Laundries turn to filtration systems to capture lint, boost dryer efficiency

By Michael Reilly

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Every laundry type, from the home to the large commercial facility, must deal with the pesky problem of lint collection.

Handling and processing textiles fatigues the fibers and produces lint particles. A clothes dryer or tumbler is the most obvious source of lint, which can be found throughout a textile processing facility. Every step of processing — from washing to finishing — produces lint, but the greatest volume comes from dryers.

This article summarizes common lint-collection methods and emphasizes the importance of lint collectors (or lint filters) for use in conjunction with clothes dryers and ironers.

Evolution of lint filters

A lint collector may be used either as a primary filter or secondary filter for a single machine or multiple machines. The application may vary from one small dryer to a bank of dryers in a continuous-batch washing system. In any application, the reasons to use a lint collector are typically the same: environmental concerns, meeting code requirements, reducing fire risk and, most importantly, maximizing dryer performance.

For many years, textile manufacturers developed methods of capturing and reusing processed lint while laundries concentrated on containing the large amounts of lint produced by their high-capacity (200-600 pounds) dryers. Various containment methods included homemade "chicken coops" and machines that used a powerful vacuum, compressed air, pressurized water, fabric rollers and, believe it or not, even fire! These early contraptions were large, bulky and difficult to maintain, and were typically located on the laundry's roof.

Large, outdoor lint collectors were introduced during the 1970s. By the next decade, they were standard additions for most large-capacity industrial dryers. Energy prices skyrocketed, resulting in the introduction of filters that were equipped with exhaust heat-recovery systems. This leads us to the 1990s, when more options became available from dryer manufacturers as well as after-market suppliers.

A more economical line of lint collectors targeting smaller-capacity (30-150 pounds) dryers has emerged during the last decade. This has brought about the collection of "secondary lint," making second-stage filtering with multiple dryers more commonplace, especially in smaller on-premise laundries.

Today, manufacturers concentrate on developing filtration systems that require minimal space while improving maximum efficiency by taking total airflow design into account.

This lint filter is shown in a one-on-one, or inline, application with a dryer.

Dry or wet: What's your type?

Dry-type and wet-type are the two common terms used in describing methods of lint filtering. Most lint filters made today are dry-type, but their designs vary.

A dry-type lint collector uses a mesh screen to filter the lint from the exhaust. Some require manual screen cleaning while others automatically collect lint into a container. The mesh screen is made of high-temperature polyester or stainless steel, and its holes range in size from 180 to 300 microns — about the thickness of a human hair. Wet-type lint collectors use water to saturate the lint and filter it through a fine screen or a coarse bag.

Some various designs and methods of lint collection used today are:

• Manual Cleaning — Flat screen; floating screen; cylindri-

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cal screen.

• Automatic Cleaning — Cyclone design with cylindrical screen and compressed air; cylindrical screen with compressed air and scraper and suction; flat screen with suction and other mechinism.

• Automatic Cleaning — Cyclone design with spray nozzles; square-baffle design with spray nozzles or jets.

The inline cyclone lint collector is heralded as the most efficient and economical means of containing lint. The slender design is common in many processing industries and naturally assists in the separation of air and particles while providing low resistance. It has a small footprint and improves screen longevity by spinning oncoming particles of lint, sand and foreign objects around the screen instead of directly into it. These units are available in many capacities and can be used for individual dryers (one-on-one) or in multiple-dryer applications.

When choosing a lint collector, the entire dryer-exhaust system must be properly designed to achieve the best results. As the lint filter is only one part of the system, considerations for resistance of the ductwork, including possible elbows, fan, damper, louver or weather cap, must be made.

With the proper sizing of the filter and ductwork, a large-capacity dryer may operate within specifications while having up to three 90-degree elbows and up to 30 feet of running duct. The rule of thumb for smaller dryers is that performance may be decreased if there are more than two 90-degree elbows and more than 20 feet of running duct.

When the static pressure in the exhaust-air system exceeds the dryer manufacturer's recommendations, then an assist (or booster) fan should be considered. Such a fan can maintain constant airflow, improve dryer efficiency, prevent lint buildup and reduce energy costs. Installing an assist fan requires proper engineering to equalize the airflow properly or it may create negative results: longer drying times, higher maintenance costs and additional lint pass-through.

Photos courtesy Clean Cycle Systems

This lint collector for an on-premise laundry can be installed either indoors or outdoors.

Selecting a lint collector

One must first determine how much lint exhaust is acceptable when choosing a collector. Most lint collectors are designed to collect at least 97% of exhaust lint. This is adequate in most commercial applications but it's important to consider the final dryer-exhaust point. If there is any lint pass-through, it will cause a problem.

Too much lint passing through a filter can litter a parking lot, clog an air conditioner condensing unit, waft onto a neighbor's property or scatter at the entrance of your building (snow in July). Even if your facility is in an industrial area, the local fire marshal or your insurance loss-control consultant may require better containment of lint.

Suggestions for matching dryer and filter:

• **New-dryer installation** — The ideal situation would consist of one collector for every dryer, but space constraints and higher up-front costs don't always make this practical. The built-in filter saves space but may sacrifice performance and boost maintenance costs.

• **Existing-dryer installation** — A central lint collector, where multiple dryers are connected, can produce results that are similar to a one-on-one installation, but ductwork design is important. An assist fan may be required.

• **When textiles contain sand, grit or foreign objects** — Slowing down the velocity of the exhaust air and deflecting particles on approach to the filter's screen, which are characteristic of the inline cyclone filter, will create the best results. In more abrasive applications, a stainless-steel housing and filter screen will result in longer life.

• **When 100% lint collection is necessary** — For highly sensitive situations, a two-stage lint filter process is required. For this scenario, and when heavy solvents or oils are present, a wet-type lint filter is more applicable.

There are many advantages in having a properly designed dryer-exhaust system, starting with a lint collector.

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