Fischer-Robertson, Inc.
3890 Symmes Road
Hamilton, OH 45015
ph 513-860-3445 fx 513-860-4744
www.fischer-robertson.com

PLASTICS PROCESSING

Manufacturing facilities in the U.S., and globally, are running at capacity. The demand for all types of finished plastics remains high in all markets. Plastics processing covers a broad range of operations. Several of the more common processes include: blow molding, calendaring, compression molding, cutting, grinding on plastics, heat sealing, injection molding, plastic casting, plastic curing, plastic extrusion, plastic machining and plastic welding.

Injection molding, compression molding and blow molding processes are used to convert raw thermoplastics from pellet or powder form into common useable plastic parts such as forks, bottles and cabinets. This process involves heating the plastic pellets or powders to a liquid state and then injecting, or blowing, the liquid plastic into a cooled mold where it is held under pressure until it cools to the solid state again.

Plastic extruding involves forcing molten plastic through a shaping die under pressure. This process starts with solid pellets or powders being fed into a hopper where the plastic is heated to a liquid or molten state. The plastic melt is then forced through the die with the formed material emerging from the die. The plastic is then cooled with water or air and post-processed to create the desired part as necessary.

The last thing you need is your plastic dust and fumes collection equipment becoming a contributing factor to unscheduled downtime and lost production. We want to use our experience to help you. For example, a PVC plant in North America had an elutriator baghouse that needed to move more air to meet their production requirements. Years ago we converted the dust collector to BHA PulsePleat® filter elements, and at the time, it met their needs. Recently, demand increased again, and the plant needed to move 40% more air than the original design. We worked with the customer to design a BHA PulsePleat filter that met their filter-area requirements and prevented the need for new capital projects to replace the dust collector.

Key benefits from air filtration for the mist, fumes, smoke and dust generated by plastic processing include:

- Protecting worker health
- Reduced exhaust air make-up requirements through recirculated conditioned air
- Improved part / product quality
- Reduced housekeeping costs
- Compliance with even the strictest federal, state and local environmental standards

OVERVIEW/PRODUCT SOLUTIONS

- **Contaminant Characteristics**

Contaminants from plastic processing applications can produce wet mists, fumes and dust from extrusion

and molding processes as well as dry contaminants on machining applications.

Mists, fumes and dust from plastic molding and curing machines result when thermoplastics are heated to a liquid or molten state. The primary contaminant is a submicronic smoke (> 0.1 µm) consisting of plasticizer emitted as the plastic is injected or poured into the die. Fumes from plastic processing extrusion machines also result in plasticizer smoke emitted as the plastic emerges from the die.

Dusts and fine particulates from plastic dry processing machines and cutting applications range in both size and properties depending upon the plastic type. These dust particles can range in shape from fiber fragments to fine round spheres. Based on the operation, in addition to the dust particles, heat from the machining process can result in fume or smoke being emitted along with the dust particles. The dusts produced may also pose a combustion or explosion hazard.

Recommended Approaches for Plastics Dust Contaminants

- **Source Capture.** Whenever possible, capturing the mist, dust and fume at the source is the recommended approach for controlling plastic fume and dust emissions. Source capture typically involves utilizing canopy hoods with clear, plastic drop curtains or guards with flexible ducting to contain the majority of fumes at or near the generation source to protect the worker and prevent the fume from migrating elsewhere in the facility. Source capture can also be accomplished utilizing machine mount mist collectors or by ducting to ceiling mounted or central fume collection systems. Source capture is the most effective means of capture and requires the least amount of energy and initial investment to accomplish.

- **Local Containment.** Containment isolates the process from the rest of facility and protects the contained area. An example would be a partitioned area kept under negative pressure such as a cross draft booth where one side of the booth is configured as a hood that extracts the contaminants horizontally across the booth. The extracted air can either be ducted to a dust collector located remotely or drawn directly into a collector that incorporates a hood. In some cases, the filtered air can be returned to create a push-pull airflow pattern to improve the contaminant control.

- **Ambient Air Collection.** When source capture is not possible, filtering ambient air can be utilized to control the fume concentrations in the facility to a more acceptable level. Ambient systems will help remove the ambient haze caused by the airborne pollutants but these systems will not protect the worker’s breathing zone.

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