

## tech.topic

## Lumps in the Insulation

Lumps in peroxide-crosslinkable insulation are most likely caused by insufficient melting of the resin or compound, premature crosslinking (commonly called scorch) or contamination.

Examining the lumps, conducting some easy tests and checking extruder conditions can help determine the cause of this problem. The following are some suggested observations to make:

1. **Do the lumps look like pieces of pellets?** If so, the source may be unmelted compound or foreign pellets.
2. **Are the lumps jagged or pointed?** Jagged lumps, often accompanied by a depression or located in a straight line, are most likely caused by scorch.
3. **Are the lumps smooth and relatively large?** These lumps could be caused by hard particles, scorch or contamination below the surface of the insulation.
4. **Was the appearance of the lumps preceded by a rapid rise in head pressure?** If so, their cause may be scorch.
5. **Is the compound in the extruder hopper clean and free of foreign matter?** If not, the cause of the lumps is contamination.
6. **When the lump is cut open, does it contain material that looks different from the insulation?** If so, the lump contains a foreign material (contamination).
7. **A quick test: Extrude the compound through the head, but not through the CV tube, and collect samples containing lumps.** Do the lumps melt when placed in an oven for 15-20 minutes at 300°F (150°C)? If the lumps melt or can be easily deformed (without recovering), the lumps are unmelted compound. If the lumps do not melt or deform easily, the lumps are caused by scorch.

## Possible causes and recommended solutions:

- A. **Contamination (foreign material).**
  1. Locate the source and eliminate it.
- B. **Unmelted pellets.**
  1. Increase the temperatures in the first extruder zones slightly, being careful not to increase the overall compound temperature to the point of causing scorch. Check with the resin manufacturer to determine the proper melt temperature.
  2. Replace the screenpack with a finer one.
  3. If screw cooling is available, decrease the temperature of the cooling fluid or increase the flow rate of the cooling fluid.
- C. **Scorch.**
  1. Decrease barrel zone temperatures.
  2. Reduce the head zone(s) temperature or cool the head.
  3. Decrease the screw RPM, if necessary.
  4. If using screw cooling, increase the temperature of the cooling fluid or decrease the cooling fluid flow rate.

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