



SimTech™

Student Answer Sheet

This answer sheet can be used to make copies for each student to write down their answers from the Student Tutorial Workbook.

Name: _____

Student Answer Sheet

I. Effects of Barrel Temperature on Melt Temperature

What is the melt temperature? _____ °F

II. Determine the Effect of Each Barrel Zone Temperatures on the Melt Temperature

A. You will raise each barrel zone by 20°F to determine which zone has the greatest effect.

1. Raise rear zone barrel temperature to 470°F.

What is the melt temperature? _____ °F

2. Raise the middle zone temperature to 470°F and set the rear zone temperature back to 450°F.

What is the melt temperature? _____ °F

3. Raise the front zone barrel temperature and nozzle temperature to 470°F and set the middle zone back to 450°F.

What is the melt temperature? _____ °F

Which zone affected the melt temperature the most? _____

Why? _____

4. Typical barrel zone settings for this plastic are: 450°F nozzle, 450°F front, 450°F middle, 400°F rear. Set the zones to these settings.

What is the melt temperature? _____ °F

III. Determine the Effect of the Back Pressure on the Melt Temperature

A. Increased back pressure causes more heating of the plastic in the barrel.

1. Raise the back pressure and repeat the cycle until melt temperature is the same as the front zone temperature. (i.e. 450°F)

What is the back pressure when the melt temperature is 450°F? _____ psi

Explain why the melt temperature increased when the back pressure was increased.

Why is it best to have the front zone temperature and the melt temperature the same?

IV. Effects of Screw Back Setting

A. The screw back setting determines how far back the screw returns when it rotates. Screw back setting also controls the cushion size.

1. Set the screw back distance to 3.5" and the VPT setpoint to 1.35".

What is the present cushion size? _____ in

Is the cushion size all Right? _____

Explain: _____

2. Reduce the screw back setting to 2.0" and the VPT setpoint to 0.4".

What happened? _____

Why? _____

3. Set the screw back position so that the cushion size is between 0.125" and 0.250".

What is the screw back position you have set? _____

What is the VPT setpoint you have set? _____

What is the melt temperature? _____ °F

V. Determine the Effect of Screw RPM on the Melt Temperature

A. Screw rpm can also affect the plastic temperature, but the magnitude of the affect depends on the screw design and the amount of non-Newtonian viscosity change that occurs.

1. Increase screw rpm to 150.

What is the melt temperature? _____ °F

Why did the melt temperature increase? _____

2. Adjust the back pressure so that the melt temperature is 450°F.

What is the back pressure to achieve 450°F melt temperature? _____ psi

VI. Maximum Injection Pressure Alarm

A. The Maximum Injection Pressure Alarm will activate if the machine has tried to exceed its maximum injection pressure.

1. Reduce max injection pressure to 1,100 psi. and reduce the Pack/Hold pressure to 1,000 psi

Why did the Low Max Injection Pressure alarm occur? _____

VII. The Screw RPM Alarm

A. The Screw Recovery Alarm will activate if the screw does not rotate fast enough thus, enabling the screw to return to the Screw Back Distance setting before the next shot.

1. Lower the screw speed to 13 rpm.

What alarm occurred? _____

Why? _____

2. Raise rpm to 150.

What is the melt temperature? _____ °F

VIII. Determine the Effect of the Mold Closed Time on the Melt Temperature

A. You will explore how the mold closed timer can affect the melt temperature.

1. Reduce mold closed time to 15 seconds.

What is melt temperature? _____ °F

Why did the melt temperature decrease? _____

2. Use the back pressure to raise the melt temperature to 450°F ±2°.

What is the new back pressure setting? _____ psi

IX. The Back Pressure and No Cushion Alarms

A. Why the back pressure and no cushion alarms come on

1. Raise back pressure to 6000 psi.

What alarms occurred? _____

Why? _____

X. Determine the Effect of Mold Open Time on the Melt Temperature

A. You will explore how the mold open timer can affect the melt temperature.

1. Increase the mold open time to 5 seconds.

What is the melt temperature? _____ °F

Why did the temperature increase? _____

XI. Determine the Effect of the Mold Temperature on the Melt Temperature

A. You will explore how the mold temperature can affect the melt temperature.

1. Set mold temperature to 110°F (both halves).

What is the melt temperature? _____ °F

Does the mold temperature affect the melt temperature in the barrel? _____

XII. Determine the Effects of Fill Rates on the Molded Parts

A. You will explore how fill rates can affect the molded parts.

1. Set barrel rear zone to 380°F, middle zone to 385°F, front and nozzle to 400°F
2. Set screw rotation to 65 rpm and screw back pressure to 600 psi.
3. Set mold temperature to 60°F (both halves).
4. Set all fill rates 4.0 in/sec.
5. Set the max injection pressure to 25,000 psi.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

6. Set Fill Rates 1, 2, 3, and 4 to 10.0 in/sec.

7. Set Fill Rate 5 to 4.0 in/sec.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

What changes occurred to the molded parts? _____

8. Set Fill Rates 1, 2, 3, and 4 to 3.0 in/sec.

9. Set Fill Rate 5 to 6.0 in/sec.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

What happened to part weight and dimensions when the final Fill Rate 5 is very fast?

Why? _____

10. Set Fill Rates 1, 2, 3, and 4 to 13.0 in/sec.

11. Set Fill Rate 5 to 4.0 in/sec.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

What happened to part weight and dimensions when final Fill Rate 5 is reduced?

Why? _____

XIII. Determine the Effects of Clamp Force Setting and Fill Rates on Burn Marks and Flash

A. How does clamp force and the fill rate settings affect burn marks and flash?

1. Set Fill Rates 1, 2, 3, and 4 to 4.0 in/sec. Set Fill Rate 5 to 8.0 in/sec

What molded part defect occurred? _____

Why? _____

2. Reduce clamp force to 65 tons.

What change occurred in the defects present? _____

Why? _____

3. Set Fill Rates 1, 2, 3, and 4 to 13.0 in/sec. Set Fill Rate 5 to 4.0 in/sec.

4. Set the Clamp Force to 75 tons.

What happened to the flash? _____

Why? _____

What conclusions would you make concerning the effects of clamp force and fill rate on burn marks and flash? _____

XIV. Determine the Effects of Pack/Hold pressure on the Molded Part Properties

A. Now we'll examine the effect of pack/hold pressure on part weight and dimensions.

1. Increase the clamp force to 300 tons. (This will avoid flash when we increase the pack/hold pressure.)
2. Increase the pack/hold pressure to 5,500 psi.

What is the fill time? _____sec

What is the cycle time? _____sec

What is the part weight? _____oz.

What is the part length? _____in

Why did the part size increase? _____

3. Reduce the pack/hold pressure to 4,500 psi.

What is the fill time? _____sec

What is the cycle time? _____sec

What is the part weight? _____oz.

What is the part length? _____in

Why did the part dimensions and weight decrease when the pack/hold pressure was reduced?

4. Reduce the pack/hold pressure to 6,000 psi.

What is the fill time? _____sec

What is the cycle time? _____sec

What is the part weight? _____oz.

What is the part length? _____in

Notice the part dimensions are now out of spec. Why did this happen?

5. Increase the pack/hold pressure to 2,500 psi.

What is the fill time? _____sec

What is the cycle time? _____sec

What is the part weight? _____oz.

What is the part length? _____in

XV. Determine the Effects of Pack/Hold Time on the Molded Part Properties

A. Now we'll examine the effect of pack/hold time on part weight and dimensions.

1. Set the Pack/Hold Pressure back to 5,500 psi..

What is the fill time? _____sec

What is the cycle time? _____sec

What is the part weight? _____oz.

What is the part length? _____in

Is there any change in the molded parts? _____

2. Set pack/hold time to 3 seconds.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

Is there any change in the molded parts? _____

3. Set holding time to 1 seconds.

What is the fill time? _____ sec

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

Is there any change in the molded parts? _____

XVI. Find the Gate Freeze Time

1. Set the Pack/Hold Time to 0.1 second.
2. Continue to increase the Pack/Hold Time by 0.1 seconds until you find that the part weight and length does not change.

At what holding time does the gate freeze? _____ sec

XVII. Effects of Mold Temperature on Part Properties and Gate Freeze Time

- A. Observe the effect of mold temperature on part dimensions and weight.

1. Set the Screw Rotation to 25 rpm.
2. Set Mold Temperature for both mold halves to 160°F.
3. Set the Pack/Hold Time to 1.5 seconds.
4. Set Cooling Time to 35 seconds.

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

Determine the gate freeze time at 160° F.

1. Set the Pack/Hold Time to 0.2 second.
2. Continue to increase the Pack/Hold Time by 0.2 seconds until you find that the part weight and length does not change.

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

What is the gate freeze time? _____ sec.

Determine the gate freeze time at 60° F.

1. Set the Mold Temperature for both mold halves to 60°F.
2. Set the Pack/Hold Time to 0.2 seconds.
3. Increase the Pack/Hold Time by 0.2 seconds until you find that the part weight and length does not change.

What is the cycle time? _____ sec

What is the part weight? _____ oz.

What is the part length? _____ in

What is the gate seal time? _____ sec