

The Pontiac plant handles the production of custom plastic pieces. The plant is also responsible for the production of all medical products produced by the company.

Receiving Department

The receiving department accepts the delivery of raw materials shipped to the company by truck.

The raw materials, or inputs, are:

1. High-density polyethylene (HDPE) plastic pellets
2. Colorizing dyes
3. Paper
4. Cardboard
5. Plastic film
6. Styrofoam packaging peanuts
7. Adhesives
8. Ink
9. Steel stock
10. Aluminum stock
11. Abrasive grinding and cutting wheels and bits
12. Solvent cleaners
13. Lubricating oils
14. Mold release agents
15. Electricity
16. Natural gas
17. Light bulbs

The desired product is comprised of inputs sent to the mixing or mold fabrication departments.

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. Otherwise, the material is treated as waste and sent to a landfill.

Mold Fabrication Department

The custom plastic pieces produced by the plant are usually specialized, unique, or limited-run items. The molds used in the production of these custom pieces are fabricated in-house. The department also fabricates the molds for new designs, as ordered by the Research and Development department in San Jose, CA. If a new design is put into production at the Georgia or China plants, the molds used for the production machines would be purchased from a third-party mold maker.

The inputs are:

1. Steel stock
2. Aluminum stock

3. Abrasive grinding and cutting wheels and bits
4. Water
5. Solvent cleaners
6. Lubricating oils
7. Electricity
8. Natural gas

The desired product is a mold that will be sent to the molding department or to the Research and Development department in San Jose, CA.

The outputs from this department are:

1. Metal shavings removed from the metal stock as part of a grinding operation
2. Gases created as stock metal is vaporized during laser cutting or etching
3. Slag metal from spillage during metal casting
4. Water used to cool metal and tools during grinding, cutting or etching operations
5. Worn grinding/cutting wheels and bits
6. Spent cleaners managed as hazardous waste
7. Used oils managed as industrial waste
8. Spilled materials that may cause land and water pollution
9. Wasted energy from lighting, heating, and processing equipment

Work areas are swept and cleaned every day. Metal shavings and slag metal are placed in the trash, which goes to a local landfill.

In some cases, worn grinding/cutting wheels and bits may be returned to the manufacturer for sharpening or resurfacing. If that is not possible, the worn equipment is placed in the trash.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Water used in the fabrication process and in cleaning is collected by floor drains connected to the city sewer system.

Mixing Department

The HDPE plastic pellets are transported from the receiving department to the mixing department in moveable 25-gallon containers. Colorizing dye, in powder form, is also transported to the mixing department. The inputs are mixed in a batch mixer by a plastics technician.

The inputs are:

1. HDPE pellets
2. Dyes
3. Lubricating oils
4. Solvent cleaners
5. Electricity
6. Natural gas

The desired product is comprised of mixed plastic pellets and colorants for the molding department.

The outputs from this department are:

1. Particulates from the mixing process that may create air pollution
2. Off-spec product managed as solid waste
3. Spilled product that may create land and water pollution
4. Spent cleaners managed as hazardous waste
5. Used oils managed as industrial waste
6. Wasted energy from lighting, heating, and processing equipment

Off-spec and spilled products are collected and thrown away.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Molding Department

Custom molds from the mold fabrication department are transported to the molding department and mated to the production machines. Mixed raw materials are transported from the mixing department, where they are formed into custom plastic pieces using injection-molding machines.

The plastic used in medical devices cannot contain colorizing dyes. To ensure that there is no contamination, the molding department has two physically separated production lines; one used for the production of the medical devices and the other used for the custom orders. The HDPE pellets used by the medical device production line are delivered directly from the receiving department.

The inputs are:

1. Mixed HDPE pellets and dye — Custom production line only
2. HDPE pellets — Medical device production line
3. Lubricating oils
4. Solvent cleaners
5. Mold release agents
6. Electricity
7. Natural gas

The desired product is comprised of molded plastic parts for the trimming department.

The outputs from this department are:

1. Emissions from the molding operation that may cause air pollution
2. Scrap plastic or flashing managed as solid waste
3. Plastic material used to purge the equipment before a color change and managed as solid waste
4. Spent cleaners and mold release agents that may create air pollution from volatile organic compound emissions and managed as hazardous waste
5. Off-spec product managed as solid waste
6. Used oils managed as industrial waste
7. Spent cleaners and mold release agents managed as hazardous waste
8. Wasted energy from lighting, heating, and processing equipment

Scrap plastic, off-spec product, and purge material are collected and thrown away.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Trimming Department

The excess plastic attached to the part is trimmed with a mechanical shearer.

The inputs are:

1. Lubricating oils
2. Solvent cleaners

3. Electricity
4. Natural gas

The desired product is comprised of finished plastic parts for the labeling or the assembly departments.

The outputs from this department are:

1. Scrap plastic or flashing managed as solid waste
2. Off-spec product managed as solid waste
3. Used oils managed as industrial waste
4. Spent cleaners managed as hazardous waste
5. Wasted energy from lighting, heating, and processing equipment

Scrap plastic and any off-spec products are collected and thrown away.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Labeling Department

Some custom orders call for labels, logos, or other designs to be printed on the plastic surface. This is done using machines that spray the desired label, logo, or design onto the surface of the plastic part using specially formulated inks.

The inputs are:

1. Ink
2. Lubricating oils
3. Solvent cleaners
4. Electricity
5. Natural gas

The desired product is comprised of finished and labeled plastic parts for the assembly department.

The outputs from this department are:

1. Spilled ink that may cause pollution
2. Off-spec product managed as solid waste
3. Used oils managed as industrial waste
4. Spent cleaners managed as hazardous waste
5. Wasted energy from lighting, heating, and processing equipment

Off-spec products are collected and thrown away.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Assembly Department

If required, separate plastic parts are assembled using adhesive bonding, mechanical screws, and/or ultrasonic welding. Following assembly, the products are subject to a final quality control check. If no assembly is required, the plastic part goes through the quality inspection before going to the packaging department.

The inputs are:

1. Adhesives
2. Lubricating oils
3. Solvent cleaners
4. Electricity
5. Natural gas

The desired product is comprised of assembled plastic parts for the packaging department.

The outputs from this department are:

1. Emissions from the adhesive that may cause air pollution
2. Off-spec product managed as solid waste
3. Used oils managed as industrial waste
4. Spent cleaners managed as hazardous waste
5. Wasted energy from lighting, heating, and processing equipment

Off-spec products are collected and thrown away.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Packaging Department

Appropriately sized cardboard boxes are assembled and bottom flaps are sealed with applied adhesive. The finished plastic pieces are wrapped in plastic film to which heat is applied to shrink the plastic film to conform to the shape of the product. The product is placed in the box along with Styrofoam packing peanuts to cushion the product. The top flaps of the box are sealed using an applied adhesive. A bar code identifying the recipient of the product is sprayed onto the box using ink.

The inputs are:

1. Cardboard boxes
2. Plastic film
3. Adhesives
4. Styrofoam packing peanuts
5. Ink
6. Lubricating oils
7. Solvent cleaners
8. Electricity
9. Natural gas

The desired product is comprised of boxed plastic parts for the shipping department.

The outputs from this department are:

1. Emissions from the adhesive that may cause air pollution
2. Dropped Styrofoam packing peanuts managed as solid waste
3. Spilled ink that may cause pollution
4. Used oils managed as industrial waste
5. Spent cleaners managed as hazardous waste
6. Wasted energy from lighting, heating, and processing equipment
7. Wasted energy from the shrink-wrapping operation

Styrofoam packing peanuts that land on the working surfaces are returned to their hopper. Packing material that falls on the plant floor is swept up and thrown in the trash.

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.

Shipping Department

Boxes received from the packaging department are scanned for a bar code. Using the information from the bar code, a machine sprays the shipping address onto the surface of the box using ink. The box is then routed through a system of conveyor belts that sorts the box by its destination and delivers it to the appropriate section of the loading dock, so it is ready to be loaded onto a third-party commercial carrier.

The inputs are:

1. Ink
2. Lubricating oils
3. Solvent cleaners
4. Electricity
5. Natural gas

The desired product is comprised of correctly labeled boxes sorted to the appropriate carrier.

The outputs from this department are:

1. Spilled ink that may cause pollution
2. Used oils managed as industrial waste
3. Spent cleaners managed as hazardous waste
4. Wasted energy from lighting, heating, processing equipment

Solvents are applied to the machines per the manufacturer's recommendations. Excess solvent is rinsed from the machines with water.

Used oils are collected by a third-party hazardous waste disposal company.
