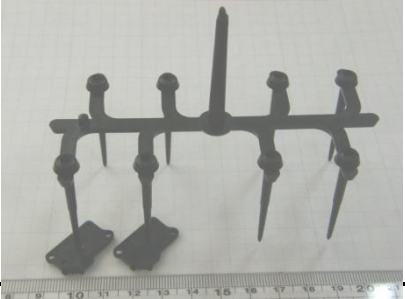
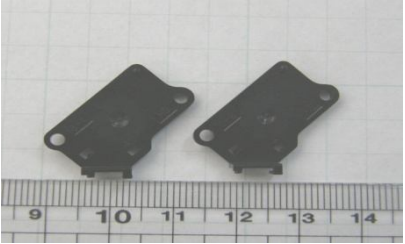
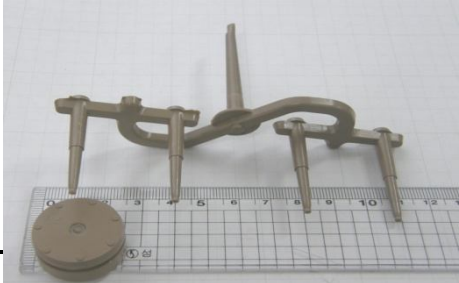



Business Case (PC + GF15% Resin)

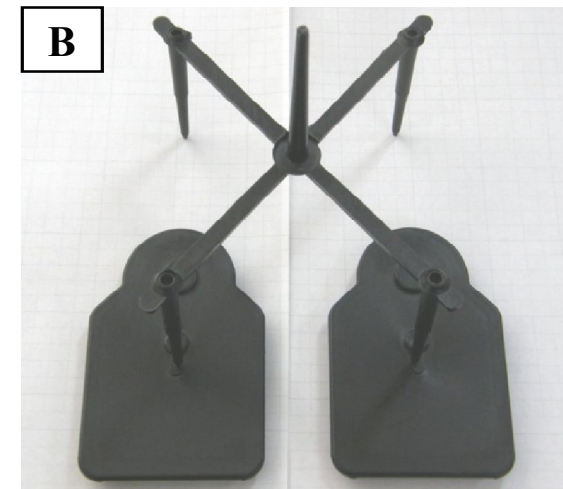
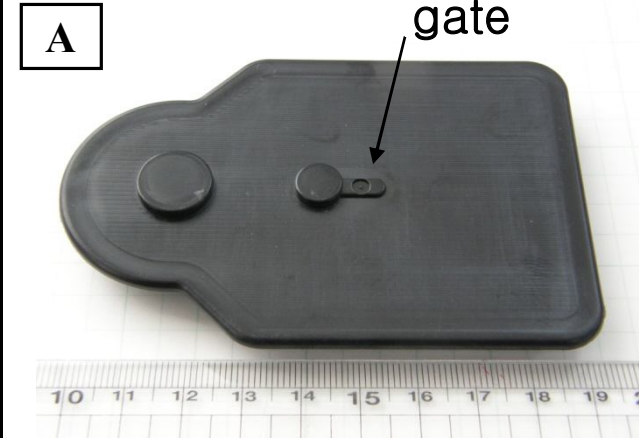
Regular Hot Runners		Actual Product Image
① Cycle Time	30 seconds	
② Hourly Production	120 shots, 960 EA	
③ Daily Production	21,120 EA	
④ Monthly Production	633,600 EA	
IPEC Hot Runner	1X8 Direct Gate	
① Cycle Time	27 seconds	
② Hourly Production	133 shots, 1,067 EA	
③ Daily Production	23,467 EA	
④ Monthly Production	704,000 EA	
Benefits		Reduced cycle time by 3 seconds Injection molding machine: Engel 60 ton
① Production Increase	70,400/month	
② Saved PC Resin	818 kg/month up to US\$5700/month	
③ Reduced Mold Plate	2-plate (from 3-plate pin-point)	

Business Case (PPS+GF35%+MF15% Resin)

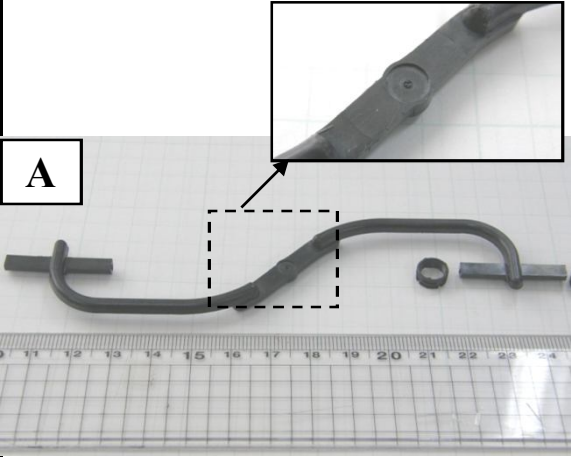

Regular Hot Runners		Actual Product Image
① Cycle Time	35 seconds	
② Hourly Production	103 shots, 411 EA	
③ Daily Production	9,051 EA (22-hour)	
④ Monthly Production	271,543 EA (30-day)	
IPEC Hot Runner	1X4 Direct Gate	
① Cycle Time	30 seconds	
② Hourly Production	120 shot, 480 EA	
③ Daily Production	10,560 EA	
④ Monthly Production	316,8000 EA	
Benefits		<p>Reduced cycle time by 5 seconds</p> <p>Injection molding machine type: Engel 80 ton</p>
① Production Increase	45,257 EA/month	
② Saved PPS Resin	1,014 kg/month	
③ Reduced Mold Plate	2-plate mold (from 3-plate)	

Business Case (engineering with fiber reinforced)

1	Resin Type	PBT + (GF+MF)40%
2	Cavity & Type	1X4 direct gate (Fig. A)
3	Cycle Time	45 seconds (injection time: 4 seconds)
4	Weight	21.2g x 4 EA = 84.4g
5	Injection Machine	Engel 120 ton
6	Injection Pressure (P)	65% (max: 100% / cold: 95%)
7	Injection Temperature (T)	280 °C
8	Mold Temperature	80 °C
9	IPEC Hot Runner Processing (Fig. A) a. Better processing P & T conditions: 30% (cp. cold) b. Saved cycle time by 10-30% with a 2-plate mold c. Open nozzle (valve gate effect) d. Saved resin up to US\$4,500/month	
10	IPEC Hot Runner Temperature	
	a. Manifold	280 °C
	b. Standby	250 °C
	c. Injection	280 °C (Heating-time: 6 seconds)
11	Cold processing problems (Fig. B) due to high injection pressure (95%) and temperature	



Business Case (Super-Engineering Plastics with Fiber-Reinforced)

1	Resin Type	LCP+GF35%+MF10%	
2	Cavity & Type	1X4 Guide-single nozzle (Fig. A)	
3	Cycle Time	13.5 sec (injection-time 1.5 sec)	
4	Weight	0.07g x 4 EA = 0.28g	
5	Injection Machine	JSW (J85ELII) / 85 ton	
6	Injection Pressure (P)	60% (max: 100% / cold: 95%)	
7	Injection Temperature (T)	340°C	
8	Mold Temperature	120°C	
9	IPEC Hot Runner Processing (Benefits, Fig. A) a. Better processing P & T conditions: 30% (cp. cold) b. Cycle-time saving (10-30%)		
10	Hot Runner Temperature		
	Nozzle Head	300°C	
	Standby	340°C	
	Injection	380°C (Heating time: 4 seconds)	
11	Cold processing problems (Fig. B) due to high injection pressure (95%) and burr on products		