

Coronavirus Pandemic (Covid-19) **Technical Directive for the Operation** **of Air-Conditioning/Ventilation Systems (HVAC)**

This directive mostly regards central Air-Conditioning and Ventilation systems (HVAC) in premises outside the healthcare sector or in other premises designated by the Ministry of Health. Also included are recommended measures about the operation of split units used in small workplaces such as retail shops and offices.

The reopening of enclosed workplaces (i.e. open-plan offices) as well as of enclosed spaces where people congregate, for example malls, requires maintenance as well as modification or enhancement of the mode of operation of Central Air-Conditioning and Ventilation Systems. International research findings have recently shown that small airborne particles contribute to the spread of infectious diseases such as the coronavirus (Covid-19). Therefore, Central Air-Conditioning and Ventilation Systems must be designed specifically in order to minimize the risk of transmitting Covid-19 while securing better indoor air quality in enclosed spaces. As far as the existing Central Systems are concerned, risks must be assessed by each separate employer based on the provisions of the Law on Safety and Health at Work, in collaboration with the competent person, such as the Systems Maintenance Officer.

More specifically, for the requirements of the abovementioned law regarding Indoor Air Quality, the provisions of the relevant Code of Practice apply. The Code of Practice was issued by virtue of the 2014 decree of the Minister of Labour, Welfare and Social Insurance (R.A.A. 519/2014). Employers, including Air-Conditioning and Ventilation Systems Maintenance Companies, must prepare and implement a Written Risk Assessment (WRA) for the protection of their employees as well as of third persons visiting their workplace.

An indicative WRA is attached as Appendix for adjustment and use by employers in collaboration with employees (Safety Representatives, Safety Committees, Internal Services for Protection and Prevention as well as Safety Officers, if a company employs at least 200 individuals).

In order to prevent the spread of Covid-19 through Air-Conditioning and Ventilation Systems, one must take into account the fact that the small particles of the virus may stay airborne for quite some time. Based on recent scholarship by ASHRAE (American Society of Heating, Refrigeration and Air Conditioning Engineers) and REHVA (Federation of European Heating, Ventilation & Air Conditioning Associations) on how to prevent the spread of Covid-19, it is recommended to implement measures in consultation with the employer/custodian of the premises and the installation/maintenance officers involved regarding the operation of the Air-Conditioning Systems for Enclosed Indoor Workplaces. The measures should take the following into consideration:

A. For **split units** that are not connected to other air-conditioners in adjacent areas, it is recommended that they be operated normally (if possible, for extended times) with parallel operation of natural ventilation (e.g. with partially open windows or external doors) to allow outdoor air to enter indoors. The cleaning/replacement of filters in this unit will be conducted according to the regular procedure, namely according to scheduled maintenance/disinfection. Regular replacement or maintenance of filters and cleaning/maintenance of the interior parts of the air conditioners will be performed while applying all the protective measures mentioned above for the protection of the maintenance officer/technician.

B. For Central Air-Conditioning/Ventilation Systems

1. Adjustment, cleaning, disinfection and maintenance of the internal parts (fan coils, evaporators, etc.) of the Central Air-Conditioning/Ventilation Systems for extended operation times. Where there is separate ventilation equipment, adjustments must be made so that ventilation is kept in operation 24

hours a day, 7 days a week, at lower ventilation rates when there are no people in the area. Partial changes to the operation of the Central System must not be allowed (do not perform local HVAC inspection).

2. It is recommended to increase the intake of fresh outdoor air, to reduce (or, if technically feasible, cease) the air-recirculation operation in order to avoid possible airborne transmission of pollutants bearing viruses such as Covid-19 from one indoor area to the other. This equals an increase in the intake of very hot but also humid outdoor air during the summer period, with specific disadvantages, such as repercussions on the comfort of employees and visitors. For the filters proposed to be used in Central Air-Conditioning/Ventilation Systems, reference is made at point 9 below. To improve the provision of fresh air per person in the enclosed workplace, instructions for physical distancing and for avoiding large gatherings of people in an enclosed space must be followed.
3. In Central Air-Conditioning Systems with rotary wheels, rotation must stop and if possible exhaust the air without having it pass through the exchanger. Also, to reduce air leakages within the System, it must be ensured that pressure on the return air side is not much higher than pressure on the supply air side. Central Air-Conditioning Systems with plate exchangers of total heat recovery (temperature and enthalpy) must be set in bypass mode if possible (even though their level of risk has not been adequately documented). Finally, Central Air-Conditioning Systems with plate exchangers of partial heat recovery (temperature only) may operate normally (without bypass) given that leakages due to pressure differences are limited.
4. In Central Air-Conditioning Systems with air recirculation, dampers must be closed and exhaust the return air directly into the surrounding area outside. In cases where air recirculation exceeds 50%, it is necessary to take additional measures, more particularly for large indoor areas e.g. malls and theatres, where a large turnout is expected. Such measures are a more frequent disinfection of the system parts at air intakes and/or other technical solutions.
5. Central Air-Conditioning-Ventilation Systems where total heat recovery devices are in use (Heat Recovery Ventilator – HRV – temperature and enthalpy) must be set in bypass mode where possible (even though their level of risk has not been adequately documented) and ensure there is no mixing between and contamination from the exhaust air side to the supply air side. Central Air-Conditioning-Ventilation Systems with plate exchangers of partial heat recovery (temperature only) may operate normally (without bypass) given that leakages due to pressure differences are limited.
6. Extract air ducts must have the greatest possible distance from fresh air intakes.
7. Where possible, air handling units (Fan Coil Units -FCU) must be switched off; when this is not possible, they must be operated continuously (24hours) in order to avoid resuspension of particles in case the units are turned off, then on again.
8. Keep ventilation from the Central Systems of enclosed workplaces, with lower rates, when the workplace is empty. Where possible, nocturnal ventilation of indoor areas during the summer months could cool the workplace while reducing air-conditioning costs.
9. Depending on the use of the workplace and the technical specifications of the Central Air-Conditioning Systems, more regular cleaning of air ducts and other parts of the System may be required, as well as maintenance or change of filters at Central Air-Conditioning Systems and the entrances to intakes of fresh outdoor air. Further, in the case of specific enclosed workplaces, the installation and/or replacement of filters (bagfilters) achieving up to 75% filtration efficiency for particles within the 0.3 – 1.0 (μm) size band and at least 90% filtration efficiency for particles within the 1.0 – 3.0 μm size band based on the specifications for Minimum Efficiency Reporting Value (MERV) of the ASHRAE may be required, if technically feasible. The use of MERV 13 class filters is recommended. Based on the relevant EU Standard EN779, F17 is the equivalent filter category. Also, based on the International Standard ISO 16890, the recommended filter class is ePM1, which retains particles of up to $1\mu\text{m}$, with 50% minimum efficiency. High Efficiency Particulate Air / Absorber filters, HEPA type, may also be used for specific enclosed workplaces, where the level of risk for the employees and/or the public due to possible airborne transmission of Covid-19 is deemed high, given that the System's technical specifications allow it. For areas with increased Covid-19 airborne transmission risk, UltraViolet Germicidal Irradiation (UVGI) equipment may be used as microbicide.

10. During the performance of cleaning, disinfection, filter maintenance/change on Central Air-Conditioning Systems, workers (maintenance officers/technicians) must take the appropriate Personal Protection Measures, for example wear face masks and gloves in case the filters are polluted with an active microbial load. They must also carry appropriate bags in order to dispose of the used filters they might replace. In case the cleaning of the filters must be carried out by washing, then measures must be taken to avoid/limit the spread of washing products to other areas. To the extent this is possible, regulations must be made in order to achieve relevant humidity between 40%-60% in indoor air-conditioned spaces in order to reduce the likelihood of droplets and pollutant particles staying airborne longer.
11. In the sanitation premises (toilets) in enclosed workplaces, if there are windows, these must remain closed in order to eliminate the risk of air transmission of droplets to other enclosed areas within the building through the Central System. If possible, technical ventilation of these areas must be carried out continuously on a 24-hour basis. The use of hand-drying machines (jet air dryers) is not recommended because in this case too there is a risk of transmitting droplets. Stress the importance of applying hygiene measures in the toilet, and hand washing before and after the use of the toilet, using soap and water for 20 seconds, both by the personnel and visitors, and hand drying with disposable paper towels.
12. It is recommended to enhance the supply of fresh air to enclosed workplaces by way of Local Ventilation Systems, where this is deemed necessary. The supply of fresh air, as mentioned above, must be conducted diagonally to the ventilation point within the same area, to avoid contamination of other areas.
13. In cases of premises without Central Air-Conditioning Systems, windows/doors must be opened for 15-minute periods, to allow inflow of outdoor air, even though this results to a thermal burden on the indoor area of the premises.

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THE DEPARTMENT OF LABOUR INSPECTION

Sample of Written Risk Assessment – To be adjusted depending on workplace and activity specifics.

Based on the Management of Safety and Health at Work Issues Regulations of 2002, each employer must have at his/her disposal and implement a Written Risk Assessment (WRA) and apply the measures set out in the Assessment.

In the following document, after first examining each work activity carried out, please record hazard sources, employees (and/or other persons) at risk, current preventive and protective measures (if there are any) and further measures or actions required. Promote the implementation of measures/actions by a designated person or designated persons in the organization. A timeline for the adoption of the measures (or any revision thereof) must be set out along with confirmation that the measures have indeed been taken. It is important to pinpoint hazard sources that may potentially damage the safety and/or health of the employees and/or other persons.

In case five (5) or more persons are employed, the employer must enter the results of the WRA in a special safety and health file, along with the details of the person that has conducted the WRA, as well as details of employees exposed to risk.

It is important that the findings of the WRA be discussed between the employer and the employees or the representatives of the employees.

The table includes a sample of written assessment for risks such as slips, trips and falls, cleaning (chemical) products and (rotating) machinery in a hypothetical workplace. For help in filling in the table, you may consult the Practical Guide on the Safety and Health Management System for Small Businesses, uploaded in the website of the Department of Labour Inspection (Link: Publications > Health and Safety at Work > [Organizational Matters](#)) as well as the other publications on the same website.

Last, the results of the WRA must be revised when necessary, for instance immediately after an accident in the workplace or if important changes have been made to hazard sources in your organization, e.g. installation of new equipment/machinery, change of work activities, new hires.

Name of Organization /

Employer:

Reporting Date:

Risk Source	Who is at risk? (employee / other person)	What preventive and protective measures are already in place?	What further measures/ actions must be taken?	Who needs to carry out the measures?	Timeline for taking measures (and for revising them if required)	Confirmation of the measures taken
Slips, trips and falls	<i>Personnel and visitors may be injured if they trip over objects or if they slip on a wet/slippery ground.</i>	<i>Cleaning and housekeeping is conducted daily. All areas are adequately lit, including staircases. There are no cables exposed on the floor. Employees keep walkways free from obstacles (e.g. no merchandise is left along corridors) and the offices are cleaned regularly.</i>	<i>Better housekeeping in kitchen; immediately cleaning up of any spills by cleaning staff.</i>	<i>All staff, supervisors to monitor.</i>	<i>01/10/2020</i>	<i>01/10/2020</i>
Contact with cleaning products that contain chlorine and other chemical substances used in workplace kitchens (food industries, catering industry etc.)	<i>Kitchen/cleaning staff carrying out cleaning and disinfection works.</i>	<i>Proper labeling of chemical substances based on CLP European Regulation.</i>	<i>Use of appropriate Personal Protection Measures (PPM) such as gloves and use of proper procedures for cleaning and storing the PPM; staff awareness.</i>	<i>All kitchen/cleaning staff; supervisors to monitor.</i>	<i>01/07/2020</i>	<i>01/07/2020</i>

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Spread of COVID-19 coronavirus**	Employees, visitors, staff of other employers, e.g. couriers, cleaning ladies etc.	Regular hand washing using soap and hot water. Use of antiseptic. Regular ventilation of workplaces with fresh air (opening windows and doors).	Labeling and announcements in the workplace. Use of information material by the Press and Information Office (PIO) https://www.pio.gov.cy/coronavirus and the website of the Department of Labour Inspection . Disinfection of phone devices, keyboards, surfaces of desks, tables, door handles etc. Monitoring implementation of measures (gloves, face masks).	ALL	Continuously, for as long as the Health Ministry Decrees still apply.	ALL
	--/--	Homekeeping. Regular cleaning of workplaces. For protection against Hazardous Chemical Substances in chlorine-based cleaning products, information by the Department of Labour Inspection must be taken into consideration, here Cleaning/Maintenance/ Disinfection of Air-Conditioning Systems	Regular cleaning inspections. Provision of Personal Protection Measures to the cleaning staff. Relevant guidelines about PPM have been uploaded on the website of the Department of Labour Inspection, here Frequent renewal / refill of cleaning equipment. Use separate equipment for cleaning (e.g. mops, use of single-use cloths in toilets). Monitoring implementation of measures.	Cleaning ladies.	Continuously, for as long as the Health Ministry Decrees still apply.	Cleaning supervisor.

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Spread of COVID-19 coronavirus**	Employees, visitors, staff of other employers, e.g. couriers, cleaning staff etc.	Avoiding staff crowding.	Social distancing, namely keeping a minimum distance of 2 m. between employees. Allotting 8 s.m. of useful space per person in areas where the public is present. Changes to the layout of work areas may be required. Monitoring implementation of measures.	ALL	Continuously, for as long as the Health Ministry Decrees still apply.	ALL
--/--	--/--	--/--	Revision of staffing, application of flexible working hours, teleworking, measures for vulnerable employees based on the Circulars of the Public Administration and Personnel Department.	Supervisor	--/--	Supervisor
--/--	--/--	--/--	Suspension of conferences, trainings, one-day events. Use of technology to conduct the above online.	Supervisor	--/--	Supervisor
--/--	--/--	Avoiding crowding caused by members of the public.	Stricter entry control for members of the public in order to ensure the abovementioned Social Distancing measures. Record visitor details. Alternative service (on the phone, online) including payments (e.g. via JCCsmart).	Supervisor	--/--	Supervisor

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--/--	--/--	--/--	In a safe ara, place a suitable box for incoming/outgoing documents. Set out a process for access to and handling of correspondence (use of PPM by the staff).	Supervisor	--/--	Supervisor
Employee develops corona virus symptoms	--/--	Immediately call 1420 (Ambulance Service).	Inform other employees with whom the said employee has had close contact; take further actions based on guidance by the Ministry of Health. Disinfect work areas based on the provisions of the Quarantine Law.	Supervisor	--/--	Supervisor
...other sources

Risk Indicators:

Green: Negligible, **Yellow:** Low, **Orange:** Moderate, **Red:** High

**** Note: Risk assessment on the spread of COVID-19 coronavirus depends on various factors. Indicating the risk as low, moderate or high may change depending on the type of work activities conducted and the protective measures taken based on the recommendations of the World Health Organization and the Ministry of Health of the Republic of Cyprus.**