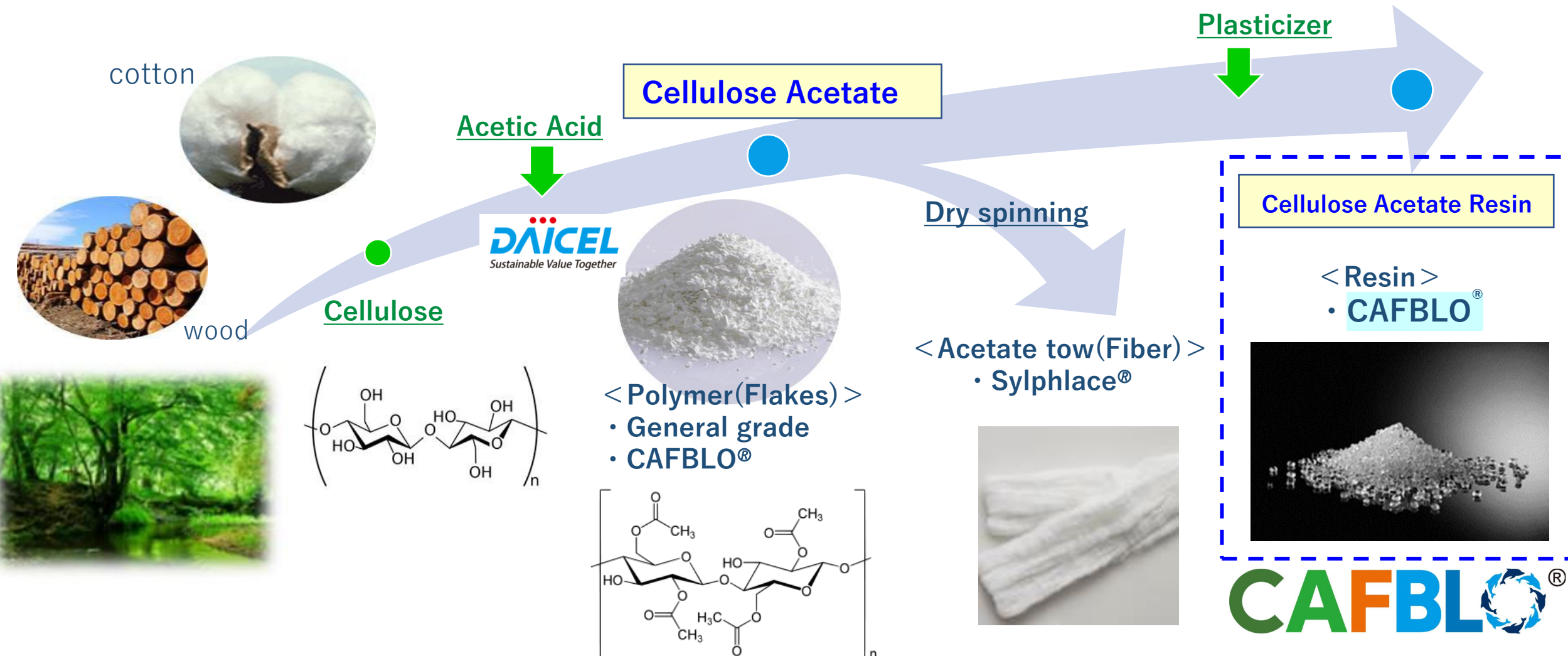
Features

- 1 Non-edible Biomass
- 2 Material Recyclable
- 3 Transparency
- 4 Marine Biodegradability
- 5 Antibacterial



Cellulose Acetate chain

A material that returns to nature from cellulose obtained from non-edible plants such as wood and cotton.



- ✓ Under the REACH regulation, both RSS025 and RSF208 are restricted to a maximum shipping limit of 40 tons within the EU region.
- ✓ “RSF038” will be cleared REACH regulation restrictions.

Grade	Test Method	Unit	RSS025	RSF208	RSF038
Features			Standard	High Flow	High Flow
Density	ISO 1183	g/cm ³	1.28	1.27	1.28
MFR/220°C*10kg	ISO 1133	g/10min	22	70	-
Tensile Strength	ISO 527	Mpa	53	42	-
Flexural Strength	ISO 178	Mpa	63	49	-
Flexural Modulus	ISO 178	Mpa	2,600	2,100	-
Notched Charpy impact strength	ISO 179/1eA	kJ/m ²	10	11	-
Deflection temperature under load/0.45MPa	ISO 75	°C	92	NA	-
Deflection temperature under load/1.80MPa	ISO 75	°C	66	56	-

* These are typical properties and are not be construed as specifications.

Grade	3D printing	Injection	Extrusion	Sheeting	Vacuum	Blow	Inflation
RSF038	Good	Good	Good	(Developing)	(Developing)	(Developing)	(Developing)

Traditional

- ✓ Glasses frame
- ✓ Screwdriver handle etc.

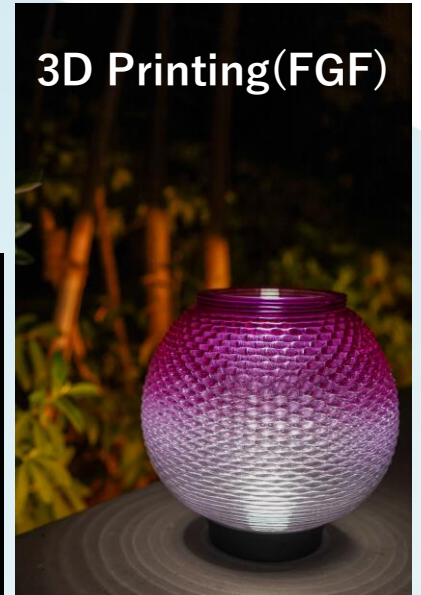


Trend

3D Printing(FGF)



3D Printing(FGF)



Injection

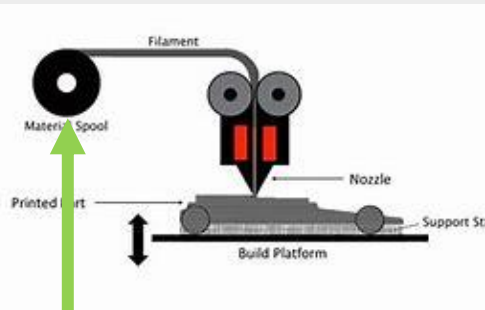


3D Printing(filament)



- ✓ CAFBLO® is available a 3D printing applications of the melt stacking method using pellets(FGF), **which can print large scale sculptures.**
- ✓ CAFBLO® is possible to design models that take advantage of **transparency and second processing.**

Fused Deposition Modeling(FGF)



- ✓ Low-temperature, low-shear stress
- ✓ Resistant to drawdown
- ✓ Low solidification temperature and good fusion characteristics

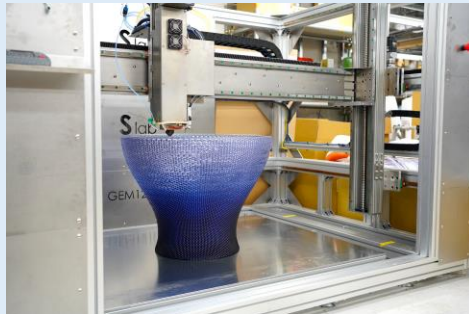
CAFBLO® × FGF



CAFBLO®

【Features】

- ✓ Transparency
- ✓ Luxurious feel
- ✓ Adhesion
- ✓ Polishability
- ✓ Environmentally friendly material



Large-scale sculptures

Molding condition .ex

【Grade】 RSF038

【Molding equipment】 3m × 3m × 3m

【Printing condition】

temperature : C1 : 200°C / C2 : 210°C / C3 : 210°C / C4 : 210°C

Nozzle(φ) : 6mm

Speed : 1.4m/min

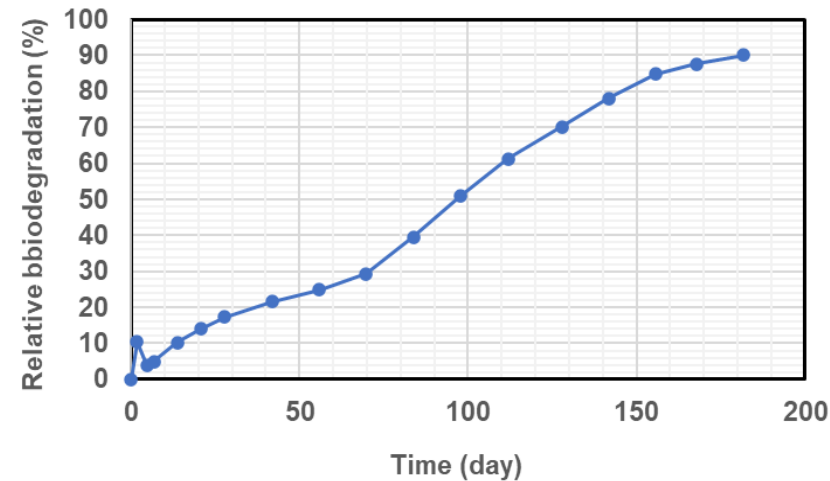


- ✓ CAFBLO® is highly biodegradable in seawater. It is made from Cellulose acetate, acetic acid and biodegradable plasticizer mainly. These raw materials are biodegraded by microorganisms eventually converted into water and carbon dioxide.



Marin disintegration

Test location : Himeji, Hyogo Japan
Test sample : 6mm Φ Straw (CAFBLO®)

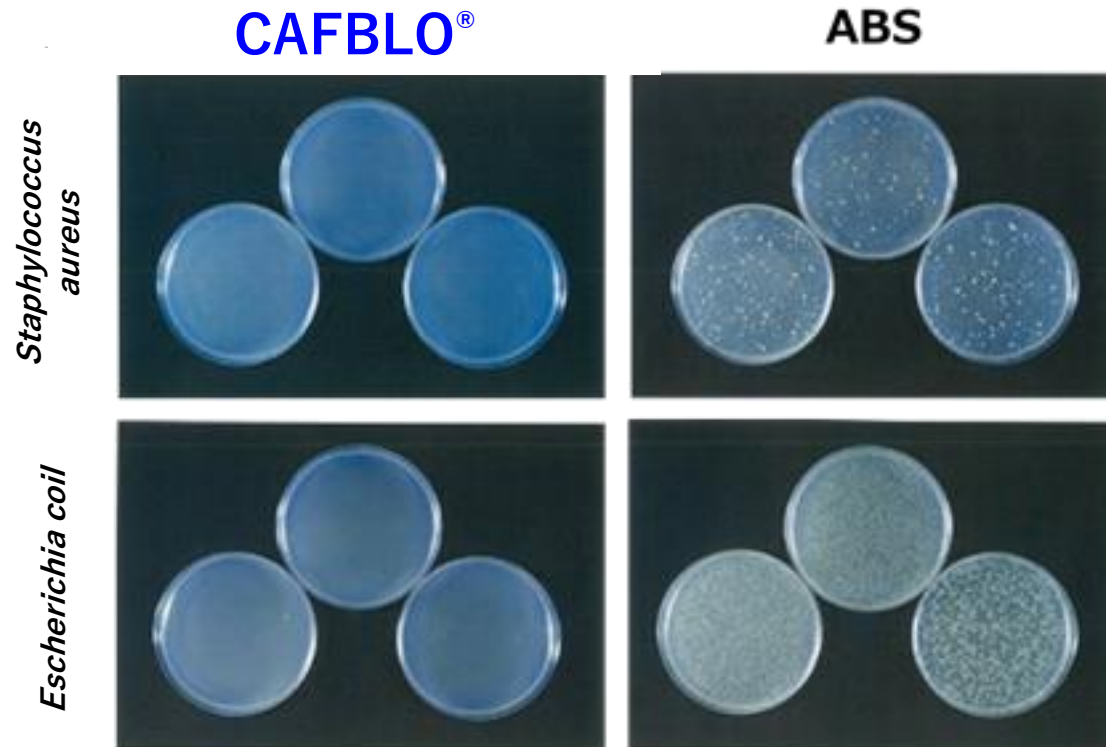


Marine biodegradation test

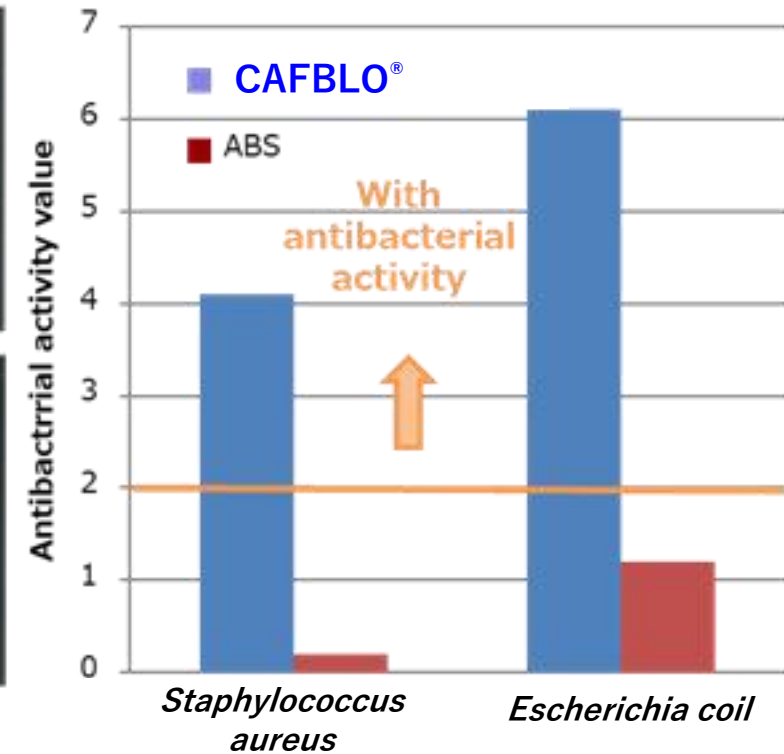
Measurement laboratory: OWS
Compliant Standard: ASTM D6691
Culture temperature: 30°C
Reference item: Cellulose

CAFBLO[®] holds high antibacterial activity against *Staphylococcus aureus* and *Escherichia coil*. According the JIS Z 2801 (ISO22196), antibacterial activity value 2.0 or more defines antibacterial effect.

Photo of culture solution after test



Comparison of antibacterial activity values



Test method : JIS Z 2801 (ISO22196)
Test bacteria : *Staphylococcus aureus* and *Escherichia coil*
Test institution : Japan Food Research Laboratories Center

» Pre-drying conditions

◆ Package for “CAFBL0[®]” is designed for moisture proof, as Cellulose Acetate Resin absorbs moisture.

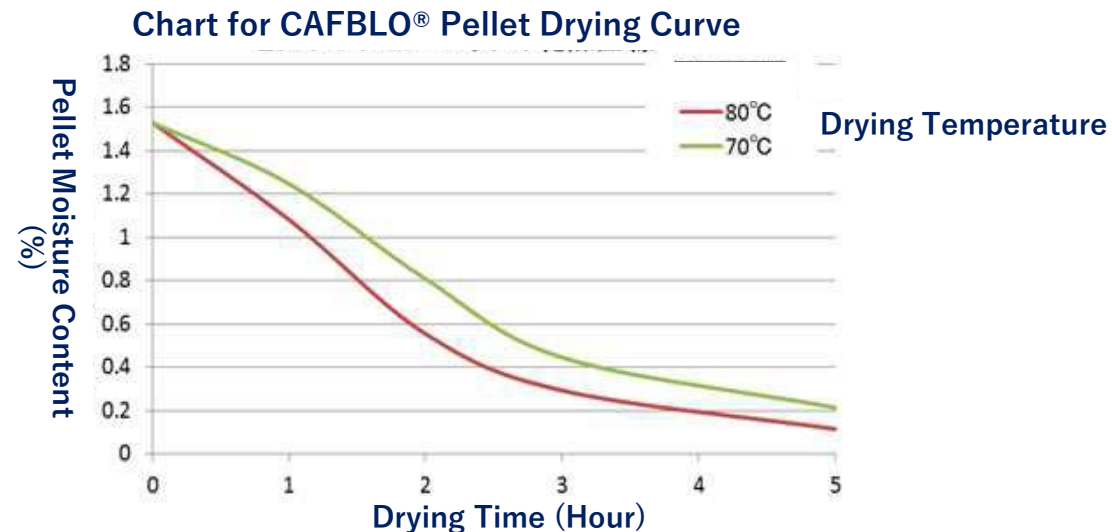
However, “Pre-Drying” is a necessary step before molding.

(In molding, the coefficient of moisture absorption of “CAFBL0[®]” is about $\leq 0.3\%$)

◆ In case of insufficient drying, there will be some issues such as a degradation of mechanical properties provoked by hydrolysis, Foaming (Bubbles) / Sliver Streak to molded products.

◆ If a hot air circulation dryer is used, the conditions of “Pre-Drying” are

- 1) To put CAFBL0[®] side the box-shaped container Pellet Layer $\leq 3\text{cm}$
- 2) To dry temperature at 80 °C, for 3 – 5 hours
- 3) Hopper dryer is recommended to prevent moisture absorption during molding work.

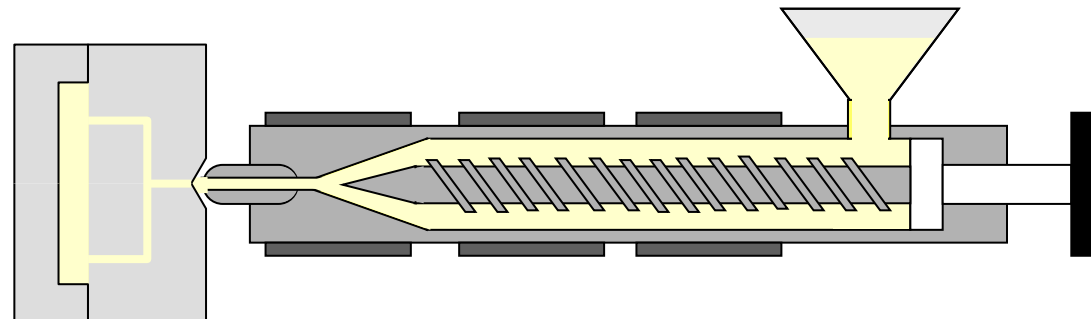


Injection Molding Conditions

◆Standard Injection Molding Conditions are as follows.

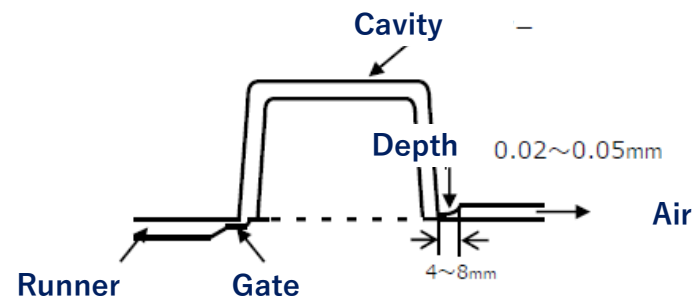
Grade	Temperature inside Cylinder(°C)				Screw Rotation Speed (rpm)	Back Pressure (Mpa)	Molding Temperature (°C)
	Nozzle	Front	Middle	Back			
RSS025	220-240	220-240	200-220	180-200	50-80	5-20	50-80
RSF208	210-230	210-230	190-210	180-200	50-80	5-20	40-60
RSF038	210-230	210-230	190-210	180-200	50-80	5-20	40-60

*[Precaution] In molding, a volatile gas is generated by mainly compounded ingredients. Please take precaution for not inhaling the volatile gas to install a local exhaust ventilation.



» Precautions for molding work

- ◆ Please do not retain “CAFBL0[®]” inside Cylinder for hours, to prevent the chemical decomposition.
If molding work is stopped temporarily, please drain the resin from inside Cylinder, and keep the temperature inside Cylinder cooler.
- ◆ If Molten Resin is injected rapidly in the cavity, the remaining air & gas are compressed and generated heat, which might cause burning/haze/pinhole to molded products.
In order to avoid these issues, please remove air and generated gas completely.
- ◆ “CAFBL0[®]” contains of a few plasticizer, an air ventilation for molding facility is necessary.
Generally, the air vent is created by surrounding the cavity to make a shallow chase.
The air vent is located at a corner part where keeps some distance from the gate.
Please select mainly the weld line part, and drain it from the parting line in the mold.



Molding temperature and flow length

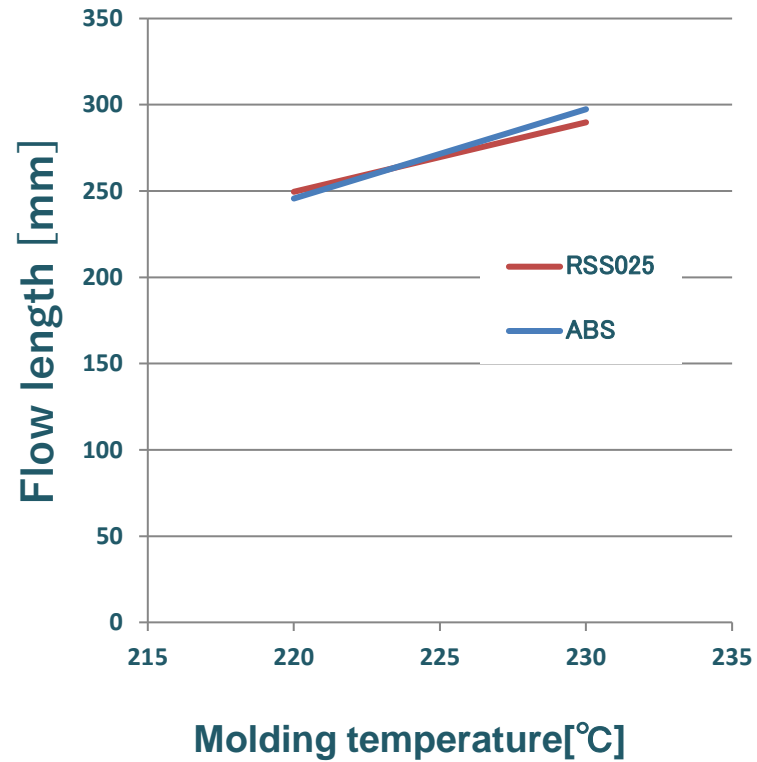
[Molding condition]

Molding Temperature : 50°C、

Injection pressure : 100MPa

[Molding design]

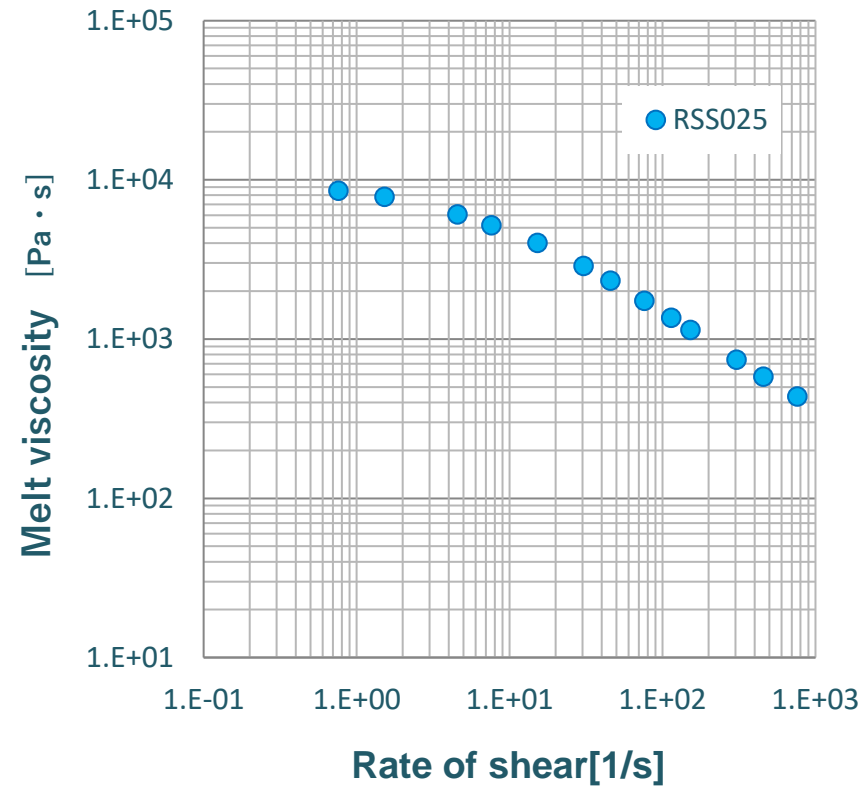
width : 20mm、 thickness : 2mm



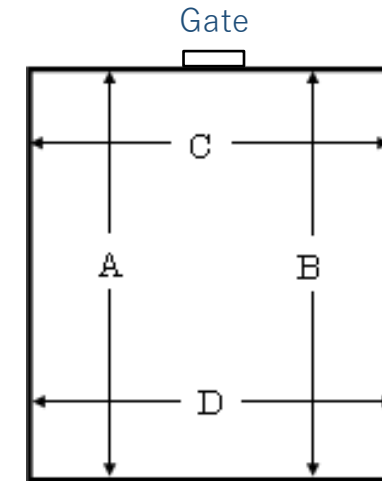
Melt viscosity

Temperature : 230°C

Capillary : L/D=10/2



Molding : 120 × 120 × 2 mm
Fangate : 9.5 × 2.0 mm
Cylinder temperature : 220 °C
Molding Temperature : 50 °C
Injection speed : 1.5 m/min
Injection pressure : 60 MPa



	shrinkage
Flow direction	0.49%
Transverse direction	0.80%



DAICEL
Sustainable Value Together

The logo features the word "DAICEL" in a bold, blue, sans-serif font. Above the "A" are three red dots. Below the text is a stylized globe with a grid pattern. The globe is held by two hands, palms up, in a light blue, ethereal glow. The background is a bright blue sky with white clouds.

< GENERAL CONTACT INFORMATION >

DAICEL CORPORATION

CAFBLO Business Strategy

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