A Hot Topic - Preventing Laundry Fires

BY DERE ROSS PRYOR

FIRE. IT IS ONE OF nature’s most devastating phenomena and there is no person, place, or situation that is absolutely immune to its dangers. However, some environments are by their very nature more prone to the risk of fire, and none more so than the laundry.

Michael Reilly, President of Clean Cycle Systems, writes that according to U.S. Fire Administration (USFA’s) National Fire Incident Reporting System (NFIRS) and National Fire Protection Association (NFPA’s) statistics washer and dryer fires account for over $200 million in direct property damage for household, commercial and industrial applications. Dryers account for over 90% of this with approximately 30% of these due to failure to clean dust, fiber, or lint. For hotels alone, 10% of the fires are dryer and washer related.

A Google search of “commercial laundry fire” will bring up page after page of fire incidents within commercial laundry facilities of all types and sizes. In August 2015, a Portland, Oregon laundry suffered a multi-alarm fire which started in a laundry bin full of oil soaked rags. In December that same year a Las Vegas laundry sustained $250,000 in damages from a fire that started in the folding room. Dayspa magazine in its article “Up in Flames” reported that 10% of spa owners surveyed had suffered a laundry room fire, and “All were caused by dryer lint screen/vent problems, or the spontaneous combustion of garments and linens due to a highly flammable combination of massage oil residue and dryer heat.”

As is often the case, the first step in prevention is understanding how and why something happens. Breaking down the most common places and ways a fire can start in a laundry is crucial in knowing the best practices for preventing them.

Dryer Fires

“There are three primary factors that can lead to a dryer fire,” says Steve Wilber, Director of Engineering and Product Development for G.A. Braun. “The first is airflow problems with the dryer. The second problem can occur from improper use of dry formulas. The third is spontaneous combustion from leaving goods in the dryer or discharging them at too high a temperature.”

Wilber goes on to state that “airflow is the single most important aspect of a dryer.” Not only is it essential to the drying process, but also in preventing fires. Air flow is utilized by the dryer in two ways: in the combustion process and in the main dryer basket to dry the goods and carry away moisture. When this air flow is impeded, in either process, this causes an ignition rich condition with elevated temperatures. And in both cases, the cause is almost always a lack of proper preventative maintenance. Both the combustion air filter and lint collector must be kept clean to keep air flowing properly and temperatures within safe ranges.
“Dryer and lint collector manufacturers provide cleaning frequency and replacement recommendations,” says Wilber. “Like the combustion filter maintenance schedule, this must be followed or a fire may be triggered as a result of ignoring this key preventative maintenance step.”

There are other factors that can impede airflow, such as overloading the dryer beyond capacity. This will also result in heat buildup inside the dryer which will potentially cause the goods to ignite. Again, it is vital to follow manufacturer recommendations. Another factor is poor ductwork which can cause excessive back pressure.

The second cause of dryer fires Wilber mentions is improper use of dryer formulas. He cites impatience as the leading culprit for this — operators who use the highest inlet temperature set point hoping to dry the load faster. At the very least, there is the risk of scorching and melting the textiles. In the worst case scenario, a fire will occur. Even if a fire is avoided, the damaged textiles can cause future problems, such as in the case of microfiber products.

“Microfiber should never see temperatures exceeding 160°F,” Wilber says. “However, many operators dry microfiber at inlet temperatures exceeding 500°F. The microfiber melts, not only losing its usefulness and life span, but that melted debris often ends up in the lint collector screens, plugging them up and causing airflow problems.” And those airflow problems, again, put the laundry at risk for a dryer fire.
Impatience can also cause operators to stop the dryer to check if the load is dry. If not, they restart the dryer, which may start the formula from the beginning. This can lead to overheating.

The third factor in dryer fires, spontaneous combustions, is related mostly to the types of textiles being dried. These contain Volatile Organic Compounds (VOCs) which can ignite under certain conditions. These can be shop towels, heavily soiled uniforms, bar towels, and kitchen towels containing grease and other organic compounds. Even when washed properly, residual VOCs present potential fire hazards.

“These VOCs lower the flash point of the textile composition,” Wilber warns, “and if exceeded, can spontaneously ignite.” He stresses that after being washed correctly, they should be dried at the appropriate temperature, cooled, and should never be left in the dryer, sitting in large piles, or left in sling bags and left in the laundry. This is because heat build-up, even outside the dryer, can cause them to ignite. This risk is also a reason to never leave a load in the dryer overnight. This is especially dangerous if the power is shut off to the dryer as this will also shut off of the dryer’s fire suppression system. In the laundry fire examples cited above, all started overnight when the facilities were unmanned and the equipment was not running.

**Laundry Cart Fires**

Laundry carts are another common place for fires to start through the process of spontaneous combustion. Much like the issue with textiles left in the dryer, textiles not allowed to cool down before being placed in carts can be problematic.

Ryan Friedenberg, National Sales Manager of TECNI-QUIP Carts and Covers, says that the common cause of spontaneous combustion is oxidation, which starts in the dryer. When the textiles are placed in the carts, the oxidation process continues, creating additional heat. Because the linens are packed into the cart, the heat cannot disperse safely. This can cause the linen and/or the cart to ignite, and the fire can...
quickly spread to other carts and then to the entire facility.

“A popular cart material choice in the laundry industry is polyethylene,” Freudenberg says. “Poly carts can seem like a great choice due to their low cost and durability [in transit] and ease of use. However, it is important to recognize that ‘poly carts’ are highly flammable and have a very low ignition temperature. Polyethylene melts at 122-137° Fahrenheit and ignites at 349° Fahrenheit.”

**Fire Prevention**

“Dryer fire prevention begins with the purchase of the equipment,” Wilber says. Modern dryers often are equipped with fire suppression systems. A probe in the dryer basket communicates with a microprocessor which controls a sprinkler head above the basket. If the temperature inside the basket exceeds the highest dry formula set point by 20 to 30 degrees, the controller will open the valve to the sprinkler and tumble the basket to distribute the water throughout the load. If the door to the dryer is shut, the controller will keep it shut to prevent oxygen from feeding the fire; however, if the door is open, it will not shut the door as a safety measure to prevent injuries to workers. It is imperative that workers do not open a dryer door if a fire or overheating has been detected within the dryer.

These automated fire suppression systems that are built into the dryers can be tied into other fire prevention systems, such as the laundry’s building-wide fire alarm and separate lint collector suppressions systems.

In terms of lint, a highly flammable component in any laundry, common sense dictates to always use a lint filter and make sure all ventilation pipes are clear and of proper size to handle airflow. However, Reilly warns that most commercial dryer lint filters collect only 50-80% of lint.

“It has been common to install a secondary, or after market, lint filter to help collect any bypass lint,” he says. “Many dryer and lint collector manufacturers offer fire suppression systems as an added degree of safety as well as high pressure alert...
Fire Properties, Melt Points, and Flammability for Laundry Carts

Courtesy of Ryan Freudenberg

**Metals:**
- Steel melts at 2,500° Fahrenheit
- Stainless Steel melts at 2,500° Fahrenheit
- Aluminum melts at 1,220° Fahrenheit

**PVC, Poly / Plastic, and Fiberglass**
- Poly / Polyethylene melts at 122-137° Fahrenheit
- PVC / Polyvinyl Chloride melts at 176° Fahrenheit
- Ignites at 349° Fahrenheit
- Ignites at 851° Fahrenheit
- Fiberglass (Glass fibers bonded with Polyester Resin) Glass fibers are non-flammable with no melting point but does soften a 2,192° Fahrenheit

All textiles with potential VOCs should be identified and washed with appropriate formulas to reduce the chance of residues that can spontaneously combust. Workers should be thoroughly trained to not pull loads out of the dryer before they have cooled down properly, but also to never leave loads overnight.

“Most laundry fires are completely preventable with appropriate equipment safe guards and adherence to manufacturer’s recommended preventative maintenance steps.” Wilber says. “Training operators to follow sound processing practices and not cutting corners on wash or dryer formula times when processing goods containing VOCs will prevent dryer fires from ever occurring.”

Another training point is to utilize and load laundry carts correctly. Again, only properly cooled and processed textiles should go in laundry carts to prevent combustion. However, from the standpoint of the carts themselves, prevention can begin with choosing the correct equipment. As already stated, poly carts are popular because of their lightweight properties but are the worst at fire prevention. Their
low ignition temperature makes them a poor choice for a laundry.

Freudenberg says, “Today’s marketplace offers several fabrication options that are seen as superior choices for use in carts at commercial laundries when it comes to fire safety: Fiberglass, stainless steel, or anodized aluminum.” Fiberglass carts can be found in models and sizes comparable to poly carts. An additive is often applied to fiberglass carts, giving them a Class II fire rating with a melting point over 2000° F. Stainless steel and anodized aluminum also have high melting points. This is important in containing fires that start within the cart and keeping it from spreading to other carts or to the facility.

The types of fabric used over the frame can also impact flammability; canvas and mesh liners will ignite immediately when exposed to fire while vinyl and steel-based liners work better at high temperatures. (see chart) When decision makers are looking at carts, all of these factors should be taken into account. What may seem convenient or inexpensive may cost millions of dollars or even lives in the event of a completely preventable fire. Freudenberg advises that laundries with poly carts should make switching to safer carts their next purchasing decision.

Even with all these equipment innovations, the human factor is still the most important one to consider. Training and consistent adherence to fire prevention protocols should be the first line of defense. The best equipment and fire suppression system in the world will not prevent a fire if workers are not utilizing them or maintaining them correctly.

All workers should be trained to understand how fires can start so they can instinctively understand why preventative measures are effective. For example, as stated earlier, if a dryer fire occurs and the door is shut, it should under no circumstances be opened until the fire has been determined to have been completely controlled. The reason for this is the sudden introduction of oxygen can cause a flashover event; a small smolder can ignite quickly into a massive fire which will be much harder to contain. The worker will also be exposed to extreme injury. Outlining this clearly will help reinforce in the workers’ minds why a certain protocol is so important, which help to emphasize the protocol.
Similarly, helping workers understand how spontaneous combustion works will help them adhere to the policy of letting dryer loads cool appropriately before discharging them from the dryer, and to not leave them overnight or dumping them into carts without proper processing.

Another factor to consider is the workloads coming into the facility. Any facility has a threshold of what it can handle safely. Pushing workers to go faster to meet unrealistic demands will directly increase the risk of them ignoring protocols. Managers and supervisors can do their part in making sure the facility is not taking in work it cannot handle and that workers are not put in a position where they might circumvent safety measures.

For worker training, never assume it is a one and done situation. Much like fire drills, fire prevention training should be addressed through continuing education and visual prompts throughout the facility. Make especially sure that all training materials and signage is available in appropriate languages for those workers for whom English is not their first language. A simple miscommunication or misunderstanding could be all that is needed to start a preventable fire.

Fire is unfortunately a part of life and can never be 100% preventable. However, education on how a fire can start within the laundry and the best practices in prevention, along with proper equipment and enforcing safety protocols, can significantly reduce the chances of a fire, or lessen the damages if there is one.