afidamp

ASSOCIATION OF ITALIAN SUPPLIERS OF EQUIPMENT, MACHINERY, PRODUCTS AND SERVICES FOR THE PROFESSIONAL CLEANING SECTOR

The use of professional cleaning machines during the Covid-19 emergency

PREMISE

The professional cleaning sector has been offering for years machines and solutions specifically designed to optimise performance, time and costs, which are difficult to achieve with cleaning operations carried out exclusively through manual systems. The increase in knowledge, synergies with other sectors and technological evolution have made it possible to develop specific machinery and solutions even for high and very high risk environments, for reclamation activities, in the pharmaceutical or healthsector.
Given that in high/very high risk environments the use of cleaning machines is only allowed in the absence of people, excluding cleaning operators equipped with suitable PPE, the following is a presentation of the most important families of cleaning machines used in professional environments, highlighting the specific solutions to be considered for their use in environments where there have been verified cases of Covid-19 or in preventive sanitization activities.

Please note that these are professional solutions and therefore need to be used by properly trained operators (training that can be provided by the constructors/distributors of the solutions) in order to ensure that they are used safely and as instructed by the manufacturer.

In addition, where disinfection is concerned, it is necessary that operators follow the technical indications according to the product/method used because, otherwise, there is a risk of compromising the result.

TYPES OF MACHINES

SWEEPER

The sweeper is a machine that can sweep over any paved surface (including carpet), collecting both coarse dirt and fine dust. Sweepers can be driven by the operator who follows them on foot (walk-behind machines) or they can be equipped with a driver's seat (man-on-board machines). In recent years, fully robotised machines have been developed that do not require operator guidance. Within these categories, there are further classifications of sweepers according to waste loading, feed and traction type.

Anti-Covid-19 solutions:

Sweepers in this context are mainly suitable for use in outdoor areas in order to reduce the transport of dirt through the accesses to the inside of the premises. They may be suitable for indoor areas if they are equipped with an effective dust retention system and if they are small in size. Together with the heavy dirt, fine dust is also collected and a vacuum system maintains the vacuum inside the waste container and in the area of the central brush. If the flow of air and dust is filtered out through a specially designed HEPA filter (tested according to EN1822), the risk of returning aersol or particulate matter to the environment is eliminated.

HEPA (or ULPA) filters have the ability to provide sterile airflow when properly designed. The European standard that determines its classification is EN 1822. The efficiency has been sufficient to count particles of the size so that the penetration is higher in the range between 0.02 and 0.5 microns (MPPS).

TYPE	CLASSIFICATION	EFFICIENCY	PENETRATION	
EPA	E10 E11 E12	>85% >95% >99,5%		high-efficiency "semi-absolute filters".
HEPA	H13 H14	>99,95% >99,995%	≤0,05% ≤0,005%	"absolute filters" with very high efficiency
ULPA	U15 U16 U17	>99,9995% >99,99995% >99,999995%	≤0,0005% ≤0,00005% ≤0,000005%	absolute filters with very low penetration

SCRUBBER DRIERS

The scrubber-dryer is an automatic machine, push or self-propelled, which washes and dries floors. In the same way as sweepers, scrubber driers can be driven by the operator who follows them on foot (walk-behind machines), they can be equipped with a driver's platform (walk-behind machines) or they can be fully robotized. Within these categories, there are further classifications depending on the washing system, the power supply and the type of traction.
The scrubber-dryer cleans surfaces, exploiting the mechanical abrasive action of the rotating brushes (or abrasive disc) (one or more) and the chemical action of the water/detergent solution. The solution tank is filled with water combined with a variable percentage of detergent depending on the type of surface to be washed, the type of dirt to be removed and the type of product used. At the same time, the squeegee (generally located at the rear of the machine) collects the mixture of cleaning solution and dirt, sucks it in and conveys it to the recovery tank.

Anti-Covid-19 solutions:

There are machines on the market with side splashguards, with HEPA filters, rear disinfectant dispensers after drying or with special technologies for tank disinfection such as ozone, UV, antibacterial or antiviral materials. Anyway, during wet cleaning, the probability of aerosols or volatile particulates being released into the exhausted air of intake engines is to be considered extremely low, so that scrubber driers are to be considered safe inside buildings, especially in places where the level of risk is not high, ventilation is sufficient and both operators and those present are protected by PPE. Thanks to the extreme efficiency of these machines on medium and large surfaces (such as supermarkets or hospital corridors), cleaning times can be considerably reduced and a high level of hygiene can be maintained.

SINGLE DISC

Born in practice as a different application of the dry polisher, the single-disc is the historical machine in the mechanization of the cleaning sector, destined to the washing of hard and textile floors, polishing, scraping, crystallization and surveying of marble and parquet floors. Single disc machines differ according to brush rotation speed (low, high and ultra high).

Anti-Covid-19 solutions:

To remove the most stubborn adherent dirt from floors (especially linoleum or PVC) down to the root, the single-disc in combination with a liquid aspirator is a suggested tool to carry out the disinfection activity, certainly in low risk environments or with adequately protected operators in the absence of people. Even on carpet-type surfaces, these machines can distribute the sanitizing or foaming product.

VACUUM CLANERS and VACUUM CLEANERS/LIQUID VACUUM CLEANERS

It is a suction machine for cleaning, equipped with one or more engines with turbine, which creates a vacuum (air extraction) inside a closed container. The vacuum, through a flexible hose connected to the tank, allows the suction of dust/liquids and other particles from various surfaces.

The suction machines are divided into two families:

- Vacuum cleaner: for suction of dry dust and fine particles.
- Vacuum cleaners/liquids: for suction of dust, mixtures or liquids.

There is also a family of machines called Industrial vacuum cleaners, of high size and weight, with three-phase electric motors for continuous use, with high suction power.

Anti-Covid-19 solutions:

When using vacuum cleaners or liquid vacuum cleaners, the use of a HEPA or ULPA filter is an essential starting point to avoid remission into the environment. At international level, a specific product regulation has been established for vacuum cleaners designed to vacuum health hazardous substances.

The standard (IEC 60335-2-69 Annex AA) allows this type of vacuum cleaner to be classified into 3 risk classes:

DUST CLASS LABEL RISK LEVEL	SUITABILITY FOR HAZARDOUS DUST WITH AN EXPOSURE LIMIT VALUE DEPENDING ON THE VOLUME OCCUPIED MG X MC	DEGREE OF PENETRATION %	BASIC FILTER MATERIAL TEST	BASIC FILTER ELEMENT TEST (CARTRIDGE/ PANEL)	TEST METHOD OF THE ASSEMBLED DEVICE
 (SLIGHT RISK)	>1	>1	REQUIRED	NOT REQUIRED	REQUIRED IF BASIC FILTER MATERIAL HAS NOT BEEN TESTED
 (AVERAGE RISK)	≥0,1	<0,1	REQUIRED	NOT REQUIRED	REQUIRED
 (HIGH RISK)	>0,1 INCLUDING CARCINOGENIC DUSTS AND DUSTS CONTAMINATED WITH CARCINOGENS AND/OR PATHOGENS	<0,005	NOT REQUIRED	REQUIRED	REQUIRED

As you can see from the table, not only the filter material is tested, but also the entire filter cartridge or filter panel and finally the entire assembled suction system.

In addition, additional safety elements are required by the standard, such as for example:

- Functional design to facilitate cleaning and avoid dust lifting from the floor
- Blocking the basic filter (filter can only be installed or removed with tool)
- Disposable collection medium (safe collection bags to reduce losses during disposal)
- Protection against accidental release of dust (safety cap or hooks)
- Visual or audible warning devices (activate when efficiency drops due to clogging, blockages, overpressure)
- Documentation developed to provide appropriate safety or maintenance instructions

In the sanitisation field, using a class H vacuum cleaner allows the use of safe instrumentation for the suction of substances contaminated by pathogens.

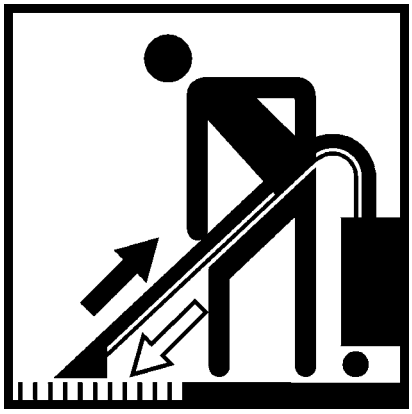
CARPET CLEANER

The carpet cleaner is a machine designed to remove dust and dirt from textile floors and carpets that is free or removable only with the abrasive action of the brush and the suction effect. It combines the two functions “suction” and “brushing” to increase cleaning efficiency and reduce working time.

Anti Covid-19 solutions:

It is mainly used for carpet cleaning, in low risk areas or in the absence of people and with protected operators. Dry processing requires the use of HEPA filters.

INJECTION-EXTRACTION MACHINE

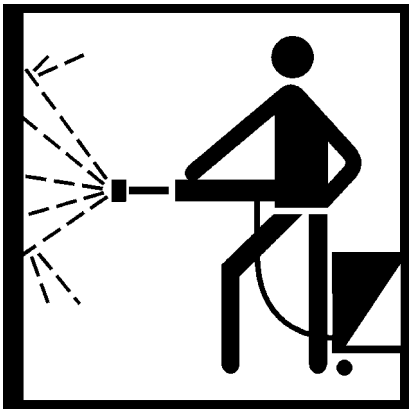


The injection-extraction carpet cleaner is a machine designed essentially to clean carpets and fabrics by dispensing a solution of water and detergent on the surface to be cleaned and the immediate suction of the mixture of solution and dirt. Through a series of nozzles, water or detergent solution (cold or hot) is sprayed on the surface to be cleaned and immediately sucked with the dirt removed.

Anti-Covid-19 solutions:

As with liquid vacuum cleaners, injection/extraction machines may generate aerosols as they have a generally absent or very low filtration, so in hazardous areas, it would be good if they were equipped with HEPA or ULPA absolute filters. In the “injection” function, chemicals functional to cleansing, sanitation or disinfection could be used, but the short time between spray and suction should be considered to allow a biocidal product to be effective.

PRESSURE WASHER



The pressure washer is a machine designed to clean various types of waterproof surfaces, using a high-pressure water jet (cold or hot). To strengthen the cleaning action, the water jet can be combined with detergent or other liquid substances or sanitizing foams as well as abrasive solids.

Anti-Covid-19 solutions:

For outdoor areas where the use of chemicals should be avoided due to environmental problems, e.g. street furniture or public swimming pools or inside industries or food transport vehicles, the use of hot water cleaners should be considered to allow a sufficient level of sanitation.
They are able to break down adherent protein or lipidic dirt thanks to the high pressure as well as adding the high temperature component. Spray resistant PPE must be used during use.

STEAM GENERATOR

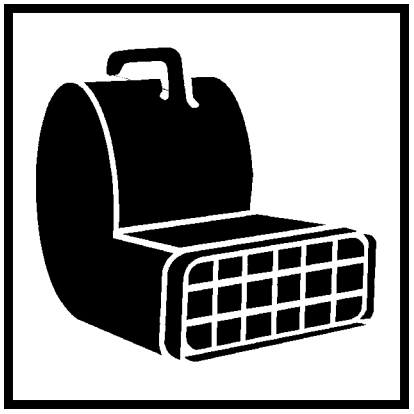
Steam generators are machines designed for cleaning various types of surfaces, resistant to water and high temperatures, using steam and, when appropriate, a mixture of water and detergent, supplied at a considerable outlet pressure (from 4 to 7 bar), proportional to the temperature reached (up to 180°C at the outlet).
Steam generators can be classified according to the type of boiler and therefore the steam produced, which can be saturated steam, saturated dry steam and saturated wet steam.
The main difference between a domestic and a professional steam generator is the guarantee that the emitted temperature generated by the boiler as well as the steam flow are managed by a control system and actually correspond to those declared.

Anti-Covid-19 solutions:

With professional products, steam has a detergent and biocidal effect and can be considered as disinfectants, therefore able to break down most of the pathogens due to thermal shock.

The ability to penetrate poorly accessible areas such as gaps (leaks) or cuts (as in cutting boards) allows a higher level of hygiene, especially in the food sector. They are particularly suitable for the disinfection of textiles, where disinfectants can create colour and physical variations of fabrics or in general where the chemical cannot be used. In order to have a more effective and deep cleaning, it is advisable to use accessories in combination with microfiber cloths, which contain the dispersion of steam and consequently the temperature, concentrating it between the accessory and the surface, with shorter contact times necessary, which vary according to the type of dirt, the pathogen and the type of surface.

SPRAYERS AND ATOMIZERS



The sprayer is a device designed to fractionate a liquid into drops generating a jet of defined shape, which can be used in different processes. Sprayer sizes range from the portable unit (usually backpacks with spray guns / lances) to the large towed sprayer. The nomenclature “sprayer” or “atomizer” is assigned according to its ability to produce small droplets. The main factors influencing the diameter of the drops are the flow rate, the pressure and the type of spray. Increasing the pressure reduces the diameter of the drops as well as the spray angle. The finest drops are obtained with pneumatic or hydraulic sprayers.

Anti-Covid-19 solutions:

Sprayers are essential for sanitisation. They allow biocides (PMCs) or disinfectants to be sprayed in atomised form on horizontal, vertical surfaces, in front, behind and inside objects in the environment. After the cleaning activity, in fact, laying the disinfectant solution (bactericide, virucide, etc.), selected according to the type of pathogen to be eliminated (and leaving it to act for the necessary time), in a uniform way without creating drips, allows to guarantee the elimination of the invisible dirt against which we are fighting, and complete, if the protocol has been correctly performed, the sanitization activity. Professional products are manufactured with resistant materials, however the product standards (ISO 19932, IEC 60335-2-68, IEC 60335-2-79) exclude the possibility of using flammable or corrosive solutions, which are often intrinsic characteristics of high concentration disinfectants, so it is necessary that operators are adequately protected and trained to use this equipment and able to verify the compatibility of the concentrations necessary for the sanitizing activity, if sprayed with this equipment. It is essential to wear appropriate PPE during use.

TYPES OF DIRT	MACHINES
NON-ADHERENT	SWEEPER, VACUUM CLEANER
ADHERENT	STEAM GENERATORS, SINGLE DISC, LIQUID VACUUM CLEANERS
MIXED	STEAM GENERATORS, SCRUBBER-DRIER
INVISIBLE	STEAM GENERATORS, SPRAYERS/NEBUILIZERS/ ATOMIZERS

SANITISE WITH PROFESSIONAL CLEANING MACHINES AND DISINFECTANT SYSTEMS DURING THE COVID-19 EMERGENCY

HEALTH SECTOR

- COVID-19 DEPARTMENT
  - IT IS NOT POSSIBLE TO USE ANY TYPE OF MACHINE
- DEPARTMENT RECLAMATION FROM ASCERTAINED COVID-19 CASE OR REQUIRING "SPECIAL" SANITISATION, (ABSENCE OF PEOPLE)
  - ALL TYPES OF MACHINES CAN BE USED
    - COMPLETE PPE SET (SIMILAR TO THAT OF HEALTH PERSONNEL)
      - OPERATORS WITH SPECIAL SKILLS
- AREAS WITH PRESENCE OF PEOPLE, MAINTENANCE
  - YOU CAN USE SPECIALS MACHINES
    - COMPLETE PPE SET (SIMILAR TO THAT OF HEALTH PERSONNEL)
- AREAS WITH NO PEOPLE, MAINTENANCE
  - ALL TYPES OF MACHINES CAN BE USED
    - COMPLETE PPE SET (SIMILAR TO THAT OF HEALTH PERSONNEL)

CIVIL SECTOR

- ROOM RECLAMATION WITH ASCERTAINED COVID-19 CASE OR WITH NEED FOR SPECIAL SANITATION (ABSENCE OF PEOPLE)
  - ALL TYPES OF MACHINES CAN BE USED
    - COMPLETE PPE SET (SIMILAR TO THAT OF HEALTH PERSONNEL)
      - OPERATORS WITH SPECIAL SKILLS
- AREAS WITH PRESENCE OF PEOPLE, MAINTENANCE
  - YOU CAN USE SPECIALS MACHINES
    - BASE PPE SET
- AREAS WITH NO PEOPLE, MAINTENANCE
  - ALL TYPES OF MACHINES CAN BE USED
    - BASE PPE SET

CONCLUSION

In conclusion, the use of mechanised cleaning systems in the presence of people in public, commercial or private environments potentially contaminated by pathogens is permitted provided that such machinery is fitted with technical solutions to avoid the generation of aerosols or the dispersion of particulates in the environment.
In the case of environments with established cases of Covid 19 or high risk, the use of mechanised systems is permitted for clean-up operations only in the absence of persons, provided that the operator wears all Personal Protective Equipment necessary to avoid risks of exposure and the premises are adequately ventilated.
Careful maintenance, cleaning and disinfection should always be carried out before and after the use of such machinery, including collection tanks or as far as they come into contact with surfaces, and disposal should be handled correctly.

REFERENCE STANDARD

Macro directives dealing with product safety and relevant CE marking:
Machinery Directive - EMC Directive - Medical Directive.

Product standards harmonised with the above directives:
IEC 60335-2-69 => wet and dry vacuum cleaners, including power brush, for commercial use
IEC 60335-2-79 => high pressure cleaners and steam cleaners
IEC 60335-2-68 => spray extraction machines, for commercial use
IEC 60335-2-72 => floor treatment machines with or without traction drive, for commercial use

Other regulations and standards to consider when designing machines:
European Reach Regulation - European CLP Regulation
UNI EN 1822:2019: High efficiency air filters
ISO EN 14476:2019: Quantitative suspension test for the evaluation of virucidal activity in the medical area
ISO 22196: Measurement of Antibacterial activity on plastics and other non-porous surfaces
ISO 21702: Measurement of antiviral activity on plastics and other non-porous surfaces
NF T72-110 March 2019: Methods of surfaces disinfection by steam with or without contact

The AFIDAMP Machine Group
Document completed on 17 June 2020