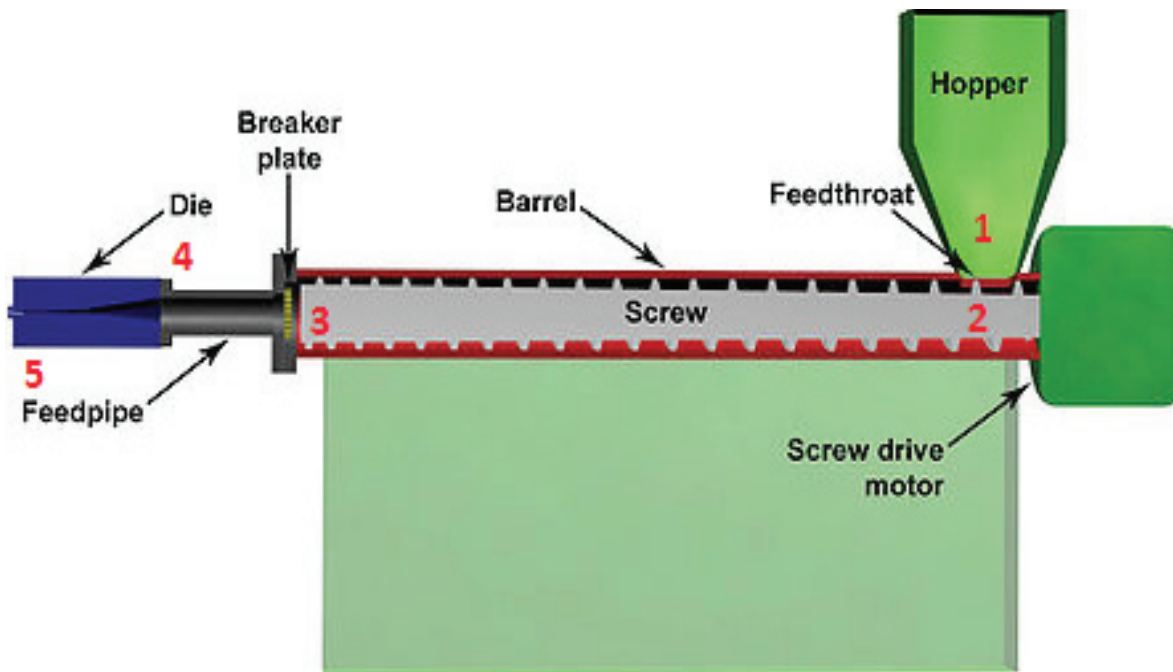


## AEROSPACE 101 - FEP EXTRUSION



*Ever wondered what exactly goes on during the cable extrusion process? Allow us to demonstrate!*

**STEP 1.** Small colored beads (resins of Fluoropolymers-FEP,E-CTFE,ETFE,PVC) are fed from the hopper into the feedthroat (opening near end of extruder barrel)

**STEP 2.** The rotating screw (normally turning at up to 120 rpm) forces the plastic beads forward into the barrel which is heated to the desired melt temperature of the molten plastic (ranging from 200 °C to 275 °C depending on the polymer) A heating profile is set for 3 or more heating zones of the barrel to allow for a gradual increase in temperature from where the plastic enters to the front. This allows the plastic beads to melt gradually as they are pushed through the barrel and lowers the risk of overheating. Cooling fans are present to keep the temperature below a set value if too much heat is generated.

**STEP 3.** At the front of the barrel, the molten plastic leaves the screw and travels through a screen to remove any contaminants in the melt. The screens are reinforced by a breaker plate (a thick metal puck with many holes drilled through it) The pressure at this point can exceed 5,000 psi.

**STEP 4.** After passing through the breaker plate, the molten plastic enters the die. The die is what gives the final product its profile and must be designed so that the molten plastic evenly flows from a cylindrical profile, to the product's profile shape. Uneven flow at this stage would produce a product with unwanted stresses at certain points in the profile. These stresses can cause warping upon cooling. Almost any shape imaginable can be created so long as it is a continuous profile.

**STEP 5.** The plastic is then cooled, achieved by pulling the extruded material through a water bath. Compared with steel, plastic conducts its heat away 2,000 times slower. Once the product has cooled, it can be spooled or cut into lengths

### Benefits of extruded thermoplastic vs. extruded thermoset: (Example: FEP vs. PTFE):

- Due to a current supply shortage of PTFE, lead times for FEP products are shorter (approx. 2-3 weeks)
- FEP has a Dielectric Strength that is 4X stronger than PTFE
- No premium or fee for continuous lengths of FEP (up to 1,500')
- Pricing for FEP is currently more cost effective than PTFE
- FEP extrusion produces less waste and does not require heating toxic lubricants-ruling it eco-friendlier than PTFE

To learn about Teflon property data, visit Dupont's product information page:  
Dupont: Teflon product information

#### Sources:

- [http://www.jinlogic.com/plastic\\_extrusion\\_process.php](http://www.jinlogic.com/plastic_extrusion_process.php)
- [http://www2.dupont.com/Teflon\\_Industrial/en\\_US/assets/downloads/h38179.pdf](http://www2.dupont.com/Teflon_Industrial/en_US/assets/downloads/h38179.pdf)
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