Q: A vendor injection molds this part for us. The material is high-density polyethylene. Our problem is that almost every part has a horizontal line through it.

What is the cause of this line and how could it have been prevented? The line is visible to the customer because the part is on the outside of our product.

A: The line in this part is called a knit line (also known as a weld line). It is caused by two or more molten plastic flows meeting inside the mold cavity. These multiple flows may be caused by the use of multiple gates or by the flow being separated by a pin or other mold obstruction. After flowing around the obstruction the molten plastic rejoins, "welding" back together to form the solid part.

Because the molten front can entrain gas, contaminants, or lubricants on its surface, and because the molten plastic cools as it fills the mold, the weld may be imperfect, forming a weld or knit line in the part. Knit lines are visually objectionable and create a local weakness in the product. High stress areas (e.g., mounting holes, etc.) containing these imperfections may fail.

There are several solutions to a knit line. First is to increase the injection temperature, pressure, or both. Reducing mold lubrication may also help. The mold temperature can also be increased, but this is less effective. A more robust solution (but sometimes impractical) is to prevent the separation of the flow by redesigning the mold. The objective is to provide a continuous path for the molten plastic as it fills the cavity.

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