



# **FIREFIGHTER LAUNDRY PLANNING FILE**



# ASKING THE RIGHT QUESTIONS ABOUT LAUNDERING FIREFIGHTING GEAR

By Leroy J. Trevigne, Pellerin Milnor Corporation

How much concern do your department's firefighters show for the cleanliness of their gear? For that matter, how much concern have you given this issue lately?

Chances are, you've recently thought about it more than in the past, because the issue has been raised increasingly -- by the press, by speakers at seminars, and by committees preparing safety regulations.

As you develop your own approach to the issue, I suggest you consider these four questions.



## 1) Why clean regularly?

The first question to address is why is regular, thorough cleaning of firefighting gear necessary? The most important answer is that it protects firefighters' health. Dirty turnout gear is laden with hydrocarbons, which take in 90% of toxins produced by a fire. These toxins can be absorbed through the skin when firefighters handle dirty gear. Hosing down after a fire can remove surface deposits but is not effective on deposits embedded in the fibers of clothing. And don't forget the health hazard of bloodborne pathogens. Prompt cleaning is essential where exposure to blood exists.

Cleaning can help eliminate safety hazards, too. Heavy residues obscure the color and I.D. markings of a coat, making it difficult to spot a firefighter during heavy risk. Dirty gear can ignite when fabrics are embedded with heavy oil, grease, and hydrocarbon deposits. Heavy hydrocarbon deposits can also conduct electricity -- another danger in a building where wiring is still live.

Another benefit of cleaning is that it makes equipment more comfortable. Dirty protective clothing is hot. The difference between clean and soiled turnouts can be 30% reflectivity.

## 2) Why clean in-house?

OK, if we accept the premise that cleaning is necessary, why is an on-premises laundry the best way to clean gear? For one thing, it prevents exposure to others. Laundering at home subjects families to carcinogenic substances that are potentially cancer causing. Processing gear in coin laundries puts others at risk. With an on-premises laundry, soiled gear can be handled immediately, right on location -- minimizing contact with firefighters and others around them.

On-premises laundering can greatly reduce operating costs. It can produce clean clothing at a fraction of the cost of specialized gear cleaning services. (And remember -- if cleaning costs less, it's likely to get done as often as it should be done.) Depending on your volume, savings can pay for the laundry in a very short time -- and thereafter, the money you save can be used on other things. More savings can be realized by also processing stationwear, wipers, mopheads, and mats.

An on-premises laundry can also make gear last longer. Fast, regular cleaning minimizes abrasion of hydrocarbons on fibers. Professional formulas created specifically for washing firefighting clothing can help assure quality control and a longer lifespan, too. On-premises laundering reduces turnarounds, since gear does not leave the site for cleaning. You don't have to rely on the schedule of others.

### 3) What do you need?

If you decide to launder in-house, what equipment do you need? The first thing is a commercial-quality washer-extractor. It can bring professional laundering capabilities to your operation. It washes more turnouts than a home-appliance washer, washes them better, and lasts longer. Washer-extractors range from 35 lb. capacities up. Buy a machine with as large a cylinder as economically feasible, since some of the personal protective equipment is bulky, and you will want to process quickly. (For example, three coats and pants can be processed in a 35-40-lb. machine, or five in a 55-60-lb. capacity washer-extractor.)

Air-drying is generally recommended for the majority of firefighting gear. Drying racks should be located near the washer-extractor, in an area not exposed to direct sunlight. If a dryer is required for secondary items (full-dry towels, wipes, etc.), it ideally should be one size larger than the washer-extractor (i.e. a 50-lb. dryer for a 35-lb. washer-extractor).

### 4) How do you choose?



What features should you look for in a washer-extractor? Firefighter gear is bulky, so a spacious cylinder is essential for commercial-quality "lift and drop" washing action. Compare actual cylinder dimensions and specific cubic foot volumes -- not just rated capacity -- when choosing washing equipment. A big cylinder will also reduce processing time, since more goods can be laundered per load.

Effective rinsing is essential for heavily soiled firefighting gear. A machine with intermediate extraction enhances rinsing, since this slow extract "slings" water and chemicals from firefighting equipment prior to the next rinse. Thus gear gets cleaner faster. With continuous duty (rather than intermittent duty) motors, as many intermediate extractions as necessary can be programmed.

Bulky firefighter gear can create an out-of-balance condition inside the cylinder, causing vibration during extraction. A special distribution speed can prevent this by helping balance the load. Less vibration can mean longer machine life.

Look for a machine that offers enough washing formulas to launder different items as they should be laundered. But make sure it is simple to operate, so the right formula choices will be made. It's very helpful if the equipment is pre-programmed, but be certain the formulas have been devised strictly for firefighting equipment. (You don't want to wash filthy gear in a hotel wash formula!) If the machine is programmable, is it easy to create and modify formulas?

While the machine should be versatile, it should also be easy to operate. Formula selection should be clear, so the operator will make the right choices. Some machines' controls provide operating information (such as how much time remains in the formula) and troubleshooting information (to minimize downtime).

Rugged construction from top-quality parts and materials is imperative for long service. Bulky, heavy turnouts can be rough on a machine. So look for features such as continuous (rather than spot) welding, large tapered roller bearings, a triple shaft seal to shield the bearing from water, heavy-duty, single-speed motors, and heavy gauge console materials.

### Summing up

Ask the right questions. Study sales literature to find out what best meets your own department's needs. Then carefully write your specs with those needs in mind. Doing your homework on this subject -- and basing your action on careful study -- can benefit your department for years to come.

## HIGH SPEEDS CAN DAMAGE FIREFIGHTER TURNOUT GEAR

By: Darrell Redler, Pellerin Milnor Corporation

Whether it's a commercial laundry facility or an on premises laundry (OPL), a common concern is production. How many pounds of laundry per hour or per day will the equipment process? The rationale for quick turnaround is apparent in a commercial facility or in a large hospital or hotel. Similarly, in a fire station with an established policy for cleaning turnout gear in accordance with the latest guidelines (National Fire Protection Association Bulletin 1851, Chapter 5), of primary concern is how quickly the cleaned gear can be returned to service. As this article will show, the quickest turnaround is not necessarily what is best for the garment in terms of functionality and longevity.



First, consider the washing process in a commercial quality front-loading washer-extractor. Milnor machines, like all machines of this kind utilize water and a lift-and drop action (as opposed to agitation used in top-loading machines) as recommended by NFPA 1851 and reinforced by the FEMSA (Fire and Emergency Manufacturers and Services Association) pamphlet on protective ensembles for structural firefighting. (Both publications emphasize the importance of using machines dedicated to cleaning turnout gear as opposed to washing at home or using a commercial launderer not set up to handle firefighting gear specifically.)

After the garments or inner linings are cleaned and rinsed, the washer-extractor will go into its extract cycle. Regarding water extraction, it is important to know what the effects are on the materials that make up the typical ensemble. During the laundering process, water circulates in and around the outer shells and inner linings. It is recommended that these be washed separately, unless the protective inner lining is sewn into the shell, to avoid cross contamination. One of the problems that can arise is associated with the moisture barrier. These moisture barriers are of two main varieties: a Teflon-type and a polyurethane-coated mesh as made by various companies for use in protective clothing. When turnout gear is subjected to high-speed extraction, water is violently pulled from the goods. Since the moisture barrier is by necessity waterproof, water must pass either around or through the barrier. Water is often trapped within the folds of the gear during the wash process. This results in small microbursts of the fabric that leads to premature moisture barrier failure when using excessively high extract speeds. This effect will also be evidenced by the premature deterioration of the reflective striping (safety striping, name, number, etc.) on the gear. This can lead to increased maintenance cost, premature gear retirement, or worse still, increased risk to the firefighter.

Damage to inner liners from excessive G-forces exerted in the final extraction step of the wash cycle was the reason for the 100 G extraction limit

specification in NFPA 1851. Milnor washer-extractors like the 30015 T5X and 30022 T5X with Gear Guardian® formulas are ideal for cleaning turnout gear because the extract speeds minimize wear and tear. Another valuable feature is that Gear Guardian formulas suspend basket motion during water refills to avoid tumbling the gear, unless the water level is satisfied. This reduces undue wear on the fabric, enhancing its longevity even further. The higher extract machines such as the 30015 V7J or 30022 V6J with Gear Guardian formulas can also be used for cleaning turnout gear as long as the extract rates are set according to the garment being laundered in accordance with the manufacturer's instructions. *(Please consult the Gear Guardian brochure for a comparison of the Milnor washer-extractors offered with the Gear Guardian concept of ten pre-programmed wash formulas for the goods most commonly found in a fire station.)* Naturally, the dryer the goods are when the leaving the washer-extractor, the shorter the dry time will be. Milnor machines, like all washer-extractors, remove water centrifugally so goods can be dried in a short amount of time. However, shorter dry times should not come at the expense of excess wear. Beware, then, of competitors' claims of faster dry times due to their high extraction rates. ***Remember: The most important factor in choosing a washer-extractor should be what is best for the turnout gear itself.***

This brings us to drying methods, which is mentioned here as a conclusion to the subject of turnaround time for turnout gear. Please consult the specific



drying instructions from the gear supplier for guidance on drying since many gear suppliers prohibit tumble drying due to the potential for damage to various elements of the ensemble. Milnor solves this problem by offering an all-stainless steel drying cabinet in two size capacities: the 40"-wide model for up to 3 sets of gear; and the 61"-wide model for up to 6 sets. The Milnor drying cabinet uses directed hot airflow (instead of the mechanical action of a tumble dryer) to quickly return the clean gear to useful service (typically in about one hour). Otherwise, simple hang-drying (perhaps aided by a ventilation fan) also works, but takes more time.

In conclusion, Milnor Gear Guardian washer-extractors and cabinet dryers are the ideal choice for use in fire stations. The preprogrammed formulas and controls design make them simple to use, and their rugged construction ensures many years of dependable service. The lift-and-drop wash action and NFPA 1851-compliant extract speeds of the Milnor Gear Guardian washer-extractor help to maximize the service life and protective attributes of turnout gear.

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## FIREFIGHTER HEALTH & SAFETY

By DARRELL REDLER

### *Rugged Turnout Gear Requires Delicate Care*

**F**irefighter turnouts can withstand the effects of a burning building, yet a simple home washer can render them useless.

The improper cleaning action of a top-loading home-style washer is brutal to turnouts. The agitator in most home machines harshly abrades the material while other parts of the bulky gear receive little or no washing action – vital for proper cleaning. This is just one of the many concerns to keep in mind when planning how to properly clean turnout gear and keep it in the best condition.

Efficiently cleaning and decontaminating firefighter gear can be done at either an on-premises laundry (OPL) at the firehouse or by working with a gear-cleaning service that specializes in handling firefighter turnouts. Either way, washing processes should follow the recommendations of the National Fire Protection Association (NFPA) 1851 Standard and guidelines from the Fire and Emergency Manufacturers and Services Association (FEMSA) pamphlet on protective ensembles for structural firefighting. (Both publications emphasize the importance of using a gear-cleaning specialist or machines dedicated to cleaning turnout gear as opposed to washing at home. NFPA 1851 also prohibits cleaning at a public laundry unless that facility has an area dedicated to turnout gear, as well as cleaning by a dry cleaner.)

Properly cleaned turnout gear will last longer because the various components of the gear – shell, moisture barrier and temperature barrier – will be cleaned without damage to the goods. Proper cleaning also makes the gear safer to wear because carcinogenic soot and tars have been removed from the turnouts.

Darrell Redler is a market specialist for Milnor Laundry Systems.

**Properly cleaned turnout gear lasts longer and is safer to wear.**

Turnout gear cleaning should take place in a front-loading, industrial washer-extractor, with lift-and-tumble washing action. This type of washing action causes the gear to interact with the water (and wash chemicals) and releases soil. In a

home appliance, an agitator provides some mechanical action, but a commercial/ industrial machine imparts complete mechanical action by lifting and gently tumbling the garments in the washing solution. Lifting is aided by “ribs” placed along the wall of the rotating wash cylinder.

Provided you have the correct type of formulas and the correct chemicals, efficient cleaning and decontamination of gear can be done at the same time. A variety of cleaning and disinfecting chemicals are available through many firehouse supply companies. Also, check with your turnout gear manufacturer. NFPA 1851 provides guidelines on these chemicals.

One process that many fire stations have chosen is to designate a specific individual to ensure that turnout gear – whether laundered in-house or by an outside cleaner – is handled properly. A compliance officer can monitor the tracking of these goods to determine that they are properly cleaned after each use and that they are cleaned on a regular basis – regardless of whether or not they have been used.

Another concern to keep in mind regarding turnout gear cleaning is the extraction speed – or spin cycle – at which moisture is removed from the goods. After the garments or inner linings are cleaned and rinsed, the washer-extractor will go into its extract cycle. Extraction removes most of the water in preparation for drying.

Because turnouts are typically made of materials that shed water easily—unlike cotton towels, for example—they do not require high extraction speeds. In fact, some garment makers prefer lower extraction speeds to avoid harm to the turnouts. It is important to keep in mind what type of items you plan to wash most frequently, and judge extraction speeds on this basis.

One problem that can arise is associated with cleaning the moisture barrier. These moisture barriers are of two main varieties: a Teflon fabric or a polyurethane-coated mesh. (It is recommended that these be washed separately, unless the protective inner lining is sewn into the shell, to avoid cross contamination.)

During the laundering process, water circulates in and around the outer shells and inner linings. When turnout gear is subjected to high-speed extraction, water is violently pulled from the goods. Since the moisture barrier is by necessity waterproof, water must pass either around or through the barrier. Water is often trapped within the folds of the gear during the wash process. This results in small microbursts of the fabric that leads to premature moisture barrier failure when using excessively high extract speeds. This effect will also be evidenced by the premature deterioration of the reflective striping (safety striping, name, number, etc.) on the gear. This can lead to increased maintenance cost, premature gear retirement, or worse still, increased risk to the firefighter.

Consideration should also be given to drying turnout gear. A variety of devices and methods are available to fire departments. The best course of action, including the washing of turnout gear, is to always consult the manufacturer’s specific cleaning and drying instructions.





# GEAR GUARDIAN<sup>®</sup> WASHER-EXTRACTOR CAPACITIES

	MILNOR 25 lb. models	MILNOR 40 lb. models	MILNOR 60 lb. models	MILNOR 80 lb. models	MILNOR 100 lb. models	MILNOR 140 lb. models
No. of sets of gear *	1	2 to 3	4 to 5	6 to 7	8 to 9	11 to 13

*\*These figures are based on sample items. Weights and sizes of some brands differ, and therefore the figures should be used only as guidelines*

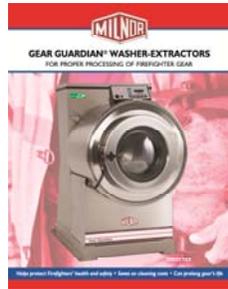
# GEAR GUARDIAN<sup>™</sup> DRYING CABINET CAPACITIES

	FC-3 Drying cabinet	FC-6 Drying cabinet
No. of sets of gear	3	6

*These figures are based on **complete** sets of turnout gear, including bib, jacket, boots, hat liner, and gloves.  
Stainless steel racks and insertion tubes optional.*

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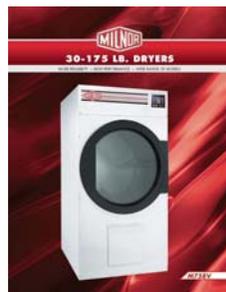
# MORE INFORMATION FOR FIREFIGHTER LAUNDRY PLANNING



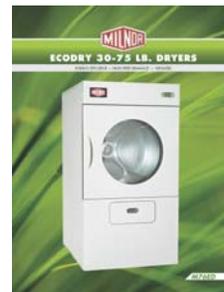
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