Are the swelling ratios of the melt at different positions across the die diameter equal?

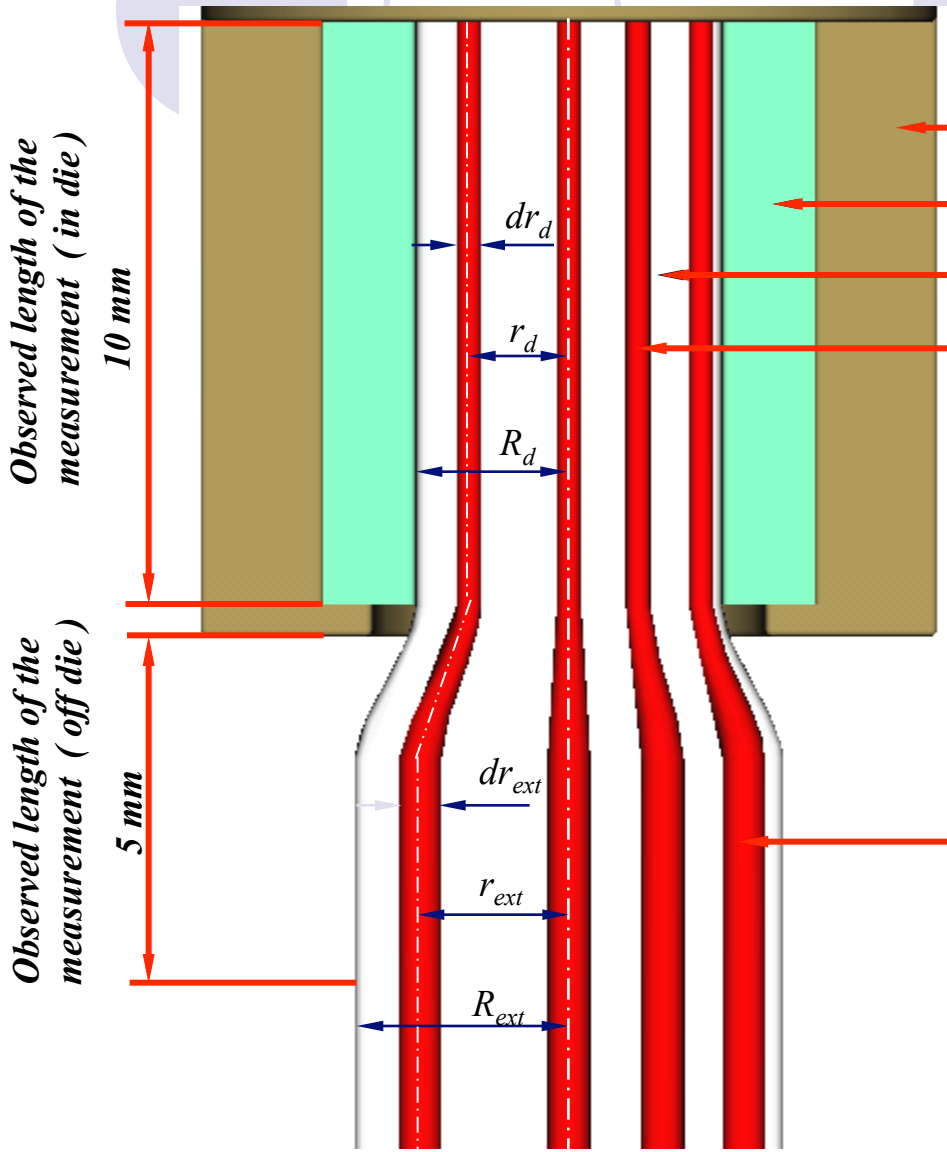
To answer this question, radial extrudate swell measurements were carried out.

- The radial velocity profiles were then required to explain the radial extrudate swell changes.
- The swell and the velocity profiles data are very useful in co-extrusion processes.

Why (radial) die swell is so important!!!

- Control the size and shape of the extruded products. [Quality]
- Determine the productivity of the extruded products. [Quantity]
- So far, only overall die swell is widely measured. No evidence on *experimental investigations on* radial die swell has existed due to difficulties in the experimental designs.
- Radial die swell measurement is important *especially* in the co-extrusion process, for controlling the size of each flow layer.
- Associated with the occurrences of sharkskin and melt fracture

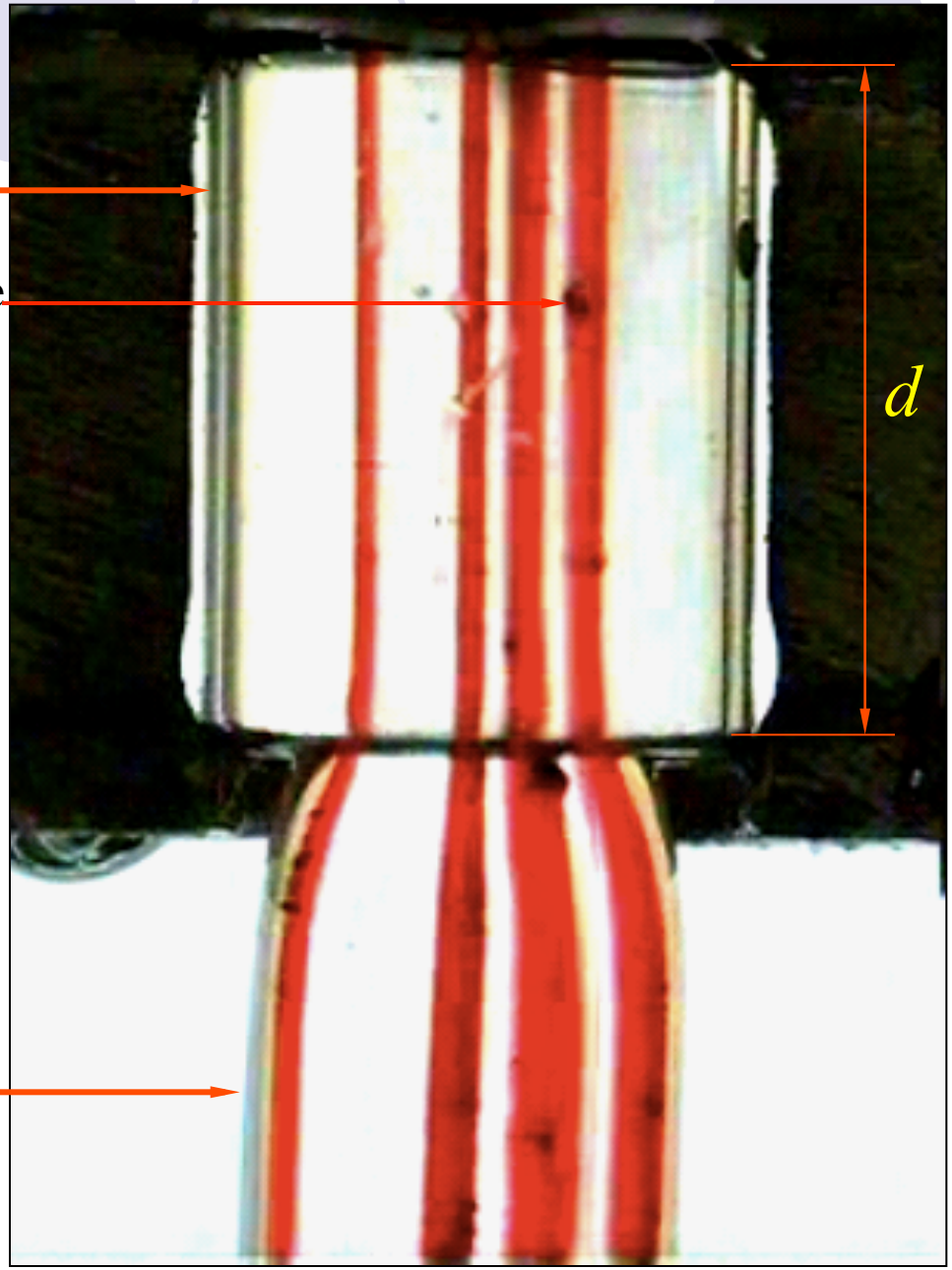
Radial extrudate swell profiles



$$B_{overall} = \frac{R_{ext}}{R_d}$$

$$B_r = \frac{dr_{ext}}{dr_d}$$

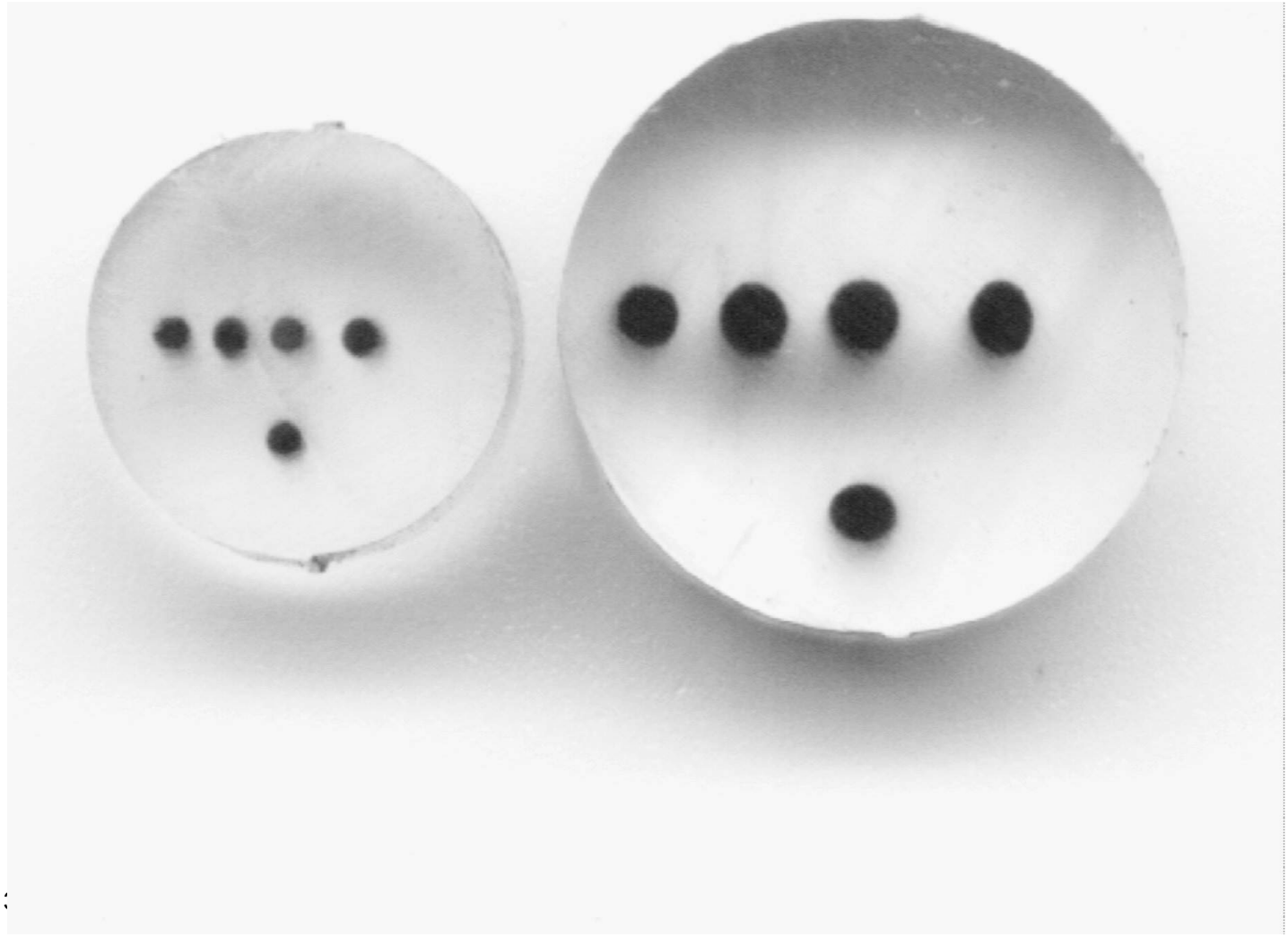
Radial velocity profiles



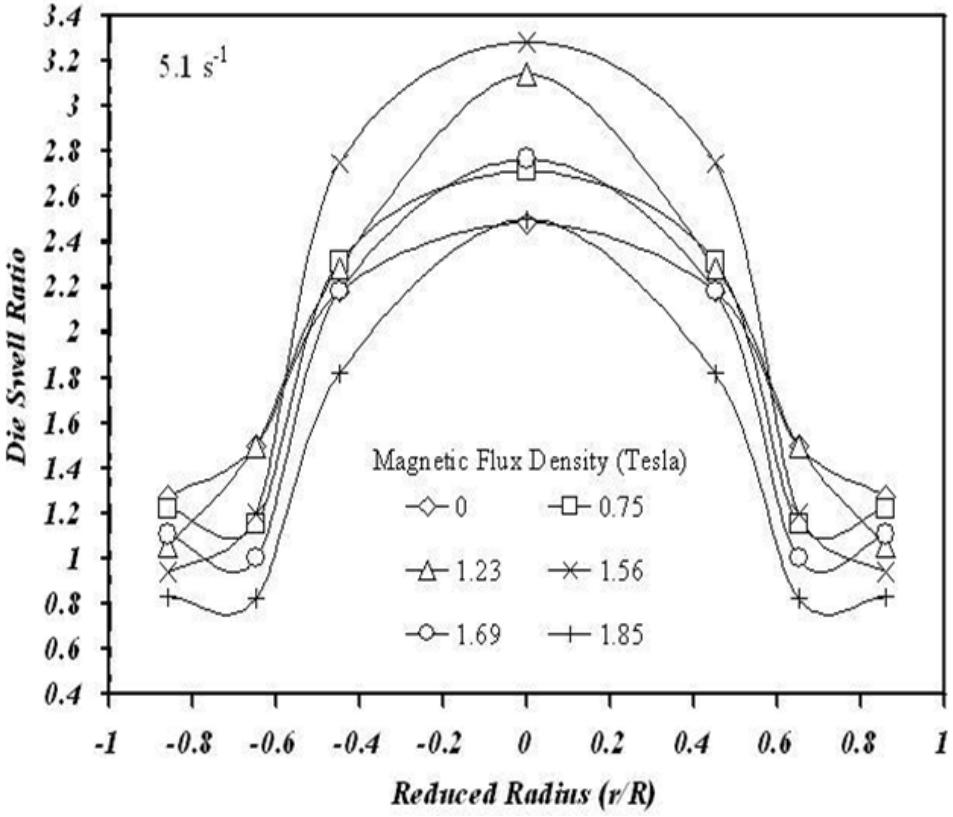
$$V \propto \frac{d}{t}$$

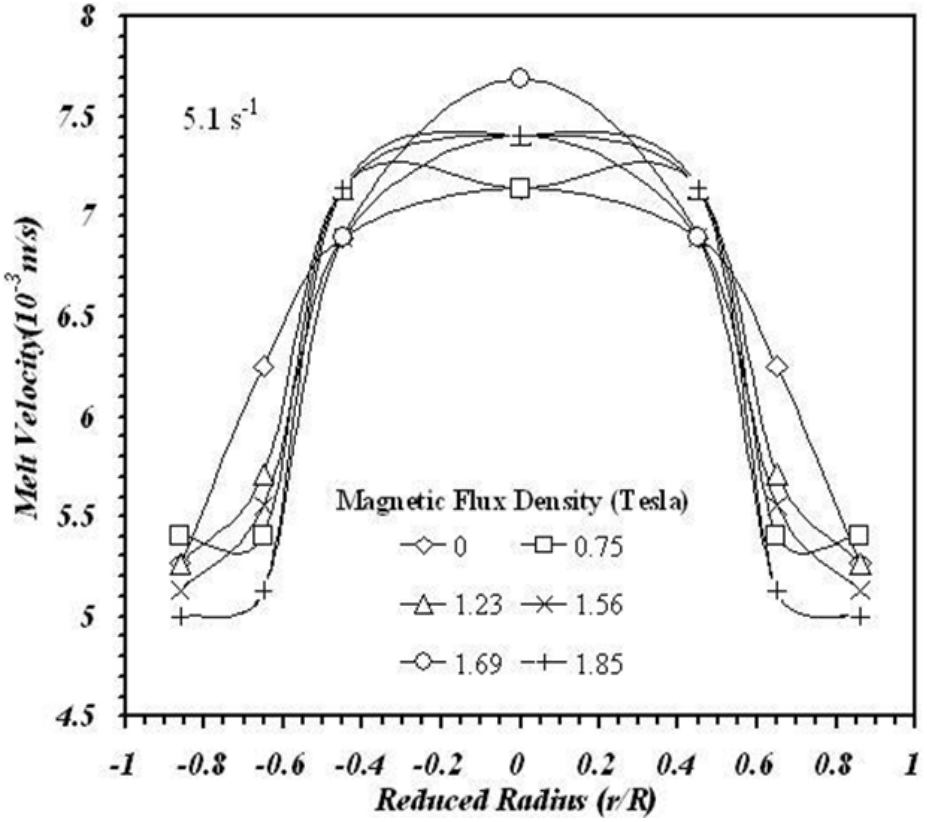
V = Velocity (mm/min)	
D = Distance (10 mm)	
t = Time (s)	

Preliminary results (not bad too)

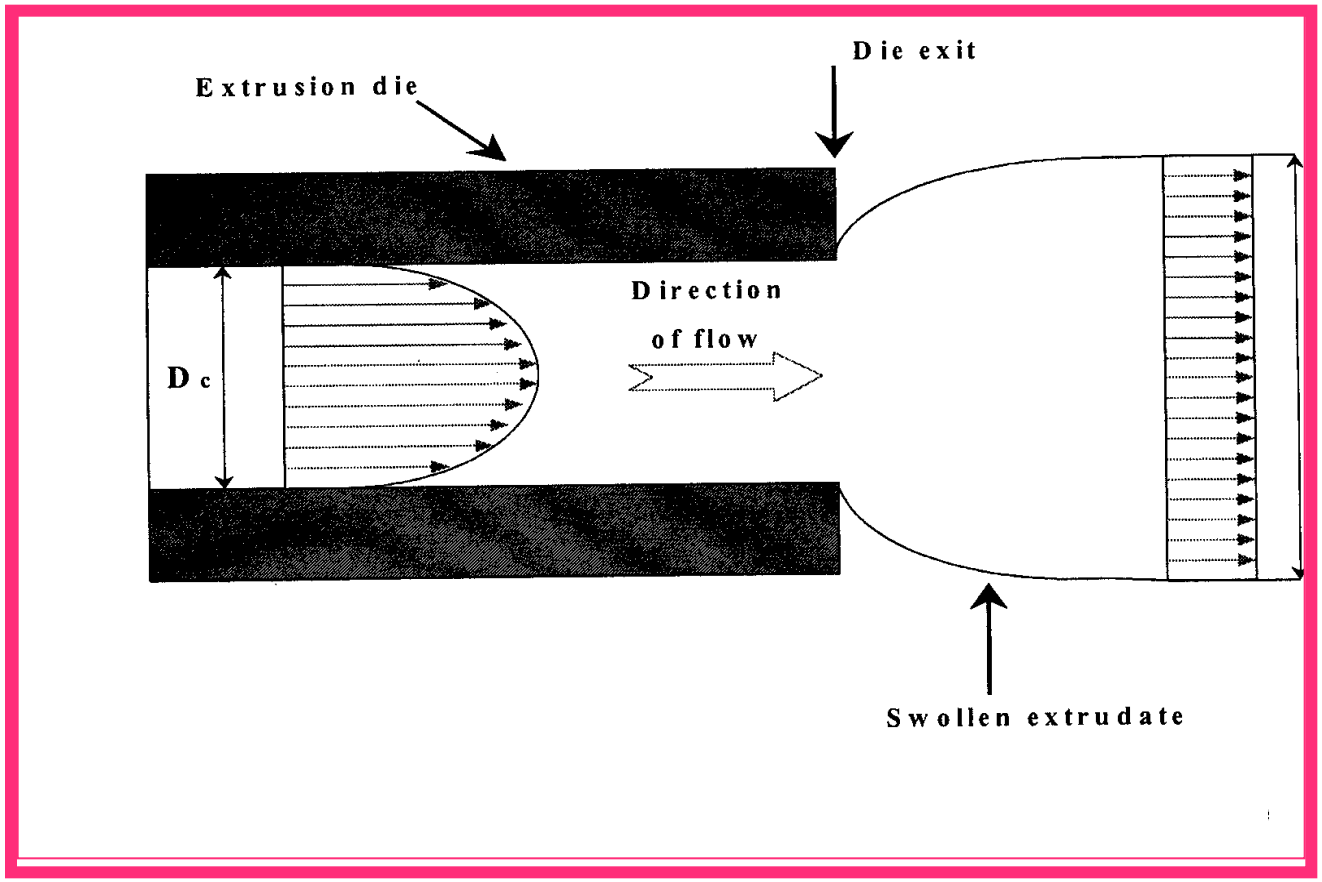


Additional Experimental Results





Relationship between extrudate swell VS velocity profiles



Additional Experimental Results