For A Better Qualification Choose the Guild of Cleaners and Launderers

GUILD OF CLEANERS AND LAUNDERERS

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GOOD HOUSEKEEPING AND PERSONAL SAFETY Now even more important due to the EU Directive 2017/164/EU and implemented by the UK on the 21st August 2018 which brought down levels of exposure to solvent. See page 4 for more details.

The bulk of retail cleaning of textiles is still being processed in enclosed machines using synthetic solvents and solvents derived from petroleum it is to these types of machines that this article refers. Ideally the totally enclosed dry cleaning machine would be one which would carry out the cleaning operations indefinitely without loss of solvent, and always producing perfect cleaning results on each fabric processed. Obviously, because of various factors beyond our control, e.g, wear and tear and corrosion of machinery, atmospheric conditions, and the condition of garments sent for cleaning, this ideal state can never be achieved in practice. Inevitably, therefore, these machines will develop faults which will require the skills of a trained engineer to put them right. However, with intelligent use and regular routine care the manager or operator of a unit employing these machines can ensure a consistently high standard of cleaning and solvent economy. If neglected, the machines will still operate but the solvent economy, quality of cleaning and possibly the standards of safety will fall.

So the most common troubles caused by neglect are:

POOR SOLVENT ECONOMY usually caused by liquid and vapour leaks or inefficient drying of garments and failure to strip still sludge.

POOR QUALITY CLEANING — Often due to
(a) filtration troubles
(b) (b) distillation troubles
(c) water in the solvent system due to lack of regular maintenance.

BREAKDOWNS — due to escape of solvent into the working environment

POTENTIAL HEALTH AND SAFETY HAZARDS

The following paragraphs indicate some of the ways in which a drycleaning operator, even without special engineering skills, can reduce the occurrence of such troubles. Most of the points refer to conventional enclosed machines operating on perchloroethylene, but many of them would be equally applicable to machines using hydrocarbon solvents.

POOR SOLVENT CONSUMPTION—Under correct working conditions, conventional enclosed perchloroethylene machines should be capable of cleaning at a rate in excess of the requirement contained in SED (Solvent Emissions Directive) If the cleaning machine is operated in conjunction with a carbon recovery unit, a solvent 'mileage' well in excess is by no means unattainable. Machine operators should realise at all times that they are responsible for a large quantity of highly volatile and expensive solvent.

CAUSES OF HIGH SOLVENT CONSUMPTION AND THEIR REMEDIES

VAPOUR LEAKS

A large proportion of solvent lost from machines is lost as a result of vapour leaks. If there is a smell of solvent vapour around the machine, the source of the leak should be investigated. In the case of the non inflammable solvents, vapour leaks can be detected by an electronic “solvent detector”.

The main sources of vapour leaks are:

(a) The dust bag door gasket
(b) The cage door gaskets
(c) The button trap lid gasket
(d) The cage shaft bearing seal
(e) The heating battery cover plate gaskets
(f) The cooling battery cover plate gaskets
(g) Gaskets sealing inspection hatches in the outer casing of the machine
(h) The vapour lines and filter line glands on the still roof.

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Leaks at points (a) to (f) are usually most easily detected whilst the machine is operating on the drying cycle of the cleaning operation.

LIQUD LEAKS—These are readily detected by the presence of brown oily deposits on the machine body and pipe work.

KEEPING A MACHINE CLEAN MAKES LIQUID LEAKS IMMEDIATELY OBVIOUSLY A DIRTY MACHINE WILL HIDE THEM.

LEAKING VALVES—Leaking solvent valves should be repaired immediately. One valve leaking at the rate of one drop every 10 seconds can lose up to 220 litres per year.

STILL RESIDUES—Insufficient recovery from still residues can give rise to large losses of solvent. Apart from being an expensive loss to the operator, the safe disposal of such a sludge could pose health and safety problems.

UNDERLOADING MACHINE—On all totally enclosed machines, some solvent leakage is inevitable. Approximately the same amount of solvent is lost through the machine outlet damper during aeration whether there is a full load or one garment per load in the machine. Therefore, under loading should be avoided wherever consistent with good cleaning practice. However, exceeding 'rated' loading of machines can not only waste solvent due to poor drying, but also will give poor cleaning.

DIRTY WATER SEPARATOR—Sediment which settles in the water separator can cause solvent to overflow down the drain with water. Separators should be cleaned out regularly.

BUTTON TRAP WASTE—Fluff from the button trap should be thoroughly drained before disposal. Many machines have a draining tray inside the button trap to allow for full drying before disposal.

CARELESS HANDLING—Many spillages can be avoided with a little thought.

POOR DRYING—Much solvent is lost by garments being removed from the machine before drying is complete. Always check that a load is dry before removing from machine. Most machine manufacturers can supply machines with drying controls to ensure drying is complete.

Most drying troubles can be prevented by proper maintenance.

(a) Reduced Air Flow which may be due to a dirty dust bag or lint screen.

Operators should clean or CHANGE DUST BAGS REGULARLY

(b) Build up of fluff in ducting or on the heater or cooler battery. If this is the problem the operator should check dust bags and lint screens for holes and replace them with new ones if necessary. Obviously the heater and cooler battery should be kept clean to ensure adequate heat transfer.

(c) On machines which vent on aeration a damper out of adjustment can cause considerable vapour losses every drying cycle. Adjustments may require some degree of engineering skill.

Low Hot Air Drying Temperature—On steam heated machines this may be due to low steam pressure, faulty steam traps or solenoid valves. Correction usually requires some engineering skill. High 'Cold Air' Temperature i.e . air leaving cooler battery at too high a temperature. This is usually due to partial or total failure of coolant supply.

On water assisted cooled machines this may be due to insufficient water flow, cooling water temperature being too high or scaling up of the cooler battery.

In the case of refrigerated machines, loss of fridge coolant may be the cause.

Drying Cycle Needs Extending or is taking too long—Almost all modern enclosed machines are pre-programmed by micro processors to deliver repeatable cleaning and drying cycles. Whilst most machines are provided with drying controllers, this is not universally so. Where drying controllers are not provided, the programmer may signal that the cleaning and drying cycles are complete whereas, in fact, drying is still incomplete. Insufficient drying may be due to the following:

(a) Insufficient High Speed Extraction—The extraction speed needs to be checked to ensure that it is reaching the designed specification. Drive belt slippage may prevent this. Checks should be made to ensure that the cage is draining fully before extraction begins.

(b) On some machines, where the distilled solvent tank can be drained directly into the cage, a leak on the distilled inlet valve may prevent complete drying.

(c) If maintenance of dust bags and lint screens have been regularly neglected, fluff can bypass these and eventually builds up on the back plate of the machine housing behind the cage. This will absorb solvent each load which has to be dried out during each drying cycle. If this fault has occurred, considerable dismantling of the cleaning machine is usually necessary to rectify the fault.

Leaking Dampers—On machines which aerate to atmosphere leaking aeration dampers cause loss of vapour to the atmosphere. If the machine is coupled to a carbon recovery plant, leaking dampers can cause overloading of the recovery plant with subsequent loss of solvent into the environment. Drycleaning machine loading doors should never be left open longer than necessary whilst the operator is sorting, making up or weighing loads of fabrics for cleaning. This can also cause losses to atmosphere or overload a recovery plant.

LOW QUALITY CLEANING—Low quality cleaning is quite often the result of poor housekeeping by the dry cleaner. Some of the more common causes of poor quality are listed below:

FILTER TROUBLES

High filter pressure causes a low solvent flow rate, which could lead to greying and redeposition of soil on garments. Leaking filters could lead to redeposition of filter powder, if this is used, on to garments.

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Common faults include:
High Pressure at Start of Load
Possible causes are:

(a) Outlet valve not fully open
(b) Filter needs cleaning
(c) Insufficient precoating (on machines that require the addition of filter powder) - operators should check that filter powder is dry and that the precoat is built up gradually.

High Filter Pressure at End of Wash

(a) Insufficient filter powder being used
(b) Damp filter powder
(c) Too much moisture in the system.

The operator should check for:

(i) Water leaks from heater and cooler batteries or still coils
(ii) Damp garments
(iii) Excess water additions to soap.

Filtered Solvent Cloudy

(a) At the beginning of the load - filter may not be pre-coated early enough
(b) Throughout the process - damaged filter

Low Pressure and Flow Rate

(a) Filter inlet valve is sticking. (Where applicable)
(b) The circulating pump is not operating efficiently.
(c) There is insufficient solvent in the stock tank. The operator should check the machine maker's recommendations and top up the stock as required.
(d) Solvent is not draining from the cage - the operator should check button trap and clean out if necessary.
(e) The washer inlet is not fully open. Adjustment may need some engineering skill.

STILL TROUBLES—On machines where a still is an integral part of the unit, incorrect distillation causes many problems. In order to maintain the quality of solvent, the still should be capable of distilling at least 10% of the machine's total sdvent capacity per load. A good figure to work on is 2.5—3 litre of solvent distilled for every kilo cleaned.
Some common faults are listed below:
The Solvent Does Not Distill Fast Enough

(a) Low steam pressure or insufficient heat or - in order to meet the demands for clean solvent, a still pressure of 601bs, per square inch is required for perchloroethylene.
(b) Dirty still - excess dirt in the still will cause poor distillation. Stills should be raked or pumped out regularly.
(c) Faulty steam traps.
(d) Overfilling of the still - operators should check that the drain to still valve is not letting solvent from the cage into the still when not required.
(e) Blockages in the vapour line or condenser - if these occur considerable dismantling of the machine will be necessary.

Note. After cleaning fire proofed curtains the distillation rate can be drastically affected by the fire proofing agent coating the lining of the still reducing the temperature and preventing distillation. 2. Silicon from overalls and rags used when polishing cancause blacking over of the still 3. A vapour leak from still door seal can easily be missed. 4. Blocked outlet from cage to buttontrap caused by build up of lint and foreign materials can restrict solvent flow leaving solvent in the machine throughout the drying proœss, resulting in poor drying and solvent loss.
Distilled Solvent is Dirty (Blacking Over or Priming)
The still is overfull, thus not allowing room for expansion during heating.
The steam pressure is too high.
Water in Distilled Solvent Tank

(a) Live steam in the main still - the operator should check the still jacket for corrosion, holes or leaks if applicable.
(b) Leak in condenser tubes - detection will involve stripping the condenser and pressure testing by an engineer.
(c) Dirty separator - water separators should be drained and cleaned weekly or after blacking over.

Other Still Problems

(a) Still overfilled.
(b) Still steam pressure too high (where applicable).
(c) Blockages in vapour lines or the condenser - persistent 'priming' can cause this. Prevention of priming is easier than cure.

WATER IN THE SOLVENT SYSTEM

Water and drycleaning solvents are immiscible. 'Free' water in the solvent circuit can cause:
High filter pressure, Garment shrinkage, Greying, Colour bleeding etc.
It must be detected and corrected without delay

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The most frequent causes of free water contaminating solvent are:

1. Steam heated heater batteries and water cooled cooler batteries leaking, thus allowing moisture to drain into the cage, and from there to the solvent stock tanks.
2. Addition of excess moisture with the soap.
3. Overnight condensation (especially in winter). It is not good practice to clean 'sensitive fabrics' as the first load of the day when condensation may be present.
4. Cleaning excessively damp garments.
5. Free water in the distilled solvent tank - see 'Still Troubles'

OPERATOR MAINTENANCE

To ensure efficient operation, the following servicing is required regularly:

DAILY—Operators should change dust bags and clean out dust bag chamber and guides Regularly and EVERY LOAD if you want to have the most efficient machine.

WEEKLY— Water separators should be cleaned at least weekly. And each time after suffering a still priming (blacking over of solvent)

PERIODIC MAINTENANCE— Filter and all tanks to be thoroughly cleaned as necessary. Heater and cooler batteries should be inspected regularly and cleaned as necessary. Examine still for leaks.

PERSONAL SAFETY

One of the main concerns of any responsible management should be the protection of the health, safety and welfare of its employees. Good management teams do not need reminding of their responsibilities, but for less responsible organisations various authorities in the U.K. such as the Health and Safety Executive, local authority,or SEPA in-Scotland, can bring pressure to bear as a result of the Health and Safety at Work Act, SED directive and COSHH (COSHH stands for the **Control of Substances Hazardous to Health** Regulations. These Regulations require employers to control exposure to hazardous substances to prevent ill health. The U.K. Drycleaning Industry has adopted a responsible attitude towards health and safety.

The provision of safe working systems is a responsibility of management but the maintenance of safety standards is not the sole prerogative of management. Each and every employee has responsibilities for preserving safe and healthy working conditions in his/her place of work. Consequently, all employees should be aware of potential hazards in the working environment.

Probably the biggest single hazard in any cleaning establishment is the danger of employees falling or colliding with carelessly positioned equipment, or burns from hot equipment. However, the solvents and chemicals used in the industry do present some potential hazards, with which all employees should be familiar.

The products presenting potential health or safety hazards are:-

Drycleaning Solvents (particularly synthetic solvents) , from inhalation and flammable solvents from careless use

Filter Powders

Spotting Reagents

DRYCLEANING SOLVENTS

Whilst the recommendations made in the Safety Guidelines are directed primarily at management there are certain aspects concerning solvents of which every employee should be aware, particularly those which concern the effects of the solvents on the personnel, and the actions to be taken in the event of accidental spillage of solvents.

The following points are extracted from the Safety Guidelines:

DESCRIPTION OF EFFECTS OF SOLVENT ON PERSONNEL

Since Perchloroethylene is still the major solvent used for dry cleaning applications the major part of what follows will be related to its properties.

INHALATION (EU Directive 2017/164/EU on reducing TLVs of solvents was implemented on 21st August 2018)

The lowest concentration at which Perchloroethylene can be detected by smell is about 50ppm and most people can smell it below the STELV of 40ppm, although as with all these solvents, continued exposure causes people to be less sensitive to the smell. It follows that a good basic rule for safety is that there should be no smell of solvent in the work place.

(a) Short Term Effects (STELV 40ppm) STLEV stands for short term exposure limit value.

When inhaled, all these solvents cause varying degrees of anesthesia (narcosis) depending upon the concentration and duration of exposure and the person's susceptibility. The symptoms include headache, dizziness, sleepiness, fatigue, lightheadedness, vertigo, tremors, nausea, vomiting and unconsciousness. On prolonged exposure to high concentrations death may result unless prompt steps are taken to remove the affected person to fresh air. The consumption of alcohol aggrvates the symptoms resulting from exposure to solvent vapour at all levels.

(b) Long Term Effects (LTELV 20ppm) LTELV stands for long term exposure limit value

Prolonged, or repeated intermitted exposure to high concentrations of perchloroethylene vapour, may cause liver or kidney damage. Early indications of liver malfunction may be dyspepsia, nausea and sometimes actual sickness. These are aggravated by alcohol, and the biochemical tests of liver function will be abnormal. At this stage recovery will occur if there is no further exposure. The development of clinical jaundice with yellowing of the white of the eyes and of the skin is indicative of a more severe effect and medical advice should be sought. Inhalation of a very high concentration of solvent vapour by a person in a state of physical or mental shock can cause alteration of the heart's rhythm or even heart failure. All the harmful effects described above can be avoided by rigorously observing the basic precaution-

AVOID BREATHING SOLVENT VAPOUR

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INGESTION

The immediate effect of ingestion (swallowing) of chlorinated solvents is to cause severe chemical burning and necrosis of the mouth, throat and gullet. Induction of vomiting, particularly by use of a salt emetic, is NOT favoured, since vomiting will aggravate the damage already caused to the mouth, throat and airways. It is in any case probably that the amount ACCIDENTALLY ingested will not be more than 15ml. The treatment recommended is to take the patient at once to the Casualty Department of the nearest hospital where the contents of the stomach can be evacuated if necessary by a stomach pump. The patient should be kept under observation until this can be done to ensure that there is no loss of consciousness and subsequent airways obstructions. Refer to Emergency Drill.

EYES

Any chlorinated solvent splashed in the eye may have a severe damaging action on the cornea and other parts unless promptly removed. Rapid removal by copious flushing with fresh clean water is ESSENTIAL to avoid damage.

SKIN

Skin contact with solvents should be avoided, for example, by wearing PVC gloves. The defatting action of the solvent can lead to skin problems because the skin may become dry and hard and if cracks form infection may result. The effects can be minimised by applying a suitable proprietary hand cream, preferably one containing lanolin.

The same principles apply to All Solvents.

All employees should be aware of the emergency drill in the event of accidental spillage.

The guidelines emphasise the following points--

EMERGENCY DRILL

It is very important that there should be clear and well understood procedures to be followed in the event of an emergency in any drycleaning establishment. Emergency drills relating to fire will already be in existence. There may, however, be occasions when there is a serious accidental release of solvent vapour or spillage of solvent for which the following forms the basis of an emergency drill which should be rehearsed periodically - as is the case with fire drill. All valves and switches relevant to the Emergency Drill should be clearly labeled.

DO NOT TRY TO BE A HERO. REMEMBER THAT SOLVENT VAPOUR IS HARMFUL AND SHOULD BE TREATED WITH MAXIMUM RESPECT.

Those not concerned with the emergency should leave the area immediately.

1. A second person must, however, remain in close attendance before any attempt is made to close down the machine.
2. Summon assistance.
3. Warn other staff in the building of the emergency and also inform other occupants of the building and nearby premises.
4. Locate respiratory protective equipment for use if necessary.

EMERGENCY SHUT-DOWN PROCEDURE

5 Turn off all the solvent pumps.
6 Turn off the steam or heat source to the machine BUT
7 Check that the cooling water and/or cooling system is on and operating.
8 Check that the machine ventilation and all other ventilation is switched on and operating.
9 THEN vacate the affected area.

Make sure that a second person is in close contact before re-entering to correct the fault. If medical assistance is required for people affected by solvent, specific information should be given to the medical personnel relating to the particular solvent, its anaesthetic effects and the danger of administering heart stimulants. A standard card for this purpose is available from solvents suppliers. Anyone suffering anaesthetic effects caused by solvent should be taken out into the fresh air and should avoid physical exertion and be allowed to rest. All accidents or 'near misses' should be recorded and analysed in order to reduce the chance of a recurrence.

Hydrocarbon is less toxic than synthetic solvents and many of the points above do not apply - but it is inflammable.

FILTER POWDER—is a diatomaceous earth. It is a dry white powder of low density which if not handled correctly can contaminate the working atmosphere as a fine dust which could adversely affect the respiratory system.

Filter powder is normally delivered to dry cleaners in 20 - 25kg heavy duty paper bags. The following instructions on handling filter powder should be observed. Filter powder bags must be placed UNOPENED in a rigid bin and then cut (not slit) along the top with scissors. The bin should be situated away from all extraction fans and draughts. Care must be taken when transferring filter powder from the bag to the machine. The lid of the bin must be kept CLOSED AT ALL TIMES, except when taking out the powder. Suitable respirator masks should be available for use by personnel handling filter powder.

SPOTTING CHEMICALS HEALTH & SAFETY PRECAUTIONS

Some solvents and many textiles are inflammable, so it is important to guard against fire in the spotting or stain removal area. Chemicals such as sodium hydrosulphite , and sodium chlorite are liable to spontaneous combustion, and therefore should be stored and used correctly taking note of the hazard labels on the containers. In view of many toxic vapours which are likely to be evolved during the treatment detailed above, all stain removal should be undertaken in a well ventilated area, away from naked flames Wherever possible protective clothing, gloves and goggles should be worn in order to prevent accidents. If used responsibly most stain removal chemicals are relatively safe, but dry cleaners should be aware of potential hazards. Paint removers may contain Trichloroethylene or Amyl Acetate and so contain products which could be harmful if inhaled in quantity. Amyl Acetate is also inflammable.

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Ammonia, even in dilute solution is an irritant. Skin contact and ingestion should be avoided. Rust and metal stain removers are usually based on hydrofluoric acid or oxalic acid, both of which are toxic and corrosive. Skin contact and ingestion should be avoided.
Under COSHH regulations, it has become necessary to label chemicals which may be potentially hazardous with appropriate symbols and/or written instructions and hazard warning sheets should be available for each and every product/chemical used and these should be easily accessible by users/operators

Corrosive sign

Explosive

Flammable

Oxidising

Corrosive

New sign for Harmful Irritant

Acute toxicity

Flammable

Hazardous to the environment