

HOW TO USE OUR FOCUSED TRAINING MODULES

▶ STEP 1 **Review the Lesson Content**

Preview the video training lesson for the module to determine which employees at your facility could benefit from this training. Focus on the following criteria:

- Who would benefit directly from learning this topic?
- Who should know about the concepts covered in this module?

▶ STEP 2 **Complete the Training Plan**

List all the employees identified in STEP 1 in your **TRAINING PLAN** for the module. We recommend that you identify your employees by job description (such as all the technicians or operators) and use this to track their progress throughout the training initiative.

▶ STEP 3 **Have Your Employees Watch the Video Training Lesson**

Have each employee on your training plan sit down and watch the video training lesson. We suggest that you train from the top down: This will help you get everyone on the same page.

▶ STEP 4 **Carry out the On-The-Job Training**

Identify a few knowledgeable employees who can take the others out to the plant floor and cover the **ON-THE-JOB TRAINING SHEET**. Be sure to complete this step within a week of completing STEP 3.

▶ STEP 5 **Quiz Your Employees**

Have each employee on your training plan take the **TRAINING QUIZ**. To pass the test, your employees must answer at least 3 out of the 4 questions correctly. If they fail the quiz, have them repeat STEP 3 and STEP 4 before giving them another opportunity to pass the quiz.

FOCUSED TRAINING MODULE #5

Pressure Losses and Differential Shrinkage

ON-THE-JOB TRAINING SHEET

Training Facilitator:	
Training Participant:	
Training Date:	
Training Location:	<i>In front of an injection mold, open on the bench, with a part from the mold. Have some calipers, paper, calculator, and pencil available for measuring and calculating.</i>

Explain the process of calculating the percentage of part shrinkage:

- **First Step:** Subtract the part dimension from the mold dimension
- **Second Step:** Divide that number by the mold dimension
- **Third Step:** Multiply the result by 100

Using the part and mold, locate an area near the gate and an area away from the gate. From both these locations, measure the part and mold dimensions for each. Discuss the differences in dimensions and explain why there is a difference in shrinkage across the part:

- Pressure losses within the mold during fill cause there to be more pressure near the gate than the end of fill
- These pressure losses typically cause less shrinkage near the gate.
(NOTE: This may not be the case if the gate has not been properly sealed)

Some of ways differential shrinkage can be improved are:

- Consistent wall thickness
- Adding flow leaders to hard-to-fill areas
- Rounded corners
- Strengthening ribs
- Gating into thick sections of the part

Using example parts, explain some of the design features used to improve the processability and minimize pressure differentials and part warpage.

FOCUSED TRAINING MODULE #5

Pressure Losses and Differential Shrinkage

TRAINING QUIZ

Facilitator Name:	
Participant Name:	
Date:	

Question #1:

Typically higher shrinkage occurs... *(circle one)*

- A. Near the gate
- B. In the middle of the part
- C. Near the end of fill
- D. Shrinkage occurs evenly across the part

Question #2:

It is recommended to gate a part in the thicker sections of the part. *(circle one)*

True or False

Question #3:

Which is **not** a method of reducing differential shrinkage and warpage? *(circle one)*

- A. Maintaining a consistent wall thickness
- B. Adding flow leaders to hard-to-fill areas
- C. Adding strengthening ribs
- D. Sharpening corners

Question #4:

Explain and/or draw a part feature from one of your parts which helps reduce pressure differentials and part warpage.

(write your answer in the space below)

FOCUSED TRAINING MODULE #5

Pressure Losses and Differential Shrinkage

TRAINING QUIZ ANSWERS

Passing Score:

3 of the 4 questions must be answered correctly

Question #1:

Typically higher shrinkage occurs... (circle one)

- A. Near the gate
- B. In the middle of the part
- C. Near the end of fill
- D. Shrinkage occurs evenly across the part

Pressure losses within the mold during fill cause there to be more pressure near the gate than the end of fill. These pressure losses typically cause less shrinkage near the gate.

Question #2:

It is recommended to gate a part in the thicker sections of the part. (circle one)

True or False

Gating from the thicker sections can reduce pressure loss as the thick portion of the cavity is filled.

Question #3:

Which is **not** a method of reducing differential shrinkage and warpage? (circle one)

- A. Maintaining a consistent wall thickness
- B. Adding flow leaders to hard-to-fill areas
- C. Adding strengthening ribs
- D. Sharpening corners

Rounding corners will improve stress differentials and sharpening corners will create additional stresses.

Question #4:

Explain and/or draw a part feature from one of your parts which helps reduce pressure differentials and part warpage.

This is a plant-specific question requiring your input.