

## Thermoforming Checklist



**Identification:** \_\_\_\_\_

**Company:** \_\_\_\_\_

**Machine Make:** \_\_\_\_\_

**Machine Model:** \_\_\_\_\_

**Machine Type (e.g. inline, shuttle type, etc.):** \_\_\_\_\_ in-line or off-line

**Number (e.g. 6 of 10)** \_\_\_\_\_

	<b>COMMENTS</b>
<b>Machine/Equipment Capabilities</b>	
Roll fed or cut sheet:	roll fed
Purchase sheet or extrude internally?	
Process control (windows based, manual, etc.)	
Oven length:	issue with CPLA
Heater type (calrod, ceramic, etc.):	
Heater arrangement (machine direction-MD, transverse direction-TD, both-T&MD):	
<b>Heater Control</b>	
How many adjustable zones?	
Top and bottom heater control?	
Controller type? (% on/off, PID control, etc.)	

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Pressure or vacuum former, or both?	
Is temperature mapping available?	unusual, but desirable
Is an IR thermometer available?	very helpful
Is edge heating (for pin chains) available?	must have
<b>Tooling</b>	
What polymer(s) was it designed for?	PET
# Cavities/mold (drawing available?):	
Index Length	Important for cPLA
Tool material (Al, steel, etc.):	
Plug material/shape (drawing available?):	PET or torpedo not trunkated
Cooling/heating temperature range available?	want to have 60-70°F potential
Cool/heat source (central chiller, ind. unit, etc.)	
Trim tool type:	matched metal punch and die
Tool heating available?	needed for steel rule due
Trim tool material:	
In-house tool making ability?	
What other products (molds) run on this line?	especially for in-line, may wish to keep all PLA on the same line - so what else can we make?
<b>Skeleton Handling</b>	
Is regrinding an option?	

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Cleanliness controls:	
<b>Sheet</b>	
Do they slit to size?	Usually no, but talk about rotary shear
Incumbent material:	
Min/Max sheet thickness:	
Min/Max sheet width:	
Part dimensions:	
<b>Material Handling</b>	
Is there power assisted nip unwind?	talk about handling
Does company have dryers?	
Type / manufacturer / how many?	
Total capacity:	
Maximum roll size/wt. co. can handle:	
Maximum core size (6" best for PLA):	
Please attach a small sketch of line to help understand travel of sheet/skeleton thru process	
<p><b>Safety and Handling Considerations</b></p> <p>Material Safety Data (MSD) sheets for PLA polymers are available from NatureWorks LLC. MSD sheets are provided to help customers satisfy their own handling, safety, and disposal needs, and those that may be required by locally applicable health and safety regulations, such as OSHA (U.S.A.), MAK (Germany), or WHMIS (Canada). MSD sheets are updated regularly; therefore, please request and review the most current MSD sheets before handling or using any product.</p> <p>The following comments apply only to PLA polymers; additives and processing aids used in fabrication and other materials used in finishing steps have their own safe-use profile and must be investigated separately.</p>	

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## Hazards and Handling Precautions

PLA polymers have a very low degree of toxicity and, under normal conditions of use, should pose no unusual problems from incidental ingestion, or eye and skin contact. However, caution is advised when handling, storing, using, or disposing of these resins, and good housekeeping and controlling of dusts are necessary for safe handling of product. Workers should be protected from the possibility of contact with molten resin during fabrication. Handling and fabrication of resins can result in the generation of vapors and dusts that may cause irritation to eyes and the upper respiratory tract. In dusty atmospheres, use an approved dust respirator. Pellets or beads may present a slipping hazard. Good general ventilation of the polymer processing area is recommended. At temperatures exceeding the polymer melt temperature (typically 170°C), polymer can release fumes, which may contain fragments of the polymer, creating a potential to irritate eyes and mucous membranes. Good general ventilation should be sufficient for most conditions. Local exhaust ventilation is recommended for melt operations. Use safety glasses if there is a potential for exposure to particles which could cause mechanical injury to the eye. If vapor exposure causes eye discomfort, use a full-face respirator. No other precautions other than clean, body-covering clothing should be needed for handling PLA polymers. Use gloves with insulation for thermal protection when exposure to the melt is localized.

## Combustibility

PLA polymers will burn. Clear to white smoke is produced when product burns. Toxic fumes are released under conditions of incomplete combustion. Do not permit dust to accumulate. Dust layers can be ignited by spontaneous combustion or other ignition sources. When suspended in air, dust can pose an explosion hazard. Firefighters should wear positive-pressure, self-contained breathing apparatuses and full protective equipment. Water or water fog is the preferred extinguishing medium. Foam, alcohol-resistant foam, carbon dioxide or dry chemicals may also be used. Soak thoroughly with water to cool and prevent re-ignition.

## Disposal

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. For unused or uncontaminated material, the preferred options include recycling into the process or sending to an industrial composting facility, if available; otherwise, send to an incinerator or other thermal destruction device. For used or contaminated material, the disposal options remain the same, although additional evaluation is required. (For example, in the U.S.A., see 40 CFR, Part 261, "Identification and Listing of Hazardous Waste.") All disposal methods must be in compliance with Federal, State/Provincial, and local laws and regulations.

## Environmental Concerns

Generally speaking, lost pellets are not a problem in the environment except under unusual circumstances when they enter the marine environment. They are benign in terms of their physical environmental impact, but if ingested by waterfowl or aquatic life, they may mechanically cause adverse effects. Spills should be minimized, and they should be cleaned up when they happen. Plastics should not be discarded into the ocean or any other body of water.

## Product Stewardship

NatureWorks LLC has a fundamental duty to all those that make and use our products, and for the environment in which we live. This duty is the basis for our Product Stewardship philosophy, by which we assess the health and environmental information on our products and their intended use, then take appropriate steps to protect the environment and the health of our employees and the public.

## Customer Notice

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