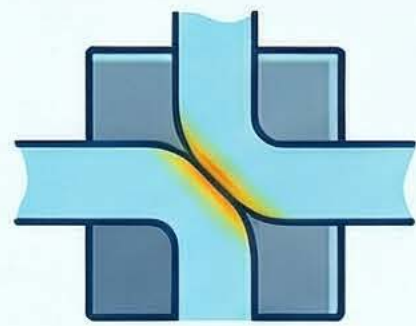


Optimising Polyamide Performance: The 105° ECAE Process

Severe Plastic Deformation

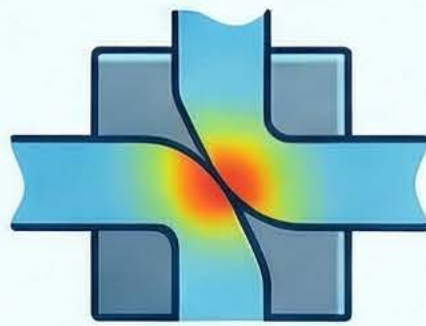
ECAE forces material through intersecting channels to induce shear without changing cross-sectional dimensions.

1-ECAE vs. 2-ECAE Configuration



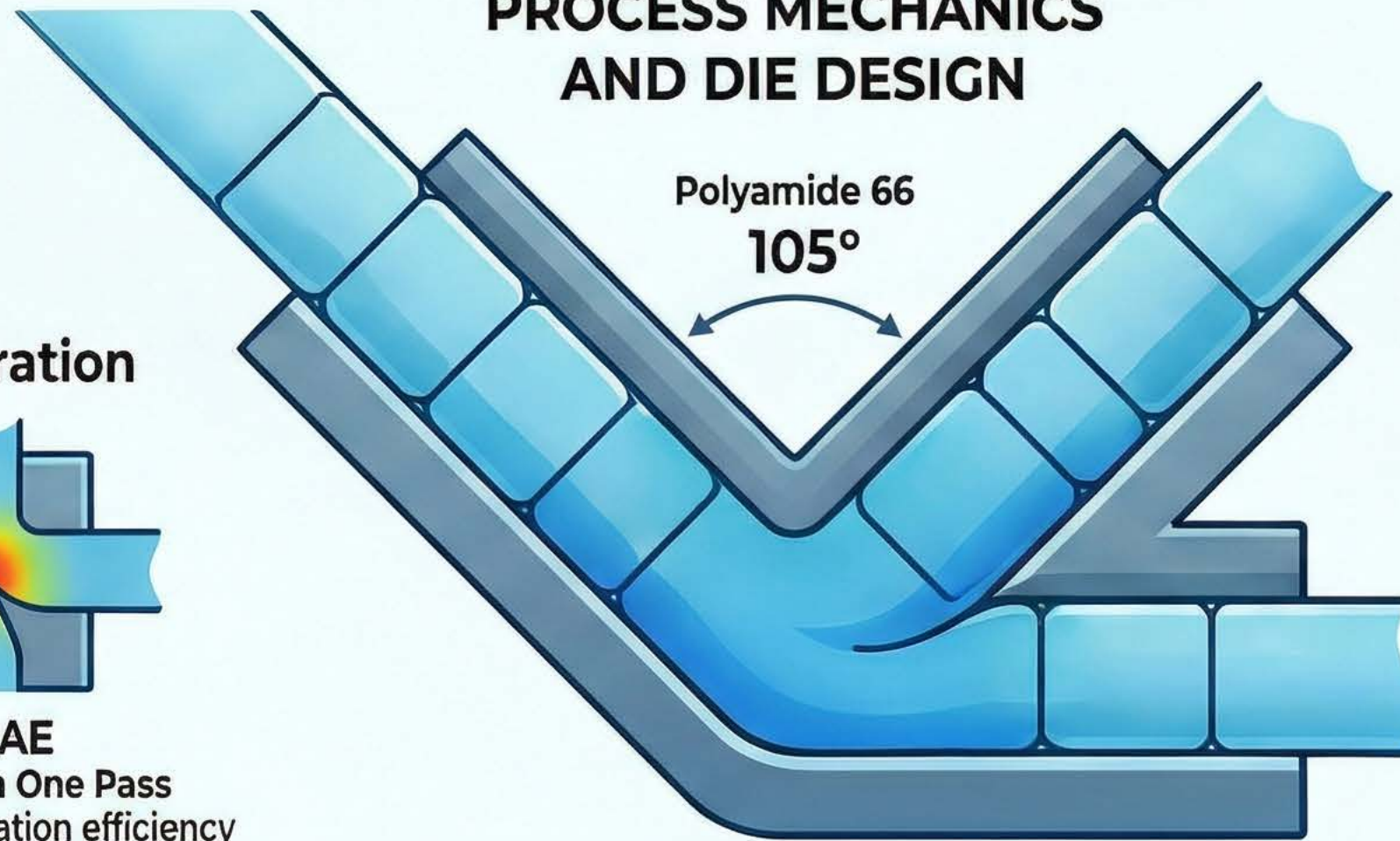
1-ECAE
Single Pass
One shear zone

VS.

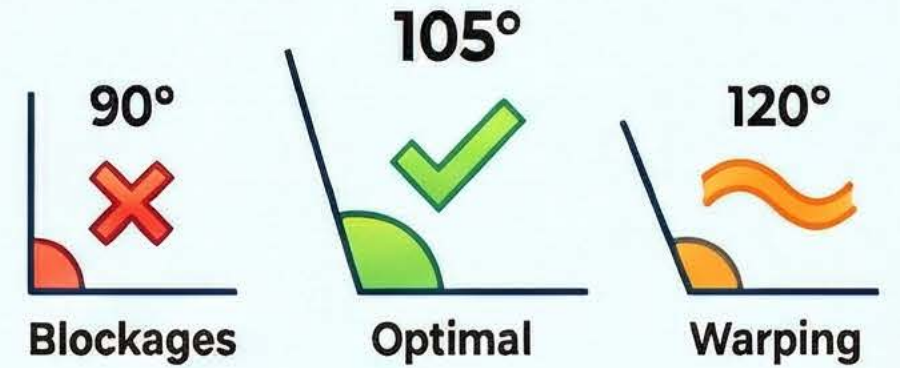


2-ECAE
Two Zones in One Pass
Doubling deformation efficiency

PROCESS MECHANICS AND DIE DESIGN



The 105° "Sweet Spot"

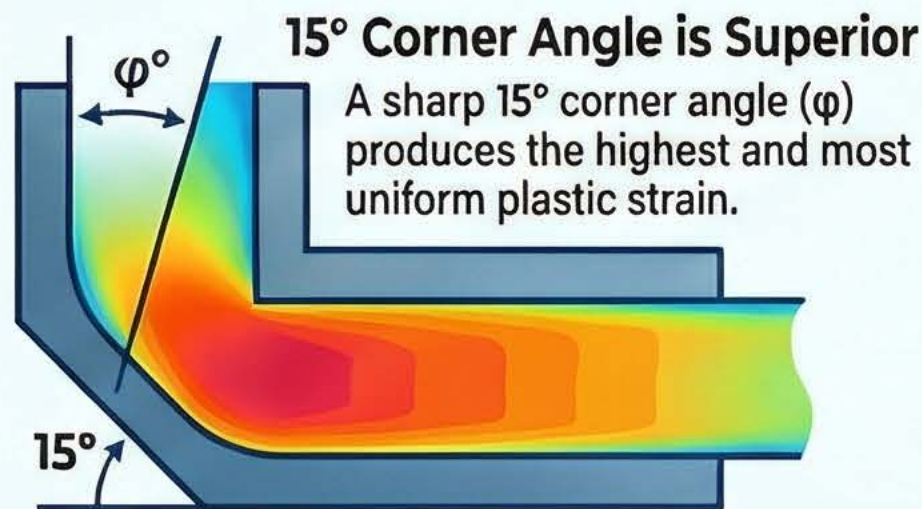


This intermediate angle prevents the material blockages of 90° dies and the warping of 120° dies.

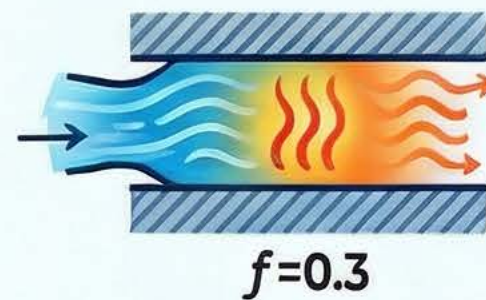
Average Plastic Strain Comparison



PERFORMANCE AND OPTIMISATION

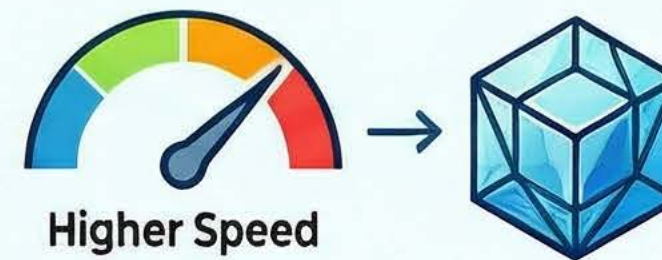


Friction as a Catalyst



Higher friction ($f=0.3$) enhances strain development but significantly increases the required pressing force.

Rate-Dependent Hardening



Higher extrusion speeds significantly increase yield stress and material resistance.

Average Plastic Strain Comparison

