HARTMAN INDUSTRIES LLC

San Jose, California
Process Overview

The Research and Development department (R & D) is located at the Corporation's headquarters in San Jose, California. The department designs and tests new products, designs and tests new production processes and evaluates new chemicals, polymers and dyes used in the manufacturing process.

Receiving Department

Small amounts of raw materials are shipped to the company by truck and are received at the main entrance. Once the received materials have been reconciled with the applicable invoices and purchase orders, the raw materials are moved to a large storage room adjacent to the R & D labs.
The raw materials, or inputs, are:

1. High-density polyethylene (HDPE) plastic pellets
2. Colorizing dyes
3. Ink
4. Solvent cleaners
5. Lubricating oils
6. Mold release agents
7. Electricity

The desired product is comprised of inputs sent to molding.

The possible byproducts, wastes, or outputs, from this department are:

1. Particulates from the handling of damaged bags of dyes that may cause air pollution
2. Off-spec raw materials managed as a waste
3. Spilled materials that may cause land and water pollution
4. Wasted energy from lighting, heating, and processing equipment

If possible, off-spec raw materials are returned to the vendor for credit. If not returned, the materials are delivered to a local recycling center or a local landfill.

Molding

If dyes are needed for the work being done during a particular test, the dye(s) are brought to the R & D lab where they are mixed and then added to the HDPE pellets. Solvent cleaners are used to clean the molds and prepare them for use. A mold release agent is applied to the mold to make it easier to extract the finished product at the end of the molding process.

The HDPE pellets are added to the machine where they are melted at a precise temperature and injected under pressure into the mold. The plastic product is removed from the mold and evaluated. The product is trimmed of any excess plastic and evaluated again. If the final product requires assembly, it would be done at this time.

Excess plastic is collected from the machines and the floor of the production area. Solvents are used to clean the machines and the molds. Preventative maintenance of the machines is performed and, if necessary, oil-based lubricants are applied to the machines' moving joints.

All products molded are experimental and not for mass production. Therefore, the mixing, molding, trimming and assembly functions are included in molding and all tasks are performed in the R & D lab space.
The inputs are:

1. HDPE pellets
2. Dyes
3. Lubricating oils
4. Solvent cleaners
5. Mold release agents
6. Electricity

The desired products are prototypes or experimental molded parts and data on materials and processes.

The outputs from this department are:

1. Particulates from the mixing process that may create air pollution
2. Spent cleaners and mold release agents that may create air pollution from volatile organic compound emissions, managed as hazardous waste
3. Off-spec products, used purge material, and scrap plastic managed as solid waste
4. Spilled raw materials that may create land and water pollution
5. Used oils managed as industrial waste
6. Spent cleaners and mold release agents managed as hazardous waste
7. Wasted energy from lighting, heating, and processing equipment

If any dyes are mixed, after the mixing is complete, the work area is cleaned and any spilled dye is collected. The waste dye is stored in an airtight container. When a sufficient amount of waste dye has been collected, it is picked-up by a licensed and bonded hazardous waste disposal company.
After the molding process is complete, spilled and excess plastic is collected and analyzed to determine the amount of waste generated by the process and the design. The molds and machines are examined to determine if there are any ways to make the process more efficient in the use of the polymers. Excess plastic is collected following the trimming of the finished product and a similar analysis is conducted.

If the plastic being used is undyed, the collected excess plastic is cleaned and returned to the raw materials storage of the undyed HDPE pellets to be recycled. If the plastic being used is dyed, the excess plastic is collected and delivered to a local recycling center.

Floor drains and scuppers in the R & D lab are piped to a special waste liquid collection system. This system is not connected to the San Jose sewer system. The collection system allows the R & D lab to determine the total volume of waste liquid generated during the production and/or cleaning processes. Samples of the liquid can be taken and analyzed to determine concentrations of the waste chemicals. When analysis of the waste liquid is complete, the contents are pumped to a 1,000-gallon above-ground storage tank located outside the R & D building on the Hartman Industries, LLC campus. The company contracts with a licensed and bonded hazardous waste disposal company, which empties the tank at regular intervals.