An investigation was carried out to determine the effect of die diameter on the temperature profiles of polypropylene (PP) melt measured in the barrel of a counter-rotating twin-screw extruder. The results were considered in connection with the flow patterns and pressure drop occurring in the barrel of the extruder. It was found that the melt-temperature profiles across the duct were not uniform and were affected by the size of the dies used, this being associated with the flow patterns of the melt. The differences in the maximum temperature rise ($\Delta T_{\text{max}}$) were affected by the pressure drop occurrence. The experimental results obtained were found to be different from theoretically calculated results.