

LAMPIRAN

1. Perhitungan Diameter Gate

Diketahui :

Tebal produk = 4 mm

Diameter Gate = 4 mm

Shot volume/total volume = 763,31 cm³ (nilai diambil dari moldflow)

Fill time = 14,81 s (nilai diambil dari moldflow)

Maximum shear rate material = 3663,86 1/s (nilai diambil dari moldflow)

Ditanya :

a. Shear rate?

Jawab :

$$\begin{aligned} Q &= \frac{\text{Short volume}}{\text{Injection time}} \\ &= \frac{763,31 \text{ cm}^3}{14,845} \\ &= 51,51 \text{ cm}^3/\text{s} \end{aligned}$$

a. Shear rate

$$\begin{aligned} &= \sqrt[3]{\frac{4 \cdot Q}{3,14 \cdot r}} \\ &= \sqrt[3]{\frac{4 \cdot 51,51}{3,14 \cdot 2}} \\ &= 3,26 \text{ 1/s} \end{aligned}$$

2. Perhitungan Diameter *Runner*

Diketahui :

$$\rho_{\text{material PA66}} = 1,39 \text{ g/cm}^3 \text{ (nilai didapat pada Tabel 3.4)}$$

$$V = 152,91 \text{ cm}^3$$

$$L = 40 \text{ mm}$$

Ditanya :

Diameter *runner* ?

Jawab

$$m = V \cdot \rho$$

$$= 152,91 \times 1,39$$

$$= 212,54 \text{ g}$$

$$d = \frac{W^{0,5} \cdot L^{0,25}}{3,7}$$

$$= \frac{232,43^{0,5} \cdot 40^{0,25}}{3,7}$$

$$= 9,91 \text{ mm}$$

3. Perhitungan Jarak *Circuit Cooling*

Diketahui :

$$d = 10 \text{ mm}$$

Ditanya :

a. c (jarak *circuit cooling* dengan produk) ?

b. b (jarak *circuit cooling*) ?

Jawab

$$\begin{aligned} \text{a. } c &= 2.d \\ &= 2.10 \text{ mm} \\ &= 20 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{b. } b &= 3.d \\ &= 3.10 \text{ mm} \\ &= 30 \text{ mm} \end{aligned}$$

Berdasarkan perhitungan 3, maka tinggi *circuit cooling* 20 mm, dengan masing-masing jarak *circuit cooling* 30 mm.

4. Analisa Moldflow Insight

No	Analisa	<i>Runner 1, Cooling 1</i>	<i>Runner 2, Cooling 1</i>	<i>Runner 1, Cooling 2</i>	<i>Runner 2, Cooling 2</i>
1	Fill time (runner)	1,6521 s	1,669 s	1,657 s	1,666 s
2	Fill time (runner & cooling)	15,60 s	15,73 s	15,64 s	15,74 s
3	Pressure at V/P switchover	31,37 Mpa	35,55 Mpa	31,45 Mpa	35,64 Mpa
4	Temperature at flow front	287,6 °C	295,1 °C	287,1 °C	295,4 °C
5	Bulk Temperature	31,79 s	32,57 s	31,82 s	32,83 s
6	Shear rate, bulk	1,651 s	1,666 s	1,652 s	1,667 s
7	Pressure at injection location :XY	X=0,129 s, Y=36,91	X=0,127 s, Y=35,37	X=1,665 s, Y=35,25	X=1,663 s, Y=35,14
8	Volumetrik shrinkage at ejection	11,20%	13,57%	13,49%	12,07%
9	Time to freeze	630,2	630,6	630,3	630,7
10	Frozen layer fraction	31,79 s	32,76 s	31,82 s	32,85 s
11	Average fiber orientation	31,79 s	31,79 s	31,75 s	31,82 s
12	Average velocity	31,79 s	31,82 s	31,79 s	31,85 s
13	Bulk temperature end of fill	306,4	308,1	306,4	308,7
14	Fiber orientation tensor	0,9996	0,9996	0,9996	0,9996
15	Flow rate, beams	31,79 s	31,82 s	31,79 s	31,75 s
16	Frozen layer fraction at end fill	0,1799	0,1829	0,1823	0,1863
17	In-cavity residual stress in frist	123,5 Mpa	129,4	128,4	134,0
18	In-cavity residual stress in secon	270,9 Mpa	278,3 Mpa	272,1 Mpa	281,0 Mpa
19	Orentation at core	1.000	1.000	1.000	1.000
20	Orentation at skin	2.000	2.000	2.000	2.000
21	Poisson's ratio	0,4238	0,4241	0,4239	0,4238
22	Pressure	31,41 s	31,79 s	31,82 s	32,07
23	Pressure at end of fill	34,68	35,23	34,81	35,78
24	Shear modulus	2445,5	2445,5	2445,5	2445,5

25	Shear stress at wall	31,79 <i>s</i>	31,82 <i>s</i>	31,95	32,26
26	Sink indek	1,88%	1,19%	1,913	1,94%
27	Tensile modulus in frist (fiber)	11759	11808	11783	11834
28	Tensile modulus in secon	6576,7	6579	6581,5	6586,9
29	Throughput	2503,2 Cm ³		2529.0 Cm ³	2549,9 Cm ³
30	Circuit coolant temperature	25,44°C	25,56°C	25,69°C	25,71%
31	Circuit flow rate	3450,5	3461,3	3943,4	3958,1
32	Circuit reynolds number	16366	16398	17187	17245
33	Circuit metal temperature	28,96°C	29,05°C	29,93°C	30,19°C
34	Temperature (top), part	144,2°C	144,9°C	145,7°C	145,9°C
35	Temperature at surface, cold runner	144,6	114,9	117,3	117,7
36	Time to frezze, part	108,7	109,8	110,8	123,6
37	Time to freeze, cold runner	46,56 <i>s</i>	47,08 <i>s</i>	60,67 <i>s</i>	61,43 <i>s</i>
38	Maximum temperature, part	281.0	282,3	290,8	291,3
39	Maximum temperature, cold runner	255,8	257,4	347,5	348,3
40	Average temperature, part	218,3	220,5	227,9	229,4
41	Average temperature, cold runner	173,8	174,3	178,7	179,4
42	Maximum temperature position, part	1.000	1.000	1.000	1.000
43	Percentage frozen layer (top), part	100%	100%	100%	100%
44	Temperature profile, part	290,8	291.0	291,3	291,6
45	Temperature profile, cold runner	255,8	256,2	274,5	275,1
46	Circuit heat	0,7501	0,7393	0,7482	0,7389

	removal				
47	Deflection, all effects:Deflection	0,9498	0,9622	0,9648	0,9701
48	Deflection, all effects:X component	0,8111	0,8431	0,8755	0,8967
49	Deflection, all effects:Y component	0,7445	0,7542	0,7793	0,7885
50	Deflection, all effects:Z component	0,5099	0,5281	0,5313	0,5378