PLASTIC SEPARATION VIA HYDRO-CYCLONIC METHODS

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Due to the extreme growth of plastic usage around the world, especially in the United States, there is an extreme strain on recycling manufacturers to process the large quantity of plastics provided to them. This is primarily due to the extreme difficulty in separating and categorizing plastics when compared to other materials and often requires the plastics sorting process to be primarily done by hand. In this investigation, the application of the well-established technology of cyclonic separators is applied to plastic separation with the potential of increasing throughput while removing the element of human error. While there have been previous investigations that have utilized this technology before for plastic separation, this work investigates the effects that inlet speed, plastic particle density, and cone geometry have on separation efficiency through the use of both computational fluid dynamics simulations and experimental validation. Through experimental demonstration of an achieved separation efficiency of between 90-95% for plastics that fall within the density range of 0.9 and 1.4 kg per cubic meter, it will be shown that hydrocyclonic separators can successfully perform the plastics separation necessary to reduce costs and increase plastics recycling efforts worldwide.