ACETY

Daicel Miraizu Ltd.

Characteristics of Acety

1

Excellent transparency.

2

Free coloring and excellent gloss and luster.

3

Excellent impact resistance.

4

Tough and resistant to cracking even when metal inserts are used.

5

Excellent gasoline resistante and outstanding oil resistance.

6

Less static charge and less dust adhesion.

7

Pleasant feel and smoothness

8

Sound absorbency.

9

Secondary processing is easy.

molding

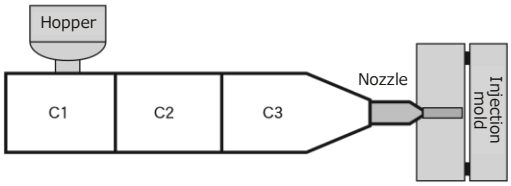
1 Injection molding

■1.Pellet drying conditions

Acety usually absorbs 2~3% moisture. In injection molding, this moisture greatly affects the physical properties and appearance of the product. Therefore, it is desirable to keep the moisture content below 0.2%. Pre-drying requires about 3 hours at a temperature of 70~80℃ in a normal hopper dryer. Dehumidified air should be used in the hopper dryer.

■2. Molding Conditions

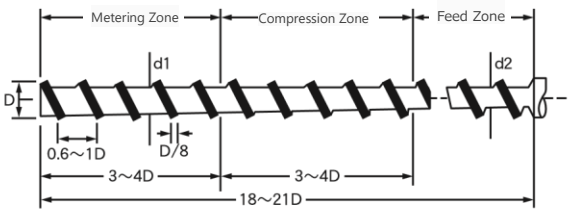
Acety has relatively high melt viscosity and can be molded at injection pressures of 1000~2000 kg/cm2.
Two types of molding machines are available: inline screw type and plunger type.
The inline screw type is mainly used, but the plunger type is often used for two-color molding of special patterns.



グレード (%)	Cylinder temperature (℃)			Nozzle temp (℃)	Mold temp (℃)
	C1	C2	C3		
22	180～190	195～200	200～215	180～210	40～60
26	170～180	180～195	185～200	180～200	40～60
28	165～170	175～185	175～190	175～190	40～55
31	155～160	165～170	170～180	165～180	40～50
37	150～155	160～170	165～175	160～175	40～50

■3. Screw Type

Screws as shown in the figure below are desirable for forming Acety.

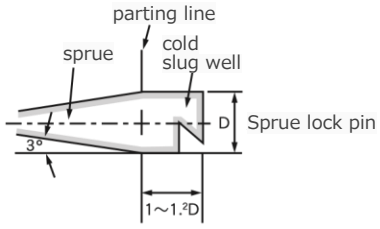


D(mm Ø)	D_1(mm Ø)	D_2(mm Ø)
30	24.6	19.2
40	33.6	27.2
60	52	44

■4. Mold design

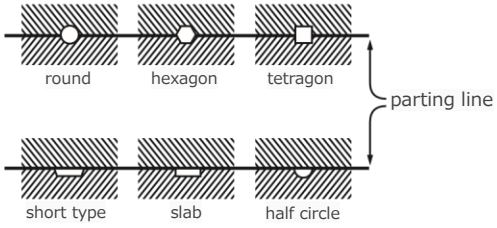
1. Sprue

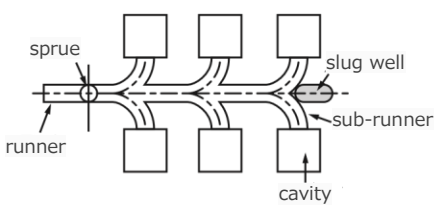
Sprues are usually 1.5~2 times the diameter of the runner. The taper of the sprue pullout is generally 3 degrees, and a cold slug well 1~1.2 times the diameter is provided to match the sprue lock pin.



2.Runner Shapes

Runner shapes are generally circular, semi-circular, or short in cross-sectional area, but circular shapes are most often used for ease of material flow. The larger the size of the molded product and the longer the maximum flow length in the mold, the thicker the design should be. For small molded parts, 5~6mm is necessary, and for eyeglass frames, 7~9mm. In addition, a cold slug well should be provided at each corner and at the end of the runner.

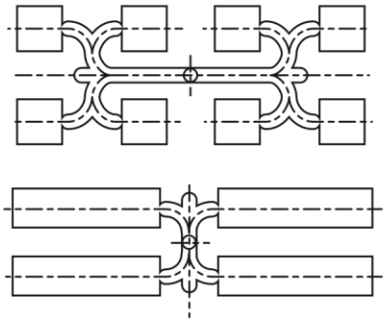




3. Gates

Pin gates, fan gates, ring gates, disk gates, submarine gates, tab gates, etc. are used as gates, and are selected according to the shape of the molded product and the flowability of the grade. Care must be taken to avoid weld line marks, flow marks, and orientation, as well as to position and balance the gates so that they are injected into each cavity under the same conditions. This orientation causes directional mold shrinkage, which in turn causes warpage, torsion, and other deformations in the product. In general, the larger the gate size, the smaller the mold shrinkage,

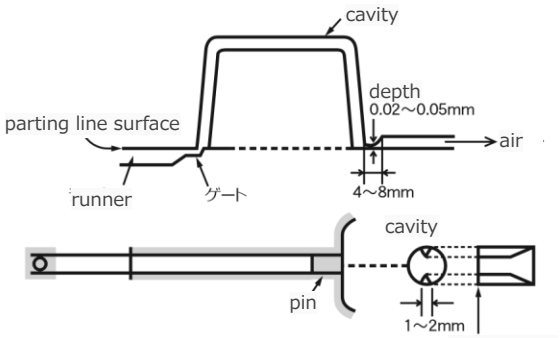
In the case of Acety, a shrinkage rate of 0.3~0.6% should be considered.



Equal distance from sprue to each gate for balance

4. Air vent

When molten resin is rapidly injected into a cavity, the air and gases in the cavity must be completely expelled or the remaining air and gases will be compressed and generate heat, causing burning, fogging, and pinholes in the molded product. Because Acety contains plasticizers, molds must be equipped with air vents. Generally, air vents are shallow grooves around the cavities and are selected around the corners and weld lines away from the gate, and then vented from the parting line surface of the mold. If a vent groove is not available, use the gap between the ejector pin and the pin hole.



<events caused by insert pins>

5. Problems and Solutions in Injection Molding

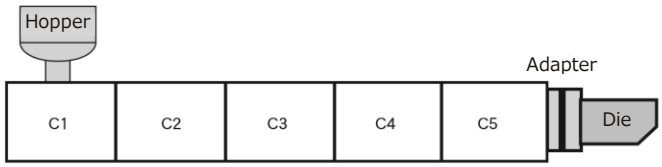
Acety is an extremely easy to mold material with high transparency and colorful hues.
By selecting the most suitable conditions, high quality products can be obtained.

counter-plan \ the point at issue		short shot	sink mark	weld mark	silver streak	bubble	Deformation, warping	gas burning	Surface imperfection	flow mark	blushing	brittle	discoloration	wave mark	sticking
Raw materials	Perform sufficient pre-drying	○	○	○	○	○		○	○	○	○	○			
	Contamination Prevention			○	○				○	○		○			
	Change to high-flow grade	○	○	○		○	○			○				○	○
Molding conditions	Increase injection pressue	○	○	○	○	○			○					○	
	Reduce injection pressure						○	○			○	○	○		○
	Increase injection speed	○		○			○								
	Reduce injection speed					○				○					
	Extend the pressure holding	○	○			○	○								
	Increase the cylinder temperature	○		○					○	○				○	
	Reduce the cylinder temperature		○		○	○	○	○			○		○		○
	Increase the mold temperature	○		○	○	○			○	○		○		○	
	Reduce the mold temperature		○				○								○
	Adjust the injection volume	○	○									○			○
	Check the mold release agent on the cavity surface				○										
Injection mold	Enlarge the sprue, runner, and gate ※)	○	○	○	○	○		○	○	○	○	○	○	○	
	Venting gas in the mold	○		○	○			○	○						
	Increase the cold slug well capacity	○		○	○				○	○				○	
	Modify the gate location		○	○	○	○	○	○			○	○		○	
heater	Check the heaters	○			○			○				○	○	○	○

2 Extrusion molding

■1. Temperature setting conditions.

The conditions shown here are general and should be set according to product form, screw design, extrusion speed, etc.



Plasticizer Quantity (%)	Cylinder temperature (℃)					Adapter (℃)	Die (℃)
	C1	C2	C3	C4	C5		
22	205	215	225	225	230	230	230
26	185	190	200	205	210	210	210
28	175	180	190	195	195	195	195
31	170	175	180	185	185	190	190
37	165	165	170	170	175	175	175

■2. Screw Design

The most commonly used screws for Acety extrusion molding are those with L/D=22~32 and compression ratio=2.5~3.5. For uniform extrusion of Acety, it is desirable to gradually heat the screw with a long feed section to the melting temperature. Although a vent type extruder can be used, the plasticizer will be dispersed at the same time as water and other volatile components are removed from the ventro. The amount of reduction is usually 1~3%, but it is important to note that this will change the physical properties of the product (hardening). In Acety extrusion, it is important to precisely control the temperature of each part of the extruder, and pre-drying must also be performed. During the humid rainy season to summer, it is advisable to use dehumidified air sent to the dryer with a dew point of 15℃or less.

●3 zone single-shaft screw

L／D	24D	32D
Feed Zone	12D	17D
Compression Zone	4D	5D
Metering Zone	8D	10D

●flight groove depth

Screw diameter (㎜Φ)	Feed Zone (㎜)	Metering Zone(㎜)
65	7.5～9.5	2.5～3.5
90	10～15	3.5～5.5
115	15～18	5.5～6.5

■3. Problems and Solutions in Extrusion Molding

Temperature control is an important point in Acety extrusion molding. Incorrect setting of extrusion conditions can cause the following problems, which require attention.

	counter-plan \ the point at issue	extrusion fluctuation	surface roughness	foaming defects	flow lines	Thickness Irregularity	shrinkage	contamination
Raw materials	Perform sufficient pre-drying		○	○		○		
	Prevent moisture absorption after drying		○	○		○		
	Contamination Prevention				○			○
Extrusion conditions	Adjustment of cylinder temperature	○	○	○	○	○		
	Cooling under hopper	○		○				
	Adjustment of die temperature		○			○	○	
	Adjustment of take-up speed and cooling						○	
Equipment conditions	Change screw design	○			○			
	Change die design		○			○		
	Changing screens							○
	Cleaning screws and dies			○				○
	Cleaning screws and dies					○		

Standard Physical Properties

Item	Unit	Plasticizer quantity					Method
		22%	26%	28%	31%	37%	(ASTM)
Melt Flow Index (MFI)	g/10min.	0.4	0.8	1.3	2.4	8.2	D1238
yield strength	Mp	48	41	37	31	25	D638
elongation at break	%	24	27	28	31	45	
breaking strength	Mp	52	44	40	33	22	
flexural strength	Mp	54	50	46	39	24	D790
flexural modulus	Mp	2300	2000	1900	1600	900	
Izod impact strength	J/m	80	140	170	200	310	D256
Rockwell hardness	R・Scale	100	85	77	65	53	D785
Heat distortion temperature	℃	76	68	63	57	54	D648
water absorption	%	2.7	2.7	2.6	2.6	2.2	D570
specific gravity	-	1.27	1.27	1.27	1.26	1.26	D792

※About each value, it is a reference value and not a standard value.