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**To: IP File**  
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## **Subject: Food Depackaging**

There are three general categories of foodwaste, two of which require decontamination or depackaging:

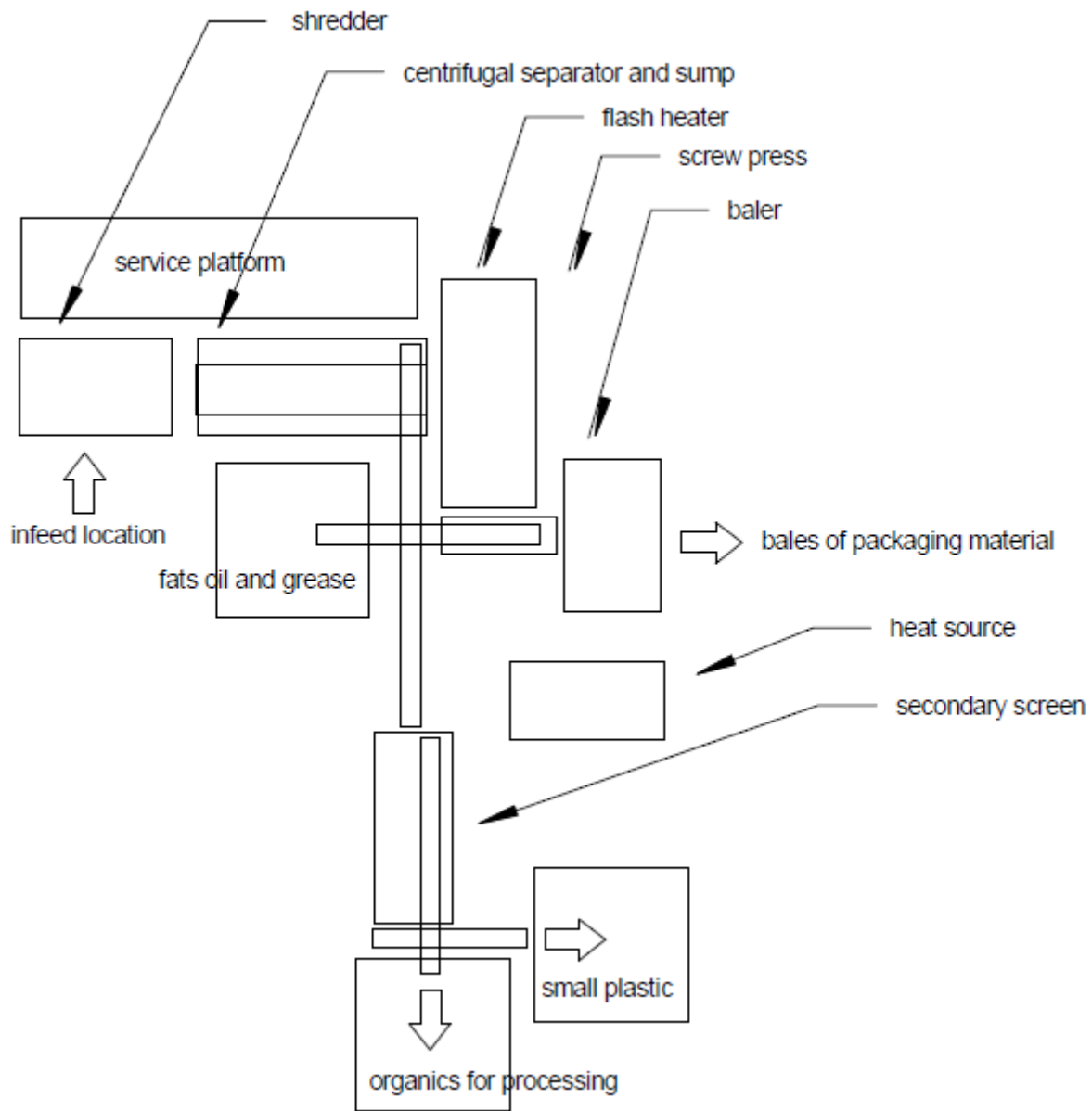
1. Uncontaminated pure food without any contamination or packaging
2. Food commingled with plastic, compostable plastic, glass, ceramic, metal, or other materials
3. Packaged food still in its container, bag, can, box, bottle, or other package

The second and third categories can be processed through the same machinery, using mechanical and thermal systems to separate the food or other organic (biodegradable) material from the contamination or packaging. These processing systems are not designed to remove chemical contamination like soap, bleach, petroleum products, poisons, salts, or disinfectants from food or other organic materials. Chemical contaminants must typically be prevented in advance rather than separated after being commingled with foodwaste.

The general process flow for separation is shown below:

1. The feedstock (bulk or packaged material) is fed into a slow speed shredder to reduce the size of each piece to less than 2.5" (63.5 mm) in its maximum dimension. If the feedstock is palletized or in large plastic buckets (5 gal; 20 liter) then the feedstock will have to be metered into the shredder at a rate the shredder can accept. For example, a one ton (tonne) pallet of feedstock may take 3 minutes to process (735 lbs/min; 333 kg/min) through the initial shredder. This will pace the entire downstream system.
2. The size-reduced material will then be conveyed immediately into a centrifugal separation device with rotating blades or paddles on a center shaft and a stationary tube or barrel with perforations, screens, or openings. The blades, shaft rotational speed, and perforations are variable according to the specifications for the downstream process and the type of feedstock anticipated. Dense organic materials, liquids, and denser inorganic materials (some metal, ceramic, glass) will be pulverized inside the barrel and forced out through the perforations by the force of the blades. Lighter and less dense plastics, cardboard, foils, and thin metals will be carried out the end of the barrel by the blades.

3. The soft and denser materials will drop below the barrel into a sump or tank where metal, ceramic and glass can be captured by gravity as they drop to the bottom of the sump. The sump can be circulated and agitated with liquid or vibration to assist in this gravity separation. Then the organic materials can be conveyed to a transfer container, pump, tank, or conveyance system for anaerobic, aerobic, dewatering, drying, or other treatment. A secondary sieve or screening system can be added to remove any small plastic particles during conveyance. The small plastic particles can be discharged into a drum or bulk bin.
4. The lighter materials will be conveyed into a flash heater to raise the temperature to approximately 180 F / 82 C to liquefy any fats, oils, and grease still contained in the packaging.
5. The shredded, separated, and heated light fraction will be conveyed into a compression system to extract remaining fats, oils, and grease and the compressed packaging is then discharged into a drum, bulk bin, or baler for subsequent recycling. To the extent feedstocks can be run with similar packaging this compressed packaging may be uniform in composition; such as all metal, all film plastic, all HDPE, or all PET. To the extent feedstocks are commingled or non-similar the compressed packaging will be a mixture of plastic, metal, cardboard, and composite materials.
6. The extracted fats, oils, and grease can be conveyed into a separate container or blended with the organic materials for treatment.
7. Mass or volume measurement is possible at the sump or tank, in the conveyance systems, or in the final discharge area for compressed packaging.
8. Outputs are: organic materials, FOG, packaging in bale form, and small plastic particles



Food Depackaging System Plan View  
30 ft x 35 ft approximate footprint  
735 lbs/min (333 kg/min)  
Access on two sides