

PVC Extrusion Processing Guide

Since flexible vinyl comes in a wide range of hardness and density, the setting of the extruder temperatures will vary greatly. If you have prior experience with a similar flexible vinyl, then those temperatures would be a great starting point. If not, we recommend that you refer to the compound's recommended stock or melt temperature. Sometimes this information is found on the compound's TDS (technical data sheet) and sometimes it is provided separately.

Typically, recommended temperatures are given within a range. We recommend that you take the midpoint of the range and set all barrel, head, and die temperatures ten (10) degrees less than the midpoint temperature. Once material is flowing through the extruder, it may be necessary to adjust each temperature zone depending on the aesthetics and output desired.

The most critical zones will be the rear barrel temperature or feed zone, and the temperature of the die. The feed zone temperature controls the compound sticking to the barrel wall (otherwise known as the bite). Too much bite will lead to overheating of the compound, and too little bite will lead to poor output. The die temperature also will affect output and the dimensions of the extrudate. A cold die will restrict flow, whereas a die that's too hot will affect dimensions.

Once optimum temperatures are reached, this is known as the temperature profile. Please note that temperature profiles can vary greatly. A temperature profile with all the same temperatures is known as a straight profile. A profile with the temperatures rising from the rear to the die is known as an ascending profile. An inverted profile is one where the temperatures decrease from the rear to the die. One with the hottest temperatures in the middle is a hump profile. All of these temperature profiles may work, but finding the right combination for output and aesthetics takes time.

One other controllable setting is the screw RPM. This should be set as high as possible as long as you are producing a consistent quality product.

PVC Extrusion Troubleshooting Guide

PVC extrusion is a continuous processing method that offers high speed and high-volume production with the ability to create products of varying shapes, thickness, hardness, additives, and colors.

Due to the complexity of the extrusion processing method, problems can and will eventually occur. Because most of the extrusion processing steps occur within the machine and are not visible, it is essential to us a systematic approach and keep detail job logs to minimize costly downtime.

PREVENTATIVE MEASURES

- Operators should fully understand the extrusion process
- Good machinery instrumentation and maintenance records should be kept
- Current and historical processing data should be available
- Material should be stored in a clean and dry area without extreme temperature variation

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THREE (3) MAIN CATEGORIES OF COMMON EXTRUSION PROBLEMS

1. Aesthetic flaws (pits, black specs, pinholes, drag marks, die lines, sink marks, etc.)
2. Size variance (intermittent or contiguous)
3. Dimensional variation

TROUBLESHOOTING COMMON PROBLEMS

Following are common problems along with their causes and possible remedies. This resource can help your team to diagnose and correct processing issues that will help ensure a quality product. Because of variations in equipment, methods, and conditions, this resource is only a guideline. Please feel free to contact us if you require additional information.

Problem	Probable Cause	Possible Remedy
Lumpy Surface	Too cold	-Increase all temps -Increase screen packs
Surging	Equipment or settings	-Take off puller irregular -Motor speed variations -Inconsistent RPMs -Uneven feed -Bridging in hopper -If Ammeter is varying by 5% or more, increase temp of the feed
Orange peel surface	Overheating	-Raise die temp -Decrease speed
Pimples on surface	Resin gels	-Increase screens -Decrease speed
Excessive shrink	Too much stress	-Cool slower -Decrease speed -Design die with lower draw-down
Bubbles	Moisture	-Dry material for 220F for one hour

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