



PROTOCOL OF ACTION FOR DISINFECTION AGAINST NOVEL CORONAVIRUS (COVID-19)

31 March 2020

This protocol is under constant review depending on the evolution and new information available on the infection of the novel coronavirus (SARS-CoV-2)

Contents

1. Aims
2. Coronavirus COVID-19
3. Action
 - 3.1 Preventative disinfection
 - 3.2 Disinfection of confirmed virus
4. Workers' protection
 - 4.1 Respiratory protection
 - 4.2 Eye protection
 - 4.3 Protective clothing
 - 4.4 Placement and removal of PPE
5. Bibliography

1. Aims

The aim of this document is to guarantee the correct execution of disinfection work, applying the appropriate measures to protect the health of citizens and workers who carry out disinfection services against the virus that causes COVID-19, as these services are considered essential in accordance with (Spanish) Royal Decree 463/2020 and the Information Note on biocide service companies of the Ministry of Health dated 30 March 2020.

The following disinfection recommendations are based on the current situation in which the virus that causes COVID-19 develops, and on the latest information available, bearing in mind that the main objective is to protect citizens through prevention.

2. Coronavirus COVID-19

On 7 January 2020, the Chinese authorities identified an outbreak of a new type of virus in the Coronaviridae family which has subsequently been named SARS-CoV-2, the genetic sequence of which was shared by the Chinese authorities on 12 January (1).

Coronaviruses are a family of viruses that infect humans and a variety of animals, including birds and mammals such as camels, cats, and bats. It is a zoonotic disease, which means that it can be transmitted from animals to humans (2). Human coronaviruses (HCoV) can produce issues ranging from the common cold with a seasonal pattern in winter to more severe ones such as those produced by the Severe Acute Respiratory Syndrome (SARS) and the Middle East Respiratory Syndrome (MERS-CoV) viruses (3).

The route of transmission between humans is considered similar to that described for other coronaviruses through secretions from infected persons, mainly by direct contact with respiratory droplets larger than 5 microns (capable of transmission to

distances of up to 2 metres) and hands or fomites contaminated with these secretions followed by contact with the mucous membrane of the mouth, nose or eyes (4). SARS-CoV-2 has been detected in nasopharyngeal secretions, including saliva (5).

Depending on the type of material, human coronaviruses can remain active on inanimate surfaces for up to 9 days, however, at temperatures $\geq 30^{\circ}\text{C}$ survival is shorter. The survival of SARS-CoV is estimated to be several days and that of MERS-CoV >48 hours at an average room temperature (20°C) on different surfaces. Human coronaviruses are efficiently inactivated in the presence of 70% ethanol or sodium hypochlorite in concentrations greater than 0.1% (6,7).

Airborne or aerosol transmission (capable of transmission over a distance of more than 2 meters) could not be demonstrated in the SARS-CoV-2 outbreak in China (8).

At the beginning of the epidemic, high in-hospital transmission to health workers in Wuhan hospitals was reported, but according to the conclusions of the WHO mission to China, once adequate individual protective measures were taken, transmission to health workers decreased dramatically (9).

3. Action

To correctly disinfect and decontaminate a space that may have recently had a coronavirus, or any type of virus, a thorough knowledge of the agent to be eliminated is required. The case that most concerns us at present is the species that causes coronavirus disease (COVID-19). This virus presents a new strain (SARS-CoV-2) that is still being investigated, in order to know in depth its means of transmission and thus be able to apply the best disinfection and decontamination procedures.

Understanding COVID-19 allows us to create better disinfection and decontamination protocols for coronavirus and use the most appropriate chemicals, while helping us to better understand quarantine needs. All of this enables us to finally make it possible to offer the most complete decontamination possible and help prevent future contamination.

When considering the decontamination of COVID-19, we have doubts, derived among other things from the current level of knowledge of the virus, but until more information is obtained, we must rely on the decontamination techniques already developed and that have been used for previous strains of coronavirus.

Two types of situations may arise, where the presence of the virus has been confirmed in the facilities or simply the decision to take preventive action to reduce the viral load of the facility, as an example would be the case of facilities used by high-risk people (nursing homes, health centers, etc.), centers of high confluence of people (educational, sports, municipal, etc.), transport of people, industrial activities, etc.

In both cases, the technical manager shall be responsible for establishing the action programme, taking into account that the disinfectants used must be classified as TP2 biocides and have proven virucidal effectiveness (<http://www.anecpla.com/contenido-anecpla-7167>). The most appropriate systems and biocides will always be chosen for the circumstances of each case, also taking into account their lower environmental impact and risk for the operator.

Disinfection actions shall be coordinated with the actions carried out by the cleaning company; the technical manager of the biocide service company shall establish the cleaning and disinfection action plan and supervise its correct execution.

The action plan for cleaning and disinfection of these companies must include a diagnosis of the situation and the action programme.

Before disinfecting by fogging in each scenario, staff must carry out the following measures:

- During the treatment and until the security period ends, access shall be restricted to staff carrying out the disinfection
- Personal items (computer keyboard, photos, decorative objects, etc.) placed on work surfaces such as tables and shelves that may have been exposed to contamination shall be taken into account. Depending on the materials, those that can be treated in this way should be sprayed and wiped (paper is recommended);

the rest should be put in boxes and kept in quarantine for a period of time equal to or greater than the period in which the infectious capacity of the virus remains active in the substrate in question. If several different materials share storage, apply the longest period of time.

- Paper documents that have been exposed to contamination, if untreatable, should be stored and quarantined to avoid damage by wetting or, if necessary, destroyed.
- Remove any food; if it has been exposed to contamination and cannot be treated, it should be stored and quarantined or, if necessary, destroyed
- Turn off fire alarms, as fogging can activate them.
- Turn off the climate or ventilation systems and seal the communication grids with other rooms for the duration of the treatment and its safety period
- Bed linen, towels, etc., that may have been exposed to contamination should be placed in a bag for subsequent washing with normal soaps or detergents at 40°C and allowed to dry completely. Avoid shaking the clothes before washing them.
- Protect computer and electrical equipment (computer, keyboard, monitor, UPS, telephone, CPU, etc.) with plastic. These should be disinfected beforehand by applying the disinfectant directly to the device using a disposable cloth and a virucidal product.
- In case the nebulization technique has been used, the safety period must be respected and the treated area must be ventilated.

3.1 Preventative disinfection

In cases where we have no evidence of the presence of coronavirus and disinfection is required to reduce the possible viral load, it is recommended that preventive disinfection be carried out, preferably by cold fogging. Once the safety period established in the authorisation for registration of the biocide has elapsed, and after ventilation of the treated area, the cleaning services may access the facilities to carry out the cleaning established in their routine action programme, with the usual PPE.

3.2 Disinfection of confirmed virus

In cases where the presence of the virus has been confirmed, shock disinfection is recommended.

In order to carry out this disinfection, the technical responsible will establish an action protocol based on the risk level, type of installation, etc.; as a general recommendation, the risk area should be determined, which will be integrated by:

- Work station where a case of COVID-19 has been detected.
- Areas of common use with the possibility of having been transited by the affected person (toilets, warehouses, stairs, corridors, elevators, etc.).

Around the post or work area where a case of COVID-19 has been detected, a surrounding perimeter with a radius of 2 metres shall be established. In this perimeter and in the areas of common use transited by the affected person, disinfection will be carried out by applying a spray of the selected biocide to the horizontal and vertical elements, i.e. those that due to their height may have been in direct contact with the affected person. In case of using sodium hypochlorite, a concentration of 1000 ppm shall be used, leaving it to act for at least 5 minutes. Then, a dry disposable cloth shall be passed over these elements, always carrying out this action from the outside to the inside, that is, from the areas that are presumed to be less contaminated to the most contaminated ones. Once the product has been spread evenly, the cloth should be disposed of in a bag or container for controlled disposal. In other elements that, due to their nature and preservation, do not allow direct spraying, a disposable cloth should be submerged in a solution of sodium hypochlorite at 1000 ppm of active chlorine (20 ml/L water) and applied. For textiles or sensitive equipment a solution of 62-71% ethanol or 0.5% hydrogen peroxide can be applied, with a minimum action time of 1 minute. These three disinfectants are those mentioned by the Ministry of Health in its general recommendations; however, biocide service companies may also use specialised professional disinfectants authorised by the Ministry of Health with virucidal action (<http://www.anecpla.com/contenido-anecpla-7167>).

In this risk area, special emphasis will be placed on the elements with the greatest contact, such as handrails, taps, switches, door knobs and frames, telephones, control

buttons, cabinet handles, keyboards and material for manual use. Items that cannot be disinfected should be stored in quarantine or disposed of.

After the disinfection of the risk areas, the whole facility should be disinfected by cold fogging to reach the difficult to reach areas.

After the expiry of the action period of the biocidal product and the safety period established in the authorisation for registration of the biocidal product used for disinfection, the treated area shall be ventilated and access to the cleaning services shall be allowed for the cleaning established in their action programme, taking appropriate occupational protection measures.

Once the disinfection has been completed, the disinfection service certificate will be issued in which, in accordance with the provisions of UNE 171210, the details of the biocide used (registration number, trade name, dose, etc.), safety period and recommendations for the client must be included.

4. Workers' protection

As a general rule, the guidelines for hygienic behaviour dictated by the Health Authorities will be followed, such as frequent hand washing and other respiratory hygiene habits to avoid the spread of the virus (coughing, sneezing...). These personal hygiene guidelines can be found in the following link from the Spanish Ministry of Health:

https://www.mscbs.gob.es/profesionales/saludPublica/ccayes/alertasActual/nCov-China/documentos/20200306_Preguntas_respuestas_2019-nCoV_v2.pdf

Workers who perform coronavirus disinfection operations are exposed to two types of risk; exposure to coronavirus by contact or aerosolization and exposure to chemical agents. It is up to the Technical Manager of the company to define the necessary measures to be adopted.

The same product, for which a double purpose is required (protection against coronavirus and disinfectant), must simultaneously comply with both legislations. This is the case of gloves or masks for dual use.

With regard to **exposure to disinfectants**, protective procedures based on the hazard classification of the biocidal product should be followed, and the health and safety recommendations contained in this document should be followed:

- The product label
- The Safety Data Sheet
- The Official Register of Biocides file
- The technical recommendations of your Prevention Service

Coronavirus **protective equipment** will be those suitable for respiratory and eye protection and protective clothing (body, hands and feet). In general, the recommendation is to use disposable PPE, or if not, that can be disinfected after use, following the manufacturer's recommendations.

PPE must be chosen in such a way as to guarantee maximum protection with minimum discomfort to the user, and to this end it is critical to choose the size, design or size that will suit the user.

The following is a description of the PPE that may be necessary, and the features or aspects of it that may be outstanding in the work environment in question. This is not a description of all PPE that may protect against biological hazards, but those indicated in the case of staff potentially exposed to the infecting agent. The assessment of the risk of exposure will make it possible to specify the need for the most appropriate type of protection.

4.1 Respiratory protection

FFP3 self-filtering masks or half-masks with P3 filtering will be used, which would require additional eye protection; although the use of P3-type face masks is recommended as these masks guarantee respiratory and eye protection.

Self-filtering masks (UNE-EN 149:2001 +A1:2009) or filters used (UNE-EN 143:2001) MUST NOT be reused and MUST be discarded.

The half-masks (UNE-EN 140:1999) should be cleaned and disinfected after use, and the filter used should be discarded.

4.2 Eye protection

Eye protection should be worn when there is a risk of eye contamination from splashes or drops. Recommended eye protection (UNE-EN 166:2002 for protection against liquids) may be integral glasses or face shields.

Side protection is recommended, to avoid contact of the conjunctive with hands or gloves.

4.3 PPE

For body protection, waterproof long-sleeved chemical protection category III overalls may be used, complying with the UNE-EN 14126:2004 standard; the marking must include the type and letter B

For hand protection, disposable gloves should be used, protecting against biological and chemical hazards and complying with UNE EN 374-5:2016. When cleaning and disinfecting surfaces that have been in contact with patients, slightly thicker, break-resistant gloves should be chosen.

In the case of disinfection by rubbing, it is advisable to use nitrile or neoprene gloves that reach a length up to the forearm in order to guarantee that when the wipes are immersed in the disinfectant solutions, no liquid enters through the upper end of the wipes.

Taking into account the limitations of the gloves, which do not guarantee an absolute barrier against viruses due to their small size, their use should always be accompanied

of good practices such as frequent glove changes, double-gloving in high-risk tasks and scrupulous hand washing after removal of gloves.

As for footwear protection, disposable tights, waterproof high boots or waterproof and washable shoe protectors can be used.

4.4 Placement and removal of PPE

4.5 The correct placement of PPE is essential to avoid possible routes of entry of the biological agent; equally important is the removal of PPE to avoid contact with contaminated areas and/or dispersion of the infectious agent.

4.6 The following link from the WHO is available on the placement and removal of PPE: https://www.who.int/csr/resources/publications/PPE_EN_A1sl.pdf.

As a general rule, the PID will be placed before entering the area to be treated. When leaving the area to be treated, the operator(s) should spray each other with the disinfectant solution, leave it on for a few minutes and then remove it as soon as they leave the area to be treated.

Once used it will be eliminated within the zone.

How to put on the PPE:

- 1.- Remove rings, bracelets, watches and other decorative items from your hands and wrists, and pull your hair - if it is long - in a ponytail or bow. In the case of men, they should be shaved or have a very thin beard that allows for the appropriate adjustment of the masks.
- 2.- Carry out an adequate cleaning of hands and face. If they are dirty with water and antiseptic soap. If they are already clean, with a hydroalcoholic gel.
- 3.- Put on the appropriate coverall up to the top, but without putting on the hood yet.
- 4- Put on the boot covers over the shoes you are wearing. They should reach the top of the calf and be taped there. The boot cover should be inside the leg of the monkey's pants.

5- Put on the mask, adjusting the rubber bands properly and checking the correct sealing by blocking the air passage through the filter.

In the case of using a mouth or face mask, wear goggles to protect against aerosols or splashes. They must cover the upper part of the mask and be perfectly adjusted to prevent air from passing through the sides.

6- Put on gloves (the appropriate type against viruses and/or chemicals used), which should be placed under the sleeve of the coveralls.

If the coverall does not fit perfectly over the wrist and above the glove, seal the sleeve over the glove with insulating tape that is tight but not tight, leaving a flap so that it can be easily removed later.

7- Put on the hood of the coverall or the hood and finish closing it.

8- If the work is of high risk, contact with patients or their fluids, put new gloves over the sleeve of the coveralls, sealing them with insulating tape. These must remain above the sleeve of the coverall.

9- Check that everything is correctly placed and adjusted, and that there are no exposed parts.

How to take off the PPIs?

1.- Wash the outer gloves.

2.- Remove the coveralls.

With one hand on each side of the head, pinch and pull the hood, folding it back to reveal the head. Do not touch the hair or the head with the gloves.

Open the zipper or closure of the coverall, so that the shoulders are free, but avoid touching the inside of the coverall. Pull the back of the coverall, always on the outside, so that it goes down to the waist and releases the elbows up to the wrists.

If you are wearing a pair of gloves, with your arms behind you, loosen the glove with one hand, grab the glove and the sleeve at the same time and pull it out to get the glove and the sleeve together. The second glove is left until the end.

If only one glove is worn on each hand, it is removed in the same way, leaving the naked hand, which only touches the inside of the coveralls, to be rolled out as we lower them, freeing the feet.

The coverall is removed, touching only the inside, and placed in the waste container, with type III sanitary waste bags.

3.- Wash your hands properly before continuing.

4.- Remove the inner boot covers by releasing the adhesive tape from the tab, trying not to touch them on the outside, especially in the lower parts that may have been contaminated. To do this, roll them up, invert them and remove your foot with a combined toe and heel movement.

5.- Perform a correct hand hygiene.

Remove the eye protection from behind, trying not to touch the hair, and place it in a bag for later cleaning. If it is disposable, throw it in the container with type III sanitary bag.

7.- Remove the respiratory protection from behind without touching the front of the mask and place it in a bag for later cleaning with soap and water or alcohol or a disinfectant solution.

8.- Remove the second pair of gloves if used.

9.- Perform correct hand hygiene again.

Steps 1 to 7 are recommended to be performed within the treatment area, next to the door. Steps 8 and 9 are recommended to be performed outside the area, next to the door.

After treatment, disposable PPE should be placed in appropriate waste containers and treated as hazardous waste, except in exceptional cases where access has been gained to areas of high viral contamination, in which case it should be treated as class III bio-sanitary waste. Have a container for the PPE to be disposed of and other materials (cloths, etc.), with a pedal opening and a bag of type III biological waste.

For further information on waste, please refer to Order SND/271/2020, dated March 19, establishing instructions on waste management in the event of a health crisis caused by COVID-19 (<http://www.anecpla.com/contenido-anecpla-7168>)

5. Bibliografía

1. Wuhan seafood market pneumonia virus isolate Wuhan-Hu-1, complete genome. 23 de enero de 2020 [citado 7 de febrero de 2020]; Disponible en: <http://www.ncbi.nlm.nih.gov/nuccore/MN908947.3>
2. Novel Coronavirus (2019-nCoV) situation reports [Internet]. [citado 23 de enero de 2020]. Disponible en: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>
3. Paules CI, Marston HD, Fauci AS. Coronavirus Infections—More Than Just the Common Cold. JAMA [Internet]. 23 de enero de 2020 [citado 6 de febrero de 2020]; Disponible en: <https://jamanetwork.com/journals/jama/fullarticle/2759815>
4. Hung LS. The SARS epidemic in Hong Kong: what lessons have we learned? J R Soc Med [Internet]. agosto de 2003 [citado 6 de febrero de 2020];96(8):374-8. Disponible en: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC539564/>
5. To KK-W, Tsang OT-Y, Chik-Yan Yip C, Chan K-H, Wu T-C, Chan JMC, et al. Consistent detection of 2019 novel coronavirus in saliva. Clin Infect Dis Off Publ Infect Dis Soc Am. 12 de febrero de 2020;
6. Kampf G, Todt D, Pfaender S, Steinmann E. Persistence of coronaviruses on inanimate surfaces and its inactivation with biocidal agents. J Hosp Infect. 6 de febrero de 2020;
7. World health Organization. Water, sanitation, hygiene and waste management for COVID-19 [Internet]. 2020. Disponible en: https://apps.who.int/iris/bitstream/handle/10665/331305/WHO-2019-NcOV-IPC_WASH-2020.1-eng.pdf?sequence=1&isAllowed=y
8. World health Organization. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) [Internet]. 2020. Disponible en: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>
9. Ministerio de Sanidad. Gobierno de España. Informe Técnico. Enfermedad por Coronavirus, COVID-19, Actualizado a 6 de marzo de 2020 (2020)