ASHLAND

Cycletime Tips - General

Volume 31: Safety in Processing Thermoplastic

Safety in processing thermoplastic
As with any industrial process, plastic processors need to think " SAFETY FIRST." Simply put, this means think before you act. Ensure that the working environment is a safe place to do the job, ensure that you have the appropriate time, and ensure that you have the necessary equipment needed to perform the job.

Additionally, there are other key areas that you should address in order to ensure safety:

Protective Equipment
EYES: The use of safety glasses with side shields should be mandatory in a plastic shop, especially if there is dust in the area or if you are working directly with tools.

EARS: Heavy protection should be used where there is excessive noise. Examples would include work environments where grinding and trimming equipment are operational.

FACE: When purging a machine, a face shield should be worn. Plastic may degrade in the barrel and splash.

HANDS: When trimming a part with a knife or handling hot purge or pieces of metal, appropriate working gloves should be used. Note: NEVER handle hot purge with bare hands.

BODY: Long pants and long sleeve shirts should be worn, especially when purging the machine. In the event that molten material splashes toward you the layer of fabric may protect you from the hot plastic. Note: if melted plastic comes in direct contact with skin, do not try to directly remove it. Immerse the affected body part in cold water until the plastic cools and immediately make arrangements to go to the hospital or contact medical emergency personnel.

Loose clothing like ties and jewelry should never be worn in a plastic shop because of the numerous moving parts contained in the work environment. Loose clothing and jewelry could very easily become caught in a machine and cause injury.

General Housekeeping
It is important that the shop is kept clean. The presence of water, oil, plastic pellets on the floor make working conditions unsafe and negatively reflect on the overall work environment. Avoid moving dust or dirt from one corner of the shop to the next corner with the air hose; use a vacuum cleaner or central vacuum system to fully clean up the

dust. Residual dust easily becomes airborne and may serve as a source of contamination in plastic processing. Note the use of a good ventilation system is recommended to efficiently remove worker exposure to fumes coming from a machine. Good ventilation will reduce the harm that could result from contact with fumes for an extended period of time. Tools should be kept in good working condition. It is recommended that regular checks be performed to ensure that the tools can perform the prescribed work in a safe manner.

It is important that first aid kits are available and easily accessible to all personnel in the work area. It is also recommended that proper training of first aid and safety equipment such as fire extinguishers is provided to help ensure that proper care is provided in the event of an accident. Fire extinguishers should be accessible and regularly tested to ensure proper working condition.

General Safety Measures

An evacuation plan must be established and communicated to all personnel in the event of an incident requiring evacuation. All operations should have emergency lights that are in good working condition. Exit signs must be clearly marked and posted. A shower/eye wash may be appropriate for your shop.

Each machine must be regularly checked to make sure that all the safety switches are present and in proper working condition.

If a worker has to go between the platens of a press, stop the motor to make sure that the press will not close with you inside. Do not inject molten plastic into an open mold. This is unsafe and could damage the mold. Also, do not leave the ejector pins out when the mold is open, as the pins can easily be broken.

Do not overheat plastic because it will cause degradation and release gas. Dispose of all purge in accordance with the regulations in your area. To reduce the fumes coming from the purge, drop the hot molten plastic in a covered water bath, which will cool the purge quickly.

Never reach for something you cannot see. A wrong movement while reaching without full vision could cause serious injury.

Dangerous Mixes

Some plastics are reactive at molten temperature and may generate gas. Others can even explode. Examples include: PVC-Acetal, PVC-Santoprene, (1) TPE (or similar product), Acetal-Santoprene TPE (or similar product), and Acetal-Alcryn (2) synthetic rubber.

PVC-Acetal-TPR, are incompatible. At processing temperature, the TPR (thermoplastic rubber) degrades both the PVC and the Acetal. The HCL (hydrochloric acid) from the PVC will degrade the Acetal and the mix of those two products may create BCME, which is a known carcinogen.

It is recommended that you do not run incompatible materials such as those described above on the same machine. If you elect to, simple purging will not be enough. It is recommended that a thorough mechanical cleaning be done as well. Also, you should consider using a tagging system to identify the material in the machine. This will reduce the risk of contamination that could cause harm to individuals and/or machinery.

To further minimize the risk of contamination, it is recommended that incompatible materials are not stored in the same general area. Also, have a dedicated grinder for each material. Remember that it takes very little contamination to get a reaction with many incompatible plastics.

If contamination does occur, you should immediately involve appropriate personnel that have a full understanding of the associated health, safety, and environmental issues that may result. Some of the steps that may need to be taken include the following:

1. Immediate evacuation of the premises
2. Shut down the machine
3. Proper ventilation of the facility
4. Use an air respirator and other appropriate protective equipment in order to perform necessary repair work
5. Wait for the cylinder to properly cool to remove the head and empty the hopper properly.
6. Reheat the machine slowly and purge as soon as possible
7. Individuals exposed to gas/fumes may need to shower and/or be examined by medical personnel.
8. Disposal of contaminated clothing.

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