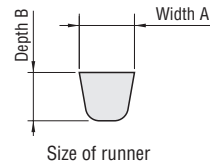


EXAMINATION MOLDING BY ECOLOGY SPRUE BUSHINGS

Molding examples

Molding condition:

- Injection machine : Clamping pressure 400kN (40tf), In-line screw type thermoplastic injection machine
- Mold base : 4 small mold articles per injection, mold articles size 15×4×1.5 runner size adjustable for 4 levels.
- Comparison : Conventional Sprue Bushing and Ecology Sprue Bushing
- Judgment standard for the test result evaluation : Appearance and weight ($\pm 0.001g$) of the mold article



[ABS resin]



- Standard grade
- Un-reinforced resin (non-filler)
- Specific gravity : 1.04

- 1) Disposed waste resin - approx 67% reduction
- 2) Cooling time - shorten in 3 seconds
- 3) Stop stringing



	Conventional Sprue Bushings P=3.5	Ecology Sprue Bushings P=2 F=0.8
Runner Size A(Width) B (Depth)	A=4, B=3.5	A=1.4, B=1.2
Weight (g) per one mold article	0.094	0.094
Weight of waste resin at sprue runner part	2.378	0.779
Nozzle temperature (°C)	225	225
Cavity temperature (°C)	62	62
Injection pressure (MPa) (kgf/cm ²)	71 {724}	101.5 {1035}
Cooling time (Sec)	6	3
Cycle time (Sec)	16.9	13.3

Example (Estimate) Case of injecting 100,000 mold articles with ABS resin material by mold base of 4 articles per injection and 25,000 shots

	Conventional Sprue Bushings	Ecology Sprue Bushings
Weight of waste resin at sprue runner part	59.5kg	19.5kg
Waste resin weight ratio against finished mold articles	16%	48%
Required molding processing time (based on 8 hours per day)	14.7days	11.5days

By changing conventional sprue bushing to Ecology Sprue Bushing, 40 kgs were cut down in waste resin and enabled to shorten the molding processing time to 3.2 days (25.6 hours) as well.

Reducing weight of waste resin and energy saving (cut down electricity expense) leads to CO₂ reduction.

[Polypropylene resin (PP)]



- Standard grade
- Un-reinforced resin (non-filler)
- Specific gravity : 0.9

- 1) Disposed waste resin - approx 69% reduction
- 2) Cooling time - shorten in 3 seconds



	Conventional Sprue Bushings P=3.5	Ecology Sprue Bushings P=2 F=0.8
Runner Size A(Width) B (Depth)	A=4, B=3.5	A=1.4, B=1.2
Weight (g) per one mold article	0.075	0.074
Weight of waste resin at sprue runner part	1.91	0.591
Nozzle temperature (°C)	200	200
Cavity temperature (°C)	43	43
Injection pressure (MPa) (kgf/cm ²)	71 {724}	71 {724}
Cooling time (Sec)	8	5
Cycle time (Sec)	18.6	11.8

[Metacrylate resin]



- Standard grade
- Un-reinforced resin (non-filler)
- Specific gravity : 1.19

- 1) Disposed waste resin - approx 63% reduction
- 2) Cooling time - shorten in 5 seconds
- 3) Stop stringing



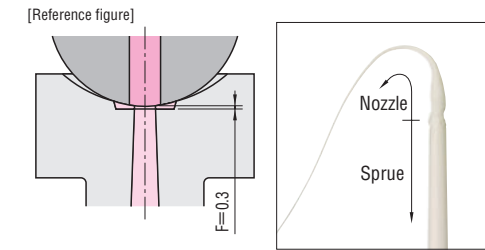
	Conventional Sprue Bushings P=3.5	Ecology Sprue Bushings P=2 F=1.0
Runner Size A(Width) B (Depth)	A=4, B=3.5	A=2, B=1.6
Weight (g) per one mold article	0.105	0.105
Weight of waste resin at sprue runner part	2.636	0.979
Nozzle temperature (°C)	260	260
Cavity temperature (°C)	75	75
Injection pressure (MPa) (kgf/cm ²)	101.5 {1035}	152.3 {1553}
Cooling time (Sec)	10	5
Cycle time (Sec)	20.3	15.3

Selection of resin pocket depth F

Finished mold article condition in Ecology Sprue Bushing is depending on the size of resin pocket depth F.

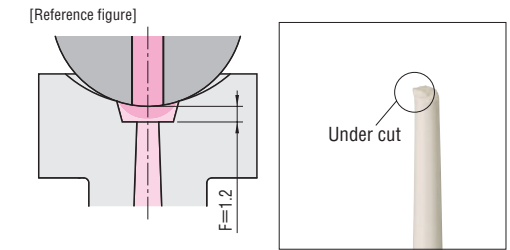
Referring to the chart below mentioned on the relationship with mold resin and resin pocket depth F sizes available for mold processing, select the suitable resin pocket depth F.

• In case shallow resin pocket depth F (F=0.3)



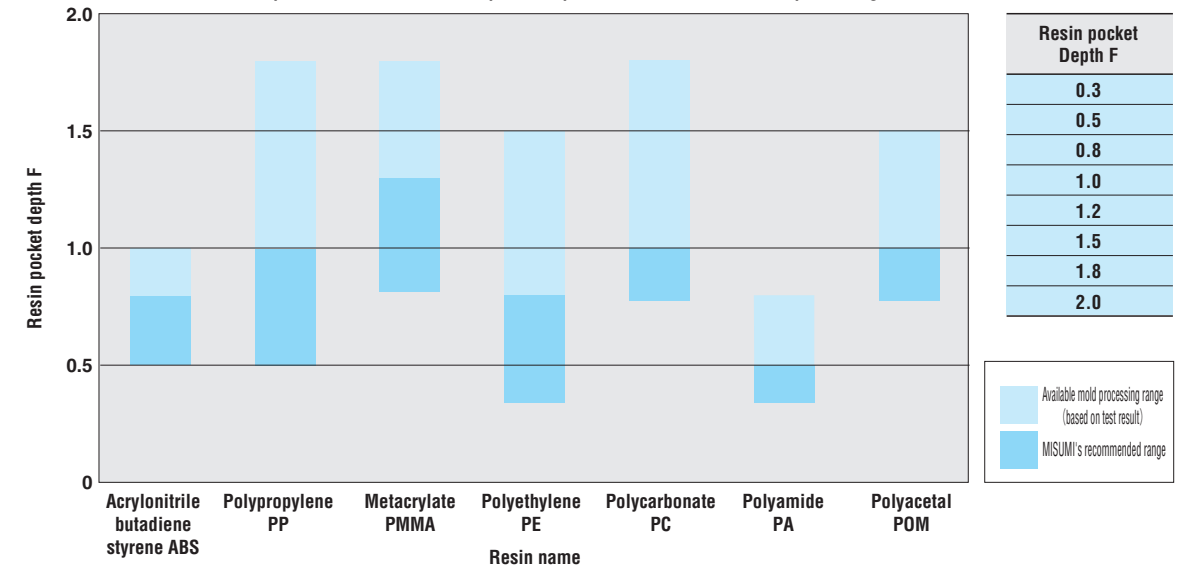
Stringing is occurred as the sprue does not cut at the resin pocket and pulls out the resin from the nozzle tip.

• In case deeper resin pocket depth F (F=1.2)



Mold release trouble is occurred as the resin in sprue pocket becomes solidified and unified with sprue.

Relationship with mold resin and resin pocket depth F sizes available for mold processing.



- Select the suitable resin pocket depth F from the above chart.
- Stable mold processing may not be done when the resin pocket depth F deeper due to rapid cooling and solidification at the bottom part of the resin pocket. Therefore, shallower depth is recommendable.
- This testing is an example and considers this chart as reference purpose for selecting suitable resin pocket depth F.
- Note on the possibilities of stringing or mold release trouble depending on the using resin grade, mold machine type and mold conditions.