

CLEAN

LINEN & WORKWEAR

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Home Washing vs Professional Laundering

Potential Risks of Washing Workwear Uniforms at Home



The importance of laundering PPE properly

The United Kingdom is witnessing a concerning trend as an increasing number of employees are taking their technical workwear and PPE home for washing. This practice not only compromises the effectiveness of personal protective equipment and places those living with workers in a potentially vulnerable position, but also raises questions about employers fulfilling their legal responsibilities.

A survey conducted by the European Textile Services Association uncovered the following insights:¹



50% of workers acknowledged wearing their work clothes during travel to and from the workplace



A significant **58%** of workers admitted to washing their workwear alongside personal clothing on low-temperature cycles



1 in 4 individuals express concerns about the potential contamination of their personal laundry by workwear

1.1 Meeting legal responsibilities

The Personal Protective Equipment at Work Regulations of 1992² and 2022³ emphasise that employers are obligated to ensure the maintenance, replacement or cleaning of personal protective equipment provided to employees. Domestic washing poses a significant threat to businesses as they bear legal responsibility for the care, maintenance and suitability of the PPE provided to their workforce.

¹ETSA: Study into workwear and protective clothing

²PPE at Work Regulations 1992

³PPE at Work (amendment) Regulations 2022

1.2 Ensuring workplace safety

Home laundering, when combined with household detergents, has the potential to significantly diminish the protective qualities of specialised workwear. This exposure leaves employees vulnerable to potential risks on the job. A further inadequacy of home laundering is its lack of a systematic approach to tracking the number of wash cycles an item undergoes. This absence of a recordkeeping system results in a loss of visibility for businesses, making it challenging to assess the history of an item accurately. Consequently, businesses may overlook the need for crucial activities such as inspection, repairs or timely replacement of workwear.



Manufacturing and Processes

2.1 Complexity of PPE Manufacturing

Navigating the Personal Protective Equipment (PPE) regulations encompasses a vast range of specialised workwear across many industries. PPE ranges from high-visibility jackets for civil engineers to garments tailored for industrial hazards as well as ensuring the safety of healthcare professionals and patients. Each piece is designed with fabrics woven from a blend of specially selected natural or synthetic fibres based on the performance requirements of the garment. These textiles undergo a series of treatments - surface spraying, immersion or penetrative procedures - enhancing their protective attributes and extending their functionality lifespan.

Understanding the multitude of complex processes involved in the manufacturing of these garments can be overwhelming and exhausting. The complexity of fibre types and the intricate procedures, from fabric creation to garment construction and, finally, the subsequent treatments demands sensitive handling of the garments to maintain their protective performance characteristics.

Just some of the processes involved in the creation of PPE that are used daily involve:⁴

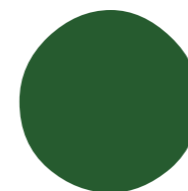
-  Colour dyeing
-  Surface spraying
-  Drying
-  Rolling & folding
-  Immersion and high-pressure penetration

2.2 Quality Control

Ensuring quality control at every stage of PPE manufacturing is paramount. Often conducted offshore, the fabric and fibre manufacturing processes necessitate meticulous oversight to rectify any error once the garment construction is underway in the UK or mainland Europe. Part of the process of the final garment article involves standardised tests that validate the fabric's performance before it undergoes final drying, storage and transportation procedures.

For PPE to be effective post-construction, the garment must adhere to performance standards, serve its intended purpose, and meet regulation sizing specifications. Variance arises due to factors including industry specifics and the standards of the destination country.

⁴[Shyju Skariah, 'Techie Fibres', Health & Safety International Issue 99 April 2023](#)



2.3. Risk of home laundering

Garment manufacturers provide explicit washing and drying instructions, crucial for preserving the garment's integrity and ensuring its performance guarantee remains valid. Any deviation from these instructions - be it incorrect laundering, resulting in shrinkage, colour loss and most importantly treatment loss - poses not only a risk to the garment's longevity but, more critically, jeopardises the safety of the wearer.⁵

The intricate relationship between manufacturing and maintenance of PPE underscores the need for professional laundering of workwear garments to ensure the safety and well-being of those who rely on these essential PPE garments. Such complexities may be difficult to provide in a domestic setting, meaning that PPE garment effectiveness can be compromised, for example in a healthcare setting it could still carry bacteria, or in an industrial setting it may still be carrying silica dust.

2.4 Management and maintenance of garments

The maintenance of protective garments encompasses more than just their effective cleaning—it also involves their efficient management and upkeep. Home laundering falls short in tracking each piece of workwear, how it's cleaned, the cleaning frequency and its ownership.

Commercial laundering companies can accurately record the life, laundering cycles, repair history, sizing details and wearer feedback for each garment. As part of their services, non-destructive performance testing ensures that PPE items meet regulatory standards, providing employees with the assurance that their workwear is consistently up to par. If any item fails to perform as expected, contracts often cover re-treatment, repairs or replacements, ensuring that employee safety is never compromised. Professional laundering companies are better equipped to handle industrial effluents and dangerous pathogens. Their specialised equipment, detergents, and filtering processes are designed to responsibly manage medical and industrial waste. Simply put, home settings are ill-suited for industrial and healthcare workwear, as the environment lacks strict control, making it impossible to guarantee the effective washing of items. Moreover, domestic washing machine drainage and waste management systems are inadequate for handling the industrial waste discharged from workwear, potentially posing harm to environments beyond the controlled worksite through contamination.

2.5 Hygiene Standards

Home washing is insufficient for maintaining hygiene standards and may not effectively remove contaminants like oils or chemicals, posing risks to the wearer and contaminating other items.

⁵ Shyju Skariah, 'Techie Fibres', Health & Safety International Issue 99 April 2023

Impact of domestic laundering of workwear in an Industrial setting

3.1 Importance of PPE and how it touches many sectors

The nature of some jobs entails the risk of being exposed to danger such as heat, electricity and heavy equipment is unavoidable meaning that PPE and work garments are the only barrier between employees and the risk they are exposed to and can be the difference between life or death. This makes robust working practices and appropriately chosen and maintained PPE a non-negotiable.

Most PPE garments are made from specialist textile articles and act as a shield against harmful elements such as:⁶

- 🔥 Flames
- ⚡ Electric arcs
- 🧪 Chemicals
- 🌫️ Silica
- ☢️ Radiation
- 🔪 Metal shrapnel

3.2 Ensuring optimal performance: professional laundering in industrial sectors

3.2.1 Choosing the right PPE specification

Professional laundries offer a strategic advantage over domestic washing in managing industrial effluents and overseeing the care of protective workwear. A collaborative approach between employer and laundry company begins with employers providing sufficient information to select the required PPE specifications. Once the appropriate PPE is selected, the employer and laundry service will assess the number of items per wearer and estimate the garments' lifespan, whether measured in amount of months or wash cycles. Such planning is crucial as every professional cleaning cycle unavoidably impacts the effectiveness of the garment's protection.

3.2.2 Effective soiling management

In demanding work environments, protective garments often accumulate deposits of oil, grease, and stains, potentially masking fire retardant properties. Professional laundries provide businesses with the correct garment rotation, preventing build up of unsafe soiling levels. Regulated cleaning becomes a matter of great importance as flammable residue, like grease and oil, can continue to burn on flammable garments if welding splatter hits soiled areas.⁷

3.2.3 Contamination risks

Whilst a garment may appear clean after being washed domestically, substances from the working environment can linger, compromising protective capabilities. Professionals implement rigorous processes to detect and address contamination risks, safeguarding the garment's protective qualities.

3.2.4 Comprehensive tracking and monitoring

From the garment's first use to its retirement, professional laundries employ advanced tracking technologies such as RFID or barcodes. This ensures meticulous control over processes, repairs and rotations. The transparent tracking system allows employers and employees to stay informed about the garment's history, including the number of washes, rotations, and repairs, facilitating a proactive approach to garment management.

3.2.5 Adaptive wash processes

Professional laundries tailor wash and dry processes based on the level of soiling. Even in cases of severe soiling, industrial wash processes are designed to remove heavy contaminants. Post-washing inspections are completed as standard, with damaged garments promptly repaired. Garments irreparably damaged are replaced as per contractual agreements, providing customers with confidence in the effectiveness of the laundry's services.

⁶Shyju Skariah, 'Techie Fibres', Health & Safety International Issue 99 April 2023

⁷Shyju Skariah, 'Cool Head Required: Looking After Fire Retardant PPE', TSA

Around 4000 deaths are estimated annually due to COPD resulting from past workplace exposures in the past. Construction workers are a significant at risk group within this.⁹

Silica dust exposure and the imperative for professional laundering

4.1 Understanding the risks: silica dust and health consequences

Perhaps one of the most threatening risks workers in industrial settings are exposed to is one that you cannot see: silica dust. MPS and peers have called for real-time monitoring of silica dust to be looked at as a "matter of urgency" as it is the biggest health risk to construction workers after asbestos.

An estimated 600,000 UK workers are exposed to silica annually, while across Europe figures show that 81 percent of those exposed to work either in construction or in manufacturing products used in the industry.⁸

An HSE-commissioned study estimates that it was responsible for the death of over 500 construction workers in 2005. In addition to the risks from lung cancer, silica is also linked to other serious lung diseases:

Silicosis can cause severe breathing problems and increase the risk of lung infections. It usually follows exposure to RCS over many years, but extremely high exposures can cause acute silicosis more quickly.

Chronic obstructive pulmonary disease is a group of lung diseases including bronchitis and emphysema. It results in severe breathlessness, prolonged coughing and chronic disability. It can be very disabling and is a leading cause of death.

The amounts needed to cause this damage are not large. The most you should be inhaling during a day after using the right controls is shown next to the penny.

Silica dust (crystalline silica) is prevalent in the aggregate setting, primarily found in stone, rock, sand, gravel and clay. When these materials are worked on, silica is released as a fine dust known as respirable crystalline silica or silica dust.

Type of stone	Percentage of Silica ¹⁰
Sandstone, gritstone, quartzite	More than 70%
Concrete, mortar	25% to 70%
Shale	40% to 60%
China stone	Up to 50%
Slate	Up to 40%
Brick	Up to 30%
Granite	Up to 30%
Ironstone	Up to 5%
Basalt, dolerite	Up to 5%
Limestone, chalk, marble	Up to 2% (bit these can contain silica layers)

⁸James Wilmore, 'Monitoring silica dust exposure 'matter of urgency', group warns' 2023

⁹HSE, 'Cancer and construction: Silica'

¹⁰HSE Scilicosis

4.2 Silica Dust and Cancer

Silica dust, 100 times smaller than a grain of sand, poses substantial health risks when unknowingly inhaled. The consequences of exposure encompass severe ailments such as lung cancer, silicosis (irreversible lung scarring), kidney disease, and chronic obstructive pulmonary disease (COPD). Annually, an estimated 230 individuals develop lung cancer due to past occupational silica dust exposure, with risks escalating under prolonged, high-level exposure.¹¹

4.3 Silicosis

Silicosis, a consequence of long-term exposure to RCS, leads to severe breathing problems and increases the risk of lung infections. Chronic Obstructive Pulmonary Disease (COPD), a group of lung diseases including bronchitis and emphysema, can result in severe breathlessness, prolonged coughing and chronic disability.

The occupations with the greatest exposure include:

⚒ Miners

🏗 Construction worker

🚜 Farmers

👷 Engineers

🏠 Quarrying

You may be exposed to silica dust if your work involves:

Breaking, crushing, grinding or milling material containing silica dust

- Sand blasting or casting
- Paving, surfacing or cement finishing
- Bricklaying • Demolition work
- Road construction • Stonemasonry
- Mineral ore-treating processes
- Manufacturing of glass, ceramics, brick, concrete, tile, metals or machinery

4.4 Mitigating risks: Controls and preventative measures

4.4.1 Exposure Limits and Regulations

In Britain, regulatory exposure limits set a workplace exposure limit (WEL) for Respirable Crystalline Silica (RCS) at 0.1 mg/m³ over an 8-hour time-weighted average. Compliance with the Control of Substances Hazardous to Health Regulations 2002 (COSHH) governs exposure to RCS. High-risk occupations, including construction, foundry work, brick and tile work, ceramics, slate manufacturing, quarries, and stonework, warrant mandatory health surveillance due to regular RCS dust exposure¹²

4.4.3 Mandatory PPE Use

Employers are legally required to provide workers with Personal Protective Equipment (PPE) in workplaces with health and safety hazards. This obligation not only encompasses the initial provision but also extends to the ongoing maintenance of PPE. It entails ensuring that PPE is used, checked, maintained and stored in strict accordance with both the manufacturer's instructions and regulatory requirements. This strict level of adherence is crucial for the PPE to function effectively in safeguarding the well-being of workers and those living with them.

Specialised Laundry for Silica-Contaminated Workwear

In environments with elevated silica dust levels, the risk of contamination during the laundering of protective workwear is a crucial consideration. When workwear from these environments is washed with other garments, there's a potential for cross-contamination by fine silica dust particles. The challenge lies in the difficulty of determining whether the dust has been completely removed during the laundering process. Hence, it's imperative to launder such garments separately to keep employees and those they live with or share laundering facilities with, safe.

An effective solution to mitigate prolonged exposure to silica dust is outsourcing your laundry to a specialist company off-site. This ensures a dedicated and controlled process that does not deviate from manufacturing instructions and completely eradicates the risk of cross-contamination with domestic clothing.

Managing silica dust exposure demands a comprehensive strategy, encompassing stringent controls, compliance with exposure limits, health surveillance, and proper usage and maintenance of Personal Protective Equipment (PPE). Specialised laundry services emerge as a pivotal component, actively contributing to preventing contamination and upholding the safety standards for workers exposed to silica in diverse industries.

¹¹Silica Dust, Cancer Council
¹²HSE, Silicosis

Impact of Domestic Washing of Workwear

5.1 Background information

Every day, workers stand on the frontlines, often exposing themselves to harmful bacteria. Surprisingly, amidst their critical roles, there's a noticeable oversight when it comes to the maintenance of their Personal Protective Equipment (PPE).

In the UK, workers, especially those in healthcare, are advised to launder their uniforms at the highest possible temperature, specifically emphasising the efficacy of a 60°C wash in eliminating microorganisms. However, alarming disparities exist, with studies indicating that a significant portion of workers, even those in healthcare, opt for domestic laundering at 40°C - a substantial 20°C below the recommended temperature.

Divergences in international and national laundering guidelines further complicate the scenario. In Scotland and England, mandatory requirements dictate disinfection cycles during washing, with load temperatures maintained at 65°C for at least 10 minutes or, preferably, 71°C for no less than 3 minutes. Adequate mixing time is essential to ensure thorough heat penetration and confirmed disinfection. In vitro studies corroborate the impact of temperature variations, demonstrating significant reductions in bacterial and fungal contamination at temperatures exceeding 60°C, while survival rates persist at 30°C, 40°C, and 50°C.¹⁵

However, a study into domestic washing and bacterial decontamination conducted by De Montfort University calls into question the efficiency of domestic washing even if guidelines are followed.

5.2 Transmission Risks

These infection control guidelines pose significant risks of transmission of microorganisms from the healthcare environment into a domestic environment and vice versa. Previous research demonstrates that *Staphylococcus aureus* and *Escherichia coli* can cross contaminate onto sterile fabrics during a domestic wash.

¹⁵[ARHAI Scotland - Safe Management of Linen: Standard Infection Prevention & Control and Transmission Based Infection Control Precautions](#)

5.3 Study at De Montfort University

5.3.1 Aim of the Study:

The study at De Montfort University aimed to investigate the bacterial decontamination efficacy of a range of domestic washing machines and cycle parameters using a commercially available bioindicator test strip containing Enterococcus.

5.3.2 Methodology

The study employed bioindicators consisting of 1cm² of cotton swatches inoculated with 7-3 log₁₀ Enterococcus faecium (ATCC 6057). The study involved testing various domestic washing machines with full-length and rapid 60°C cycles to see if E. faecium would survive and to ascertain the optimum conditions to ensure E. faecium became non-viable within the wash system so as not to contaminate domestic clothing for the following wash cycle.

E. faecium bioindicators were added to domestic washing machines using both full-length and rapid 60°C cycles with 8kg of poly cotton makeweight. The washing machines varied in brand, model

and age so as to replicate differences in washing environments from employee to employee. These tests were carried out using biological and non-biological detergent.

5.3.3 Results

The study found significant variations in wash cycle temperature profiles between domestic washing machines, leading to variations in decontamination efficiency.

Results drawn from the study emphasised the potential for survival of microorganisms on domestically laundered healthcare uniforms, leading to cross-contamination of both domestic and healthcare environments.¹⁶

The variation in decontamination between machines and the inability to monitor or control parameters stresses the disadvantages, and potential threat, of domestic laundering. This becomes of increasing concern to people who are vulnerable (weak immune system) who share the same household and laundering facilities.

5.4 Domestic vs commercial washing

Relying on domestic washing poses a significant challenge in achieving the necessary levels of hygiene. Employees find it nearly impossible to ensure satisfactory laundry outcomes at home, mainly due to the lack of control over essential parameters. This includes factors such as temperature, holding time (the duration a garment remains in water), detergent and disinfectant quantities, and the liquor ratio. Additionally, assuming that all employees are well-versed in the specific washing machine settings required for workwear adds another layer of complexity, especially considering the limited training on safe laundering practices discussed earlier.

The inability to oversee every aspect of the laundering process at home raises concerns about the reliability of home laundering for all workwear environments. The risk of pathogen transmission via textile/workwear further questions the efficacy of home-washing practices.

In stark contrast, professional laundering services are equipped with the necessary machinery and possess profound competence in handling laundry on a commercial scale. These services offer a level of security and reassurance essential for maintaining hygiene standards. Professional laundry services that adhere to quality management systems like ISO 9001 are specifically designed for processing workwear garments, ensuring compliance with the requirements of various sectors.

5.5 Conclusion

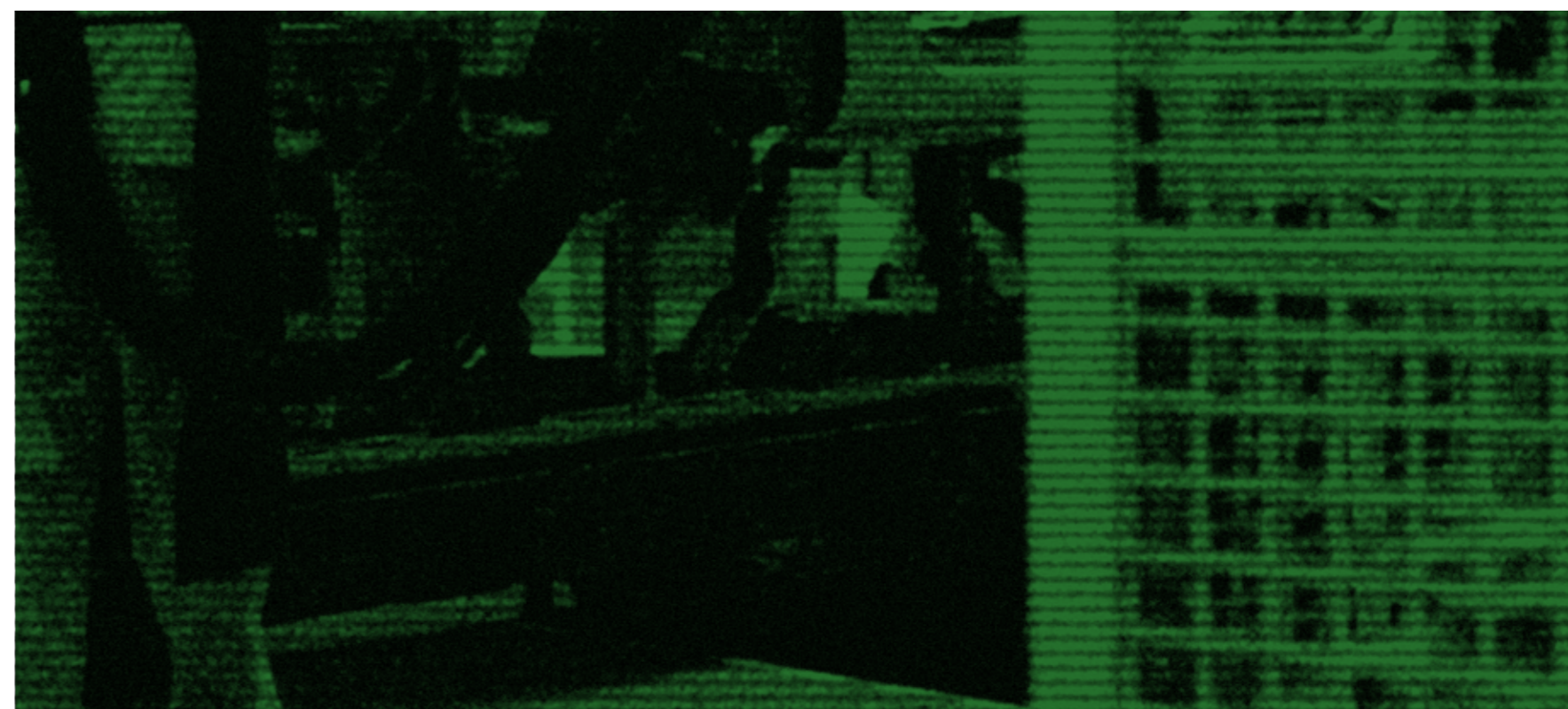
The impact of domestic workwear laundering raises critical concerns regarding the transmission of microorganisms and the overall efficacy in achieving the necessary levels of hygiene. The significant variations in washing practices coupled with the lack of comprehensive training, highlight the challenges associated with home laundering.

RESULTS: DECONTAMINATION EFFICACY

Log₁₀ reduction of E. faecium bioindicators following domestic laundering using a 60°C full-length/rapid (n=4)

		Make and model	Indesit IWSD62 ECO	Beko WDEY-854P44QW	AEG 7000 series kombi	Hoover HBWD-8514DC-80	Indesit IW007143	Indesit IWE91281
		Machine age (years)	8	1.4	3	4	2	9
Full length 60°C	Biological detergent		0	>5	6	6	6	0
	Non-biological detergent		0	5	6	6	6	0
Rapid 60°C	Biological detergent		0	5	0	>4	6	0
	Non-biological detergent		0	6	0	6	6	0

¹⁶Owen, L. & Laird, K. 'Variable Decontamination Efficacy of Domestic Washing Machines: Potential Risks for Home Laundering of Healthcare Uniforms' De Montfort University



Conclusion

The risks associated with employees laundering workwear at home extend beyond initial perceptions and carry significant implications for PPE effectiveness, employer legal obligations and the associated intricate manufacturing processes that demand specialised aftercare. In many sectors workwear serves as a crucial protective barrier, either shielding workers from life-threatening risks like fire or preventing them from bringing harm home through contaminated clothing.

Domestic washing lacks the necessary control over washing variables to confidently guarantee that garments meet correct standards each time. It lacks systematic tracking of items, potentially leading to oversights in essential garment care, such as re-treatment and repairs. In construction, professional laundering ensures the maintenance of PPE integrity, accurate tracking and responsible disposal of industrial waste after each wash. Clothes are washed at the correct temperature for the correct holding times to ensure bacteria and germs are destroyed leaving garments sterile and free of contamination. The risks associated with domestic washing far outweigh the investment in professional laundering, particularly considering the legal and moral complications that may arise should an employee be harmed due to inadequate workwear protection and handling.

Ensuring the proper professional laundering of technical workwear and PPE is critical to ensuring the safety of workers and those they live with and this need will only increase as the world continues to industrialise and evolve.

Workwear Rental & Laundering

CLEAN offers a comprehensive workwear rental service providing you with garments that are comfortable, robust and comply with all the appropriate safety standards.

We have a huge range of off the shelf workwear garments available from UK based suppliers. We can also offer a customised workwear service allowing you to control the design of your own uniforms so whatever you have in mind, we will be able to assist. The main advantage of choosing a rental service is that costs are spread over the length of the contract and garments are altered, repaired and replaced as necessary. Whether you need workwear clothing for as few as 5 or more than 5,000 employees we offer an excellent service tailored to the needs of both single local sites as well as multi-location businesses.

How the process works:

The process is designed to make life easier for business and to ensure that each wearer has the right garments available at the right time:



Getting your business up and running:

Once you have made the decision to partner with CLEAN to provide your workwear rental and laundry service, CLEAN will guide you through the set-up process.

1. Measuring service

Our consultant will measure your employees to ensure a comfortable, protective fit.

2. Scheduling

Garments will be ordered from our UK suppliers and you will be advised on current lead times

3. Getting started

On an agreed start date we will issue garments to all your wearers and install all the necessary lockers and equipment

4. Service

Garments are collected, laundered and delivered to an agreed schedule

Services CLEAN offers

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