

Technical Article Series

Separating Scrap for \$\$\$

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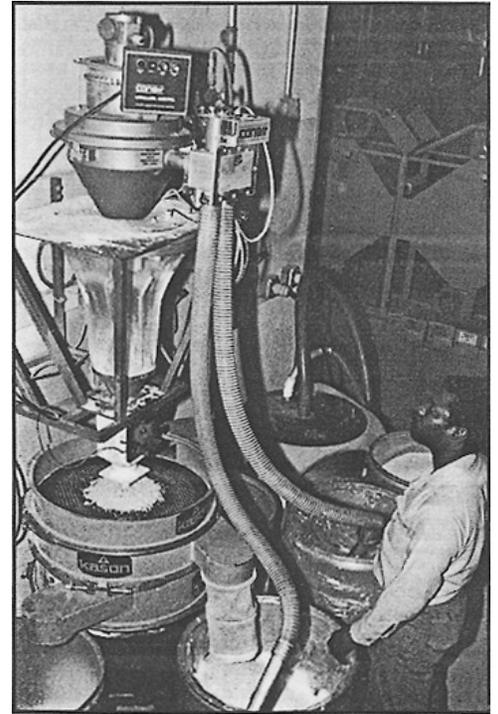
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Separating Scrap for \$\$\$

Injection molding machines need to be fed uniformly-sized plastic particles for proper melting; plastic dust and strands cause troubles. But when sprues and flash from molding are ground up for recycling, they don't all come out as uniform particles; the odd pieces and fines must be taken out before going to the extruder.

All Metal Inc., a precision injection moulder located in Bensenville, IL, was faced with the problem of recycling its Type 6 nylon scrap. Their first move was to review available separation systems-circular and rectangular vibratory as well as centrifugal sizing equipment in seeking the best combination of operating efficiency, space-saving and reliability. They also examined sizes, capacities, costs, materials of construction and requirements for energy, labor and maintenance. Their choice: the circular vibratory type screen separator because of its space savings and efficiency for the job to be done.

Their specific choice was a 24" diameter, circular, two-deck vibratory screen separator from Kason. Installation was completed in October 1983. The top deck is a special perforated plate that removes any long strands left after grinding. The lower deck is a woven wire mesh screen which takes out fines. The usable screened material (some 90% of the total regrind) is readily molded into high quality products. Some 1100 pounds are recycled each day, saving All Metal \$500-800 a day. The separator has paid for itself many times over.



How The Separator Works

Ground nylon scrap is fed to the center of the top deck, an 0.008" carbon steel plate with 3/8" holes on 1/2" centers. Vibrating only in the horizontal plane, the plate removes the long filaments in the ground material. The perforations are omitted in the plate's center and periphery to facilitate the retention of long filaments:

1. long filaments in any mix of particles align themselves in the direction of flow. Thus, the vertical feed of reground nylon pieces onto the un-perforated center of the plate avoids passing the filaments through in the impact area
2. the unground filaments and reground bits then travel horizontally to the perforated area of the plate, where the bits fall through the holes while the filaments slide over them to the periphery and side wall. The absence of holes at the periphery allows them to be conveyed to the discharge spout without up-ending.

Regrind material passing through the holes is directed by the feed tray to the center of the 12 mesh Market Grade screen below, which separates out the fines, discharging the "on-size" material for remelting. The separator is operated 3 hours a day, 5 days a week. Maintenance is negligible.

Basic Construction

The basic assembly of this circular vibratory separator design consists of a number of interchangeable screens/perforated plates mounted in frames with discharge outlets. These frames are fixed to a structure which also holds a gyrator with a double extension shaft carrying adjustable eccentric weights. The whole vibrating assembly, mounted on a circular base, is supported by springs which allow it to vibrate freely without transmitting its motion to the floor. As the eccentric weights rotate, they produce vibrations that can be adjusted to give desired flow patterns. The weights themselves may be varied to change amplitudes and directions of movement; increasing the top weight increases horizontal motion to speed the discharge rate of oversize material. Adding to the bottom eccentric weight increases vertical motion, to maximize the quantity of undersize material passing through the screen and inhibit blinding of mesh openings.

